

ISSN 2047-2862 (Print)
ISSN 2047-2854 (On-line)



THE BUSINESS & MANAGEMENT REVIEW

Volume 12 Number 2 December 2021



www.cberuk.com



CBER 10th International Conference on Restructuring of the Global Economy (ROGE) -A Virtual Conference

9-10 December 2021

Hosted by the
Centre for Business & Economic Research (CBER), UK
In association with

International Journal of Maritime Crime & Security (IJMCS)
Journal of Business and Retail Management Research (JBRMR)

Conference Proceedings

Method - Integrity - Camaraderie

www.cberuk.com

The Business and Management Review

Volume 12 Number 2 December 2021

The Conference proceedings is approved for listing in ProQuest.
of Refereed Publications

www.cberuk.com

Mission Statement Centre for Business & Economic Research (CBER)

The Centre for Business and Economic Research (CBER) works assiduously to contribute to progress and prosperity through research and managerial excellence. CBER strives to be an important knowledge conduit via its academic journals, international conferences and bespoke consultancy and training services.

The Business & Management Review (BMR) is the official conference proceedings of the Centre for Business & Economic Research (CBER) the Editors, the Conference Chairs, member of the conference committee and Editorial Advisory Board is not responsible for authors' expressed opinions, views, and the contents of the published manuscripts in the proceedings. The originality, proofreading of manuscripts and errors are the sole responsibility of the individual authors. All manuscripts/abstracts/extended abstracts submitted to the conference for review go under blind reviews for authenticity, ethical issues, and useful contributions. All accepted papers are included in the official conference proceedings titled "The Business & Management Review".

CBER reserve the rights to add, amend, modify, or delete its rules, policies, and procedures affecting its relationship with contributors as deemed necessary by the administration. Any such amendment, modification, addition, or deletion shall not be Reconsidered a violation of the relationship between CBER and contributors.

CBER 10th International Conference on Restructuring of the Global Economy (ROGE) -A Virtual Conference

ROGE-2021 CONFERENCE COMMITTEE MEMBERS

Conference Chairs

Dr. P. R. Datta, Executive Chair, Centre for Business & Economic Research (CBER), UK

Dr. Evangelia Fragouli, University of Dundee, UK

Conference Committee

- **Prof. Yi-Zeng Chen**, School of Management and E-business in Zhejiang Gongshang University, China
- **Dr B.R. Chakraborty** - Project Director, Academy of Business and Retail Management, UK
- **Prof. Srinivasan Sampalli**, Dalhousie University, Canada
- **Prof. Deepraj Mukherjee**, Kent State University, USA
- **Prof. Gairik Das** -Review Editor, IISWBM, Kolkata, India
- **Dr Justin H. Beneke**, University of Winchester, UK
- **Dr. Wallace Ford**, Medgar Evers College of the City University of New York, USA
- **Prof Evelyn Chiloane-Tsoka**- Review Editor, University of South Africa, South Africa
- **Prof. Eman Abdelsalam**, Arab Academy of Science, Technology & Maritime Transport, Alexandria, Egypt
- **Professor Chris Bellamy**, Professor Emeritus of Maritime Security, University of Greenwich, Editor-in-Chief International Journal of Maritime Crime and Security
- **Dr. Jo-Ann Rolle**, Dean, Medgar Evers College of City University of New York.

ROGE-2021 ADVISORY BOARD

- **Prof. Da-Qiang Chen**, School of Management and E-business in Zhejiang Gongshang University, China
- **Dr. Cheng Luo**, Lecturer in Zhejiang Gongshang University, China
- **Prof. Warren Mathews**, Belhaven University, USA
- **Małgorzata Magdalena Hybka**, Poznań University of Economics and Business, Poland
- **Prof. Jennifer Bowerman**, MacEwan University, Canada
- **Prof. Noha Bendary**, The British university in Egypt
- **Prof. JP Spencer**, Cape Peninsula University of Technology, Cape Town, South Africa
- **Prof. Salil K Sen**, NIDA Business School, Bangkok, Thailand
- **Prof. Michael D. MacColl**, Vancouver Island University, Canada
- **Prof. Fabrizio Pezzani**, Bocconi University, Milano, Italy
- **Prof. Juan Carlos Botello**, Universidad Popular Autónoma del Estado de Puebla, Mexico
- **Dr Imbarine Bujang**, Universiti Teknologi MARA, Malaysia
- **Dr Yongmei Bentley**, University of Bedfordshire, UK
- **Prof. Rahul Gupta Choudhury**, IFIM Business School, Bangalore, India
- **Dr. Eleni Aravopoulou**, St Mary's University, UK
- **Prof. Huseynova Khatira**, The Academy of Public Administration under the President of the Republic of Azerbaijan, Azerbaijan.

10th International Conference on Restructuring of the Global Economy (ROGE)-A Virtual Conference

Co-Sponsors



Centre for Business & Economic Research (CBER) was founded in London in 2006 with the aim of inspiring, recognizing and supporting excellence in Business and Economic research. Currently, the Centre has three main areas of endeavour: organizing an annual cycle of international academic conferences, producing academic journals, and offering bespoke consultancy projects both in the United Kingdom and further afield. CBER works assiduously to facilitate international collaboration, providing an independent and credible source of advice, as well as contributing to academic debate and research. The Centre is fortunate to have a truly international following and is committed to encouraging knowledge sharing, foresight planning and greater interaction between academics, policymakers, thought leaders and those engaged in diverse commercial activities. Through both its researchers and a network of specialists internationally it is well placed to provide targeted consultancy work aimed at providing fresh insight and understanding that is underpinned by creditable research methods and a thorough and objective approach.



The JBRMR is a scholarly and refereed journal that provides an authoritative source of information for scholars, academicians, and professionals in the fields of business and retail management. The objectives of the JBRMR are to attract and publish theoretical, conceptual, and empirical manuscripts from academics and professionals from all disciplines regarding a wide range of contemporary issues in business and retail management. The aims of the journal are to disseminate knowledge; provide a learned reference in the field; and facilitate communication between academic and research experts, and executives.



The International Journal of Maritime Crime and Security (IJMCS) is the first high-quality multi/interdisciplinary journal devoted to the newly identified field and academic discipline of maritime security and to the study of maritime crime. The latter has been neglected, as the scientific study of crime has remained essentially landlocked. The Journal covers the following, broadly constructed and interpreted, disciplines as they relate to maritime security: economics, environmental studies, global governance studies, anthropological and cultural studies, human factors and psychology, security, criminology and crime science, cyber security, international and national law (Maritime Law, Law of the Sea and National Jurisdictions), political and policy perspectives, strategic security and war studies, naval and maritime history as they relate to current issues, maritime crime, including cyber-crime, fraud, piracy and armed robbery at sea, Illegal, Unregulated and Unreported (IUU) Fishing, smuggling, people trafficking, illegal immigration, stowaways and pollution, disaster management and resilience at sea and in littoral areas. 'Maritime Security' includes port facility, offshore platform, and undersea resource extraction security – not just ships

CONFERENCE PROCEEDINGS
THE BUSINESS & MANAGEMENT REVIEW
ISSN 2047-2854 (Print) ISSN 2047-2862 (ONLINE)

A statement about open access

*The official conference proceedings of the Centre for Business & Economic Research (CBER) are an open access publication which means that all content is freely available without charge to the user or his/her institution. Users are allowed to read, download, copy, distribute, print, search, or link to the full texts/abstracts of the articles in this proceeding without asking prior permission from the publisher or the author. **CBER** is committed to publish all full text articles /abstracts accepted for the conference online for immediate open access to readers and there is no charge to download articles and editorial comments for their own scholarly use.*

Contents

No	Title	Page
1.	<i>Employee wellbeing, employee performance & positive mindset in a crisis</i>	1
2.	<i>An overview on green human resource management practices</i>	16
3.	<i>Literature Reflections on Career Women Development</i>	27
4.	<i>Risk management and strategic improvement of corporate sustainability for multinational companies</i>	45
5.	<i>FDI & Institutional Quality: Empirical Evidence from India</i>	55
6.	<i>The work-life balance of employees and management staff working for newly established virtual organisation as a result of the COVID-19 Pandemic</i>	64
7.	<i>Anchoring AI/Machine Learning on the African Technological Innovation and Investment Table</i>	75
8.	<i>Enterprise transformation projects in the financial industry and ethics (TPFI&E)</i>	112
9.	<i>The role and adequacy of disaster management unit within the South African Municipalities</i>	126
10.	<i>Land expropriation model in South Africa: A consequent impact on food security</i>	132
11.	<i>Business transformation project's architect's profile (BTPAP)</i>	137
12.	<i>Assessing the role of China in Africa's infrastructure development and its impact on the African continent</i>	154
13.	<i>Current Account Balances, External Debts and Exchange Rates in Selected African Countries</i>	161
14.	<i>The impact of monetary policy on long-run share price reversals on the Johannesburg Securities Exchange</i>	170
15.	<i>Impacts of big data on accounting</i>	186
16.	<i>Digital transformation, creativity & innovation during the Covid-19: An employee perspective</i>	194
17.	<i>Equity provision equal-pay for work of equal-value implementation within South African State Owned Enterprise (SOE)</i>	211
18.	<i>Assessing the efficacy of open distance learning in South Africa</i>	222

Employee wellbeing, employee performance & positive mindset in a crisis

Pipera, Maria
Fragouli Evangelia
University of Dundee, UK

Keywords

positive mindset, employees, performance, wellbeing

Abstract

Although there is rich literature in the field of OB & HRM focusing on the importance of psychological contracts, intellectual capital, job satisfaction & performance, however, the role of positive psychology & mindset in an organizational context has been addressed to a very limited extent. In times of crisis, organizations might go beyond survival mode and find ways to improve the psychological resources of employees as a positive mental attitude becomes an alternative perspective that leads to optimal performance outcomes. This paper, through a critical literature review methodological approach, studies the theoretical framework of employee wellbeing, employee performance during a crisis period and explores the role of a positive working mindset. The study concludes that the positivity in the workplace and employee wellbeing in times of crisis are key factors corporate leaders to enhance organizational citizenship behavior, which is a crucial factor in terms of productivity, affective commitment, job satisfaction, and efficiency.

1 Introduction

Theoretical background

During the last decades, humanity has encountered unprecedented global crises such as wars, genocides, terroristic attacks, economic crises, migration crises, political crises, climate changes, humanitarian crises and lately covid-19 pandemic. They may be different in their origins and scale, although they have in common the fact that they lead to catastrophic individual, societal, financial, and natural impacts, such as the massive job losses, social instability, and natural changes beyond control (Wenzel et al., 2021).

Modern globalized entrepreneurial environment constantly changes, and a new culture (Bhaduri, 2019) should be cultivated so as organizations survive and prosper. As organizations function under complicated circumstances (Bundy et al., 2017), crises are hard to be avoided or predicted (Bhaduri, 2019; James et al., 2011). On the contrary, crises might increase and become more intense in the years to come (James et al., 2011). According to Agnes, modern crises are greater and global due to the spread of technology, virality and speed of communications (Faulds & Raju, 2019). They challenge the core values of the existing business culture and introduce different, new ones (Ritter & Pedersen, 2020).

Crisis threatens both the organization and the employees (Dirani et al., 2020). It can cause considerable disruption to the activities of the organization (James et al., 2011) and may destabilize the wellbeing and performance of the employees (Dirani et al., 2020). Employee wellbeing, which includes psychological, physical, and social aspects (Edgar et al., 2017; Grant et al., 2007; Guest, 2017) is a crucial factor (Vakkayil et al., 2017). It clarifies that human resource management and organizational practices have been implied in the right way and caused a positive impact (Vakkayil et al., 2017). It refers to the feelings that the employees have both about themselves and their jobs (Baptiste, 2008). Employee wellbeing is highly linked to people's satisfaction related to parameters such as pay, relationships with coworkers and supervisors, working conditions, job security, opportunities for training, personal advancement and team working (Baptiste, 2008; Edgar et al., 2017). Especially in times of crisis, healthy and happy employees guarantee a sustainable and profitable company (Baptiste, 2008).

Companies, when in crisis, have to adjust and a new human resource management agenda must emerge and be applied immediately (Teague & Roche, 2014). In order to create sustainable growth and development, a new way of thinking is essential for organizations who wish to survive (Luthans, Norman, et al., 2008). Previous approaches should be abandoned (Geue, 2018) and new optimal human functioning (Youssef-

Morgan & Luthans, 2013b) must be promoted through the application of recent approaches of the positive psychology movement (Kern et al., 2020). The notion of psychological capital (Luthans, Youssef, et al., 2007; Luthans & Youssef, 2007; Youssef-Morgan & Luthans, 2013b), which derives from the theory and research of positive psychology (Cheung et al., 2011; Seligman & Csikszentmihalyi, 2000), encapsulates and describes workplace positivity (Ribeiro et al., 2021). Psychological capital keeps employees emotionally committed to the organization and it is associated with individual job performance and psychological well-being (Avey, Reichard, et al., 2011; Luthans et al., 2010; Ribeiro et al., 2021). Positive employee attitude leads to major consequences such as work satisfaction (Luthans, Youssef, et al., 2007), affective commitment, employee development (Norman et al., 2010), resilience and competence (Shahid & Muchiri, 2019).

According to (Lehmann-Willenbrock et al., 2016), it is crucial to prove how positivity influences the human factor in the workplace. Shahid and Muchiri (2019) stress the fact that knowledge on employee positivity is yet to be measured and examined. Cameron et al. (2011) also highlights the need for additional research on positivity. To address this gap, this paper tries to reveal the role of positive mindset in managing balances between employee wellbeing and employee performance in times of crisis. The study presents a critical literature review of the issues of employee performance, employee wellbeing and positive mindset.

Methodology

The study is, secondary research, consists of the first part of an empirical research work; the study through a critical literature review, following a qualitative approach, examines the main parameters of employee wellbeing, employee performance and positive mindset.

2. Literature review

2.1 Employee wellbeing

2.1.1 A critical examination of the context of employee wellbeing

Wellbeing is a complex and multidimensional concept which is hard to define and measure (Rahmani et al., 2018). Even though there is an ongoing global interest in the levels of international and national wellbeing, it is a term which remains vague and needs further explanation. This rising concern on wellbeing also applies on wellbeing at work (Kowalski & Loretto, 2017; Salas-Vallina et al., 2020).

During the last decades employee wellbeing or work-related wellbeing has become a subject of concern in the organizational life (Grant et al., 2007). It is a broad term which integrates cognitive as well as affective elements (Vakkayil et al., 2017). The term of employee wellbeing should not be confused with the concept of general wellbeing, since life conditions differ a lot from working conditions (Zheng et al., 2015). Employee wellbeing could be defined as the condition of the employee's physical and mental health, including both life and work experiences (Danna & Griffin, 1999). A widely accepted definition based on (Warr, 1987) states that work-related wellbeing is the general quality of job that the employee experiences (Grant et al., 2007).

The study of employee wellbeing has concerned various fields of scientific research (Kowalski & Loretto, 2017). Researchers have tried to point out the facets of work-related wellbeing in many ways (Vakkayil et al., 2017). (Daniels, 2000, p. 1) proposes a two-dimensional model, which includes five factors of affective wellbeing. These factors, elaborated as such, are "*anxiety-comfort, depression-pleasure, bored-enthusiastic, tiredness-vigour and angry-placid*". (Fisher, 2010) suggests that being happy at work should not only be related to job satisfaction, but also to job involvement, organizational commitment, thriving, vigor, flow and intrinsic motivation and feelings experienced at work.

(Grant et al., 2007) introduce a more holistic approach, in which they claim that employee wellbeing has three key dimensions: the psychological, the physical and the social one. The psychological wellbeing could be distinguished as hedonic and eudemonic (Guest, 2017). The hedonic part of psychological wellbeing at work has gained the attention of business research (Edgar et al., 2017). It is happiness oriented and refers to the subjective experiences that employees have at work. It is linked to job satisfaction, to the presence of positive feelings at work and the balance between positive and negative thinking (Grant et al., 2007). The eudemonic part of employee wellbeing refers to the positive functioning of employees at work and the achievement of their full potential. It is associated with finding meaning and purpose when working and includes feelings of engagement and affective commitment to the organization (Grant et al., 2007; Guest, 2017; Marescaux et al., 2019).

The physical part of employee wellbeing focuses both on physical and mental health (Marescaux et al., 2019). Health wellbeing encompasses elements that create extreme stress like burnout and work intensification, as well as job strains, such as work overload and over commitment (Edgar et al., 2017). It incorporates personalized feelings of health, given as energy levels, stress, and exhaustion (Guest, 2017). Work could cause injury and stress which might lead to disease, but also provides access to health services for the employees (Grant et al., 2007).

The social facet of employee wellbeing is relevant to the quality of interpersonal relationships that employees experience inside the organization (Grant et al., 2007). It refers to the interaction among employees, both vertical and horizontal, as well as the way they relate to the organization in general (Pagán-Castaño et al., 2020). Employee wellbeing could be viewed in terms of cooperation and reciprocity, along with the levels of organizational trust and support. It adds to the general feeling of being fairly treated and accepted (Grant et al., 2007; Guest, 2017).

2.1.2 A critical perspective of employee wellbeing

Guest (2017) underlines the ethical obligation of an organization to focus on the employee wellbeing, especially in times of crisis. The rapidly changing working environment as well as the increasing demands of technology could be really challenging for both employees and organizations. The financial crisis of 2008 led to an enormous workload for employees, who have to be more productive with less available resources. Organizations must deal with the outcomes that at times have a destructive result or even jeopardize the work-related wellbeing. Organizations that are willing to adapt and want to prosper, need to provide employee wellbeing in a competitive working environment and review their work-related wellbeing policies. Thus, investing on employee wellbeing could prove to be saving in the long run, even though it is hard to afford at the moment (Guest, 2017; Kowalski & Loretto, 2017).

2.1.3 Facets of employee wellbeing

2.1.3.1 Job satisfaction

Job satisfaction is a key concept in the fields of organizational behavior (Indarti et al., 2017). It is one of the most frequently studied parameters of employee wellbeing (Koopman et al., 2016). Job satisfaction refers to a person's feeling of satisfaction not only with the actual job but with the larger organizational picture in which the work belongs to (Baptiste, 2008). It is outlined as a positive emotional feeling which originates from the work-related experience and the satisfaction the person gains from the specific job (Edgar et al., 2017). Therefore, work satisfaction is linked to the terms and the conditions of employment. For instance, employees should be happy with their earnings along with the physical work environment, the autonomy they are given, the responsibility, the authority, and the general empowerment in their jobs (Baptiste, 2008).

Work satisfaction is a multifaceted concept highly affected by disposition and mood (Hosie et al., 2012). It includes two facets related to the intrinsic and extrinsic features of a job. Extrinsic satisfaction stems from external conditions like remuneration, management policies, physical conditions, or job security. Intrinsic satisfaction refers to the subjective feelings of satisfaction which result from chances for personal accomplishment and personal evolution (Markovits et al., 2014).

2.1.3.2 Affective organizational commitment

Affective commitment is a key element of organizational commitment (Ribeiro et al., 2020). It is outlined as the positive emotional bond that employees have with their organization. It is viewed as a defining factor of employees' dedication and loyalty (Rhoades et al., 2001). Affective commitment refers to the "*emotional attraction of employees, identification and involvement in the organization*" (Indarti et al., 2017, p. 1285). It is a vital work-related attitude highly connected with job outcomes like performance, turnover, and organizational citizenship behavior (Qian et al., 2019). Employees who are affectively committed to their organization embrace the organizational goals and values. They are willing to make the effort and keep alive the bonding. Employees commit to the organization to gain extrinsic rewards such as a bonus or intrinsic ones such as a feeling of belonging (Baptiste, 2008).

2.2 Employee performance

2.2.1 A critical examination of the context of employee performance

Employee performance is a basic component of organizational success (Aguinis et al., 2011). It is a notion which has gained the attention of work and organizational psychologists, who try to understand it

and analyze it (Meijerink et al., 2021). It is viewed under certain criteria relevant to business success such as productivity and sales or as the achievement of set goals (Charbonnier-Voirin & Roussel, 2012). Employee performance is the set of employee's actions and behaviors consistent to the organizational goals that are under the control of employees (Jiang et al., 2012). They successfully do their job, by adequately fulfilling their duties as expected by their employers and their specific job description (Ribeiro et al., 2018).

Employee performance is a multifaceted concept, which incorporates different dimensions. (Meijerink et al., 2021) provide the task performance and the organizational citizenship behavior as key dimensions of individual performance. The dimension of task performance is linked to the behaviors that are stated in a job description, which support the technical core of the organization (Alfes et al., 2012). It refers to the practical skills that employees should have and the required knowledge to successfully complete their tasks (Bish & Kabanoff, 2014). These behaviors are role-prescribed, depend on the job description, and can have a quantitative or numerical value (Edgar et al., 2017).

Organizational citizenship behavior or contextual performance is of utmost importance regarding the sectors of psychology and management (Narzary & Palo, 2020). It is a multidimensional concept that includes behaviors which are voluntary and beneficial to the organization (Ribeiro et al., 2018). (Organ, 1997) claims that organizational citizenship behavior supports and fortifies the social and psychological environment in which tasks are being conducted. It consists of the extra-role behaviors, which are not formally or directly recognized but contribute to the proper function of the organization (Edgar et al., 2017; Ribeiro et al., 2018). Some of these behaviors are being interactive and cooperative with other colleagues, being innovative and creative, or sharing knowledge as member of a team (Meijerink et al., 2021). Organizational citizenship behavior is highly linked to several organizational results such as productivity, competency, customer satisfaction and turnover intention (Ocampo et al., 2018).

The volatile working environment and the alteration of the traditional pattern of work performance make the existing working models incomplete. The multidimensional and demanding circumstances that employees must deal with, impose they acquire a certain level of adaptability. It is crucial they adapt efficiently and respond accordingly to urgent situations. It is important to prioritize, when needed and deal successfully with new problems (Charbonnier-Voirin & Roussel, 2012). Adaptive performance could be defined as the *"flexible work behaviors that help employees adapt to change by demonstrating excellence in problem solving, uncertainty/stress/crisis control, new learning, and adaptability related to people culture and environment"* (Park & Park, 2019, p. 298). It is an extension of the traditional employee performance, which reflects the changing working trends and is critical for the survival of the modern organization (Marques-Quinteiro et al., 2019; Park & Park, 2019).

Counterproductive work behavior is another dimension of individual work performance that should be considered. It is one of the major concepts of organizational psychology, with great impact on the survival of the organization. They are behaviors which are voluntary and have the intention to cause damage to the organization and its members. They can be physical or verbal such as sabotage, laziness, vandalizing the organization's property, performing inadequately on purpose, and absenteeism (Dischner, 2015; Miao et al., 2017). These behaviors could affect the property, the regular operation and the employee's effectiveness. This might lead to situations which could be disastrous and costly to the organization and to the employee wellbeing (Chang & Smithikrai, 2010).

2.2.2. A critical perspective of employee performance

Employee performance is critical to the survival of any organization and could be the foundation of its success (Aguinis et al., 2011; Baptiste, 2008). Organizations that wish to prosper have to invest on practices that boost individual performance. That could be achieved when employees experience high levels of job satisfaction, feel supported and motivated. It is crucial to provide them with valuable infrastructure, motivation, opportunity to perform and all the needed resources. Organizations that add value to their employees manage to obtain the optimal performance (Meijerink et al., 2021).

2.2.3 Facet of employee performance that is used in this study

2.2.3.1 Organizational citizenship behavior

Organizational citizenship behavior is a key factor in both the areas of psychology and management and has been analyzed widely in the literature (Foote & Li-Ping, 2008). Organizations perform better when

positive and supportive behavior is achieved (K. Lee & Allen, 2002). Researchers believe that organizations base their success on employees who not only accomplish their normal duties proficiently, but also help their colleagues spontaneously. Social exchange theory is frequently applied to reveal why employees engage in such behaviors (Harvey et al., 2018). The theory proposes that reciprocity is a basic component of social interactions. Employees who feel valued and respected will probably respond with emotional engagement (Ng & Feldman, 2011). When organizations provide employees with satisfying jobs, support, and fairly treatment, employees are willing to perform beyond their call of duty. In accordance with this theory, research indicates that high levels of job satisfaction and affective organizational commitment are positively linked with organizational citizenship behavior (Baptiste, 2008; Harvey et al., 2018).

Organizational citizenship behavior consists of five basic dimensions (Ocampo et al., 2018). Altruism refers to supportive behaviors and actions to other persons (Foote & Li-Ping, 2008). Conscientiousness refers to employees that tend to be always punctual, are always present, and do perform their tasks beyond normal expectations and prerequisites. Courtesy refers to employees, who are always good and respectful to others because they always help to prevent a problem or take measures to reduce the aftermaths of any critical issues. Sportsmanship focuses on the positive aspects rather than the negative ones and reveals the behavior of an employee who is not complaining on trivial matters and does not make any fuss on minor situations. Civic virtue refers to voluntary behaviors both professionally and socially and the general support of the functions of the organization (Indarti et al., 2017; Niehoff & Moorman, 1993).

2.3 Employee wellbeing and employee performance

2.3.1 A critical examination of the relationship of employee wellbeing and employee performance

A variety of organizational studies highlight the link between wellbeing and job performance (Wright & Huang, 2012). It has been proved that work-related wellbeing has a great effect on both the performance and the survival of the organization (Grant et al., 2007). It is of critical importance as it contributes to the improvement of individual performance (Edgar et al., 2017; Huang et al., 2016). Healthier and happier employees are those who manage to combine greater performance and productivity outcomes. Thus, organizations that invest on employee wellbeing will have multiple gains and prosper in the long run (Baptiste, 2008). Due to its multidimensionality wellbeing appears in different modifications when it comes to individual performance. It can present both positive indicators such as job satisfaction, along with negative ones, such as work intensification (Edgar et al., 2017).

2.3.2 Job satisfaction and organizational citizenship behavior

According to (Podsakoff et al., 2014) job satisfaction is considered a substantial predictor of employees' organizational citizenship behavior. Extensive research shows a positive correlation between job satisfaction and organizational citizenship behavior. This relationship is based on the social exchange theory and the norm of reciprocity. Job satisfaction encourages positive behaviors among employees to the degree they consider their work contribution as part of a general exchange. Employees with higher levels of job satisfaction are more likely to reciprocate by engaging in citizenship behaviors (Gyekye & Haybatollahi, 2015; Ocampo et al., 2018). This study attempts to examine the relationship between job satisfaction and organizational citizenship behavior in times of crisis. Figure 2.1 shows the correlation between job satisfaction and organizational citizenship behavior in times of crisis:

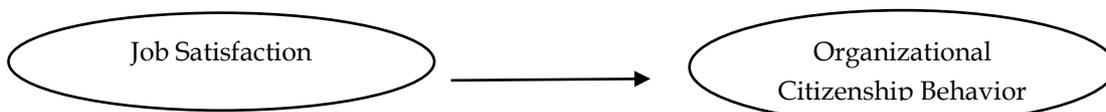


Figure 2.1 Correlation between Job Satisfaction and Organizational Citizenship Behavior

2.3.3 Affective organizational commitment and organizational citizenship behavior

The relationship of affective organizational commitment and organizational citizenship behavior could be explained by the social exchange theory and the inducements-contributions model. Employees who feel valued and respected are expected to reciprocate with trust and emotional engagement. The model indicates that organizations offer inducements for employees to join and stay with the business, while employees contribute through high levels of performance (Ng & Feldman, 2011). According to (Cropanzano et al., 2003)

the above theories clarify that employees with high levels of affective organizational commitment are about to reciprocate to the organization through organizational citizenship behavior. Thus, affective organizational commitment is positively related to organizational citizenship behavior (Lepine et al., 2002). This study attempts to examine the relationship between affective organizational commitment and organizational citizenship behavior in times of crisis. Figure 2.2 shows the correlation between affective organizational commitment and organizational citizenship behavior in times of crisis:

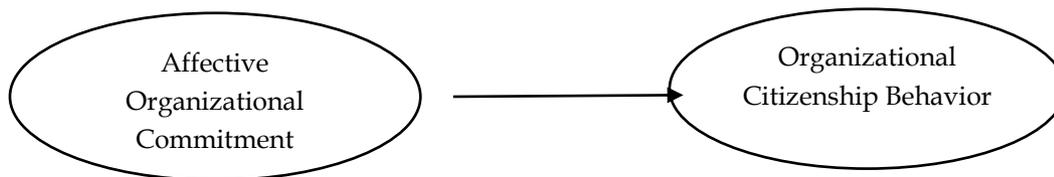


Figure 2.2 Correlation between Affective Organizational Commitment and Organizational Citizenship Behavior (Lepine, et.al. 2002).

2.3 Crisis

2.3.1 A critical examination of the context of crisis

Crisis has been in the center of organizational research for a long time because it changes the core values of an organization (Bundy et al., 2017; Ritter & Pedersen, 2020). It is defined as the chain of unexpected events which could have a negative impact on the organization, if not handled accurately and in time (Coombs, 2007; Ritter & Pedersen, 2020). A crisis could even put at stake the organization's existence by threatening its goals and leading to destructive impacts among its stakeholders (Bundy et al., 2017).

Crises are sudden, usually unpredictable events which find the organization unprepared to confront. Crisis itself could be either external like environmental disasters, pandemics, financial crises, technological changes etc. or internal like leadership failures or unexpected change in leadership, mergers, or acquisitions, moral or ethical corruption, product flaws etc. (Bhaduri, 2019; Bowers et al., 2017).

According to (Coombs, 2007) the threats that will arise from crisis might concern public safety, financial loss and reputational damage. He claims that the organization has the responsibility to put public safety first and protect it. If that cannot be achieved, the damage from a crisis will be more severe and difficult to handle. He suggests that reputation and economic loss should be considered afterwards, only if public safety has been improved.

During the writing of this study, humanity is facing a severe sanitary crisis of global effect. The pandemic SARS COVID-19 has caused millions of confirmed cases and mortalities around the world. Apart from the above-mentioned consequences, the aftermath of this crisis on a social and financial level as well as the psychological and cultural one remains to be evaluated (Rudolph et al., 2020).

(Coombs, 2007) holds that crisis management is of utmost importance to the function of any organization. It is a process which aims to prevent crisis or minimize the potential aftermaths. It refers to the measures that leadership must apply in order to diminish the likelihood or the side-effects of a crisis. Crisis management includes all the efforts that are necessary to restore order after the end of a crisis (Bundy et al., 2017).

Bundy et al. (2017) propose two perspectives regarding crisis and crisis management: the internal and the external one. The internal one refers to the infrastructure and the internal dynamics which help the organization to overcome the crisis, while the external one, refers to the connections and interactions of the organization with external stakeholders towards this direction. Even though both perspectives have developed separately, they share common features that allow leaders to approach them altogether (Fragouli, 2020).

(Coombs & Laufer, 2018) claim that crisis management has three basic phases that should be considered. The pre-crisis phase, which is the stage of prevention of the crisis and the preparation required to lessen the organizational damage. The crisis phase, where the basic reaction must take place and the post-crisis phase, where the organization should apply all the changes and alterations deriving from the crisis. (Coombs, 2007; Coombs & Laufer, 2018).

2.3.2 A critical perspective of crisis

As modern working communities' function under demanding, variable, and complicated circumstances, crises are hard to be avoided (Bundy et al., 2017). According to James (2011) it is highly possible that crises might increase and become more intense in the years to come. Agnes highlights in her interview that crises nowadays are greater and global due to the spread of technology, virality and speed of communications (Faulds & Raju, 2019). Nowadays crisis, challenge the core values of the existing business culture and introduce different, new ones, which include updated principles (Ritter & Pedersen, 2020).

Crises should not only be considered as threats, but also as opportunities for transformation and source of motivation. The organizations that will manage to learn from a crisis and adapt accordingly, will gain a competitive asset compared to those that will not succeed to learn from it (James et al., 2011). Leaders that encourage a proactive and crisis prepared organizational culture are those who manage to address crisis successfully (Bhaduri, 2019).

2.3.3 Leadership and crisis

Leadership is an integral and essential part of crisis management that plays a crucial role in its implementation (Bundy et al., 2017). Leadership in times of crisis requires a set of competencies that will enable the leader to perform successfully and effectively in crisis situations as well as learn from them (Dirani et al., 2020). Some of these qualities could be integrity, empathy, communication, the share of a vision as well as the talent to manage relationships in times of crisis (Bhaduri, 2019; Haddon et al., 2015). Not all leaders are suitable to navigate the organization through periods of crisis. Thus, it is crucial to choose the leader that can fit in, otherwise the outcome of the crisis could be devastating (Bowers et al., 2017). Leaders who manage to overcome both internal and external threats effectively are considered an asset for the organization (Bhaduri, 2019). By acting swiftly and successfully, they can define how soon the organization will recover from the crisis (Bowers et al., 2017). Those who will not be able to take the right decisions at the right time, could probably prove to be more perilous than the crisis itself (James et al., 2011).

2.3.4 Crisis and job satisfaction

In times of crisis, employees feel high levels of anxiety and experience a decline in the general feeling of control over the environment. This could have a negative impact on their job satisfaction (Marques-Quinteiro et al., 2019). When a financial crisis occurs, normal working conditions are threatened, leading to an adverse working environment. Employees are willing to compromise with a poorer working status to maintain their current job. These changes will have a negative effect on employees' job satisfaction regarding both intrinsic and extrinsic aspects (Markovits et al., 2014). Studies conducted before and throughout major crisis such as the Great Depression, have indicated that job satisfaction was generally reduced. This effect lasted for a prolonged period of time after the recession had ended (Demirović Bajrami et al., 2020).

2.3.5 Crisis and affective organizational commitment

According to (Markovits et al., 2014) crisis has a negative effect on affective organizational commitment. In times of crisis, employees' affective commitment was heavily reduced compared to employees before crisis. A financial crisis could have a damaging impact on affections and moods, leading to a decline in employees' feelings of affective commitment towards the organization. (Brockner et al., 1987) suggest that employees who managed to keep their jobs reduced the level of organizational commitment, especially when they identified with redundant who were poorly compensated and unjustly fired from their jobs. (J. Lee & Corbett, 2006) indicate that the more severe the organizational downsizing the lower the employees' affective organizational commitment.

2.3.6 Crisis and organizational citizenship behavior

In times of crisis, working conditions deteriorate and organizational citizenship behavior is negatively affected. Organizations have no choice but to apply tough measures that affect employees' engagement in organizational citizenship behavior (Psychogios et al., 2019). Under circumstances of turbulence employees might be reluctant to engage in actions that are not directly related to their job description. Employees mainly focus on tasks and activities that help them maintain their positions rather than on extra-role performance. When the worsened working conditions prolong after a crisis, employees tend to feel less committed to any organizational citizenship behavior (Nyfoudi et al., 2020).

2.4 Positive mindset

2.4.1 A critical examination of the context of positive mindset

During the last century, psychologists started focusing on the aftermaths of two world wars, on the lives of people and the traumas that they caused. In 1998 Seligman introduced a new era regarding the fields of psychology. He highlighted the need to abandon the previous negative approach and start emphasizing on positive aspects. His main concern was to deepen on peoples' strengths and eliminate peoples' weaknesses by cultivating the positive elements (Meyers et al., 2013; Seligman & Csikszentmihalyi, 2000)

The field of positive psychology focuses on positive personal traits and features which lead to positive subjective experiences, that make life worth living. Its main goal is to ameliorate life quality by identifying and nurturing the positive qualities that make individuals and societies prosper (Meyers et al., 2013; Seligman & Csikszentmihalyi, 2000). Positivity could be outlined as a person's "*observable acts or verbal statements that express or imply optimism, enthusiasm, or effervescence, and that are constructive, supportive, and affirmative in intention and attitude*" (Lehmann-Willenbrock et al., 2017, p. 42).

Positivity is a biological disposition that describes the tendency of individuals to appraise themselves, their lives, their experiences, and even their future in a positive way. Its main manifestations are optimism, life satisfaction and self-esteem. It is a valuable quality that helps people to confront all the misfortunes of life. It could influence various sectors such as physical and mental health, social adjustment, wellbeing, and job performance (Barbaranelli et al., 2019; Caprara et al., 2017)

Fredrickson 2(001 broaden-and-build theory underlines the significance of positive emotions in optimal human functioning. She argues that positive emotions such as interest, joy, contentment, love, or pride might not last long but invoke enduring impacts. They widen people's "*momentary thought-action repertoire*" making them more flexible and build their physical, intellectual, social, and psychological resources (Siu et al., 2015, p. 368). Positive emotions result to a broadened mindset that inspires them to think creatively and out of the box. Individuals that experience positive emotions at a regular basis can use various coping strategies when dealing with stressful situations and are expected to thrive in their lives (Gloria & Steinhardt, 2016; Siu et al., 2015).

Positive psychology emerged lately and strongly affected the fields of organizational and occupational psychology. Simultaneously two broader empirical research streams emerged parallel to positive psychology (Meyers et al., 2013). "*Positive organizational behavior, which is a form of workplace positivity exhibited primarily by individuals, and which can be measured, developed and effectively managed for performance improvement*" (Youssef-Morgan & Luthans, 2013, p. 200). The movement of positive organizational scholarship used the results of scholar's research as the basis framework to be integrated in positive organizations. It refers to "*the study of what is positive, flourishing, and life-giving in organizations*" (Luthans & Youssef, 2007, p. 337).

Drawing on the theory and research of positive psychology, the construct of psychological capital focuses on peoples' strengths, growth and thriving at the workplace (Cheung et al., 2011). It is defined as:

An individual's positive psychological state of development and is characterized by: (1) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (2) making a positive attribution (optimism) about succeeding now and in the future; (3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and (4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resiliency) to attain success. (Luthans, Youssef, et al., 2007, p. 3)

Psychological capital is of critical importance organizationally wise. It leads to high levels of performance, satisfaction, commitment, wellbeing, and organizational citizenship behavior. It also moderates the negative impacts of stress, anxiety, turnover intentions, and counterproductive behavior (Youssef-Morgan & Luthans, 2013). Psychological capital pushes people to try hard for their tasks, motivates them to anticipate positive outcomes and helps them to be creative when coping with problems (Meyers et al., 2013).

Nowadays, organizations that want to be competitive should go beyond survival mode and find new ways to achieve outstanding performance. That could be achieved not by emphasizing on what is negative but more on what is positive and provides potentials (Geue, 2018). Positivity at work is outlined with regards to the feelings of optimism, confidence and hope that are associated with valuable outcomes for individuals, teams, and organizations. It broadens employees' awareness and helps them become more resilient and competent (Shahid & Muchiri, 2019). It has been proved that positive emotions are beneficial

and organizationally wise have a great impact on individual growth, job satisfaction and organizational resilience (Wall et al., 2017).

The role of positive thinking for promoting resilience and wellbeing is an issue of increasing interest (Arampatzi et al., 2020). According to (Geue, 2018) a positive workplace attitude promotes employee wellbeing and human thriving. Studies indicate that focusing on peoples' strengths and encouraging a positive mindset is the key to improve workplace performance. The broaden and build theory suggests that positive emotions can widen both affective and cognitive procedures in individuals and enhance their behavior and performance (Lyngdoh et al., 2018). This broadening effect of positive emotions expands and improves the way people face crises (Fredrickson et al., 2003).

In times of crisis, positivity offers an alternative perspective. It converts challenges and obstacles into opportunities and strengths (Geue, 2018). Positive emotions modify the way people think and make them resilient in order to overcome negative experiences. They adopt a more optimistic attitude towards life, and they apply a more positive way of thinking as a way of coping (Fredrickson et al., 2003).

Optimists have the propensity to reevaluate frustrating and stressful circumstances. Thus, they are able to accept the core of a situation which is beyond their control. They show an adaptive behavior and apply a more proactive approach in order to control the changing situations that threaten their wellbeing. Positive individuals view life in a more resilient way, when a crisis occurs and therefore experience fewer negative consequences of setbacks (Arampatzi et al., 2020). Although crises usually deplete people's psychological resources, resilient people come out stronger than before (Fredrickson et al., 2003).

Researchers also highlight the fact that positivity can also be a valuable leadership trait. It has been stressed that a "*happier-and-smarter*" leadership is more efficient than a "*sadder-but-wiser*" leadership (Youssef-Morgan & Luthans, 2013, p. 199). Positive leaders perform better in decision making situations and social connections (Youssef-Morgan & Luthans, 2013). Leaders with positive qualities have a positive impact on the way their employees perform. Their positive emotions can be contagious and generate a positive spirit to the organization (Shahid & Muchiri, 2019). This kind of leaders act as role models as they set the tone for a positive mindset across the organization (Gielan, 2020).

2.4.2 The role of psychological capital

The significance of positivity in human resource management has been widely recognized lately. Specific focus has been placed upon the way employees' psychological resources are strengthened and their performance improved. Positivity in the workplace in general and more specifically in human resource management is demonstrated through the construct of psychological capital (Luthans et al., 2008).

This higher order positive construct comprises hope, self-efficacy, resilience, and optimism (Avey et al., 2011). Investing, evaluating, and managing psychological capital has a greater effect on performance and attitudinal outcomes than the specific positive psychological qualities that compose it. In other words, psychological capital as a whole might be more advanced than the sum of its components (Luthans, Youssef, et al., 2007).

This multidimensional structure has been used to enhance the psychological wellbeing and the positive work attitudes and behaviors of the organizational members (Luthans, Avolio, et al., 2007; Luthans, Youssef, et al., 2007; Siu et al., 2015). The psychological capital is positively related to desirable employee attitudes such as job satisfaction and organizational commitment as well as with the desirable organizational citizenship behaviors (Avey et al., 2011).

Positive psychological resources work together leading to higher performance, satisfaction, and employee wellbeing (Baluku et al., 2018; Luthans, Avolio, et al., 2007). According to the conservation of resources model, these personal qualities allow employees to cope better at the workplace (Cheung et al., 2011). Employees with higher levels of psychological capital are expected to be more satisfied and committed to their job than those with lower ones. Employees with higher psychological capital are prone to be more motivated and put extra effort leading to higher performance (Avey et al., 2011). This study attempts to examine the effect of psychological capital in the relationship between job satisfaction and organizational citizenship behavior in times of crisis. Figure 2.3 shows the effect of psychological capital in the relationship between job satisfaction and organizational citizenship behavior in times of crisis:

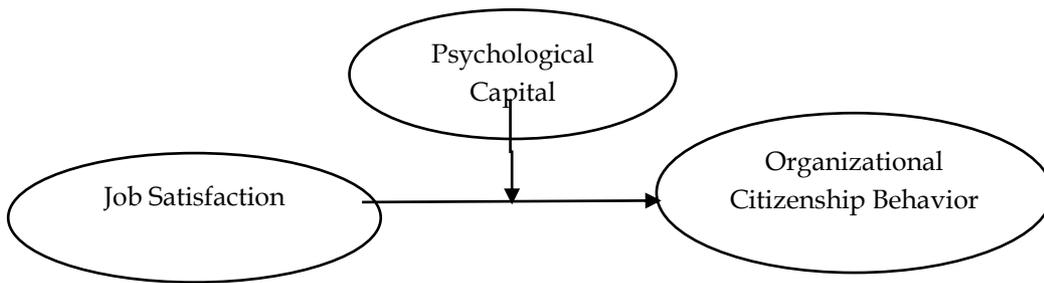


Figure 2.3 A model of psychological capital as a moderator of the job satisfaction and organizational citizenship behavior relationship in times of crisis (Avey, et.al. 2011)

This study attempts to examine the effect of psychological capital in the relationship between affective organizational commitment and organizational citizenship behavior in times of crisis. Figure 2.4 shows the effect of psychological capital in the relationship between affective organizational commitment and organizational citizenship behavior in times of crisis:

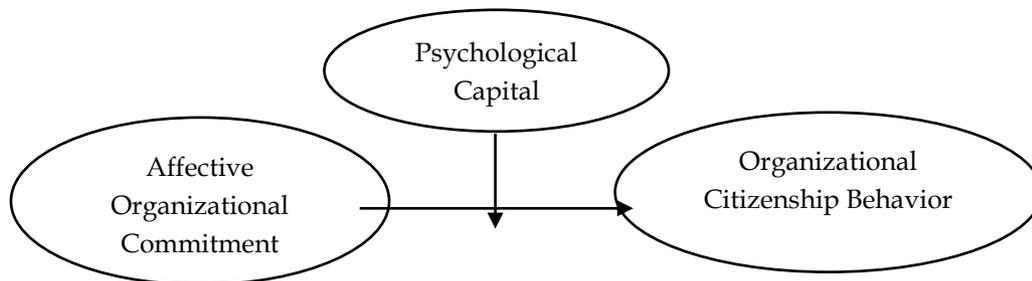


Figure 2.4 A model of psychological capital as a moderator of the affective organizational commitment and organizational citizenship behavior in times of crisis

2.4.3 A critical perspective of positive mindset

There is significant scientific proof that a positive working mindset is of utmost importance regarding relationships, wellbeing, and work (Avey et al., 2011). Researchers suggest that organizations need to embrace a positive approach towards selection, development, and human resource management. It has been found that positive work practices like recruitment, training, motivation and compensation lead to organizational performance and competitiveness. "Effective selection and placement practices that capitalize on employees' talents, clear and aligned goals and expectations, social support and recognition, and opportunities for growth, development, and self-actualization" eventually lead to employee engagement, organizational profitability, and growth (Luthans & Youssef, 2007, p. 336).

Especially in times of crisis, positivity is the key to manage challenges successfully (Gielan, 2020). Therefore, it is crucial that managers and leaders encourage a positive and healthy work culture, which results to multiple benefits for companies and employees and enhances their wellbeing (Seppala & Cameron, 2015). Organizational cultures and behaviors that nurture participation and involvement, creativity and a spirit of free thinking could promote hope and resilience (Luthans & Youssef, 2007).

3. Conclusion

The new workplace conditions of general uncertainty that workers have to face and the nature of work which constantly changes due to covid-19 affect the general feeling of the workforce during this new and challenging era (OECD, 2021).

Job satisfaction and affective commitment have a positive and strong effect on organizational citizenship behavior during a crisis period. This is consistent with the social exchange theory and the norm of reciprocity (Gyekye & Haybatollahi, 2015; Ng & Feldman, 2011; Ocampo et al., 2018). The findings imply that promoting employee wellbeing especially in times of crisis is the key to enhance organizational citizenship behavior, which is a crucial factor in terms of productivity and efficiency (Yu et al., 2021). Thus,

fostering employee wellbeing and ensuring that workers feel safe and supported should be part of the human resource agenda in order to survive through crisis.

Also important is the positivity at the workplace in times of crisis which confirms prior research about the value of a positive working mindset (Avey, Avolio, et al., 2011; Avey et al., 2009; Baluku et al., 2018; Luthans, Youssef, et al., 2007). As stated in the conservation of resources theory, positivity is a personal resource which leads to greater wellbeing (Orkibi & Brandt, 2015). Individuals with a positive mindset tend to feel more satisfied by their work, are more committed and more easily engage in supportive behaviors. Organizations which invest, develop, and manage psychological capital could gain a competitive advantage (Fang et al., 2020). Thus, cultivating a positive working mindset and encouraging employees to prioritize their wellbeing is the key to manage balances during a period of crisis.

Limitations

The first limitation concerns time constraints for the completion of the study. Another limitation is relevant to the design of this study, which was a literature one than an empirical study.

Recommendations

Future studies could explore possible mediating and moderating effects when considering the above-mentioned relationships. They could also incorporate parameters of physical and social wellbeing such as stress, exhaustion, trust, or support and explore how they relate with organizational citizenship behavior. An interesting fact is to empirically study the result of psychological capital on the above parameters under a crisis perspective. Another recommendation might be to organize a longitudinal research and collect data over an extended period of time during covid-19.

References

- Aguinis, H., Joo, H., & Gottfredson, R. K. (2011). Why we hate performance management-And why we should love it. *Business Horizons*, 54(6), 503–507. <https://doi.org/10.1016/j.bushor.2011.06.001>
- Alfes, K., Shantz, A., & Truss, C. (2012). The link between perceived HRM practices, performance, and well-being: The moderating effect of trust in the employer. *Human Resource Management Journal*, 22(4), 409–427. <https://doi.org/10.1111/1748-8583.12005>
- Arampatzi, E., Burger, M., Stavropoulos, S., & Tay, L. (2020). The Role of Positive Expectations for Resilience to Adverse Events: Subjective Well-Being Before, During and After the Greek Bailout Referendum. *Journal of Happiness Studies*, 21(3), 965–995. <https://doi.org/10.1007/s10902-019-00115-9>
- Avey, J. B., Reichard, R. J., Luthans, F., & Mhatre, K. H. (2011). Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. *Human Resource Development Quarterly*, 22(2), 127–152. <https://doi.org/10.1002/hrdq.20070>
- Baluku, M. M., Kikooma, J. F., & Otto, K. (2018). Positive mindset and entrepreneurial outcomes: the magical contributions of psychological resources and autonomy. *Journal of Small Business and Entrepreneurship*, 30(6), 473–498. <https://doi.org/10.1080/08276331.2018.1459017>
- Baptiste, N. R. (2008). Tightening the link between employee wellbeing at work and performance: A new dimension for HRM. *Management Decision*, 46(2), 284–309. <https://doi.org/10.1108/00251740810854168>
- Barbaranelli, C., Paciello, M., Biagioli, V., Fida, R., & Tramontano, C. (2019). Positivity and behaviour: The mediating role of self-efficacy in organisational and educational settings. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being*, 20(3), 707–727. <https://doi.org/10.1007/s10902-018-9972-4>
- Bhaduri, R. (2019). Leveraging culture and leadership in crisis management. In *European Journal of Training and Development* (Vol. 43, Issue 5/6, pp. 554–569). <https://doi.org/10.1108/EJTD-10-2018-0109>
- Bish, A. J., & Kabanoff, B. (2014). Star performers: Task and contextual performance are components, but are they enough? *Asia Pacific Journal of Human Resources*, 52(1), 110–127. <https://doi.org/10.1111/1744-7941.12017>
- Bowers, M. R., Hall, J. R., & Srinivasan, M. M. (2017). Organizational culture and leadership style: The missing combination for selecting the right leader for effective crisis management. *Business Horizons*, 60(4), 551–563. <https://doi.org/https://doi.org/10.1016/j.bushor.2017.04.001>
- Brockner, J., Grover, S., Reed, T., DeWitt, R., & O'Malley, M. (1987). Survivors' reactions to layoffs: We get by with a little help for our friends. *Administrative Science Quarterly*, 32(4), 526–541.
- Bundy, J., Pfarrer, M. D., Short, C. E., & Coombs, W. T. (2017). Crises and Crisis Management: Integration, Interpretation, and Research Development. *Journal of Management*, 43(6), 1661–1692. <https://doi.org/10.1177/0149206316680030>
- Caprara, G. V., Eisenberg, N., & Alessandri, G. (2017). Positivity: The Dispositional Basis of Happiness. *Journal of Happiness Studies*, 18(2), 353–371. <https://doi.org/10.1007/s10902-016-9728-y>

- Chang, K., & Smithikrai, C. (2010). Counterproductive behaviour at work: An investigation into reduction strategies. *International Journal of Human Resource Management*, 21(8), 1272–1288. <https://doi.org/10.1080/09585192.2010.483852>
- Charbonnier-Voirin, A., & Roussel, P. (2012). Adaptive performance: A new scale to measure individual performance in organizations. *Canadian Journal of Administrative Sciences*, 29(3), 280–293. <https://doi.org/10.1002/CJAS.232>
- Cheung, F., Tang, C. S. kum, & Tang, S. (2011). Psychological capital as a moderator between emotional labor, burnout, and job satisfaction among schoolteachers in China. *International Journal of Stress Management*, 18(4), 348–371. <https://doi.org/10.1037/a0025787>
- Coombs, W. T. (2007). Crisis Management and Communications. *Institute for Public Relations*, 1, 1–14.
- Coombs, W. T., & Laufer, D. (2018). Global Crisis Management – Current Research and Future Directions. *Journal of International Management*, 24(3), 199–203. <https://doi.org/10.1016/j.intman.2017.12.003>
- Cropanzano, R., Rupp, D. E., & Byrne, Z. S. (2003). The relationship of emotional exhaustion to work attitudes, job performance, and organizational citizenship behaviors. *Journal of Applied Psychology*, 88(1), 160–169. <https://doi.org/10.1037/0021-9010.88.1.160>
- Daniels, K. (2000). Measures of five aspects of affective well-being at work. *Human Relations*, 53(2), 275–294. <https://doi.org/10.1177/a010564>
- Danna, K., & Griffin, R. W. (1999). Health and well-being in the workplace: A review and synthesis of the literature. *Journal of Management*, 25(3), 357–384. <https://doi.org/10.1177/014920639902500305>
- Demirović Bajrami, D., Terzić, A., Petrović, M. D., Radovanović, M., Tretiakova, T. N., & Hadoud, A. (2020). Will we have the same employees in hospitality after all? The impact of COVID-19 on employees' work attitudes and turnover intentions. *International Journal of Hospitality Management*, 102754. <https://doi.org/https://doi.org/10.1016/j.ijhm.2020.102754>
- Dirani, K. M., Abadi, M., Alizadeh, A., Barhate, B., Garza, R. C., Gunasekara, N., Ibrahim, G., & Majzun, Z. (2020). Leadership competencies and the essential role of human resource development in times of crisis: a response to Covid-19 pandemic. *Human Resource Development International*, 23(4), 380–394. <https://doi.org/10.1080/13678868.2020.1780078>
- Dischner, S. (2015). Organizational structure, organizational form, and counterproductive work behavior: A competitive test of the bureaucratic and post-bureaucratic views. *Scandinavian Journal of Management*, 31(4), 501–514. <https://doi.org/https://doi.org/10.1016/j.scaman.2015.10.002>
- Edgar, F., Geare, A., & Zhang, J. A. (2017). A comprehensive concomitant analysis of service employees' well-being and performance. *Personnel Review*, 46(8), 1870–1889. <https://doi.org/10.1108/PR-05-2016-0108>
- Faulds, D. J., & Raju, P. S. (2019). Crisis management: An interview with Melissa Agnes. *Business Horizons*, 62(4), 421–426. <https://doi.org/https://doi.org/10.1016/j.bushor.2019.03.009>
- Fisher, C. D. (2010). Happiness at Work. *International Journal of Management Reviews*, 12(4), 384–412. <https://doi.org/10.1111/j.1468-2370.2009.00270.x>
- Foote, D. A., & Li-Ping, T. (2008). Job satisfaction and organizational citizenship behavior (OCB): Does team commitment make a difference in self-directed teams? *Management Decision*, 46(6), 933–947. <https://doi.org/10.1108/00251740810882680>
- Fragouli, E. (2020). Leading in Crisis & Corporate Reputation. *Risk and Financial Management*, 2(1), p62. <https://doi.org/10.30560/rfm.v2n1p62>
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218–226. <https://doi.org/10.1037/0003-066X.56.3.218>
- Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, 84(2), 365–376. <https://doi.org/10.1037/0022-3514.84.2.365>
- Geue, P. E. (2018). Positive Practices in the Workplace: Impact on Team Climate, Work Engagement, and Task Performance. *The Journal of Applied Behavioral Science*, 54(3), 272–301. <https://doi.org/10.1177/0021886318773459>
- Gielan, M. (2020). What Leading with Optimism Really Looks Like? *Harvard Business Review*, June 4, 2020.
- Gloria, C. T., & Steinhardt, M. A. (2016). Relationships among Positive Emotions, Coping, Resilience and Mental Health. *Stress and Health*, 32(2), 145–156. <https://doi.org/10.1002/smi.2589>
- Grant, A. M., Christianson, M. K., & Price, R. H. (2007). Happiness, Health, or Relationships? Managerial Practices and Employee Well-Being Tradeoffs. *Academy of Management Perspectives*, 21(3), 51–63. <https://doi.org/10.5465/amp.2007.26421238>
- Guest, D. E. (2017). Human resource management and employee well-being: towards a new analytic framework. *Human Resource Management Journal*, 27(1), 22–38. <https://doi.org/10.1111/1748-8583.12139>
- Gyeyke, S. A., & Haybatollahi, M. (2015). Organizational citizenship behavior: An empirical investigation of the impact of age and job satisfaction on Ghanaian industrial workers. *International Journal of Organizational Analysis*, 23(2), 285–301. <https://doi.org/10.1108/IJOA-08-2012-0586>

- Haddon, A., Loughlin, C., & McNally, C. (2015). Leadership in a time of financial crisis: What do we want from our leaders? *Leadership and Organization Development Journal*, 36(5), 612–627. <https://doi.org/10.1108/LODJ-12-2013-0166>
- Harvey, J., Bolino, M. C., & Kelemen, T. K. (2018). Organizational citizenship behavior in the 21st century: How might going the extra mile look different at the start of the new millennium? *Research in Personnel and Human Resources Management*, 36, 51–110. <https://doi.org/10.1108/S0742-730120180000036002>
- Hosie, P., Willemyns, M., & Sevastos, P. (2012). The impact of happiness on managers' contextual and task performance. *Asia Pacific Journal of Human Resources*, 50(3), 268–287. <https://doi.org/10.1111/j.1744-7941.2012.00029.x>
- Huang, L. C., Ahlstrom, D., Lee, A. Y. P., Chen, S. Y., & Hsieh, M. J. (2016). High performance work systems, employee well-being, and job involvement: an empirical study. *Personnel Review*, 45(2), 296–314. <https://doi.org/10.1108/PR-09-2014-0201>
- Indarti, S., Solimun, Fernandes, A. A. R., & Hakim, W. (2017). The effect of OCB in relationship between personality, organizational commitment, and job satisfaction on performance. *Journal of Management Development*, 36(10), 1283–1293. <https://doi.org/10.1108/JMD-11-2016-0250>
- James, E. H., Wooten, L. P., & Dushek, K. (2011). The Academy of Management Annals Crisis Management: Informing a New Leadership Research Agenda. *The Academy of Management Annals*, 5(1), 455–493. <https://doi.org/10.1080/19416520.2011.589594>
- Jiang, K., Lepak, D. P., Han, K., Hong, Y., Kim, A., & Winkler, A. L. (2012). Clarifying the construct of human resource systems: Relating human resource management to employee performance. *Human Resource Management Review*, 22(2), 73–85. <https://doi.org/10.1016/j.hrmr.2011.11.005>
- Koopman, J., Lanaj, K., & Scott, B. A. (2016). Integrating the bright and dark sides of OCB: A daily investigation of the benefits and costs of helping others. *Academy of Management Journal*, 59(2), 414–435. <https://doi.org/10.5465/amj.2014.0262>
- Kowalski, T. H. P., & Loretto, W. (2017). Well-being and HRM in the changing workplace. *International Journal of Human Resource Management*, 28(16), 2229–2255. <https://doi.org/10.1080/09585192.2017.1345205>
- Lee, J., & Corbett, J. M. (2006). The impact of downsizing on employees' affective commitment. *Journal of Managerial Psychology*, 21(3), 176–199. <https://doi.org/10.1108/02683940610659542>
- Lee, K., & Allen, N. J. (2002). Organizational citizenship behavior and workplace deviance: the role of affect and cognitions. *The Journal of Applied Psychology*, 87(1), 131–142. <https://doi.org/10.1037/0021-9010.87.1.131>
- Lehmann-Willenbrock, N., Chiu, M. M., Lei, Z., & Kauffeld, S. (2017). Understanding Positivity Within Dynamic Team Interactions: A Statistical Discourse Analysis. *Group & Organization Management*, 42(1), 39–78. <https://doi.org/10.1177/1059601116628720>
- Lepine, J. A., Erez, A., & Johnson, D. E. (2002). The nature and dimensionality of organizational citizenship behavior: a critical review and meta-analysis. *The Journal of Applied Psychology*, 87(1), 52–65. <https://doi.org/10.1037/0021-9010.87.1.52>
- Luthans, F., Avey, J. B., Clapp-Smith, R., & Li, W. (2008). More evidence on the value of Chinese workers' psychological capital: A potentially unlimited competitive resource? *International Journal of Human Resource Management*, 19(5), 818–827. <https://doi.org/10.1080/09585190801991194>
- Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. *Personnel Psychology*, 60(3), 541–572. <https://doi.org/10.1111/j.1744-6570.2007.00083.x>
- Luthans, F., & Youssef, C. M. (2007). Emerging positive organizational behavior. *Journal of Management*, 33(3), 321–349. <https://doi.org/10.1177/0149206307300814>
- Luthans, F., Youssef, C. M., & Avolio, B. J. (2007). Psychological Capital: Developing the Human Competitive Edge. In *Psychological Capital: Developing the Human Competitive Edge*. <https://doi.org/10.1093/acprof:oso/9780195187526.001.0001>
- Lyngdoh, T., Liu, A. H., & Sridhar, G. (2018). Applying positive psychology to selling behaviors: A moderated-mediation analysis integrating subjective well-being, coping and organizational identity. *Journal of Business Research*, 92, 142–153. <https://doi.org/https://doi.org/10.1016/j.jbusres.2018.07.020>
- Marescaux, E., de Winne, S., & Forrier, A. (2019). Developmental HRM, employee well-being and performance: The moderating role of developing leadership. *European Management Review*, 16(2), 317–331. <https://doi.org/10.1111/emre.12168>
- Markovits, Y., Boer, D., & van Dick, R. (2014). Economic crisis and the employee: The effects of economic crisis on employee job satisfaction, commitment, and self-regulation. *European Management Journal*, 32(3), 413–422. <https://doi.org/10.1016/j.emj.2013.09.005>
- Marques-Quinteiro, P., Vargas, R., Eifler, N., & Curral, L. (2019). Employee adaptive performance and job satisfaction during organizational crisis: the role of self-leadership. *European Journal of Work and Organizational Psychology*, 28(1), 85–100. <https://doi.org/10.1080/1359432X.2018.1551882>

- Meijerink, J. G., Beijer, S. E., & Bos-Nehles, A. C. (2021). A meta-analysis of mediating mechanisms between employee reports of human resource management and employee performance: different pathways for descriptive and evaluative reports? *The International Journal of Human Resource Management*, 32(2), 394–442. <https://doi.org/10.1080/09585192.2020.1810737>
- Meyers, M. C., van Woerkom, M., & Bakker, A. B. (2013). The added value of the positive: A literature review of positive psychology interventions in organizations. *European Journal of Work and Organizational Psychology*, 22(5), 618–632. <https://doi.org/10.1080/1359432X.2012.694689>
- Miao, C., Humphrey, R. H., & Qian, S. (2017). Are the emotionally intelligent good citizens or counterproductive? A meta-analysis of emotional intelligence and its relationships with organizational citizenship behavior and counterproductive work behavior. *Personality and Individual Differences*, 116, 144–156. <https://doi.org/https://doi.org/10.1016/j.paid.2017.04.015>
- Narzary, G., & Palo, S. (2020). Structural empowerment and organisational citizenship behaviour: The mediating-moderating effect of job satisfaction. *Personnel Review*, 49(7), 1435–1449. <https://doi.org/10.1108/PR-11-2019-0632>
- Ng, T. W. H., & Feldman, D. C. (2011). Affective organizational commitment and citizenship behavior: Linear and non-linear moderating effects of organizational tenure. *Journal of Vocational Behavior*, 79(2), 528–537. <https://doi.org/https://doi.org/10.1016/j.jvb.2011.03.006>
- Niehoff, B. P., & Moorman, R. H. (1993). Justice As a Mediator of the Relationship Between Methods of Monitoring and Organizational Citizenship Behavior. *Academy of Management Journal*, 36(3), 527–556. <https://doi.org/10.2307/256591>
- Nyfoundi, M., Theodorakopoulos, N., Psychogios, A., & Dysvik, A. (2020). Tell it like it is in SME teams: Adverse working conditions, citizenship behaviour and the role of team information sharing in a turbulent economy. *Economic and Industrial Democracy*. <https://doi.org/10.1177/0143831X20925544>
- Ocampo, L., Acedillo, V., Bacunador, A. M., Balo, C. C., Lagdameo, Y. J., & Tupa, N. S. (2018). A historical review of the development of organizational citizenship behavior (OCB) and its implications for the twenty-first century. *Personnel Review*, 47(4), 821–862. <https://doi.org/10.1108/PR-04-2017-0136>
- Organ, D. W. (1997). Organizational Citizenship Behavior: It's Construct Clean-Up Time. *Human Performance*, 10(2), 85–97. https://doi.org/10.1207/s15327043hup1002_2
- Pagán-Castaño, E., Maseda-Moreno, A., & Santos-Rojo, C. (2020). Wellbeing in work environments. *Journal of Business Research*, 115, 469–474. <https://doi.org/https://doi.org/10.1016/j.jbusres.2019.12.007>
- Park, S., & Park, S. (2019). Employee Adaptive Performance and Its Antecedents: Review and Synthesis. *Human Resource Development Review*, 18(3), 294–324. <https://doi.org/10.1177/1534484319836315>
- Podsakoff, N. P., Podsakoff, P. M., MacKenzie, S. B., Maynes, T. D., & Spoelma, T. M. (2014). Consequences of unit-level organizational citizenship behaviors: A review and recommendations for future research. *Journal of Organizational Behavior*, 35(Suppl 1), S87–S119. <https://doi.org/10.1002/job.1911>
- Psychogios, A., Nyfoundi, M., Theodorakopoulos, N., Szamosi, L. T., & Prouska, R. (2019). Many Hands Lighter Work? Deciphering the Relationship between Adverse Working Conditions and Organization Citizenship Behaviours in Small and Medium-sized Enterprises during a Severe Economic Crisis. *British Journal of Management*, 30(3), 519–537. <https://doi.org/10.1111/1467-8551.12245>
- Qian, S., Yuan, Q., Niu, W., & Liu, Z. (2019). Is job insecurity always bad? The moderating role of job embeddedness in the relationship between job insecurity and job performance. *Journal of Management & Organization*, 1–17. <https://doi.org/10.1017/jmo.2018.77>
- Rahmani, K., Gnoth, J., & Mather, D. (2018). Hedonic and eudaimonic well-being: A psycholinguistic view. *Tourism Management*, 69, 155–166. <https://doi.org/https://doi.org/10.1016/j.tourman.2018.06.008>
- Rhoades, L., Eisenberger, R., & Armeli, S. (2001). Affective commitment to the organization: The contribution of perceived organizational support. *Journal of Applied Psychology*, 86(5), 825–836. <https://doi.org/10.1037/0021-9010.86.5.825>
- Ribeiro, N., Duarte, A. P., & Filipe, R. (2018). How authentic leadership promotes individual performance: Mediating role of organizational citizenship behavior and creativity. *International Journal of Productivity and Performance Management*, 67(9), 1585–1607. <https://doi.org/10.1108/IJPPM-11-2017-0318>
- Ribeiro, N., Nguyen, T., Duarte, A. P., Torres de Oliveira, R., & Faustino, C. (2020). How managerial coaching promotes employees' affective commitment and individual performance. *International Journal of Productivity and Performance Management*. <https://doi.org/10.1108/IJPPM-10-2018-0373>
- Ritter, T., & Pedersen, C. L. (2020). Analyzing the impact of the coronavirus crisis on business models. *Industrial Marketing Management*, 88, 214–224. <https://doi.org/https://doi.org/10.1016/j.indmarman.2020.05.014>
- Rudolph, C., Allan, B., Clark, M., Hertel, G., Hirschi, A., Kunze, F., Shockley, K., Shoss, M., Sonnentag, S., & Zacher, H. (2020). Pandemics: Implications for Research and Practice in Industrial and Organizational Psychology. *Industrial and Organizational Psychology, Cdc*. <https://doi.org/10.31234/osf.io/k8us2>

- Salas-Vallina, A., Alegre, J., & López-Cabrales, Á. (2020). The challenge of increasing employees' well-being and performance: How human resource management practices and engaging leadership work together toward reaching this goal. *Human Resource Management*. <https://doi.org/10.1002/hrm.22021>
- Seligman, M. E., & Csikszentmihalyi, M. (2000). Positive psychology. An introduction. *The American Psychologist*, 55(1), 5-14. <https://doi.org/10.1037/0003-066X.55.1.5>
- Seppala, E., & Cameron, K. (2015). Proof That Positive Work Cultures Are More Productive. In *Harvard Business Review: Vol. December 1* (pp. 1-8). https://hbr.org/2015/12/proof-that-positive-work-cultures-are-more-productive?utm_campaign=HBR&utm_source=facebook&utm_medium=social#
- Shahid, S., & Muchiri, M. K. (2019). Positivity at the workplace: Conceptualising the relationships between authentic leadership, psychological capital, organisational virtuousness, thriving and job performance. *International Journal of Organizational Analysis*, 27(3), 494-523. <https://doi.org/10.1108/IJOA-05-2017-1167>
- Siu, O. L., Cheung, F., & Lui, S. (2015). Linking Positive Emotions to Work Well-Being and Turnover Intention Among Hong Kong Police Officers: The Role of Psychological Capital. *Journal of Happiness Studies*, 16(2), 367-380. <https://doi.org/10.1007/s10902-014-9513-8>
- Vakkayil, J., Torre, E. della, & Giangreco, A. (2017). "It's not how it looks!" Exploring managerial perspectives on employee wellbeing. *European Management Journal*, 35(4), 548-562. <https://doi.org/10.1016/j.emj.2016.12.002>
- Wall, T., Russell, J., & Moore, N. (2017). Positive emotion in workplace impact. *Journal of Work-Applied Management*, 9(2), 129-146. <https://doi.org/10.1108/jwam-07-2017-0017>
- Warr, P. (1987). Work, unemployment, and mental health. In *Work, unemployment, and mental health*. Oxford University Press.
- Wright, T. A., & Huang, C.-C. (2012). The many benefits of employee well-being in organizational research. *Journal of Organizational Behavior*, 33(8), 1188-1192. <https://doi.org/https://doi.org/10.1002/job.1828>
- Youssef-Morgan, C. M., & Luthans, F. (2013). Positive leadership: Meaning and application across cultures. *Organizational Dynamics*, 42(3), 198-208. <https://doi.org/10.1016/j.orgdyn.2013.06.005>
- Zheng, X., Zhu, W., Zhao, H., & Zhang, C. (2015). Employee well-being in organizations: Theoretical model, scale development, and cross-cultural validation. *Journal of Organizational Behavior*, 36(5), 621-644. <https://doi.org/10.1002/job.1990>

An overview on green human resource management practices

Asmaa Sabry AbdAlaziz Salama Radwan

Amira Sayed Mohamed Gadelrab

Suez Canal University, Egypt

Ghadeer Mohamed Badr EIDin Aboul Ela

Future University in Egypt

Keywords

Green Human Resource Management, Green Job Analysis, Green Recruitment and Selection, Green Training and Development.

Abstract

In accordance with growing awareness towards a global sustainable better future and the United Nations sustainable development goals (SDGs), the concept of Green Human Resource Management Practices became the wheel for driving organizational sustainability and growth. In this respect, scholars have attempted to investigate and analyze the dimensions and pillars of Green Human Resource Management Practices. This paper introduces an overview on the Green Human Resource Management Practices including green job analysis, green recruitment and selection as well as green training and development. This research analyzes the selected practices through addressing the extant literature as well as presenting an analysis of the previous studies. Conclusion is addressed to analyze the findings from the viewpoint of the researchers.

1. Introduction

In the late of 19th-Century the world has Insight into the psychology of color and emotion. Therefore, many scientists such as Carl Jung and Nei Ching devoted themselves for studying the psychology of colors, and they are ardent and have researched a lot about green color meaning and psychology. Particularly in color psychology, the green color affects our thinking and our physical health in a positive way. Additionally, it is a commanding color in nature that makes you think of growth. Besides, green is a color that can arouse impressive emotions, thinking of nature and seeing the inconceivable variety of shades of green expressing regeneration and enthusiasm.

As consequence, in 1993 the term "Green Business" was coined and spread by the scientist Schott and Fischer. They have edited one of the most deliberate academic literatures on green business. Green business is also known as smart business. Therefore, green business can be expressed as business exercises and practices that are employed to be eco-friendly.

Moving over to green human resource management (GHRM), there has always been confusion in articles as to whether GHRM is 'familiar' term to most of academicians or that it can be 'unfamiliar' to them. However, (Opatha, 2013) confirmed that it is rather hard to convert the whole organization green. That is the cause why HR practices are an essential part of sustainable business evolution. Moreover, (Stojanoska, 2016) defined GHRM as a part of human resource management that is participating with transforming the regular workforce into a green workforce regarding the objective of achieving the environmental targets of the company.

Green human resource management is associated with the practices, frameworks, and actions that help in guiding the workforce of a company into the green transforming for the interest of human, ecosystem, community, and the organization. This paper discusses GHRM practices represented in, Green Job Analysis, Green Recruitment and Green Training and Development. It will focus on the objectives and techniques of each process and in particular that are applicable to green hotels in Egypt.

2. Literature Review

1. Green Human Resource Management Practices

Green human resource management practices have been identified as a direct function of green management. (Halawi and Zaraket, 2018) stressed that green human resource management's objective is to

support an organization in carrying out its green management plan in order to bring down its ecological footprint and achieve human welfare. Within this framework, green human resource management establishes organizational green strategy goals, and motivates workforces to be ecologically sustainable, skilled, ethically aware, and driven to create eco-friendly work atmosphere (**Bombiak and Kluska, 2018**)

In the quintessence, the main objective of implementing green human resource management is to adjust the broader organizational framework to ensure its long-term viability (i.e., workforces, atmosphere, and practices). Furthermore, long-term green human resource management provides social, human, and ecological consequences and contributes to lengthy sustainability organizations.

Besides, (**Luo, Zhang, and Zhao, 2020**) investigated how GHRM practices affect staffs' green behavior. Workers' life span, learning and education, employee participation, and leaders' engagement all significantly contribute green performance, but incentives only indicate extra-role activity in the long-term. On the other hand, several researchers such as Stoliaruk, Vasylyk and Tsymbaliuk explored green human resource management-related topics in 2021. Some research looks into the level of green human resource management practices throughout various types of employees, including human resources specialists from diverse organizations.

The studies of Zahid and Jamal reveal that, despite widely spread knowledge, green human resource management practices are remaining uncommon. In that case, organizations desire to apply the green human resource management practice in the long term. Eventually, this research in the field of GHRM are devoted to practices of implementation of GHRM into different HRM functions such as, green job analysis, green recruitment and selection, and green training and Development.

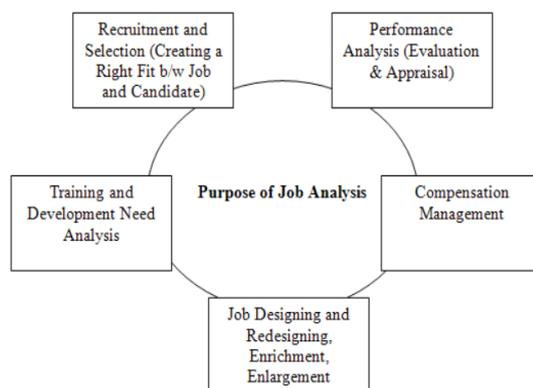
2. Green job analysis

Initially, it is very important for most Human Resource professionals to know the specifics of the job. Therefore, Information about jobs and their requirements are composed through a process known as job analysis. Besides, job Analysis process is considered the backbone of the most human resource practices, wherein a number of functions can be rendered.

In general, job analysis is expressed as the process of collecting and scrutinizing information about job descriptions and specifications, in addition determining the qualifications needed to perform the job efficiently. Moreover, (**Muaf and Wijayani, 2015**) defined Job analysis as the process that includes the gathering data activities, which is pointedly concerned with job description, job specifications, and job standards.

However, (**Juneja, 2015**) affirmed that Job analysis process plays a fundamental role in organizations, which is how the organization uses job analysis data in Workforce planning, Performance analysis, Recruitment and selection, Training and development, Compensation management, Health, safety and security, Employee/labor relations and Risk management. The following figure (1) chooses the purpose of job analysis as illustrated above.

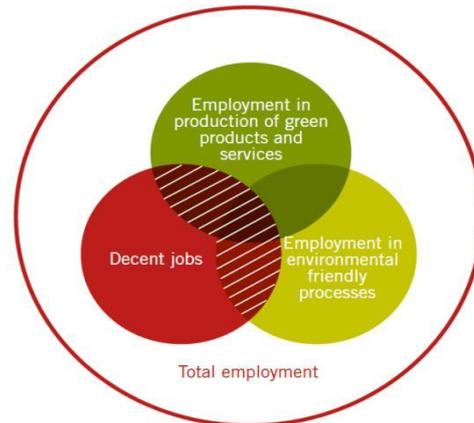
Figure 1: Purpose of Job Analysis



Source: Management Study Guide. (2015). *Job Analysis - Job Description and Job Specification*.
<https://www.managementstudyguide.com/job-analysis.htm>.

Moving over green job analysis, several organizations have designed new green jobs or positions in order to concentrate particularly on eco-friendly management prospects of the organizations. Whether, green job can be defined as a decent job that participate to conserve the environment, (International Labour Organization (ILO), 2016). For the ILO, green jobs are all those jobs that located in the dashed area as illustrated by the diagram below (figure 2).

Figure 2: *Total employment*



Source: International Labour Organization (ILO). (2016). Green jobs.

<https://www.ilo.org/global/topics/green-jobs/lang--en/index.htm>

Additionally, from the viewpoint of Human Resource Management, it is truly a precious objective to safeguard the environment. Therefore, some organizations have involved in designing their existing jobs in a more environmentally friendly style by merging environmental focused duties and responsibilities.

Besides, (Tipoe, Kuralbayev and Bowen, 2018) mentioned in their work that green jobs diversify in usage and importance of green tasks, with not many jobs embracing solely green tasks, they nominated that the term 'green' have to be regarded as a continuum in preference to a binary characteristic. Greening is likely to encompass transitions on a similar standardize and range of present job transitions. Although it is easier to go green indirectly in preference to green jobs directly, only a few skill-specific traits for non-green jobs seem to distinguish them from their green counterparts. Accordingly, the majority of retraining can take place on the job. (Tipoe, Kuralbayev and Bowen, 2018).

According to "ONET Resource Center" Green jobs are characterized as any occupation that will be influenced by greening, and there are three subcategories of green occupations based on the impact of greening on the duties, skills, and knowledge required for the job:

Green Increased Demand (Green ID) are Existing jobs that are likely to be in high demand by cause of greening, but do not require major changes in duties, skills, or knowledge. These jobs are termed "indirectly green" since they assist green economic activity without requiring any green tasks.

Green Enhanced Skills (Green ES) are Existing jobs that, by cause of greening, require considerable changes in duties, skills, and knowledge

Green New and Emerging (Green NE) are unexampled and unique jobs (as defined by workforce requirements) were created to accommodate the new needs of the green economy

As a consequence, in 2019 came the work of Sayeed, Khan and Majeed who identified Green Job Design and Analysis as the process of creating and implementing new, unexampled and unique jobs and positions that are completely focused on the organization's environmental management aspects. It requires merging many environmental protection-related tasks, responsibilities, and duties into each job. In addition, (Sayeed, Khan and Majeed, 2019) mentioned that (Opatha, 2016) stated in his work that, inclusion of environmental dimension as a duty in job description and simultaneously incorporating green competencies as an absorbing constituent in job specification comes under the preview of green job analysis. Moreover, they pointed out that many organizations have begun to adopt such environmentally friendly practices in order to protect the environment. Each job description has come to incorporate at least one duty relevant to

environmental protection, as well as specific environmental duties. (Al Mamun, 2019) discussed green job design and analysis practices as:

Including a variety of environmental-related activities, obligations, and responsibilities in each employment and putting them into practice.

Including a variety of environmental-related activities, obligations, and responsibilities in each employment and putting them into practice.

Including as many environmental, social, personal, and technical requirements as possible in work descriptions and person (job) specifications and putting them into practice.

Using job design strategies like as cooperation and cross-functional teams to successfully manage the company's environmental challenges.

Incorporating the environmental dimension as a job requirement. Including green skills as a distinct component in job descriptions.

Designing and executing new occupations and positions to focus solely on the organization's environmental management components.

Besides, the work of (Sobih, 2019) who stated that Job analysis includes job descriptions and job specifications that should have a green approach in order to apply GHRM. As mentioned before, the requisite skills, knowledge, and abilities for each position should be included in the job specification to ensure that the environment obligations are met. Moreover, environmental responsibilities should be included in the job description.

The following points illustrates some green practices introduced by (Arulrajah, Opatha, and Nawaratne, 2015)

Including a variety of environmental-related tasks, duties, and responsibilities in each job and putting them into a collection.

As far as possible, including environmental, social, personal, and technical requirements of companies in job descriptions and person specifications, and putting them into practice.

Using job design strategies such as cooperation and cross-functional teams to successfully manage the company's environmental challenges.

Incorporating the environmental dimension as a job need.

Including green skills as a distinct component in job descriptions.

Eventually, Work and nature are inextricably linked. The future is reliant on the natural environment. A healthy earth is necessary for our jobs and organizations. Therefore, green human resource management practices (i.e., green job analysis, green recruitment and green training and development.) strongly support The Sustainable Development Goals (SDGs) 2030 Agenda and Egypt's Vision 2030. In line with the 2030 Agenda, the Egyptian Government has established a working plan named Egypt's Vision 2030, also known as Sustainable Development Strategy (SDS).

The SDS encourages economic growth based on equity, social integrity, and engagement. All development plans in Egypt are incorporated into the SDS, which is also significantly directed by the SDGs. Therefore, green human resource management practices aligned with the third sustainable development goal (Good Health and Well-Being) and eighth sustainable development goal (Decent Work and Economic Growth) through green practices such as ecological preservation, pollution protection, prevention practices (i.e., waste data collection and pollution source identification), reduction and waste management, and workforce training in green workplace analysis.

However, only because the employee works in the green organization does not guarantee he has a green job, there must be clear job specifications and job descriptions in the organization. Therefore, numerous hotels use job techniques such as cooperation and cross-functional teams. In this regard, many hotels have created a distinct job title for solving the company's environmental issues. For example, Executive Director, Non-profit, Project Leader/Manager, Sustainability Program Director/Manager, sales/Business Development Associate or Manager, Marketing Manager/Coordinator, Community Crew Leaders/Supervisors, Conservation Associations, Business/Data Analyst, and Research Analyst/Manager.

3. Green Recruitment and Selection

Generally, the process of determining, attracting, interviewing, choosing, hiring, and integrating workforce are referred to as recruitment. In other words, it covers everything from defining personnel

requirements to filling them. In 2007, **John Sullivan**, a HR Specialist and Professor of Management at San Francisco State University's School of Business, coined the term "green recruitment." Moreover, Green recruiting is not a trend that will fade away. Organizations all across the universe are jumping on the green recruiting trend.

Then, came the study of (**Nagrath and Gupta, 2013**) who defined Green Recruitment as the practice of conveying a company's unwavering commitment to environmental causes with the applicants who are seeking to hire. (**Ahmad, 2015**) identified green recruitment as the process of recruiting employees who have the expertise, talents, attitudes, and behavioral patterns that are compatible with an organization's sustainability objectives.

Green recruitment is an important aspect of Green Human Resource Management Practices that emphasizes the significance of having a workforce who is concerned about ecological concerns, which can help them improve their environmental Performance (**Zibarras and Coan, 2015**). Then, (**Urbaniak, 2015**) referred to green recruiting as a procedure in which the candidate's awareness of environmentally issue and emotional desire to work for a green firm are highlighted.

Moreover, (**Ahmad, 2015**) affirmed that Companies can effortlessly recruit professionals who are knowledgeable of eco - friendly practices and are already acquainted with essentials like wastage, conservation, and developing a more reasonable world by recruiting candidates with a green bent of mind. In the recruitment framework, certain companies are integrating their organizational environmental objectives and practices with their recruitment process. From the workforce's perspective, also candidates are looking for and have a desire to work in corporations that are concerned about environmental issues.

Additionally, (**Arulrajah, Opatha, and Nawaratne, 2016**) stressed that organizations have realized that establishing an image as a green workforce is a good idea to attract new staff. Besides, the study emphasized that human resource representatives who are environmentally conscious can recruit the expertise they need to adopt green management practices, which helps them accomplish their organization's green objectives. Several organizations declare that they prefer to hire applicants with the green skills and green behaviors required to engage in organization's objectives environmental management practices. These are some of the green recruitment practices that a corporation can employ. (**Arulrajah, Opatha, and Nawaratne, 2016**) provide a set of traditional and innovative HRM practices in the context of green recruitment.

When sending recruitment messaging, indicating or making accessible the organization's environmental performance (past and current).

Becoming a green employer or a preferred green employer Environmental criterion should be included in recruitment communications.

Using recruitment efforts to communicate the employer's concern about environmental issues.

Incorporating the organization's environmental policies and strategies into its recruitment policy.

Incorporating particular environmental ideals (e.g., be a member of ABC's green team or we are a socially and ecologically responsible employer) into the company's employment adverts.

In the recruitment message, express the organization's preference for individuals who have the skills and attitudes to participate in corporate environmental management activities.

Thereafter, came the study of (**Tang, et al., 2018**) who characterizes Green Recruitment and selection in three dimensions: applicant green awareness, green employer branding, and green hiring criteria. Firstly, **applicant green awareness** is the backbone of Green Recruitment and selection; it includes personality characteristics as if green scrupulousness, mindfulness, and agreeableness that help organizations accomplish their environmental objective. Therefore, Organizations should use a series of exams to recruit and select employees who are environmentally conscious, ensuring that all workforces are enthusiastic about ecological issues.

Secondly, **green employer branding**, can be pointed out a corporation's public image in concerning environmental management, which can be developed through Green Human Resource Management Practices. Furthermore, (**Tang et al., 2018**) mentioned in their work based on the work of Willness and Jones that through green employer branding, job applicants can reach a suitable match between their values and an organization's objectives, and they may have a feeling of euphoria working for a corporation with a solid ecological image. Consequently, green branding by human resource department (i.e., green employer

branding) is an attractive way to recruit and choose potential employees who are concerned about environmental issues and attitudes.

Organizations can also employ marketing to highlight their green image, sustainability practices, and environmental regulation, which can assist entice individuals to apply for available positions (**Chaudhary, 2018**). Thereby, (**Macalik and Sulich, 2019**) confirmed that Employer branding is indeed one of the speediest fields in literature and business. Additionally, (**Birou, Green, and Inman, 2019**) mentioned that many businesses hire high-performing employees depending on their ecological efforts, which help them project a positive reputation in the community. Moreover, the work of (**Pracodawcy, 2019**) emphasized that strong Human resources (HR) department that assists the top management of the organization not only in managing the workforce and creating the internal brand, but as well in developing the overall brand of the organization.

Thirdly, environmental criteria should be employed to appraise and select candidates. For example, as mentioned earlier, job descriptions and job specifications must contain green criteria, which are used for interviewing, nomination, and selection of applicants, thus the job analysis process serves the green recruitment process. Besides, green assimilation of HR specialists who are already conscious of environmental and eager to serve the community makes it easier to establish green practices that help organizations to meet their green targets. (**Roscoe, Subramanian, Jabbour, and Chong, 2019**)

In the light of that, the study of (**Ghouri et al., 2020**) discussed that in order to recruit potential workforce, environmental institutions must establish a public image and reputation as a green organization. Furthermore, green recruitment process outlines what is expected of potential green staff in the future and demonstrates green accomplishments and ecological concerns of firms. The process is considered as an application of the job analysis process (i.e., job description and job specification).

Additionally, (**Martins et al., 2021**) stressed that green recruitment resulted in the growth of a green workforce that consistently and professionally contributed to the organization's environmental objectives. Therefore, the study affirmed that to enhance efficiency and respect to environmental norms, employers must use green recruitment processes. Green recruitment has been related to the strengthening of environmental policies that promote to sustainability as well as an improvement in workforce loyalty to the organization. Green recruitment processes can be considered as the application of environmental management in the human resource management function of the organization to improve its efficiencies and lead to better environmental performance.

4. Green Training and Development

Initially, **Stoughton and Ludema** in 2012 stressed that the main objective of the green training is to convince and integrate environmental practices into the organization's mentality. (**Ahmad, 2015**) defined training and development as a process that aims to improve workforces' talents, expertise, and perspectives in order to avoid the spread of Environmental Management-related information, talent, and perspectives.

However, the researchers interpreted green training as a significant practice used by some green human resource department in green organizations. Through the training courses, these organizations can offer the required basic information and knowledge about their green management policies, strategy, and practices after selecting candidates for the positions. Besides, the work of (**Arulrajah, 2015**) who discussed the significance of green training in strengthening workforces' skills and talents in order to improve ecological concern.

Additionally, the work of (**Mehta and Chugan, 2015**) who emphasize that green training and development improves employees' environmental abilities, expertise, and mentality. Upon entering the company, workforces should embrace the company's green practices and objectives. Furthermore, green training and development teach workforce on the significance of Environmental Management, training them in energy-saving and end up wasting techniques, develop ecological consciousness within the organization, and offer opportunities for workforces to participate in ecological issue (**Ahmad, 2015**) based on study of (**Zoogah, 2011**)

Moreover, (**Ahmad, 2015**) emphasized that the workforces become fully aware of multiple perspectives and the significance of ecological management through green training and development practices. As well as green training and development enables them to accept various preservation strategies, such as pollution

reduction within a business. In addition, green training and development also improves an employee's ability to cope with a variety of ecological concerns.

Nowadays, organizations are interested in training that creates work teams who are passionate about green policies in effective management practices. Furthermore, employee who has received green training and guided practice ought to be ready to inform clients about the benefits of being increasingly environmentally conscious and purchasing green products. Thereafter, (Ljubljana, 2016) considered Green Training as a preliminary and introductory process for new hires that should include green seminars that will motivate workforces to identify the organization's green policies and practices, as well as to adapt to the organization's green targets and objectives.

The training process requires the preparation and evaluation of content that can help enable the necessary training courses in strong environmental management and through this the implementation of effective and integrated training programs. Several actions can be conducted by HR department to establish an integrated environmental training course. For example, reviewing previous training sources, HR capabilities and comparing employee brands.

Consequently, such actions means that the HR department needs to think about how to employ these capabilities and these brands, review job background, job description, and job specifications, and then merge them into the training process for new employees.

Therefore, workers and managers must be constantly up to date on a daily basis, and they must be convinced of the importance of achieving environmental goals as a whole in order for the process to be successful (Ljubljana, 2016). Moreover, the study of (Arulrajah, Opatha, and Nawaratne, 2016) stated that in terms of green training, organizations might choose one of two strategies. There are two types of green training: general green training and job-specific green training.

In that case, Organizations should make sure that new hires are aware of their green duties, are acquainted with health and safety policies, value the workplace green culture, and follow the green management policies and practices. Arulrajah, A., (Opatha, & Nawaratne, 2016) provides some Existing Human Resources Management practices under the green training and development.

- Inducing a general green state.

- Providing green induction for certain jobs.

- Making new employees aware of the organization's environmental activities and encouraging them to engage in green interpersonal citizenship behaviour.

- Creating induction programmes that demonstrate current employees' green citizenship behaviour.

Therefore, Green training and education-integrated programs should be offered to all staff (i.e., employees and managers) of the organization, not only those associated with green divisions. Green training integrated programs can assist employees in becoming more aware of the organization's pro-environmental activities. Green training courses can help all workforces (i.e., employees and managers) comprehend the significance of ecological preservation, making them more responsive to green perspective; pollution protection and prevention practices such waste data collection and pollution source identification. Thus, this has been reflected in the internal situation and the way they use organizational resources (such as paper, electricity, as well as time).

Moreover, green training helps build an atmosphere that motivates all workforces to take an interest in environmental initiatives and ensure that they are beneficial and applicable and not just an ideal that is not applicable. It is important to realize that integrated training includes not only comprehensive programs but also complete with assessments and performance management systems, which are a way to create an ecological work climate. Thereafter, (Tang et al. 2018) considered three angles of green training: increasing awareness, managing knowledge, and improving the work climate. Firstly, green training can raise employee knowledge of pro-ecological workplace initiatives.

Secondly, Workforce can engage in ecological practices with the help of green training, which provides knowledge management. Workforces can obtain comprehensive green training through green knowledge management, strengthening their expertise and capabilities in ecological sustainability as well as their ability to deal with complicated ecologic challenges. Thirdly, Green training creates an atmosphere where all workforces are encouraged to participate in ecological projects. Additionally, as mentioned before, the way

to create an environmental work climate through green training is that training should include comprehensive programs, assessments, and performance management systems.

Moreover, the study of (Othman and Mousa, 2019) that emphasized that green training is recognized as a top concern for any organization, as it is required for implementing effective ecological management and cleaner industrial operations. The study indicated that implementing an environmental framework in the workplace necessitates raising staff' abilities, consciousness, and expertise of both resources and processes; this, consecutively, necessitates green training to encourage staff commitment and involvement in environmental concerns.

Moreover, (Rahman et al., 2020) recommended a combination of green training and development practices, including workforce training in green workplace analysis, electricity efficiency, reduction and waste management, and human capacity improvement in environmental approaches and techniques. Job rotation concepts should be utilized as an important determinant of training and professional development strategies to achieve the goal of workforce participation in environmental problem-solving missions. Thus, organizations should make those opportunities available to the workforces.

Additionally, (Mukherjee et al., 2020) provided some of the green training and development practices that are commonly seen in organizations, such as ecological discussions in the training and development session. In addition, training employees in environmentally friendly behaviors such as commuting and recycling management, communicate the organization's sustainability goals to new employees, conduct an assessment of green training requirements, and the use of online learning materials.

Eventually, (Mata et al., 2021) affirmed that green training contributes to the improvement of an organization effectiveness. It assists the organization in strengthening the green competences of the workforce. Moreover, green training causes workforces to be content with their occupations. Green training suggests that businesses should not only train their workforce in best organizational practices with regard to green policies, but also inspire clients to be more conscious of the environment and support the practice of purchasing green products.

5. Research Methodology

In order to ensure the correct implementation of the research paper, the need for an appropriate methodology has emerged. Therefore, a literature review described the definition, application, and benefits of GHRM, and the various potential factors influencing the adoption of GHRM in organizations. The main purpose of this research is to investigate an overview of GHRM practices and their importance to the environment. Therefore, the research began with a theory related to green human resource management and practices such as green job analysis, green recruitment, and green training and development.

Then to clarify how these practices are contained in the organization, the researchers relied on the research published in this field from 2015 to 2021, and this is because from the researchers' point of view, the real interest in the environment began since 2015. The sustainable development goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030.

Research philosophy is concerned with the progress of knowledge and has major implications for how people perceive the environment. According (Saunders et al., 2009) There are four main philosophies: pragmatism, positivism, realism, and explanatory. Interpretivism, the newest study philosophy, suggests that it is essential for the future. In the role as social participants, researchers are trying to figure out how humans vary. Interpretivism proponents claim that the world is more complicated to construct rule generalization.

The research philosophy for this dissertation will be interpretivistic. In the field of green human resource management, this philosophy is suitable. Because the participants in the study have distinct qualities and each event is unique, the findings of our study cannot be generalised. The researchers will participate in and perform research using the qualitative research method.

6. Conclusion

This paper discussed green human resource management practices in details. It mainly focused on green job analysis, green recruitment and selection, and green training and development, practices in organization. Therefore, the study confirmed that GHRM and its practices have a beneficial and significant

impact on the long-term competitive advantage of Egyptian organizations. As a result, the conclusions of the study revealed the importance of human resource management department in implementing green practices within the organization. As a result, it is recommended that every organization located in Egypt adopt an environmentally friendly approach while also paying attention to the environment in which the company operates in order to be environmentally friendly and pollution free for the residents. It encourages employees to be environmentally conscious by promoting green behavior

The researchers interpret **Green Human Resource Management Practices** as the practices carried out by the organization in order to be supportive of the green perspective and achieve sustainable development, and this is what countries, and their organizations are striving for at the present time. Therefore, this goal can only be achieved by starting with the most important resources of the organization, which is the workforce, and then starting to influence their behavior and their affiliation with some practices such as green job analysis, green recruitment and selection, and green training.

Firstly, the researchers considered **Green Job Analysis** as the cornerstone that supports the rest of the practices (i.e., green recruitment and selection, and green training) and describing it as a primitive practice. The researchers explained green job analysis as a written framework for specifically defining the description of each job, this is called **Job Description**., It also lists the skills, and knowledge that the job needs in the applicant who will occupy this job, and this is called **Job Specification**.

Besides, job description and job specification are associated with the term “green” which is why they support the green perspective in all the details of explaining the techniques used in the job and how to do the job and also detailing the required skills. In addition, the researchers consider job analysis is an essential reference for both workforces and managers: workforces should be aware of the details and specifics of their job and their responsibilities towards it, while managers make use of it firstly to evaluate employees and then build upon it the rest of the green practices.

Secondly, the researchers expressed green recruitment and selection as a practice that seeks to create a group of employees who share a single interest, which is the preservation of the environment. Green recruitment and selection are done through three steps. The first is to set green criteria for interview and selection, the second step is to carry out the interview in a green way, for example, an online interview, and the third step choose the most suitable applicant from the green side with green knowledge and green skills.

Thirdly and finally, the researchers expressed **Green Training** as the practice that seeks to create an integrated green work atmosphere through well-thought-out integrated training programs for employees. Therefore, green training is done by working in two aspects. The first aspect is to train new employees on the required skills of the traditional job and the required green skills included in the green job. The second aspect is to train existing and old employees, including managers, so that they are not outdated and staying up to date.

7. Limitations and direction for future research

The only three green human resource management practices used in this study were green job analysis , green recruitment, and green training and development, this is not to indicate that Green human resource management is entirely made up of these three practices; there are more practices of green human resource management that can be investigated in future studies such as: green compensation and reward, green leadership management, and green performance management. Future research integrating strategic plan and employee participation could help to paint a true overview of Green human resource management’s inclusive impact on organizations.

Another limitation of this study is the generalizability of the conclusions about the institutional effects because there are other factors that affect each organization, such as (the age of the employees - the ability to change between managers - the province in which the company is located, and so on). Additionally, for all stakeholders, the future of GHRM appears bright. The researchers believe that GHRM should be integrated into the field of management, both academically and in practice, in order to close the gap in this area.

References

Augustine, E., Ejeje, E., John, O., RichaNsor, E., & Nwuguru, M., 2021. Correlation Between Job Analysis and Corporate Performance of Business Organizations in Nigeria: A Study of Niger Mill Plc Calabar. *International Journal of Entrepreneurship and Business Innovation*, 4(1), pp.61-81.

- Tsymbaliuk, S., Vasylyk, A. and Stoliaruk, K., 2021. Green human resource management: how to implement environmental issues into HR practices. *E3S Web of Conferences*, 255, pp.1-8.
- Song, K., Kim, H., Cha, J. and Lee, T., 2021. Matching and Mismatching of Green Jobs: A Big Data Analysis of Job Recruiting and Searching. *Sustainability*, 13(7), pp.2-15.
- Jamal, T., Zahid, M., Martins, J., Mata, M., Rahman, H., & Mata, P., 2021. Perceived Green Human Resource Management Practices and Corporate Sustainability: Multigroup Analysis and Major Industries Perspectives. *Sustainability*, 13(1), pp.2-17.
- Martins, J., Aftab, H., Mata, M., Majeed, M., Aslam, S., Correia, A., & Mata, P., 2021. Assessing the Impact of Green Hiring on Sustainable Performance: Mediating Role of Green Performance Management and Compensation. *International Journal of Environmental Research and Public Health*, 18(1), pp.2-16.
- Mousa, S., & Othman, M., 2021. The impact of green human resource management practices on sustainable performance in healthcare organizations: A conceptual framework. *Journal of Cleaner Production*, pp.2-13.
- Ghouri, A., Mani, V., Khan, M., Khan, N., & Srivastava, A., 2020. Enhancing business performance through green human resource management practices: empirical evidence from Malaysian manufacturing industry. *International Journal of Productivity and Performance Management*, 69(8), pp.1585-1607.
- Islam, M., Hunt, A., Jantan, H., Hashim, H., & Chong, C., 2020. Exploring challenges and solutions in applying green human resource management practices for the sustainable workplace in the ready-made garment industry in Bangladesh. *Journal of Business Strategy and Development*, 3(1), pp.332-343.
- Malik, S., Cao, Y., Mughal, Y., Kundi, G., Mughal, M., & Ramayah, T., 2020. Pathways towards Sustainability in Organizations: Empirical Evidence on the Role of Green Human Resource Management Practices and Green Intellectual Capital. *Journal of Sustainability*, 12, pp.2-24.
- Mukherjee, S., & Bhattacharjee, S., 2020. Assessing Green Human Resource Management Practices in Higher Educational Institute. *Journal of Test Engineering and Management*, 82, pp.221 - 240.
- Mohammad, N., Bibi, Z., Karim, J., & Durrani, D., 2020. Green Human Resource Management Practices and Organizational Citizenship Behaviour for Environment: The Interactive Effects of Green Passion. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, 11(6), pp. 2-10.
- Saifuddin, Q., Hussain, F., & Khan, I., 2020. Striving to Implement Green Human Resource Management (GHRM) Policies and Practices: A Study from HR Managers Perspective. *International Journal of Management Excellence*, 14(2), pp.2037-2048.
- Dorcas, T., 2020. green human resource management and employees 'sustainable performance: a study of dangote cement PLC. *Journal of Oduduwa University*, 18(1), pp. 29-48.
- Cabral, C., & Dhar, R., 2020. Green competencies: insights and recommendations from a systematic literature review. *Benchmarking an International Journal*, 1(1), pp.1-40.
- Aykan, E., 2020. Gaining a Competitive Advantage through Green Human Resource Management. *World's Largest Science, Technology & Medicine*, pp.160-165.
- Hristova, S., & Stevceska, D., 2020. Green HRM in pursuit of sustainable competitive advantage. *University American College Skopje*, 15(1), pp. 53-63.
- Raut, R., Gardas, B., Luthra, S., Narkhede, B., & Mangla, S., 2020. Analysing green human resource management indicators of automotive service sector. *International Journal of Manpower*, 41(8), pp. 4-20.
- Morgan, D., & Rayner, J., 2020. Development of a scale measure for green employee workplace practices. *Journal of New Business Ideas & Trends*, 17(1), pp.1-22.
- Benevene, P., & Buonomo, I., 2020. Green Human Resource Management: An Evidence-Based Systematic Literature Review. *Journal of Libera University*, 12(1), pp.2-25.
- Fathy, A., 2020. The role of green human resource practices in supporting sustainable development in universities. *Journal of international conference of industrial and service organizations management in light of sustainable development plan*, pp.1-47.
- Zhang, Y., Luo, Y., Zhang, X., & Zhao, J., 2019. What a Green Human Resource Management Can Promote Green Employee Behavior in China: A Technology Acceptance Model Perspective. *Journal of Sustainability*, 11(5408), pp.2-19.
- Phama, N., Tučková, Z., & Jabbour, C. (2019). Greening the hospitality industry: How do green human resource management practices influence organizational citizenship behavior in hotels? A mixed-methods study. *Tourism Management*, 72(1), pp.386-399.
- ROFI, M., 2019. Green Human Resource Management (Ghrm) Practices and Organizational Citizenship Behaviour for Environment (Ocbe): A Case of Fertilizer Company in Kedah. *Journal of Universiti Utara Malaysia*, pp.17-47.
- Shariatpanahi, S., 2018. Testing and evaluating the new Safety Job Analysis (SJA) guidelines. *Journal of University of Stavanger*, pp.1-55.
- Ren, S., Tang, G., & Jackson, S., 2018. Green human resource management research in emergence: A review and future directions. *Asia Pacific Journal of Management*, 35(1), pp.769-803.

- Zaid, A., Jaaron, A., & Bon, A., 2018. The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study. *Journal of Cleaner Production*, 204(1), pp.965-979.
- Tang, G., Chen, Y., Jiang, Y., Paille, P., & Jia, J., 2018. Green human resource management practices: scale development and validity. *Asia Pacific Journal of Human Resources*, 56(1), pp.31-55.
- Macalik, J., & Sulich, A., 2017. external employer branding of sustainable organizations. *International Scientific Conference*, pp.2-13.
- Mishra, P., 2017. Green human resource management A framework for sustainable organizational development in an emerging economy. *International Journal of Organizational Analysis*, 25(5), pp.762-788.
- Kshatriya, S., 2016. Job Analysis and its Positive Impact on key Recruitment and Selection Processes: A Case Study. *Al Dar Research Journal for Sustainability*, 1(1), pp.1-23.
- Millar, J., Sanyal, C., & Camen, M., 2016. Green human resource management: a comparative qualitative case study of a United States multinational corporation. *The International Journal of Human Resource Management*, 27(2), 192-211.
- Ahmad, S., 2015. Green Human Resource Management: Policies and practices. *Cogent Business & Management*, 2(1), pp 2-13.
- Arulrajah, A., Opatha, H., & Nawaratne, N., 2015. Green Human Resource Management Practices: A Review. *Journal of Human Resource Management*, 5(1), pp.2-16.
- Ahmad, S., 2015. Green Human Resource Management: Policies and practices. *Cogent Business & Management*, 2(1), pp.2-13.
- Arulrajah, A., Opatha, H., & Nawaratne, N., 2015. Green Human Resource Management Practices: A Review. *Journal of Human Resource Management*, 5(1), pp.2-16.
- Wijayani, A., 2015. Redesign Process of Job Analysis and Job Satisfaction: A Qualitative Study on The Combined Group on Farmer. *Journal Dinamika Manajemen*, 6(2), pp.197-206.
- Fayyad, S., Abdel Hadi, A., Ahmed, M., & Ibrahim, S., 2013. A study on green hotels in Egypt. *Journal of The Association of Arab Universities for Tourism and Hotels*, 10(1), pp.2-18.
- Rehman, M., 2010. Impact of Job Analysis on Job Performance: A Study of Public Sector Organizations of Pakistan. *Journal of National University of Modern Languages*, pp.29-40.

Literature Reflections on Career Women Development

Farida Mohamed

Future University in Egypt

Abdel Moniem M.K. Elsaid

Ain Shams University, Egypt

Ghadeer Mohamed Badr ElDin Aboul Ela

Future University in Egypt

Keywords

Women Career Development, Glass Ceiling, Sustainable Development Goals

Abstract

United Nations Sustainable Development Goals foster the need for gender equality which opened up the windows for enhancing women career development. Women's career development is more complicated than men. The various internal and external barriers, such as family and related responsibilities, role in life, employment, the surrounding environment, traditions, and stereotypes, which facilitate and limit women's career choice and growth. The purpose of this research was to analyze the obstacles that women face in advancing their careers to senior management levels. Additionally, to gain an insight into the reasons why there are fewer women in management/leadership positions as well as finding out the factors that affect women's ability to advance to higher levels. Extensive analysis of extant literature was conducted whereby conclusions were drawn from the previous studies' findings.

Introduction

Organizations are functioning under constant change, whether it is political, economic, social, or technological development, which has resulted in the emergence of the globalization phenomenon, resulting in trade openness and market competitiveness that operational organizations encounter in various marketplaces (Goryakin *et al.*, 2015). This has led a lot of strain on these organizations of various sizes, as well as the nature of their activities and ownership, because they must adjust to these elements in order to exist and continue. In light of this situation, all departments within an organization have rushed to develop and respond to all modern situations through continuous attempts to further modify and develop objectives, means and methods, and tangible and intangible elements in order to improve performance, develop working methods, and increase production efficiency through continuous attempts to further modify and develop objectives, means and methods, and tangible and intangible elements in order to improve performance, develop working methods, and increase production efficiency. (Bomuwela and Alwis, 2013)

According to Catalyst, women currently hold 5% of CEO positions, 21.2 percent of board seats, 26.5 percent of executive/senior-level officials, and 36.9% of first/middle-level officials and managers (2018). When compared to top-level management, this shows that women in lower-level management are still uncommon. Despite the fact that women's participation in the workforce and representation in middle and lower management roles is expanding globally, there is still a long way to go (Bazazo *et al.*, 2017; Yasin *et al.*, 2019). The concept of the glass ceiling has been linked to the underrepresentation of women in top management positions. (Costa *et al.*, 2017)

Improving the role of women and enhancing their contribution to development from a firm belief that improving the status of Arab working women is a fundamental pillar of community development. Changes in foreign policy and globalization, global trade liberalization, structural reform initiatives, economic stability, and the creation of ICTs have created new challenges for Arab women, requiring a sharp increase in understanding of their problems and the importance of their role in promoting society. Women have an active role in society's development (Vossenber, 2013). This role depends on the extent to which women have a decent social status, job opportunities and the ability to express their opinions.

Furthermore, this allows them to shape their personality, increase their awareness of society's challenges, and improve their contribution to growth and change. The factors that qualify them for jobs, despite the radical changes related to women, include education, rehabilitation and legislation, the rise in the

number of women employees, the positive change in society's attitudes towards their work and status, as well as the results of research and studies that show the value, usefulness and often superiority of women over men (Stotsky, 2016). The gap is still wide between women's capacity, their skill, and what they aspire to, on the one hand, and, on the other, what is institutionally and administratively reflected in practical reality.

Women's unequal representation in senior management positions remains dominant, whether in public or private institutions and business organizations. (Oláh *et al.*, 2014).

The discrimination based on gender tends to hinder the formal involvement of women in decision-making. So far, women have not enjoyed equality with men in political status or in the power of political control in any country worldwide. Without the involvement of half of the population, that is, women, most of the decisions that impact the fate of our world continue to be made. Improving the role of women and their contribution to growth must therefore be based on a strong belief that improving the status of working women is a crucial pillar of societal development, requiring the urgent need to raise awareness of women's issues and the importance of their role in society's progress (Cook and Glass, 2014).

Women are more affected by these challenges than men, and they also have the ideas and leadership abilities to address them. Gender inequality continues to hold back too many women, and it is also holding back our globe. The 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs), which were endorsed by world leaders in 2015, represent a blueprint for sustainable progress that leaves no one behind.

Gender equality and women's empowerment are required for each of the 17 goals. We will only achieve justice and inclusion, inclusive economies, and long-term environmental sustainability for present and future generations if we defend the rights of women and girls across all goals.

Conceptualization of Women Career Development

Career advancement is defined as the upward movement of the level, position and title of the job in Organizational hierarchy and earnings or income growth (Thurasamy *et al.*, 2011). Women appears to have hit a point where they seemed unable to progress further even where there is a clear path of promotion. There were just 25% of senior management positions held by women in 2017, based on research reported by Grant Thornton. (Grant Thornton, 2017).

While women's participation in the employment sector is improving, the proportion of women in managerial positions is still poor. Gender stereotyping does affect women's career advancement as women have to work harder than men and they have to constantly compete against men to prove their abilities in the same job position level (Thurasamy *et al.*, 2011). In contrast to male colleagues, women are given insignificant tasks because women are perceived as physically, mentally and emotionally dependent, feminine and less competent in the workplace (Afza and from Newaz, 2008).

Based on the findings of previous research, most women argued that male perceptions and orientation in organizational culture, organizational practices, family constraints and social networking that led to the unequal career development were triggered by male perceptions and orientation contributes to the inequalities between the two genders (Afza and Newaz, 2008).

Women are thought to have the same prospects as men to rise up the corporate ladder, according to research in the field of career development, especially if they pursue the same occupations and have similar goals and talents as men. Women are expected to follow the male model and share child and household responsibilities with their partners in order to have successful careers (Burke, 2007).

Davidson and Burke, (2011, p. 11) suggest that "women still face discrimination and gender, ethnic, cultural and religious stereotyping; there is continuing male domination at senior management and corporate board levels". Ahmad (2001) and Oke (2003) suggest that the social environment, legal and institutional frameworks hinder women's career advancement, unequal job prospects, work-life balance, and insufficient access to economic resources-related opportunities for professional growth.

According to Huang (2006), women career advancement has been always limited by the barriers that usually involving the gender. Mavin (2000) argues that these challenges originated from the way of thinking and the generalization of women's nature by others. Female employees have commonly reported that it is difficult for them to climb the career ladder. It is important to cater to this situation or it will definitely make the job talent wasteful. These challenges would raise problems for organizations through the use of the job

skills and abilities of women workers to contribute back to the organizations. Therefore, back (2007) states that it is important to assess these obstacles and examine their effect on women's career advancement.

Women's career advancement has been hampered by a number of factors. One of the invisible impediments that women confront in their professional advancement is the "glass ceiling," which is commonly mentioned (Kuruppuarachchi and Surangi, 2020; Islam and Jantan, 2017). The 'glass ceiling,' as defined by Wirth (2004), is an unseen barrier to women's career advancement that is shaped by individual attitudes and biases. Lack of self-confidence is one of the individual obstacles preventing women from progressing in their careers (Worrall et al., 2010). Risk aversion and insecurity are common among women, which may be related to their preferred career routes (Kuruppuarachchi, and Surangi, 2020).

Another hindrance to women's career advancement is organizational practices, such as organizational culture and structure (Tlaiss and Kauser, 2010). According to Ismail and Ibrahim (2008), organizations are largely male dominated, with little attention paid to women's needs. In addition to, Ismail and Ibrahim (2008) and Kuruppuarachchi and Surangi (2020), women place greater responsibility on their families. Work-life balance and the conflict between family responsibilities and employment roles are linked to the focus on family. Work-life conflict is one of the most significant obstacles women encounter in balancing their professional obligations and family commitments (Guendouzi, 2006; Shelton, 2006). Women's decisions between work and home duties can be explained using the Preference theory (Hakim, 2000). Women who are classed as 'adaptive,' according to the theory, are quite diversified and manage their career and family commitments. This group of women wants to work, but they aren't really devoted to their jobs.

The researcher defines women career development as the process women may undergo to evolve their occupational status. It is the process of making decisions for long term learning, to align personal needs of physical or psychological fulfillment with career advancement opportunities.

2. Women's Career Development and the Glass Ceiling

In organizations, the 'glass ceiling' notion has been described as an unseen barrier or higher limit (Kuruppuarachchi and Surangi, 2020). The Federal Glass Ceiling Commission (1995) defined glass ceiling as an illusory barrier that prevents women from progressing in their careers. The glass ceiling occurs as an unseen higher limit in businesses, and it is difficult for women to rise past this limit to higher leadership positions (Kuruppuarachchi and Surangi, 2020). Because it is not a visible barrier and represents job inequity or discrimination, it has been termed the "glass ceiling" (Cotter *et al.*, 2001).

According to the Federal Glass Ceiling Commission (1995), women face three types of obstacles: sociocultural, internal structural, and government barriers. The second group is more relevant to women's professional advancement in business organizations. Corporate climates and the lack of outreach initiatives on behalf of women striving to senior management positions are examples of such hurdles. As a result, the term "glass ceiling" is used to describe inequities and prejudice. According to Wright *et al.*, (1995), higher-level positions have better discrimination than lower-level positions. In other words, males hold higher leadership roles because the 'invisible' glass prevents women from achieving top leadership positions (Bruckmüller *et al.*, 2014). The glass-ceiling phenomenon, on the other hand, is a contentious topic. The glass ceiling, according to Powell and Butterfield (1994), can exist at any level of the organization. Other than the "glass ceiling" effect, according to Bruckmüller *et al.* (2014), there are other barriers that women face in advancing to top leadership roles. According to Bruckmüller *et al.* (2014), women have a lesser chance of obtaining leadership roles, and those that they do obtain are more insecure, dangerous, and associated with high stress levels.

Career development becomes more complex when considering gender, due to other factors outside work. O'Neil and Bilimoria (2005) stated that women's career development is different due to the context of their lives in terms of family responsibilities that have consequences for women's career patterns, sustainability, and development.

In developing their career, women experience potential barriers. When women face invisible and hard-to-penetrate barriers because of their status instead of their skill, education, or experience. Besides, these barriers mean that women find it difficult to develop their careers to the higher organizational level, such barriers are known as the glass ceiling (Bell *et al.*, 2002; Goodman et. al., 2003). Another perspective is, when women are placed as leaders in high-risk positions that can make them fail, such a condition is known as the glass cliff (Ellemers *et. al.*, 2012; Sabharwal, 2013).

Cross and Linehan (2006) identified organizational barriers in the form of organizational policies and attitude bias, work environments that do not support and hinder women managers' ability to work effectively, as well as promotional barriers. Cross and Linehan (2006) also found another barrier that originates from oneself, referred to as the self-imposed glass ceiling, which is a women's belief that their careers are considered successful when they also acknowledge another life outside their jobs, namely their personal life.

The self-imposed glass ceiling is the obstacle that emerges from the inside of women (self-driven) that prevents them from improving (Boonet *et al.*, 2013). In addition, Boone *et al.* (2013) demonstrate that two key aspects originate from self-imposed barriers in women. First between family and personal life, there is the problem of 'push and pull'. They attempt to manage their job improvement with their family life when women obtain an opportunity for advancement. Second, there are problems with personal barriers to career advancement that work against them.

Women's Career Development Theories

The history of career theories has originated from the uninterrupted career growth of a person, which occurs in a permanent job within one or two businesses. Changes in organizational structure and global competitiveness have generated new demands for the research and advancement of career theories. Humans should note significant items when discussing a career. It depends on the field in which we analyze the concept. The fields of leadership can be psychological, sociological, anthropological, economic or different. The second observation involves improvements in organizations, in culture, and in people. The third starting point, which also covers the area, is at what stage we observe the profession of the individual. It may be the point of view of a person or an organizational point of view, or maybe both.

There are 5 ways to define concept of career: (Young and Collin, 2004)

1. Career as an advancement
2. Career as a profession
3. Career as a lifelong series of duties
4. Career as a lifelong series of role experiences
5. Career as a constructional concept

Career as an advancement

In this traditional concept, people are linked to vertical career development that means moving up in your career on hierarchical ladders. It also implies that all promotions for a successful career are also marked as unbreakable and heading to the top. (Ekonen, 2009).

Career as a profession

The less well-known view of this concept is that only some occupations have growth of careers. If a career is characterized as vertical growth, other occupations, such as teachers or cleaners, do not have a profession. (Ekonen, 2009).

Career as a lifelong series of duties

In this definition, career implies the earlier work experience of the individual, series of tasks in their entire life. This description means that anyone who has been working and is still working has a job. Career is not measured by vertical growth, rather career is more objective. This means unique activities that people do and get interested in such as accepting those tasks or denying certain tasks. Wage and place are also remarkable variables here. (Ekonen, 2009).

Career as a lifelong series of role experiences

This definition includes individual's experiences from series of duties and actions which his/her career includes. This is a subjective side of this definition, which means that career is more individual's personal development and it compose their values, beliefs, motivation and changes when aging. In this case success or non-success in their career is only decided by a proper not outsider. (Ekonen, 2009).

Career as a constructional concept

Career, as a definition of a constructional term means that your career can be reviewed critically and with your personal career ideas as well. (Ekonen, 2009).

As shown in figure (1) illustrate the different ways to define a career

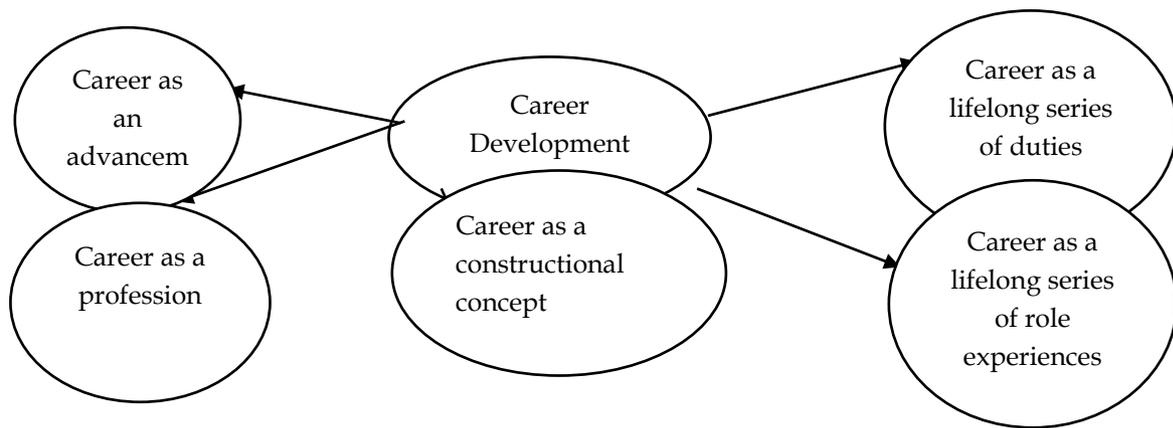


Figure (1) Definition of career development

Source: Done by the researcher

Factors of career enhancement or career hinder

Women's factors for career enhancement or hinder has been a conversation piece for long time. Many researchers have been identified as career hinders, but few have been identified as career enhancement. There have been two opposing viewpoints.

One conversation indicates women to be victims in organizational structure and society mechanism. Another says that if women are really concentrated on their career, they would reach those top positions in organization and therefore none succeeding is women's own fault.

Steps for developing women and women leaders' career can be judged as discrimination. Justification for professional advancement is one of the qualities that a firm seeks in a leader. Is the organization exaggerating the similarities or differences between women and men leaders, i.e., androgynous leadership? (Vanhala 2009.)

There are three different categories for career enhancement or hinder. (Vanhala 2009)

1. Gender-centered perspective
2. Organizational practice
3. Cultural differences

Gender-centered perspective

This perspective promotes reasoning that there are inside differences between women and men, which effect women as leaders in the top.

It includes factors such as attitudes, characteristics, behavior and socializing. Women are categorized as inappropriate for top-level management positions based on those considerations. This category also includes family and outward characteristics such as attractive looks. (Vanhala 2009)

Organizational practice

It has taken a long time to remold the organizational practices. There are numerous procedures and structural aspects in organizations that are critical to women's position and opportunities. (Vanhala 2009.)

Cultural differences

According to this perspective, only a small percentage of women leaders are based on the beliefs, standards, and stereotypes that govern women's and men's behavior, and these variables are deeply embedded in society. Because of the equality board's law, public discussion, and the appearance of role models, there has been a minor shift. (Vanhala 2009.)

Career Development phases

O'Neil and Bilimoria (2005) investigate how women's careers evolve over time, focusing on the impact of career contexts (social, organizational, and relational) as well as evolving images of their careers and women's career success. The following is a three-phase, age-related model of women's career growth stages:

- The idealistic achievement phase (phase 1)
- The pragmatic endurance phase (phase 2)

The re-inventive contribution phase (phase 3)

Those three career advancement phases are further explained as follows.

Career phase 1: idealistic achievement phase (early career)

Step 1: Early career success is driven by idealistic success (ages 24-35). In this process, women's employment choices would most likely be influenced by their expectations for career fulfilment, accomplishment, and success, as well as their desire to have a positive impact on others (O'Neil and Bilimoria, 2005). According to O'Neil and Bilimoria (2005), women at this time are most likely to be in charge of their futures and will be proactive in taking strategic initiatives to secure their job advancement (internal career locus). They are goal-oriented, driven to succeed, and goal-oriented. Consider their jobs as chances to make a difference and routes to personal pleasure and fulfilment.

Career phase 2: pragmatic endurance phase (mid-career)

As explained by O'Neil and Bilimoria, pragmatic endurance is the driving force of phase 2, mid-career (ages 36-45). (2005). In this phase, women are practical about their professions and work in a production mode, doing whatever it takes to get the task done. Their career trajectories, as highlighted by O'Neil and Bilimoria (2005), exhibit both ordered and developing tendencies. They have a strong interpersonal foundation and can handle a variety of roles both personally and professionally. They may have spent enough time in the workplace to recognise that, regardless of how internally motivated they were (during career phase 1), others now have a significant impact on their career development; professional others such as managers and peers, as well as personal others such as spouses, children, families, and friends.

Career phase 3: re-inventive contribution phase (advanced career)

Step 3, advanced career (ages 46-60) is driven by re-inventive contribution (O'Neil and Bilimoria, 2005). According to O'Neil and Bilimoria, the women in this process are focused on contributing to their organizations, families, and communities (2005). They are more prone to ascribe others' contributions to the direction of their careers (external career locus) both personally and professionally, and they are more likely to reflect a stable, planned career path (ordered career pattern). Women in the re-inventive contribution phase have had their personal lives subsumed by their work lives at some time during their careers. They have progressed further in their jobs; these women have re-conceptualized and recovered their careers as opportunities to participate in and support others without losing sight of themselves throughout their lives.

The barriers and facilitating factors affecting women's career development

The reasons behind the women's underrepresentation are complicated as at the same time women can have the opportunities to achieve higher positions but also there seems to be a variety of barriers slowing them down. The main barriers and facilitating factors affecting women's career development have been illustrated in Figure 1. The factors that are overlapping are factors that have been identified to have both hindering and facilitating effect on women's career advancement.

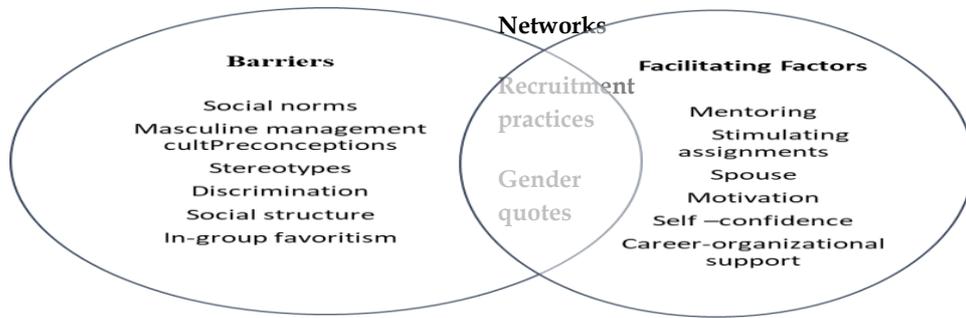


Figure 2. The main barriers and facilitating factors affecting women's careers

Source: (Johanna and Maija, 2019)

Perception and Stereotyping

Career is defined as: "the individually perceived sequence of attitudes and behaviors associated with work-related experiences and activities over the span of the person's life" (Hall, 2002, p. 7). It should be noted, however that the career of women differs from such traditional career development models, for example because of family responsibilities (O'Neil and Bilimoria, 2005), and there are many other facilitating factors and obstacles that distinguish women from male colleagues. One good example is that stereotypes and negative prejudice tend to prevail towards female leaders and hinder career growth. A common belief is that in leadership positions, men are more likely to be seen, while women are seen as supportive followers (Cooper Jackson, 2001; Eagly and Karau, 2002; Van Vianen and Fischer, 2002).

When people's perceptions of men and women's attributes are studied more closely, the mismatch between seeing women as followers and men as leaders commonly emerges (Heilman, 2001). Gender roles are socially accepted views about male and female characteristics. Women are more strongly related with attributes like compassion, empathy, and gentleness (Schuh et al., 2014), as well as kindness, helpfulness, sympathy, and concern for children and family (Schuh et al., 2014). (Heilman, 2001). Men are more strongly connected with attributes such as assertive, competitive, controlling, and dominant (Schuh et al., 2014) or aggressive, powerful, independent, and decisive (Heilman, 2001). Despite the fact that women with characteristics associated with women have progressed to positions of leadership, people's expectations about successful leader behaviors are still strongly associated with attributes such as competitiveness, assertiveness, and decisiveness, which are all traditionally associated with men's characteristics (Schuh et al., 2014). Furthermore, according to the notion of social identity (Tajfel and Turner, 1986), people choose to join groups based on their social identities, therefore male-dominated leadership posts may be avoided.

Furthermore, women in leadership positions are more prone to role conflict than their male colleagues, according to (Eagly, et al., 1994). Heilman (2001) claims that female leaders are perceived as more hostile than their male counterparts, with traits such as deception, selfishness, and bitterness.

According to Eagly and Karau (2002), the role of female gender and the role of leadership are inconsistent, according to social role theory (in most contexts). When conforming to prescriptions for the role of female gender, women are not deemed "proper" leaders (Eagly and Karau, 2002) or appropriate for progression to top leadership positions (Sools et al., 2007). As a result, women have a harder time becoming leaders than men. This is due to the widespread belief that women are less capable of leading and the preference that women do not demonstrate this skill, preferring instead to participate in supportive conduct (Eagly and Karau, 2002). Physical attractiveness, feminine apparel, and symbolic status are examples of job elements that may work against women (Eagly and Karau, 2002). Simultaneously, stereotypical attitudes about women's appearance appear to be impeding women's entry to senior management jobs (Kumra and Vinnicombe, 2008).

Personality and Self-Esteem

Women who have overcome perceptions and stereotypes According to O'Neil and Bilimoria (2005), more likely to rise above the stereotypes considering themselves in charge of their career and are fearlessly taking steps to ensure their career development. Similar findings have been also reached by other authors (e.g., Glass and Cook 2015; Guillaume and Pochic, 2009). Furthermore, women who are achievement-

oriented, motivated to progress, know what they want and are determined to succeed. In the literature, women who have achieved the high management position are the ones who are not afraid to take risks and have learned to express clearly what they want despite the opinions of others (Johns, 2013). Overall, women who have succeeded in their professions have been highly inspired to do so. Schuh, *et al* (2014), on the other hand, examined the relationship between gender, desire for power and occupancy of leadership roles. This led to women continuing to have a lower desire for power and thus holding less positions of leadership. While this may be true, women who occupy the positions seem to be much more motivated than their male peers (Ragins, 1998).

In addition, good self-image and self-esteem are important for managerial positions to be achieved and talent to be established (Robinson, *et al.* 2009). Leadership positions are often held by people who are creative and talented, as described by Northouse (2015). Studies show that as women grow up, girls who are known to be talented, their self-esteem decreases in puberty, particularly during their youth. The main explanation for this is that the expectations surrounding

how women should be, and act traditionally can conflict with how girls see themselves.

Modesty is another characteristic that has been identified as a barrier in women's careers. There is very little literature on the subject and some of the findings have been taken on the basis of research in social psychology. Budworth and Mann (2010) were one of the first to examine the relationship between modesty and access to leadership and according to modesty and self-promotion the general message, based on the literature, was that habits that are successful in the workplace for men are not successful for women. Although men are constantly self-promoting their achievement, women are under-representing their achievement to others. For instance, (Budworth and Mann, 2010) claim that women have been socialized to assume that when they are viewed by others as non-competitive, they will experience more positive outcomes, and they downplay their successes in the presence of others to avoid being considered unfeminine. Budworth and Mann, (2010) argue that men self-promote their performance in order to provide others with a successful self-image.

In sum, how women perceive themselves plays a key role in their career development and can explain the relative absence of women in higher management positions. The identity of leadership begins with a good self-image and without it, the opportunities to grow through new tasks and real accomplishments withers away. In order one reaching the top, an aspiring leader acquires the courage to differentiate oneself from the others (Ibarra, *et al.*, 2013).

Corporate Climate and Recruitment Practices

Organizations may have multiple variables that hinder the advancement of women's careers. The masculine organizational management culture (Van Vianen and Fischer, 2002) is one of these factors. The main takeaway is that organizations are mostly supported by male rather than female values and beliefs that are adhered to. Oftentimes, organizations which are male dominated (e.g., Boone *et al.*, 2013; Glass and Cook, 2015; Guillaume and Pochic, 2009), women are less prone to see themselves as leaders or seek leadership roles (Kulik, 2000). At the same time, the lack of strong female role models strengthens the perception of women as followers. According to literature, when the environment has only a few women in key executive roles, it is difficult to establish a mental model of women as leaders (Kulik, 2000).

More importantly, through their promotions and hiring methods, companies can often hinder women's careers. Women are encouraged to work in departments where growth opportunities are restricted or where they do not translate into executive promotion (Schwanke, 2013). Similarly, Guillaume and Pochic (2009) say that relative to their male peers, females are more likely to consider horizontal mobility. Women need additional qualifications, such as rare experience, better education or mentoring from male senior managers, to get promoted (Guillaume and Pochic, 2009). In addition, Kumra and Vinnicombe (2008) explores the relation between women's opportunities to top management and organizations' male-dominated management. As a result, the people who are promoted to higher positions are those who already resemble those in those positions, most of whom are men. In order to be a key barrier to achieving senior positions within the organization, women in the study experienced a lack of gender acceptance (Kumra and Vinnicombe, 2008).

In addition, it is suggested that recruiting firms are key actors in holding women out of top management positions (Fernandez-Mateo and Fernandez, 2016). Although this may be true, recruiting firms

are facing a challenge at the same time. They are expected to give more female candidates, but stereotypes restrict the description of the client organizations' desired individual. Businesses also look for a person who is reasonable, decisive and optimistic in the management role, characteristics of masculine leaders (Van Vianen and Fischer, 2002). Similarly, Johns (2013) argues that recruitment and outreach barriers are significant obstacles for women in reaching senior levels of management. As companies most often promote people to the management positions inside the company, organizations have limited options of people as they are not actively recruiting and adding more women into their ranks. Those women who do overcome the recruitment barrier, they are often obstructed by what the commission called corporate climate barriers, such as differing gender communication styles, behaviors, and ways of socializing (Johns, 2013). The conclusion is that as there is an ongoing double-bind situation affecting women's advancement, women do not have equal opportunities as men. "Oakley (2000, p. 324) describes that "a double-bind is a behavioral norm that produces a situation where a person cannot win no matter what she does." Double-bind is especially problematic for women because of difficulties affecting the career of women in terms of women's dress, actions and gender roles. In addition, an increasing number of women in leadership positions are more likely to have organizations that support the organizational culture of gender equality (Bajdo and Dickson, 2001; Knorr 2005).

Mentoring, Career Support and Networks

In order to overcome challenges in the workplace, various requirements are specified, including mentoring, career support and extended networks. Research shows, however that there are challenges related to these circumstances. In reality, a lack of mentoring is one of the most prominent female workplace obstacles (Boone *et al.*, 2013; Chanland and Murphy, 2018; Furst and Reeves, 2008; Hoobler *et al.*, 2009; Linehan and Walsh, 2001). Female leaders and other minorities have been studied to obtain less mentoring than their male peers (Linehan and Walsh, 2001; Mcdonald and Westphal, 2013). Anyway, it has been stated that the gender of the mentor does not affect the mentoring relationship's effectiveness (Linehan and Walsh, 2001). According to previous literature, when progressing in a profession, mentoring is seen as beneficial for women (Linehan and Walsh, 2001; Mcdonald and Westphal, 2013; O'Neil and Bilimoria, 2005; Tharenou, 2001). Women can benefit from strong and supportive relationships with mentoring and links with strong networks (Eagly, 2008; Linehan and Walsh, 2001). O'Neil and Bilimoria (2005) suggest that organizations should understand, recognize and support women's career. They suggest that managers are the best supporters, as they can encourage women's development through assuring that they have access to relevant opportunities.

In addition, limited access to networks is an existing problem in the development of women's professions (Eagly, 2008; Kumra and Vinnicombe, 2008). In their research, Glass and Cook (2015) note that women leaders experience a lack of access to important social and professional networks, as well as a lack of appreciation of their position and obligations and explicit difficulties with their authority. Moreover, because of work-family balancing, women face challenges when socializing with colleagues and building professional networks. In fact, women have very little time for networking because of family responsibilities (Eagly, 2008). This can be seen as one of the glass ceiling variables, as networking plays a key role in the course of a career. Networking can be described as one of the ways in which insider knowledge and help for the workplace can be obtained and proactively improved in a career (Eagly, 2008; Glass and Cook, 2015; Kumra and Vinnicombe, 2008). While networking is recognized as a proactive career-enhancing technique, while developing, women may feel frustration as they tend to develop their professional networks (Kumra and Vinnicombe, 2008). Women are not inherently naturally programmed to take personal credits for their achievement or to compete intra-sexually for economic capital, according to (Kumra and Vinnicombe, 2008).

Besides, Metz (2003) suggests that none of the interpersonal factors are connected to women's management development, such as mentor support, career promotion and internal networks. Mentoring, career support and both formal and informal networks may be beneficial for women when progressing in a career, according to the literature discovered.

Family and Spouse

Social norms tend to delegate tasks to women in childcare and eldercare, and because of this, care commitments are likely to restrict the capacity of women to enter and remain in the paid workforce. These

duties decrease their chances of promotion or opportunities to work at nights and on weekends (Coric, 2018). Also, the average age of women to start a family is 25 to 35, which is at the same time when an intense working involvement is required (Guillaume and Pochic, 2009).

Hoobler *et al.*, (2009) describes these social norms by the theory of the social role that prescribes gender-typical roles assigned to men and women, influencing both perceptions of acceptable behavior and assumptions about their own talents and abilities among men and women. The theory of the social role indicates that women are not associated with the effectiveness of management, whereas social roles are associated with nurturing (Hoobler *et al.*, 2009). Lewis (2010) argues that caregiving positions are seen in organizations with leadership roles that are discontinuous. Such caregiving assumptions attributed to women can contribute to women's career suffering (Hoobler *et al.*, 2009). A married man with kids, for example, may signal stability, while a married woman with kids may signal divided loyalties and restricted resources.

In their research, Ruderman, *et al.* (2002) mention that women with children are constantly torn between managerial and personal positions, feeling guilty and stressed. The literature, however, indicates that stress is not necessarily due to too many demands, but rather to their perception of the effect on their position as mothers of external work (Välimäki *et al.*, 2009). Hence, the position of the spouse is significant as it has been found that women who receive support from their husbands are less likely to feel that their role in the family is threatened by their profession (Välimäki *et al.* 2009). In fact, Välimäki, *et al* (2009) have found that the female manager's spouse has a big impact on a career. Thus, the role of the spouse in the career of the woman can be different, and the spouse can be determining, encouraging, flexible, instrumental or counterproductive, for example, a flexible husband with a broad-minded view of gender roles will, however, allow women to better manage their careers and effectively integrate their work and family lives (Välimäki *et al.*, 2009). Finally, as O'Neil and Bilimoria (2005) have noted, women need better integration between work life and personal life.

Barriers of Career Advancement among Women

There are two types of barriers in career advancement among women internal barriers, and external barriers. Internal barriers are the critical barriers which involve personality, psychology, experiences and the employees' self-concept towards her capabilities and abilities in achieving success in the career life (Swanson, 1997). Other than that, external barriers are the barrier that should be taken seriously by women employees. It is because, according to Zhao (2008) these barriers are out of control of the employees themselves.

These barriers are depending on the organization's awareness towards their employees benefits in their career advancement without differentiation of gender. Huang (2006), these external barriers are general, and it is typical in career advancement among women. It is because stereotyping is a very general barrier that occurs to every organization. This statement is supported by Back (2007) where the external barriers are including job promotions, motivation and reward system.

Internal Barriers

Internal barriers can be described as internal conflicts that impede the success of female employees in their career lives. Self-concept and even motivation may be part of internal conflicts (Swanson, 1997). In addition, internal barriers can also be described as the mental and emotional problems that prevent a person from doing a certain thing (Han, 2010).

In this research, internal barriers are defined as the internal conflicts that originate from the women employees themselves. The internal conflict includes perceptions regarding skills and abilities, perceptions regarding job and promotions, role conflict and aspirations support.

Perceptions Regarding Skills and Abilities

Women workers tend to view their own abilities and skills as insufficient, according to Al-Lamky (2007). This is because there is a lack of trust in female staff and insufficient training programs have been given. According to Jackson (2009), women workers lean towards inhibiting their own talents and abilities. Women employees' perceptions towards their skills and abilities. It is stated that women have lack of self-reliance and that what makes the women employees perceive that they are lacking skills and abilities.

Perceptions Regarding Job and Positions

Women workers feel unable to tolerate job promotions because they view job promotion as an out-of-control process. This is because female employees claimed that they were too heavy for the new job (Ryan, 2007). According to Kalev (2006), women workers feel that higher positions are not acceptable for them because they believe that higher positions need greater dedication. Perceptions regarding job and positions are meant to say that women perceive their job as treating them unfairly.

Role Conflict

Hamidi (2013) notes that role conflict is a conflict between two or more status positions. This happens when people in the different social positions they hold are faced with incompatible role expectations. Role conflict is focusing on women that have dual career which, her career at the workplace and her career at home.

Aspiration and Support

Aspiration and support can be defined as the aspiration given in motivating peoples (Litzky, 2007). It is also possible to describe aspiring as pushing others to do a certain thing or matter (Sümer, 2006). Aspiration and support are referring to working women who desires support from her family members include, the parents and spouse.

External Barriers

External barriers can be described as the preventing conditions that hold up the career advancement of women employees. Gender inequality and prejudices can be used in the prevention of conditions (Swanson, 1997). External barriers are defined as the impeding conditions that block the career advancement of female employees. Besides, Discriminatory behavior and sex-role stereotypes, workplace inequality, social isolation and networking are external barriers.

Discriminatory attitudes and sex-role stereotypes

Stereotyping is an irrational assumption that all persons or objects with unique features are the same (Ginige, 2007). Generalization is also a part of stereotyping where it categorizing, labelling and judging others to what they believe, not the real situation (Smith, 2012). Stereotyping is a way of thinking that describes the same traits of individuals that have the same personality. In this research, stereotyping focuses on how women are viewed.

Discrimination at the workplace

Discrimination is the prejudicial treatment of a person in a certain group or category based on their real or perceived membership (Isabel Metz, 2001). It can also be defined as a treatment given to a certain group of individuals that is unfair. The most discriminated group is black individuals and women, according to Akpinar-Sposito (2012). Moreover, workplace discrimination can be described as unequal treatment received by female workers in the workplace, such as attention provided by male supervisors and policies of organizations.

Social Isolation

For members of a social species, social isolation refers to a complete or near complete loss of interaction with society (Batacharya, 2010). Furthermore, social isolation is where the individual avoids getting contacted (Back, 2007).

Networking

Networking refers to the professional relationship that is formed between individuals (Kang, 2005). Additionally, networking is about the shared advantages obtained by those participating in it. Networking means relationships that bound in the workplace. Networking is focusing on women's networking with the male employees in the organization. (Kang, 2005)

Self-Esteem

According to Maslow (1970), self-esteem is an inner value that leads to self-appreciation that influence the behavior for self-protection. It is a person's overall emotional evaluation of his or her own worth. Self-esteem can be defined as an appreciation and respect of oneself that drives people to construct expectations that are precise to an issue and parallel to what they want.

Table (1) illustrate the difference between the internal and external barriers

No	Career Advancement Barriers	
	Internal Barriers	External Barriers
1	Perceptions Regarding Skills and Abilities The perception that women workers lack the sufficient skills and abilities than men at work.	Discriminatory attitudes and sex-role stereotypes Stereotypes a fixed idea that many people have about a thing or a group that may often be untrue or only partly true. stereotype
2	Perception Regarding Job and Positions Perception that female employees are not responsible for new position	Discrimination at the workplace Discrimination is an unfair treatment given to women workers
3	Role Conflict Role conflict is the conflict between two or more positions	Social Isolation Social isolation is where the individual avoids getting contacted with other people
4	Aspiration and Support Aspiration and Support are support given to women from her family and spouse	Networking Networking mean that females networking with males in work
5		Self- Esteem How you feel about your abilities and limitations. When you have healthy self-esteem, you feel good about yourself and see yourself as deserving the respect of others. When you have low self-esteem, you put little value on your opinions and ideas. How women workers feel about their self

Source: Done by the researcher

Impact of familial responsibilities on career advancement

Due to the fact that the current research specifically explores the career barriers experienced by women in management positions, it is of great importance to examine the concept of career advancement from the perspective of the Family Responsibility Model. Given the fluid and flexible nature of the concept of career advancement, this research uses a definition that is twofold, one that defines the markers of advancement and includes the concept of sustainability. Therefore, career advancement refers to improvements in job quality seen through "higher pay, more work hours, a promotion, increased stability, better pension and other fringe benefits" (Foster, 2011, p. 7). Moreover, it includes a person's ability to maintain the aforementioned factors. Meaning that, career advancement is not a once-off occurrence, it is continuous throughout one's career. Thus, in the current study, career advancement is viewed as the ability of women to advance beyond the current the managerial levels and to excel further.

Equally important is noting that central to career advancement, is having the right environment in which to grow and advance, for example, research by Croteau and Wolk (2010) found that organizations which have an advancement manager for top talent retainment tend to promote their top talent more than organizations that do not. Thus, indicating that career advancement is successful when there is organizational support as well as individual determination and intent.

The impact of Marriage on Career Advancement

Research shows that men who are married fare favorably in wage negotiations and promotion opportunities. This could be related to the perception of stability and responsibility that comes with the status and values attached to being married (Beauregard, 2007). In contrast, women who are married more often expected to take on fewer demanding jobs (Beauregard, 2007). The same research has suggested that single women are more likely to advance rapidly than their married counterparts; this is due to the belief that single women have less home responsibilities and are able to dedicate more time to work responsibilities.

The impact of Children on Career Advancement

Having children may reduce advancement opportunities for women for a number of reasons. Firstly, some women may choose to take less work responsibilities once they are mothers. Secondly, is that women

continue to take on the bulk of household responsibilities and childcare, leaving limited time for career advancement opportunities? Lastly, organizations may mistakenly assume that women with children will have reduced commitment to the organization and less interest in career advancement opportunities. (Beauregard, 2007). Therefore, it is of great importance to examine the effect of family responsibilities when studying the career development of women.

How to overcome Female Career Obstacles

In order to be successful, it is argued that women need support from people in a strategic position. In addition, they need to be easy to get along with and they need to be able, to a greater extent than men, to adapt. According to a study by (Burke, 2007), in order for women to resolve obstacles of career advancement, these factors related to the development of good ties with men in a male dominated environment are of utmost importance. Women were also, more often than men, acquired to take career risks, be tough, have strong desires to succeed and have an impressive presence (Burke, 2007). Morrison (1992) developed a model for career advancement that has a few assumptions; it assumes that in order to sustain growth, all three elements are present in the same relative proportions over time (Burke, 2007). As below, the components are defined.

“The Challenge of new situations and difficult goals prompts managers to learn the lessons and skills that will help them perform well at higher levels. Recognition includes acknowledgement and rewards for achievement and the resources to continue achieving in the form of promotions, salary increases and awards. Support involves acceptance and understanding along with values that help managers incorporate their career into rich and rewarding lives” (Burke, 2007, p. 118).

A greater amount of research has focused in recent years on women's career development, and how women can break through the previously presented glass ceiling phenomenon. To break the glass ceiling, three kinds of knowledge are required, according to Burke (2007):

1. It is crucial to understand the obstacles women face in their career advancement.
2. It is further helpful to understand the career strategies that successful women use.
3. It is critical that CEOs have an accurate and complete understanding of all obstacles and experiences by their female employees (Burke, 2007).

The question involving “how” women break the glass ceiling was appointed by Ragins, Townsend and Mattis (1998); they found in their research four career strategies that were central for women’s career progress (cited in Burke, 2007). These were:

1. Consistently exceeding performance expectations.
2. Developing a style with which men are comfortable.
3. Seeking difficult or high visibility assignments.
4. Having an influential mentor.

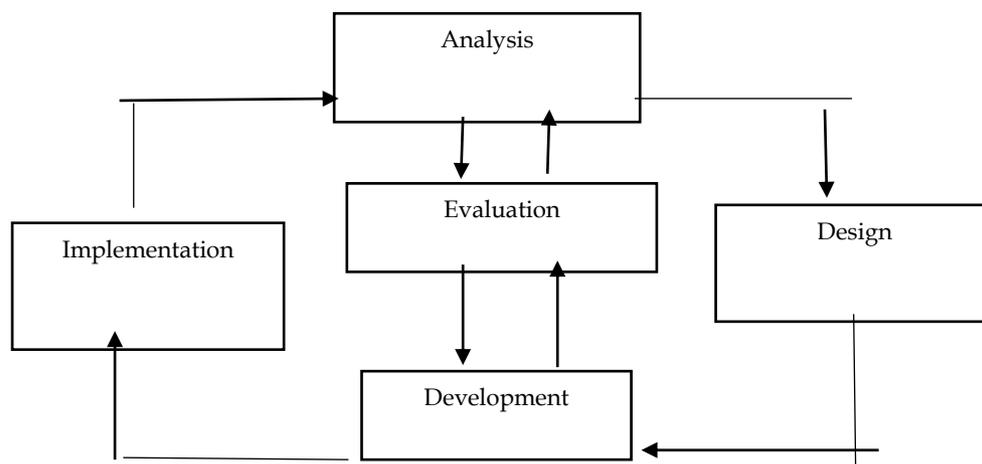


Figure 3: Development model (adapted and modified Morrison, 2010)

Factors Motivating Women's Education Advancement

There is a current development policy emphasizes on human resource development, in general, and women's education, in particular because of the impact women's education has on economic efficiency and social welfare. Shan (2015) stated that with the increase in women's education, the economic efficiency and the social welfare increases. Mujahid-Mukhtar (2008) pointed out on a similar basis, that investment in education is a significant economic investment with long-term benefits. Thus, its effect on return rates and the efficient allocation of returns capabilities.

Quite a number of research indicate that growing women's education raises women's incomes, which also results in a greater return on education for women than for men (Schultz, 2002). Empirical evidence also indicates that an increase in the education of women increases the effects of human growth, such as child survival, health and education (Morssion, and Sinha, 2007). Education is arguably the most critical tool for the production of human capital (Chaudhry, 2009).

Tools and Strategies for Educational Advancement and Career Advancement

Although women have a variety of options for furthering their education and jobs. Women's commitment to family, limited access to opportunities for professional training and development, and a lack of informal networks, mentoring systems, and organizational support, according to Binti *et al.* (2014), are all important factors, as are gender bias and male employees' failure to take women seriously. Ezzedeen and Ritchey (2009) propose a number of career advancement and career-family balance strategies as viable options for women. Education and career advancement, encompassing professional and personal support, value systems, and life-course methods such as career and family planning, spousal support bargaining, and childbearing. Many organizations and businesses are taking proactive steps to help women climb the corporate ladder by providing more opportunities for women leaders, allowing for flexible work schedules, developing leadership development programs, organizing mentoring programs, and forming women's corporate networks (McDonagh and Paris, 2012).

Kemp and Madsen also propose a variety of flexible occupations (2014). Part-time jobs, flexible work hours, Telework, and promotional possibilities are all promoted to help women enhance their education and careers. Mentoring was highly suggested for women to develop their education and employment, according to Harris *et al.* (2011), because mentors and networking can assist women acquire vital knowledge information and possibilities for job progression. The importance of mentorship was further confirmed by Peters in a study of African American women gaining tenure in the field of educational leadership (2011). Professional career women's development uses a variety of educational and job resources, including family assistance.

According to Cheung and Halpern (2010), women leaders in several research all mentioned the importance of family support in achieving top positions. While extended family may help with housekeeping and childcare, husbands could also take on a major share of home tasks or play the role of the following spouse, ready to relocate to a new area with unknown job prospects if their wife's profession was to succeed. Furthermore, assistance for families and partners was acknowledged as being important in women's education and job advancement (Turner 2007). Senior academic women seem to demonstrate very strong personalities such as being self-motivated, independent and hardworking.

Twombly (1998) discovered that these women were determined not to be left behind by trying their best to survive many battles through their own excellence, tenacity, and political skills to rise to the top of their professions. They have worked twice as hard to be popular as their male counterparts. Additionally, Cubillo and Brown (2003) similarly found in a review of narratives taken from women aspiring to leadership and management in nine different educational settings, from very different areas of the world, that while they had to confront hostile male-dominated societies, these women tended to be hostile cultures. Highly autonomous, optimistic and self-motivated. Besides, Blackwood and Brown-Welty (2011) have found that these women often wanted to be the best in their place while investigating paths to leadership. The tactics employed by a number of other women leaders and managers were also to work hard and work smart (Cheung and Halpern, 2010).

Research Methods

The descriptors "women at work," "women's growth," and "women career development" were used to perform a complete literature review. The majority of the sources, with the exception of seminal books, are Books, conference papers, refereed and non-refereed publications, and online sources were found during the literature search. The sources were chosen for their academic value. Additionally, manuscripts frequently revealed other research sources. An inductive study of the literature resulted in the emergence of patterns and themes, and the initial research question proceeded through iterations of refining as part of this process. The researcher considers the internal and external factors, gender and stereotyping as key words for literature searches on women career development

Conclusion

The socio-cultural context has a variety of effects on women's job success. Stereotypical attitudes about gender roles were experienced by the participants as hidden barriers to women's career advancement.

Gender stereotypes and opinions toward women's professional choices did have an impact on women's career choices, with many opting for teaching over administration. Women were less comfortable in managerial positions due to the realities of their roles. Although the women recognized certain environmental barriers, none of them believed that these obstacles were sufficient to prevent them from reaching their goals. The intrapersonal constraints that the participants most associated with were ideas about one's own beliefs, ability to perform, and prioritizing work and home. As a result, it can be inferred that the most significant hurdles to women's advancement in management roles are personal rather than environmental. However, the environment's influence cannot be overlooked.

References

- Afza, S.R. and Newaz, M.K., 2008. Factors determining the presence of glass ceiling and influencing women career advancement in Bangladesh.
- Ahmad, F., 2001. Modern traditions? British Muslim women and academic achievement. *Gender and Education*, 13(2), pp.137-152.
- Akpinar-Sposito, C., 2013. Career barriers for women executives and the Glass Ceiling Syndrome: the case study comparison between French and Turkish women executives. *Procedia-Social and Behavioral Sciences*, 75, pp.488-497.
- Al-Lamky, A., 2007. Feminizing leadership in Arab societies: the perspectives of Omani female leaders. *Women in management Review*.
- Azmi, I.B.A.G., Ismail, S.H.S. and Basir, S.A., 2014. Muslim women career advancement: a study of Indonesian public service. *International Journal of Business and Social Science*, 5(2).
- Back, D.P., 2007. Perceptions and reactions to career barriers among women in executive leadership roles at community colleges (Doctoral dissertation, The University of North Carolina at Greensboro).
- Bajdo, L.M. and Dickson, M.W., 2001. Perceptions of organizational culture and women's advancement in organizations: A cross-cultural examination. *Sex Roles*, 45(5-6), pp.399-414.
- Batacharya, J.S., 2010. Life in a body: Counter hegemonic understandings of violence, oppression, healing and embodiment among young South Asian women. University of Toronto.
- Bazazo, I., Nasseef, M.A., Mukattesh, B., Kastero, D. and Al-Hallaq, M., 2017. Assessing the glass ceiling effect for women in tourism and hospitality. *Journal of Management and Strategy*, 8(3), p.51.
- Bell, M.P., McLaughlin, M.E. and Sequeira, J.M., 2002. Discrimination, harassment, and the glass ceiling: Women executives as change agents. *Journal of business ethics*, 37(1), pp.65-76.
- Bombuwela, P. and Alwis, A.A., 2013. Effects of glass ceiling on women career development in private sector organizations-Case of Sri Lanka. *Journal of Competitiveness*, 5(2).
- Boone, J., Veller, T., Nikolaeva, K., Keith, M., Kefgen, K. and Houran, J., 2013. Rethinking a glass ceiling in the hospitality industry. *Cornell Hospitality Quarterly*, 54(3), pp.230-239.
- Bruckmüller, S., Ryan, M.K., Rink, F. and Haslam, S.A., 2014. Beyond the glass ceiling: The glass cliff and its lessons for organizational policy.
- Burke, R., Vinnicombe, S., O'Neil, D.A. and Bilimoria, D., 2005. Women's career development phases. *Career development international*.
- Burke, R.J., 2007. Career development of managerial women: Attracting and managing talent. *Handbook on women in business and management*, pp.109-131.
- Budworth, M.H. and Mann, S.L., 2010. Becoming a leader: The challenge of modesty for women. *Journal of Management Development*.

- Catalyst (2018). Women CEOs of the S and P 500 companies. New work. Retrieved from: <http://www.catalyst.org/knowledge/women-ceos-sp-500> [2018, April 8].
- Chanland, D.E. and Murphy, W.M., 2018. Propelling diverse leaders to the top: A developmental network approach. *Human Resource Management*, 57(1), pp.111-126.
- Chaudhry, I.S. and Rahman, S., 2009. The impact of gender inequality in education on rural poverty in Pakistan: an empirical analysis. *European Journal of Economics, Finance and Administrative Sciences*, 15(1), pp.174-188.
- Cook, A. and Glass, C., 2014. Women and top leadership positions: Towards an institutional analysis. *Gender, Work & Organization*, 21(1), pp.91-103.
- Ćorić, B., 2018. The Glass Ceiling Puzzle, Legal Institutions, and the Shadow Economy. *Feminist Economics*, 24(4), pp.56-82.
- Costa, C., Bakas, F.E., Breda, Z. and Durao, M., 2017. 'Emotional' female managers: How gendered roles influence tourism management discourse. *Journal of hospitality and tourism management*, 33, pp.149-156.
- Cotter, D.A., Hermsen, J.M., Ovadia, S. and Vanneman, R., 2001. The glass ceiling effect. *Social forces*, 80(2), pp.655-681.
- Cross, C. and Linehan, M., 2006. Barriers to advancing female careers in the high-tech sector: empirical evidence from Ireland. *Women in Management Review*.
- Croteau, J.D. and Wolk, H.G., 2010. Defining advancement career paths and succession plans: Critical human capital retention strategies for high-performing advancement divisions. *International Journal of Educational Advancement*, 10(2), pp.59-70.
- Davidson, M.J. and Burke, R.J., 2016. Women in management worldwide: Progress and prospects—An overview. In *Women in Management Worldwide* (pp. 19-36). Gower.
- Eagly, A. (2008). Women and the labyrinth of leadership. *Human Resource Management International Digest*, 16(1), Human Resource Management International Digest, 25 January 2008, Vol.16 (1).
- Eagly, A.H. and Karau, S.J., 2002. Role congruity theory of prejudice toward female leaders. *Psychological review*, 109(3), p.573.
- Eagly, A.H., Karau, S.J., Miner, J.B. and Johnson, B.T., 1994. Gender and motivation to manage in hierarchic organizations: A meta-analysis. *The Leadership Quarterly*, 5(2), pp.135-159.
- Ekonen, M. 2009. Urateoriat. Naisjohtajuuden tutkimus- ja koulutushanke.
- Ellemers, N., Rink, F., Derks, B. and Ryan, M.K., 2012. Women in high places: When and why promoting women into top positions can harm them individually or as a group (and how to prevent this). *Research in Organizational Behavior*, 32, pp.163-187.
- Ezzedeen, S.R. and Ritchey, K.G., 2009. Career advancement and family balance strategies of executive women. *Gender in management: An international journal*.
- Federal Glass Ceiling Commission. (1995). Good for Business: Making Full Use of the Nation's Human Capital. U.S. Department of Labor. <http://www.dol.gov/oasam/programs/history/reich/reports/ceiling.pdf>
- Fernandez-Mateo, I. and Fernandez, R.M., 2016. Bending the pipeline? Executive search and gender inequality in hiring for top management jobs. *Management Science*, 62(12), pp.3636-3655.
- Furst, S.A. and Reeves, M., 2008. Queens of the hill: Creative destruction and the emergence of executive leadership of women. *The Leadership Quarterly*, 19(3), pp.372-384.
- Ginige, K., Amaratunga, R.D.G. and Haigh, R.P., 2007. Gender stereotypes: A barrier for career development of women in construction.
- Glass, C. and Cook, A., 2016. Leading at the top: Understanding women's challenges above the glass ceiling. *The Leadership Quarterly*, 27(1), pp.51-63.
- Goodman, J.S., Fields, D.L. and Blum, T.C., 2003. Cracks in the glass ceiling: In what kinds of organizations do women make it to the top? *Group & Organization Management*, 28(4), pp.475-501.
- Guendouzi, J., 2006. "The guilt thing": Balancing domestic and professional roles. *Journal of Marriage and Family*, 68(4), pp.901-909.
- Guillaume, C. and Pochic, S., 2009. What would you sacrifice? Access to top management and the work-life balance. *Gender, Work & Organization*, 16(1), pp.14-36.
- Hall, D.T., 2002. *Careers in and out of organizations*. Sage .
- Hamidi, K.A. and Mustafa, Z., 2013. Politik gender: perbandingan peranan wanita dan proses politik di Malaysia-Jepun: halangan dan prospek. In *Proceeding of the International Conference on Social Science Research, ICSSR*.
- Hakim, C., 2000. *Work-lifestyle choices in the 21st century: Preference theory*. Up Oxford.
- Han, G.H., 2010. Trust and career satisfaction: The role of LMX. *Career Development International*.
- Heilman, M.E., 2001. Description and prescription: How gender stereotypes prevent women's ascent up the organizational ladder. *Journal of social issues*, 57(4), pp.657-674.
- Hoobler, J.M., Wayne, S.J. and Lemmon, G., 2009. Bosses' perceptions of family-work conflict and women's promotability: Glass ceiling effects. *Academy of management journal*, 52(5), pp.939-957.

- Huang, Q., 2006. The nature of women's career development: Determinants and consequences of career patterns (Doctoral dissertation, Psykologiska institutionen).
- Ibarra, H., Ely, R. and Kolb, D., 2013. Women rising: The unseen barriers. *Harvard business review*, 91(9), pp.60-66.
- Islam, M.A. and Jantan, A.H., 2017. The glass ceiling: Career barriers for female employees in the Ready-Made Garments (RMG) Industry of Bangladesh. *Academy of Strategic Management Journal*, 16(3).
- Ismail, M. and Ibrahim, M., 2008. Barriers to career progression faced by women: Evidence from a Malaysian multinational oil company. *Gender in Management: An International Journal*.
- Jackson, J.F. and O'Callaghan, E.M., 2009. What do we know about glass ceiling effects? A taxonomy and critical review to inform higher education research. *Research in Higher Education*, 50(5), pp.460-482.
- Jackson, J.C., 2001. Women middle managers' perception of the glass ceiling. *Women in management review*.
- Johns, M.L., 2013. Breaking the glass ceiling: Structural, cultural, and organizational barriers preventing women from achieving senior and executive positions. *Perspectives in Health Information Management/AHIMA*, American Health Information Management Association, 10(winter).
- Kalev, A., Dobbin, F. and Kelly, E., 2006. Best practices or best guesses? Assessing the efficacy of corporate affirmative action and diversity policies. *American sociological review*, 71(4), pp.589-617.
- Kang, H.R. and Rowley, C., 2005. Women in management in South Korea: advancement or retrenchment? *Asia Pacific business review*, 11(2), pp.213-231.
- Kulik, L., 2000. Jobless men and women: A comparative analysis of job search intensity, attitudes toward unemployment, and related responses. *Journal of Occupational and Organizational Psychology*, 73(4), pp.487-500.
- Kumra, S. and Vinnicombe, S., 2008. A study of the promotion to partner process in a professional services firm: How women are disadvantaged. *British Journal of Management*, 19, pp.S65-S74.
- Kurupparachchi, K.A.P.S.T. and Surangi, H.A.K.N.S., 2020. The Glass Ceiling and Women Career Advancement: A Study Based on Ready-Made Garment Industry in Sri Lanka. *Kelaniya Journal of Management*, 8(2).
- Linehan, M. and Walsh, J.S., 2001. Key issues in the senior female international career move: A qualitative study in a European context. *British Journal of Management*, 12(1), pp.85-95.
- Litzky, B. and Greenhaus, J., 2007. The relationship between gender and aspirations to senior management. *Career Development International*.
- Mavin, S., 2000. Approaches to careers in management: Why UK organizations should consider gender. *Career Development International*.
- McDonough, K.J. and Paris, N.M., 2012. The leadership labyrinth: Career advancement for women. *Frontiers of health services management*, 28(4), pp.22-28.
- McDonald, M.L. and Westphal, J.D., 2013. Access denied: Low mentoring of women and minority first-time directors and its negative effects on appointments to additional boards. *Academy of Management Journal*, 56(4), pp.1169-1198.
- Metz, I. and Tharenou, P., 2001. Women's career advancement: The relative contribution of human and social capital. *Group & Organization Management*, 26(3), pp.312-342.
- Metz, I., 2003. Individual, interpersonal, and organizational links to women's advancement in management in banks. *Women in Management Review*.
- Mujahid-Mukhtar, E., 2008. Poverty and Economic Vulnerability in South Asia: Does it Impact Girls' Education? United Nations Children's Fund, Regional Office for South Asia.
- Northouse, P.G., 2018. *Leadership: Theory and practice*. Sage publications.
- Oakley, J.G., 2000. Gender-based barriers to senior management positions: Understanding the scarcity of female CEOs. *Journal of business ethics*, 27(4), pp.321-334.
- Oke. 2003. Gender and Organizational Performance: Determinants of Small Business Survival and Success. *Academy of Management Journal*, 34(1), pp. 136-161.
- Oláh, L.S., Kotowska, I.E., and Richter, R., 2018. The new roles of men and women and implications for families and societies. In *A Demographic perspective on gender, family and health in Europe* (pp. 41-64). Springer, Cham.
- Powell, G.N. and Butterfield, D.A., 1994. Investigating the "glass ceiling" phenomenon: An empirical study of actual promotions to top management. *Academy of Management journal*, 37(1), pp.68-86.
- Ragins, B.R., Townsend, B. and Mattis, M., 1998. Gender gap in the executive suite: CEOs and female executives report on breaking the glass ceiling. *Academy of Management Perspectives*, 12(1), pp.28-42.
- Robinson, C., Feters, R., Riester, D. and Bracco, A., 2009. The paradox of potential: A suggestion for guiding talent management discussions in organizations. *Industrial and Organizational Psychology*, 2(4), pp.413-415.
- Ruderman, M.N., Ohlott, P.J., Panzer, K. and King, S.N., 2002. Benefits of multiple roles for managerial women. *Academy of management Journal*, 45(2), pp.369-386.
- Ryan, M.K., Haslam, S.A. and Postmes, T., 2007. Reactions to the glass cliff: Gender differences in the explanations for the precariousness of women's leadership positions. *Journal of Organizational Change Management*, 20(2), pp.182-197.

- Sabharwal, M., 2015. From glass ceiling to glass cliff: Women in senior executive service. *Journal of Public Administration Research and Theory*, 25(2), pp.399-426.
- Schuh, S.C., Bark, A.S.H., Van Quaquebeke, N., Hossiep, R., Frieg, P. and Van Dick, R., 2014. Gender differences in leadership role occupancy: The mediating role of power motivation. *Journal of Business Ethics*, 120(3), pp.363-379.
- Schultz, T.P., 2002. Why governments should invest more to educate girls. *World development*, 30(2), pp.207-225.
- Schwanke, D.A., 2013. Barriers for women to positions of power: How societal and corporate structures, perceptions of leadership and discrimination restrict women's advancement to authority. *Earth Common Journal*, 3(2).
- Shan, H., 2015. Women, gender, and immigrant studies: state of the art in adult education in Canada. *Canadian journal for the study of adult education*, 27(2 SE), pp.46-63.
- Shelton, L.M., 2006. Female entrepreneurs, work-family conflict, and venture performance: new insights into the work-family interface. *Journal of small business management*, 44(2), pp.285-297.
- Smith, P., Crittenden, N. and Caputi, P., 2012. Measuring women's beliefs about glass ceilings: development of the Career Pathways Survey. *Gender in Management: An International Journal*.
- Sools, A.M., Van Engen, M.L. and Baerveldt, C., 2007. Gendered career-making practices: On doing ambition or how managers discursively position themselves in a multinational corporation. *Journal of Occupational and Organizational Psychology*, 80(3), pp.413-435.
- Stotsky, M. J. G. (2016). Trends in gender equality and women's advancement. International Monetary Fund.
- Sümer, H.C., 2006. Women in management: Still waiting to be full members of the club. *Sex roles*, 55(1-2), pp.63-72.
- Swanson, J.L. and Woitke, M.B., 1997. Theory into practice in career assessment for women: Assessment and interventions regarding perceived career barriers. *Journal of career assessment*, 5(4), pp.443-462.
- Tajfel, H. and Turner, J.C. (1986) *The Social Identity Theory of Intergroup Behavior*. *Psychology of Intergroup Relations*, 5, 7-24.
- Thornton, G., 2017. *Women in business: new perspectives on risk and reward*. Chicago, IL: Grant Thornton.
- Thurasamy, R., Lo, M.C., Amri, A.Y. and Noor, N., 2011. An analysis of career advancement among engineers in manufacturing organizations. *International Journal of Commerce and Management*.
- Tlaiss, H. and Kausar, S., 2010. Perceived organizational barriers to women's career advancement in Lebanon. *Gender in Management: An International Journal*.
- Välimäki, S., Lämsä, A.M. and Hiillos, M., 2009. The spouse of the female manager: role and influence on the woman's career. *Gender in Management: An International Journal*.
- Van Vianen, A.E. and Fischer, A.H., 2002. Illuminating the glass ceiling: The role of organizational culture preferences. *Journal of Occupational and Organizational Psychology*, 75(3), pp.315-337.
- Vossenbergh, S., 2013. Women Entrepreneurship Promotion in Developing Countries: What explains the gender gap in entrepreneurship and how to close it. *Maastricht School of Management Working Paper Series*, 8(1), pp.1-27.
- Wirth, L. (2004). *Breaking through the glass ceiling: Women in management - Update 2004*. Geneva, International Labour Office.
- Worrall, L., Harris, K., Stewart, R., Thomas, A. and McDermott, P., 2010. Barriers to women in the UK construction industry. *Engineering, Construction and Architectural Management*.
- Wright, E.O., Baxter, J. and Birkelund, G.E., 1995. The gender gap in workplace authority: A cross-national study. *American sociological review*, pp.407-435.
- Yasin, E., Abdelmaboud, A., Saad, H. and Qoura, O., 2019. What challenges affect women work in the hotel industry? Evidence from five-star hotels in Cairo. *International journal of heritage, tourism and hospitality*, 13(1), pp.35-47.
- Young, R.A. and Collin, A., 2004. Introduction: Constructivism and social constructionism in the career field. *Journal of vocational behavior*, 64(3), pp.373-388.
- Zhao, W. and Zhou, X., 2008. Intraorganizational career advancement and voluntary turnover in a multinational bank in Taiwan. *Career Development International*.

Risk management and strategic improvement of corporate sustainability for multinational companies

Nasser Mohammed Lasloom
Elena Grigorieva
Peoples' Friendship University of Russia
Moscow, Russia

Keywords

Risk, Risk Management, Multinationals, Saudi Arabia, Strategy

Abstract

Risk management which occurs everywhere in the realm of finance allows organizations attempt to prepare for the unexpected by minimizing risks and extra costs before they happen. This is done by implementing a risk management plan and considering the various potential risks or events before they occur. Descriptive statistics using a frequency distribution and percentage distribution were used to analyse the data gotten from five multinational companies in Saudi Arabia. Chi-square (X^2) test was also used as the statistical tool to test for the hypothesis. The study shows that risk identification, risk evaluation and analysis, risk policy implementation and risk prevention are more efficient and influential factors to consider in contributing to the financial risk management practices of many multinational organizations. In pursuit of corporate sustainability, multinational companies are thus advised to put more attention on these factors in implementing risk management plans.

1.0 Introduction

Risk management is the process of identifying, evaluating, and controlling threats to an organization's capital and revenue. These threats or risks can arise from a wide variety of sources, including financial uncertainty, legal obligations, governance errors, accidents, and natural disasters. Threats to IT security and data risks and risk management strategies to mitigate them have become a top priority for digital companies. As a result, a risk management plan includes more and more processes for companies to identify and control threats to their digital assets, including private corporate data, personal customer information (PII), and intellectual properties.

All businesses and organizations face the risk of unexpected and damaging events that could cost the company money or lead to its eventual closure. Risk management allows organizations to try to prepare for surprises by minimizing the risks and additional costs before they occur. The implementation of a risk management plan and considering various potential risks or events before they occur, can help an organization save money and protect its future. This is because a robust risk management plan will help a company establish procedures to avoid potential threats, minimize their impact if they occur, and manage results. This ability to understand and control risk allows organizations to have more confidence in their business decisions. In addition, sound corporate governance principles that emphasize risk management can help a company achieve its goals.

Risk management occurs in all finances. It can happen in different scenarios like when an investor buys Treasury instead of corporate bonds, when a fund manager hedges its exposure to the exchange rate with exchange rate derivatives and when a bank performs a credit check on an individual before issuing a line of credit. Improper risk management can have serious consequences for businesses, individuals and the economy.

As a result of the state of uncertainty, most organizations have implemented risk management processes to identify, assess, and respond to these unavoidable risks. There is often a critical gap in this risk identification process.

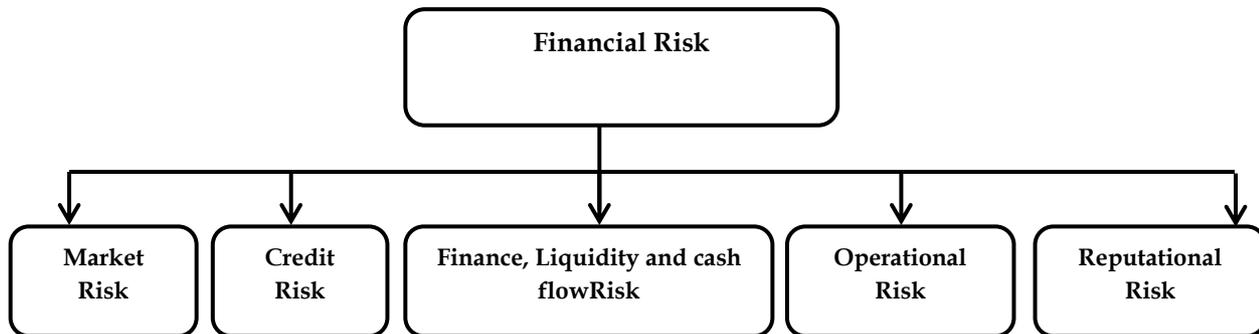
Strategic risk management, as reported in a recent study by McKinsey & Company is the process of identifying, assessing, and managing risks in an organization's business strategy, which includes taking action when risks materialize.

Financial risk management is the process of understanding and managing the financial risks your business may face, either now or in the future. It's not about eliminating risks, because few companies are

prepared adequately against risk. The idea is to understand the risk companies are willing to take and risks they prefer to avoid and how to develop a strategy based on appetite for risk.

Many financial analysts classify financial risk into five (5) main parts:

Diagram 1



Market risks: these are the financial risks that are derived from possible losses due to changes in future prices or market rates. Price changes are often related to interest rate or exchange rate movements, but they also include the price of commodities that are essential to the business.

- Credit risks: financial risks associated with the possibility of default by the counterparty. Credit risks often arise because customers do not pay for goods delivered on credit. Exposure to credit risk increases significantly when a company relies heavily on a small number of large customers who have had access to a significant amount of credit. The importance of credit risk varies across sectors and is high in the area of financial services, where short- and long-term loans are critical to the business.

- Financing risks, liquidity and cash flows: Financing risks affect an organization's ability to obtain ongoing funding. An obvious example is a company's dependence on access,

- Credit from bank: Liquidity risk refers to the uncertainty about a company's ability to close a position at low or zero cost and is also related to the availability of sufficient funds to meet financial obligations when it claims. Cash flow risks are related to the daily operation cash flow volatility of the business.

- Operational risk: this risk is the result of performing the business functions of a business that takes into account the people, systems and processes by which a company operates. It also includes fraud risks, legal risks and environmental risks. It can be defined as the loss that an institution suffers due to inadequate or failed internal processes, people, and systems. It is not used to generate benefits such as credit risk and market risks.

Reputational risk: It's a type of financial risk which is related to the trustworthiness of business or an organization or an institution. It adversely affects the reputation of an organization which are likely to destroy the value of the shareholders. It results to loss of revenue, litigation, adverse publicity, withdrawal of chief employees, fall in share values, loss of trade partners. Sometimes it is used as a tool for crisis prevention but in extreme case may even lead to bankruptcy.

2.0 Literature Review

Risk is often defined as the likelihood or threat of damage, injury, liability, loss, or any other adverse event caused by external or internal factors, which can be avoided by taking appropriate actions. Risk is a function of the likelihood that something will happen, and the degree of loss incurred as a result of the situation or activity. Losses can be direct or indirect. Indirect losses include loss of reputation, loss of customer confidence, and increased operating costs during recovery.

The likelihood that something happens will affect the achievement of goals (Basel Banking Supervision Committee 2005). Risk management is simply the practice of systematically choosing cost-effective approaches to minimize the impact of a threat on an organization. All risks can never be completely avoided or mitigated by financial and practical constraints alone (Moteff, 2005). Risk management is defined as the identification, assessment and prioritization of risks, followed by the coordinated and economical use of resources to minimize, monitor and control the likelihood and / or impact of adverse events, or to maximize opportunities.

Risks can arise from uncertainty in financial markets, project failures, legal obligations, credit risk, accidents, natural causes and disasters, and deliberate attacks by an attacker. Risk management strategies include transferring risk to another party, avoiding the risk, reducing the negative impact of the risk, and accepting the consequences of a particular risk (Hubbard, 2009). An effective risk management system minimizes the complexity of planning, executing and managing overall business management, which is critical to success, and increases business profitability. The client is happy and safe when he / she invests in a risk-free business and wants to be equally happy with every new opportunity.

Management and profitability are closely related aspects and should be treated with special emphasis. If the business is to achieve high profitability over a period of time (Gizycki, 2001; Paulinus, E.C., & Jones, A.S. 2017). In general, the financial system is more than just institutions that facilitate payments and provide loans. This includes all the features that direct the actual resources to their end user. It is the central nervous system of a market economy, containing a number of separate but dependent components that are necessary for its efficient and effective functioning. These components include financial intermediaries such as banks and insurance companies that act as primary agents for making commitments and receiving claims. The second component is the markets in which financial assets are exchanged, and the third is the infrastructure component, which is necessary for effective interaction between intermediaries and markets. These three components are inextricably linked (Adeoye & Amupitan 2015). Increasing shareholder returns, reflecting the bank's performance, is one of the important tasks of bank management. The goal is often achieved at the expense of increased risk. The Bank faces a variety of risks such as interest rate risk, market risk, credit risk, off-balance sheet risk, technology and operational risk, foreign exchange risk, country risk, liquidity risk and insolvency risk (Tandelilin, Kaaro, Mahadwartha, & Supriyatna, 2007).

The risk management process, as mentioned by Soyemi, Ogunleye, and Ashogbon (2014), includes:

Risk identification: for proper risk management, the organization must recognize and understand the risks, which may consist of both existing and new business initiatives; Risks associated with lending activities include, for example, credit, liquidity, interest rate and operational risks. Risk identification must be an ongoing process and must be understood at both the transaction and portfolio level.

Risk measurement: Once the risks have been identified, they must be measured to determine their impact on the bank's profitability and capital. This can be done using different techniques ranging from simple models to sophisticated models. Accurate and timely risk measurement is critical to effective risk management systems. An institution that does not have a risk measurement system has a limited capacity to monitor or control risk levels. Banking institutions should periodically test their Business Measurement Instruments,

Risk monitoring: Institutions should establish an effective management information system (MIS) to monitor risk levels and facilitate the timely review of risk positions and exceptions. Follow-up reports should be periodic, timely, accurate and informative and should be distributed to the right people to ensure action, if necessary.

Risk control: After measuring risk, an institution shall establish and communicate risk restrictions through policies, rules, and procedures that defines responsibility and authority. These limits should serve as a means to control exposure to various risks associated with the activities of the banking institution. Institutions may also apply different mitigation tools to minimize exposure to different risks. Institutions should have an established process in place to authorize exceptions or changes in risk limitations and document them if necessary.

Many multinational companies run the risk of foreseeable gains / losses due to unforeseen exchange rate changes. As a result, many researchers have conducted various research on financial risk management. Financial risk studies grew rapidly, especially after the financial recession of the 1990s. It contains an extensive set of literature and theories on why companies manage their risk, including exchange rate and interest rate risk. Risk management has become an important management function, especially after the increase in foreign exchange market volatility. Financial analysts and top financial executives' comment on financial risk management. Many multinational companies have also proposed studies and research articles, as well as strategic planning, which allow them to manage their financial risks and any type of risk.

The Controller's Handbook (1997) describes derivatives that basically derive their value from the performance of an underlying interest rate or the prices of currencies, stocks, or commodities. In this article,

financial risk is divided into five categories and different management techniques are discussed to eliminate the effect of all different types. Preventive measures such as Value-at-Risk (VAR) are one of the most common methods used by banks to predict total price risk.

Shehzad L. Mian (1997) provided evidence on the determination of business coverage decisions. It discloses the evidence in light of the current required financial reporting requirement and, in particular, the restriction imposed on the coverage forecast. Multinational companies are exposed to so many uncertainties about different prices. Hedging typically refers to the general risk management policies of a commercial and financial company on how to minimize risk. Hedging was one of the most important preventive measures that most multinational companies in other countries used to identify risks at all levels and also offer a bidding solution.

3.0 Research methodology

This section gives details of the statistical method that is employed in the study. The data was gotten from a primary source of data collection. A questionnaire was used as the instrument in gathering the data for analysis; the questionnaires were well-structured and close ended questions that could help in collecting enough information from the respondents. The questionnaire is divided into several parts and sections.

The study populations were five (5) different multinational companies in Saudi Arabia which includes SABIC, Saudi Aramco, Wison, ExxonMobil and Aramco Trading Company. These five companies were considered as one of the top multinational companies in the country and even globally. Samples were drawn out from the five companies by different sampling techniques which include both the random and non-random sampling methods.

3.1 Sample size determination

Given the parameter below

n = desired sample

p = proportion of target population estimated to have similar characteristics

d = error margin

$Z_{\alpha/2}$ = reliability coefficient (1.96)

The sampling size computation formula is:

$$n = \frac{Z^2_{\alpha/2} p q}{d^2}$$

$$q = 1 - p$$

The proportion of target population (p) is estimated 0.5 considering that samples were collected from the population at equal proportion. The error margin (d) is 0.05 by default statistically, the confidence interval is 1.96 by default according to the properties of Normal distribution and lastly q is 0.5 as well.

$$n = \frac{1.96^2 (0.5)(0.5)}{0.05^2} = 384.16 \approx 384$$

The total numbers of 384 questionnaires were administered and feedback was gotten from them for proper analysis.

Method of data analysis

A descriptive statistic using a frequency distribution and percentage distribution were used to analyse the data gotten from the questionnaire. Chi-square (X^2) test was also used as the statistical tools to test for the hypothesis before drawing a conclusive decision.

The Chi-square test denoted by X^2 is a statistical measure for comparing sample variance to theoretical variance. It is a non-parametric test used to determine if categorical data shows dependency or were independent. It can also be used to make comparison between theoretical population and actual data when categories were used. The test is used for the following:

Test the goodness of fit.

Test the significance association between two attributes.

Test the homogeneity or the significance of population variance.
Chi-square statistics, the test is given by:

$$\chi^2 = \sum_{i=1}^n \frac{(O_i - E_i)^2}{E_i}$$

Where:

O_i = Observe frequency

E_i = Expected frequency

And

$$\frac{E_i = R_t \times C_t}{G_t}$$

Decision Rule: Reject H_0 if p-value < 0.05 otherwise accept H_0

3.3 Descriptive Statistics

Demographic analysis shows that 34.5% of the respondents work in the finance and account department, 27.4% work in the business development department, 21.3% work in the risk and compliance department, 6.3% work in the other (specify) department, 4.2% work in the engineering and project department, 4.2% also work in the strategic planning department while only 2.1% work in the exploration and production department. As regards duration of service the demographic analysis that 52.1% of the respondents have been employed about 10-15 years ago, 23.9% have been employed for 5-10 and 16&above respectively. On nature of engagement 96.1% of the respondents are full time workers while 3.9% were employed on contract basis. Age of respondent analysis shows 53.1% of the respondents falls within the age bracket 30-39, 36.1% fall within 20-29, 6.2% fall within 50 years and above while 2.1% are within age bracket 40-49. Gender shows 97.9% of the respondents were males while only 2.1% were females. On management experience 56.1% have approximately spent 5-10 years in managerial role, 33.9% have only spent 1-5 years in similar role, while only 10% have spent just 10-15 years in a managerial role. Lastly, academic qualification analysis shows 55.8% of the respondents are bachelor's degree holder while 44.2% are Higher Degree holder.

Financial Risk Management Practice

Analysis of respondents' datashows 46.1% of the respondents rated financial risk high, 26.1% rated it very high, 15.8% rated as moderate, 7.9% decline the response while only 4.2% rated it low. On companies' efforts risk management practice, 100% of the respondent agrees that their companies identify the sources of risks and developed an appropriate management response, 100% agree that their respective company have a formulated and effective risk management policy and that the policy will enhance their financial performance and corporate sustainability and profitability. 92.1% of the respondent agrees that their firm risk management approach reflects then unique challenges and risks faced within the sector while 7.9% disagree with this statement, 100% of the respondents allocate time, budget and resources for a risk management plan and framework, 93.9% of the respondents' states that their respective companies have developed and implemented a desired risk management culture while 6.1% have not. On expertise input, 90% of the respondents stated that their respective firm brings different areas of expertise in analyzing, monitoring and responding to risk while 10% of them have not, shows that 50% of the respondents stated that financial and tax risk has the highest significant contribution to the achievements of its corporate objectives, 27.9% stated that its significances is only high while 22.1% stated that it on an average measure.

Financial and Tax Risks Reflection on Profitability Measures

On the reflection of financial and tax risk on profitability, 65.8% of the respondents strongly agree that their companies' business activities and operations are exposed to financial risk, 12.4% agrees, 19.7% of the respondents stay neutral to the statement while 2.1% disagree with it, 51.8% of the respondents strongly agree that financial risk is an integral part of their business and projects operations, 40% also agree with this while only 8.2% stay neutral. On company share impact, 77.6% of the respondents strongly agree that financial risk has a significant impact on company's share price behavior, 14.2% also agree with this, 6.1% were neutral to this question while 2.1% disagree with it. On variable that could have impact on the

company business activities, 70% of the respondents strongly agree that cash flow volatility, commodity prices, foreign exchange rates and interest rate have an impact on company business activities and operations while 30% also agrees. As to the variables that can be used to hedge and mitigate the impact of financial risk shows that 43.7% of the respondents strongly agree that derivatives are used by their companies to hedge and mitigate the impact of financial risk, 27.9% also agree with this, 22.1% disagree with this, 4.2% stay neutral to the question while 2.1% strongly disagree with the statement, 44.2% of the respondents agree that financial risk of their organization can be effectively manage through analysis and implementation of policies and evaluation, 43.7% strongly agree with this, 10% stay neutral while 2.1% disagree with the statement. Figure 22 shows that 57.9% of the respondents strongly agree that financial risk is considered an important factor in determining the overall financial performance and health of their companies, 28.2% also agree with this while 13.9% of the respondents stay neutral.

Relationship of financial & tax with other key risks

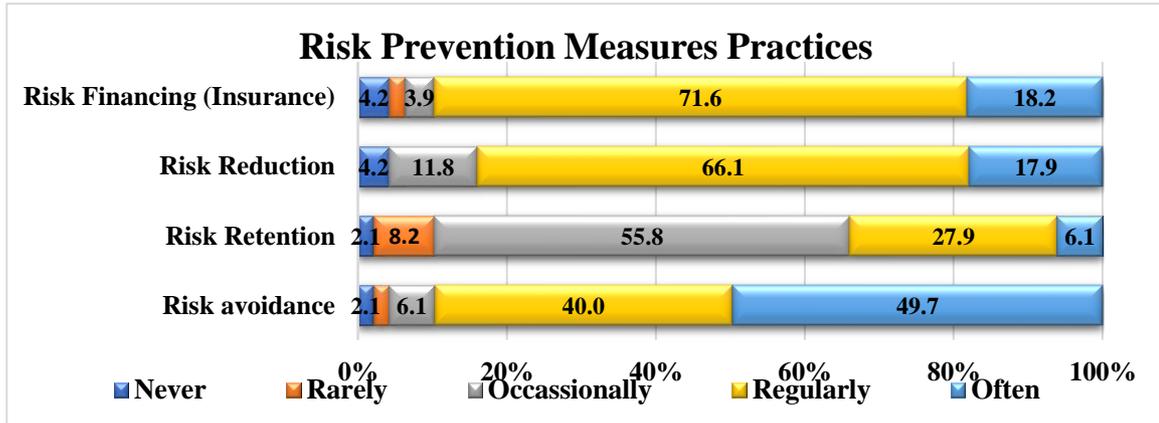
On relationship financial and tax risks with other key risks, that 53.4% justify that there is a strong relationship between financial & tax risk and other key operating and non-operating risk in their respective companies, 44.2% testify that the bonding between them is very strong, 3% stated that there exists no relationship of such while 2.1% justify that there exists a weak relationship between financial & tax risk and other key operating and non-operating risk. 52.1% of the respondents agree that the state of managing and controlling financial, operating, moral hazard and other non-financial risks shows a very strong significant aspect of their firm decision process, 37.9% justify its significances to be strong, 7.9% justify that the significances level in very weak while 2.1% believes that the significances level is weak. On ways of financing risks, 46.1% of the respondents use risk retention as a method to finance its risks while 53.9% does not. Figure 26 show that 60% of the respondents use cost of funding to finance its risks while 40% does not, 67.9% of the respondents finance its risks through advance or contingency funding while 32.1% does not, 28 show that 70% of the respondents finance its risks through borrowing or loan finance while 30% does not.

Risk Analysis and Evaluation Method

On methods used for risk evaluation 57.9% of the respondents regularly use brainstorming as a technique in evaluating and analyzing its risk, 26.3% occasionally uses brainstorming while 15.8% often uses it. 76.1% of the respondents regularly use Sensitivity Analysis as a technique in evaluating and analyzing its risk, 13.9% often uses Sensitivity Analysis, 6.1% rarely uses it while only 3.9% occasionally uses it. 40.3% uses Probability Analysis to analyze and evaluate its risks, 31.8% often uses probability analysis, 19.7% uses it occasionally, 6.1% rarely uses it while 2.1% never uses at all. 42.4% never uses Delphi Method to analyze and evaluate its risk, 35.8% uses it occasionally, 19.7% rarely use it while only 2.1% regularly uses Delphi Method to analyze and evaluate its risk. 35.8% of the respondents' occasionally uses Monte Carlo techniques to analyze and evaluate its risks, 32.4% does not make use this method, and 29.7% rarely uses it while 2.1% often uses this method as well. 49.5% of the respondents regularly use Decision theory to analyze and evaluate its risk, 22.4% does not use this method, 16.1% occasionally uses Decision theory, and 10% rarely uses this method while 2.1% often uses this method. 47.9% uses Scenario Approach to evaluate and analyze its risk, 23.9% often uses this method, and 16.3% does not use the method while 11.8% occasionally uses it. 29.7% rarely uses Utility Theory to evaluate and analyze its risks, 27.7% does not make use this method, and 13.9% regularly make use of the method while 4.2% uses it often. 21.8% often and rarely make use of Simulation Analysis respectively to analyze and evaluate it risk, 32.1% regularly use it, and 20% occasionally use it while only 4.2% does not use it at all. 38 shows that 33.9% of the respondents use Fault Tree Analysis to analyze and evaluate its risk, 27.6% rarely uses this method, and 26.1% occasionally uses this method while 12.4% does not make use this method for analysis and evaluation of their risks.

Risk Prevention Measures.

Figure 1



Source: Author

Figure 2

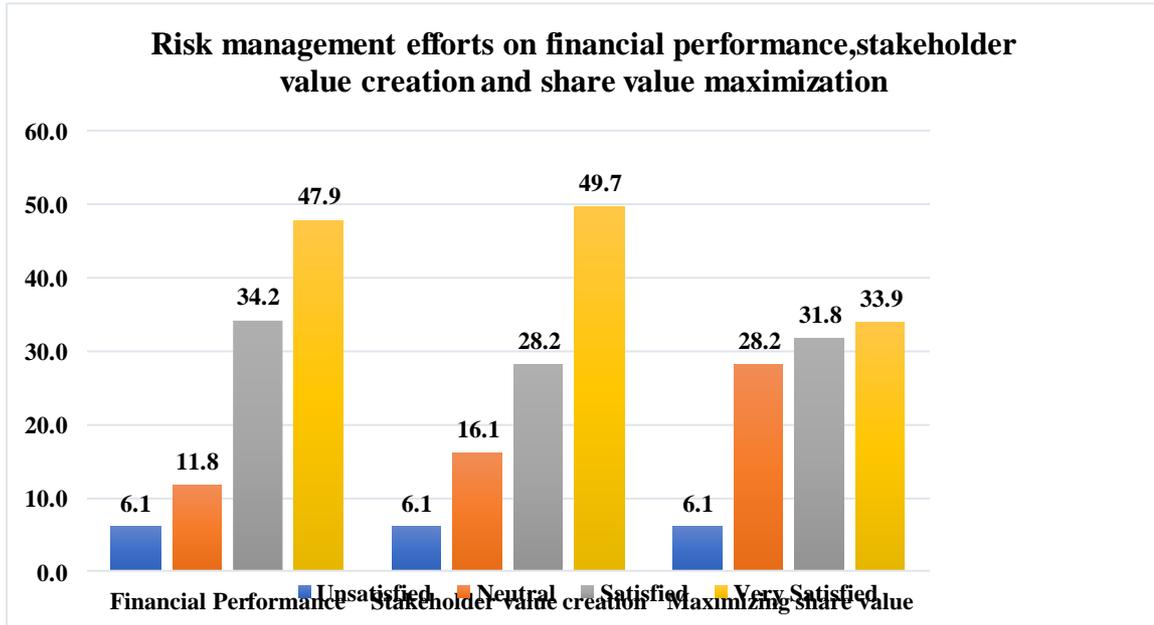


Figure 1 shows that 49.7% of the respondents often use risk avoidance for loss prevention measures, 40% regularly use this technique, 6.1% occasionally use this, and 2.1% don't use it at all while 2.1% rarely use it, 55.8% of the respondents occasionally use risk retention for loss prevention measures, 27.9% regularly uses it, 8.2% rarely use it, 6.1% often use it and 2.1% does not use it at all, 66.1% of the respondents regularly use risk reduction for loss prevention measures, 17.9% often uses it, 11.8% occasionally use it while 4.2% does not use it and lastly 71.6% of the respondents regularly use risk financing (Insurance) for loss prevention measures, 18.2% often use it, 4.2% does not use it at all, 3.9% occasionally use it while 2.1% rarely use it. Figure 2 shows that 47.9% of the respondents are very satisfied with their management effort on financial performance measures, 34.2% are also satisfied, 11.8% are neutral to the question and 6.1% are unsatisfied, 49.7% of the respondents are very satisfied with their management effort on stakeholder's value creation, 28.2% are also satisfied, 16.1% are neutral to the question and 6.1% are unsatisfied also 33.9% of the respondents are very satisfied with their management effort on maximizing their share value, 31.8% are also satisfied, 28.2% are neutral to the question and 6.1% are unsatisfied.

Financial Risk Management Impact on Corporate Sustainability and Profitability
Figure 3

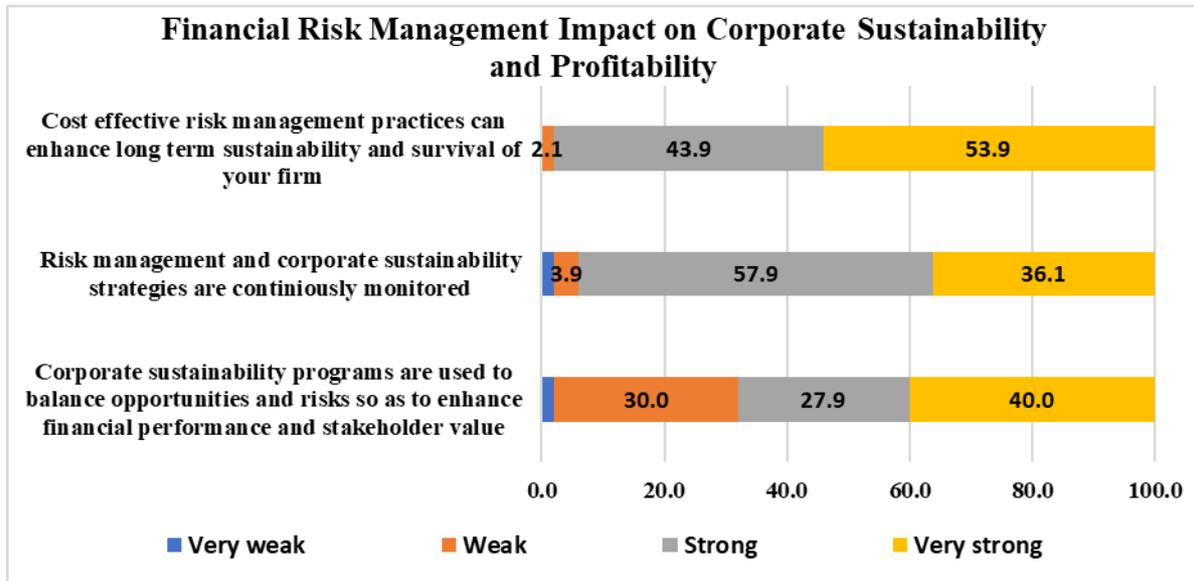


Figure 3 shows that 40% of the respondents justify that there is a very strong relationship between the risk management process of their firm and corporate sustainability programs used in balancing opportunities and risks so as to enhance financial performance and stakeholder value, 30% of the respondents justify a weak relationship, 27.9% also justify a strong relationship while 2.1% justify that the relationship is very weak, 57.9% of the respondents justify that there is a strong relationship between the risk management process and corporate sustainability, 36.1% of the respondents justify that the relationship is a very strong one, 3.9% also justify a weak relationship while 2.1% justify that the relationship is very weak also 53.9% of the respondents justify that there is a very strong relationship between a cost-effective risk management practice and long term sustainability and survival measures, 43.9% of the respondents justify that the relationship is a strong one while 2.1% justify that the relationship is weak.

3.4 Chi Square Test Result

Chi square test was tested on the hypothesis stated in the study and the result are as follows:

Hypothesis 1.

There is a significant relationship between corporate sustainability and financial & tax risk and other key risks in a multinational company.

Variables	Chi-Square	df	Asymp. (p-value)	Sig
Cost effective risk management practices can enhance long term sustainability and survival of your firm.	172.458	2	0.000	
Corporate sustainability programs are used to balance opportunities and risks so as to enhance financial performance and stakeholder value.	118.947	3	0.000	
The risk management processes and practices of your firm incorporate a robust understanding of corporate sustainability issues.	202.632	3	0.000	

Source: Author.

Table 1 above the shows the result of the Chi-square on test the first hypothesis and the result obtain declare that all the p-value of all questions that was tested on are all less than 0.05 significance level which indicate that the null hypothesis will be rejected and hence we concluded that is there is a statistical relationship between financial & tax risk management, other key risks and corporate sustainability of a multinational company.

Hypothesis 2.

There is a significant relationship between financial and tax risks and other key risks in terms of decision-making process, business and projects operation of a multinational company.

Table 2

Variables	Chi-Square	f	d	Asymp. Sig (p-value)
There is a relationship between financial and tax risk and other key operating non-operating risks in your firm.	351.558	3		0.000
Managing and controlling financial, operating, moral hazard and other non-financial risks are significant aspects of your firm's decision process.	261.095	3		0.000
Identifying, understanding and applying interrelationships among key risks are critical to your firm's business and project operations.	5.568	1		0.018

Source: Author.

Table 2 above the shows the result of the Chi-square on test the second hypothesis and the result obtain shows that all the p-value of all questions that was tested on are all less than 0.05 significance level which indicate that the null hypothesis was rejected and hence we concluded that is there is a statistical relationship between financial and tax risks and other key risks in terms of decision-making process, business and projects operation of a multinational company.

4.0 Discussion of findings

The first hypothesis was carried by conducting a descriptive analysis and a chi square test of association through a well-structured questionnaire. The Research methodology and data analysis shows the detailed analysis of financial risk management practice. The rate of the financial risk management practice is measured by using a frequency and a graphical illustration, whereas the relationship that exists between financial risk and corporate sustainability and profitability influenced by other key risk were measured using chi square test.

The findings of the frequency analysis based on the data gotten reveals financial risk management practice based on the following: Financial risk identification and rating, financial risk management, financial risk implementation and financial risk management significances. The frequency analysis shows that on an average basis financial risk is rated high and that has made every multinational firm management have a formulated and effective policies that don't just identify the source of every key operating and non-operating risks but also prevent it from affecting their organization financial performances. The chi square test was also used to justify the first hypothesis stating that its p-value is less than 0.05 level of significance, we then reject the null hypothesis and concluded that there is a statistical relationship between corporate sustainability and profitability and financial risk influenced by other key operations risks.

The second hypothesis was set to investigate the significant relationship between financial risk and other key risks on a multinational company in terms on decision making processes, business and project's operations. The findings revealed that there is a strong relationship in inter-relational attributes between financial and tax risks and other risks based on this factor, managing & controlling Financial and other key risk management has shown a very significant aspect in every organization decision making processes. The

study also shows that among all the four risk financing methods adopted in this study which include: risk retention, cost of funding, contingency funding and loan financing, study shows that most multinational firm finance their risk by borrowing loan from a financial institute and also utilizing the issuance policy in controlling their key risks.

The chi square test also shows that all the p-value of the three hypothesis questions were less than 0.05 level of significance which means that the null hypothesis will be rejected, and we thereby concluded that there is a significant relationship between financial and tax risks and other key operating risks in terms of decision-making processes.

5.0 Limitations of the study

The aim of this study is to investigate analytically the financial risk management practices of multinational companies in achieving corporate sustainability and profitability. This study was based on quantitative and qualitative research methods. The data were gotten directly from primary sources, to examine the relationship and impact of financial and tax risk management on corporate sustainability and profitability of a multinational companies. Frequency analysis and a graphical representation are used to investigate the rate of financial risk management. Chi square test was also used to examine the significance inter dependence between financial risk management practices and corporate sustainability and profitability measures. The findings from the study have been enumerated but it should be noted that findings are based on the experiences of workers in a developing country and as such the deductions from the findings will be more effective in countries with similar economic background. For a more accurate global view, population samples from a number of countries with varying levels of economic development can produce results that may be considered more ideal. Future research on this subject can therefore be fashioned in this line

6.0 Conclusion

The results of the data analysis showed that risk identification, assessment and analysis, risk policy implementation, and risk prevention are more efficient and influential factors to consider in contributing to practices financial risk management of many multinational organizations. On the other hand, understanding and managing risk, identifying and preventing risks are the most significant variables that contribute to the practice of financial risk management in a multinational institution in order to achieve maximum sustainability and profitability. In addition, there is a significant relationship between the practice of managing financial and fiscal risks, other key operational risks and corporate sustainability in terms of profitability measurement, decision-making processes, policy implementation and financial results. Due to the fact that there is a possibility of facing a high rate of financial risk, all multinational companies must have an appropriate strategy plan to manage and control their risk in another in order to obtain maximum financial return.

References

- Adeoye, A. &Amupitan, M. D. (2015).Corporate governance in the Nigerian Banking sector: Issues and challenges. *European Journal of Accounting Auditing and Finance Research*, 3(5).
- Cebenoyan, M. &Strahan, (2004).Risk management, capital structure and lending at banks. *Journal of Banking and Finance*, 28.
- Gizycki, M. (2001).The effect of macroeconomic condition on banks risk and profitability.Hosna, A. &Manzura, B. (2009). *Credit Risk Management and Profitability in Commercial Banks in Sweden*, University of Gothenburg, Graduate School of Business, Economics and Law, Master of Science in Accounting.
- Hubbard, D. (2009). *The failure of risk management: Why it's broken and how to fix it*. John Wiley & Sons.
- Motteff, J. (2005). *Risk management and critical infrastructure protection: Assessing intergrading and managing threats, vulnerabilities and consequences (report)*. Washington DC; Congressional research service.
- Paulinus, E. C., & Jones, A. S. (2017).Financial Risk Management and Corporate Performance of Deposit Money Banks in Nigeria. *Archives of Business Research*, 5(12),78-87.URL: <http://dx.doi.org/10.14738/abr.512.3909.86>.
- Soyemi, K. A., Ogunleye J. O., &Ashogbon F. O., (2014). Risk management practices and financial performance: evidence from the Nigerian deposit money banks (DMBs). *The Business & Management Review*, 4(4).
- Shehzad L. Mian (1996) Evidence on Corporate Hedging Policy", *The journal of financial and quantitative analysis* Vol.31.No 3.pp.419-439.
- Tandelilin, E., Kaaro, H., Mahadwartha, P. A. &Supriyatna, S. (2007). Corporate governance, risk management and bank performance: Does type of ownership matter? EADN working paper.

FDI & Institutional Quality: Empirical Evidence from India

Leena Ajit Kaushal

Management Development Institute Gurgaon, India

Keywords

FDI, India, Institutional Quality, EPU, BIT, GMM, Gravity Model

Abstract

The study investigates the impact of India's institutional quality on FDI inflows using panel data of the top 15 investing nations over the period 2008–2018. The study employs the augmented gravity model to identify FDI inflow determinants in India. The empirical results confirm that institutional quality has a positive impact on FDI inflows in India. The improved institutional quality and macroeconomic factors have played a vital role in attracting FDI in India despite BIT terminations. The study suggests that India must further strategize enhancing human capital and propose liberal labor policies facilitating FDI inflows equally in the manufacturing sector, promoting exports.

Introduction

The association between institutions and FDI inflows have received significant attention in the recent past. With liberal policy frameworks becoming commonplace and losing some of their traditional power, countries have been focusing more on the governance and regulatory factors to improve their competitiveness in attracting FDI. The macroeconomic determinants remain the key, but institutions now play a more prominent role (North, 1994). Foreign investors significantly consider institutional quality before investing in the host nation; hence they have become more critical than the cultural and cognitive variables in formulating international strategies. FDI literature significantly emphasizes the need for a quality institutional framework, especially for the developing nations, to attract more FDI flows (Uddin et al., 2019). Institutional and regulatory quality refers to the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development by placing uniform rules of economic engagement. As a matter of fact, realizing the importance of Institutional quality, developing nations have been significantly promoting liberal and conducive investment regimes to attract more FDI over the recent past.

FDI is an important source of private external finance promoting economic development in emerging nations. In 2018, the Asian region alone had adopted thirty-two new policy measures related to liberalization, promotion, and facilitation of FDI vis-a-vis two restrictive regulations. On the contrary, the developed world introduced twenty-one investment policy measures to reinforce restrictive regulations than seven favoring investments. Asian economies experienced a substantial 2% y-o-y growth in foreign direct investment (FDI) over the period of study (WIR, 2019). Though the global FDI inflows in India declined from 3.16 % to 2.82 %; yet India consistently ranks among the top 5 developing nations receiving maximum FDI. Across the region, FDI growth has been more pronounced in China, Hong Kong, Singapore and Indonesia compared to India with a 10.5 % decline over the period. Statistics show wider disparities across the globe and among developing Asian economies. Foreign investors prefer locations that offer the best economic and institutional facilities (Dunning, 1998). Studies suggest that institutional factors such as political stability, the rule of law attracting FDI (Akisik, 2020), uncertainty in economic policies and reforms (Tam, 2018), and ease of doing business (Hossain et al., 2018) significantly influence multinational corporations (MNCs) investment decisions. Investors prefer to wait and watch during high economic uncertainty instead of investing in the host country, mainly because these long-run commitments are costly to reverse (Canh et al., 2020). A conducive business environment enables business conduction, whereas an adverse business environment and regulations hinder the starting and operation of businesses (Liu et al., 2021).

Over the years, India has liberalized its national FDI policy and implemented several institutional reforms to draw more FDI enabling country's growth. FDI cap has been reduced in many sectors, such as multi-brand retail and insurance, besides introducing GST and the Insolvency and Bankruptcy Code, 2016 to attract foreign investors to establish operations in India. India has also been targeting governance factors

such as Economic Policy uncertainty (EPU), ease of doing business (EODB), and labor reforms to improve its competitiveness. Studies highlight that time taken by the governments to formulate and implement new policies is the prime cause of uncertainty in the host nation's business environment (Zhang et al., 2015).

The present study employs an augmented gravity model to study the impact of institutional and regulatory quality on FDI inflow in India from top 15 investing nations. The study essentially estimates the impact of domestic EPU, EODB, and BITs on FDI inflows from 2008–2018. Indian government has taken numerous policy initiatives to boost FDI inflows. The last decade witnessed numerous economic and political turbulences, both at global and domestic front, ranging from the global financial crisis in 2008, Indian policy paralysis in 2011-12 resulting in high EPU, introduction of new FDI reforms, mainly entry focused regulations (automatic FDI approval procedure, ease of doing business), and replacing investor-centric 2003 Model BIT with a State-centric model in 2015 resulting in termination over 50 BITs and the most recent Brexit and US trade war. India's attractiveness as an investment destination has increased in the past, along with its bargaining power. Reducing EPU and disbanding FIPB (Foreign Investment Promotion Board) to improve further ease of doing business has been strongly emphasized by the Indian policymakers to foster a favorable investment climate. However, with the new BIT regime, it would be critical for India to generate innovative ideas to draw an adequate legal framework beneficial to all stakeholders. BITs offering investor protection is critical for ensuring FDI inflows unless the nations offer a stable political and transparent legislative and judicial environment for foreign investors (Busse et al., 2010).

There is a growing body of literature investigating the link between institutional factors and FDI inflows. However, most studies are regional, investigating the Asia-pacific region, OECD nations, developing nations but very few concerning individual nations, particularly India. Due to the ongoing pandemic and US-China trade war, developing Asian economies, particularly India, Bangladesh, and Vietnam, compete to attract most relocating MNCs operations due to the global turbulences¹. The persistent nature of the FDI inflow requires a dynamic panel estimation technique (Singhania & Saini, 2021). The present study employs system GMM method of Arellano and Bond (1991) to investigate the dynamic nature of the link between institutional factors and FDI inflows in India. The terms policy uncertainty, economic policy uncertainty, and political uncertainty are used interchangeably in the study. The remainder of this study is organized as follows. The following section reviews the literature on the determinants of FDI. The methodology and data are presented in Section 3, while Section 4 discusses the empirical results and section 5 concludes.

Literature Review

Institutions comprises of humanly devised rules that structure political, economic, and social issues (North, 1994). The formal and informal rules aim to create order and reduce uncertainty in the nation for different players and economic factors to interact and maximize gains. Along with the standard economic constraints, markets with good quality institutions affect the profitability and feasibility of economic activities by reducing transaction and production costs.

Conventionally, researchers focused on economic determinants such as market size, population and GDP per capita as the key explanatory variables influencing FDI; however, its argued that the economic considerations only come into full play when an enabling FDI policy framework is in place (Mallampally & Sauvart, 1999). Over the past two decades, developing nations have liberalized national policies to attract FDI by relaxing rules concerning market entry and foreign ownership, enhancing treatment standards for foreign firms, and improving markets' functioning. The past studies show that liberal FDI policies attract investors but do not guarantee investments (Rodríguez-Pose & Cols, 2017)), leading to vast differences in investment volume across nations. Besides considering the state-of-the-art FDI policy frameworks, MNCs willing to invest increasingly gauge host countries' macroeconomic stability and institutional predictability. Studies suggest that good institutional factors compared to purely economic factors play an essential role in attracting FDI in emerging nations (Sabir et al., 2019).

The relationship between FDI and institutions relies on the economic foundation of cost minimization (Nunnenkamp, 2002). The host country's institutions and government policies impact foreign investors' profitability through varied cost implications, including transportation, production, operation, and

¹ <https://www.vietnam-briefing.com/news/relocating-production-comparing-vietnam-and-its-peers.html/>

manufacturing (North,1994). Good quality institutions reduce the cost of doing business by providing a risk-free business environment and significantly minimizing expenses (Sabir et al., 2019). The association between institutional factors and FDI attractiveness is commonly described through its positive or negative influence on FDI inflows. Investors consider a range of business facilitating institutional determinants such as corruption (Nguyen,2015), domestic economic policy uncertainty (Canh et al.,2020), the rule of law (Zhu et al., 2019), ease of starting and running a business (Mahuni & Bonga, 2017), BITs (Liu et al., 2021) besides the macroeconomic determinants related to the size of markets for goods and services in terms of GDP per capita (Khan et al., 2020), economic growth (Blonigen & Piger, 2014), productive cost advantage in terms of labor cost (Dorakh, 2020) and financial openness (Gaies & Nabi, 2019) among others. The present study mainly investigates the impact of select instructional factors, EPU, Ease of starting business and BITs on FDI inflows which have been the major concern for Indian policymakers in the recent past.

Select Variables of Interest

3.1 Economic Policy Uncertainty (EPU)

The uncertainty concerning the host nation's fiscal or monetary policy, banking sector reforms, and insolvency regulations worsen the EPU index (Choi et al., 2021). Ensuring macroeconomic stability and institutional predictability is the crucial tool for policymakers targeting substantial FDI inflows. However, since 2015, several facilitative measures to attract more FDI, such as GST, Insolvency & Bankruptcy code and labor reforms, came into existence. Since then, EPU has reported a consistent rise (Fig.1), contrary to the rising global policy uncertainty. India has thus fostered a healthy investment climate enabling consistency in actual policy with forwarding guidance to reduce EPU (Economic Survey 2019).

Figure 1: EPU Index for India 2008-2018 (Annual aggregate)

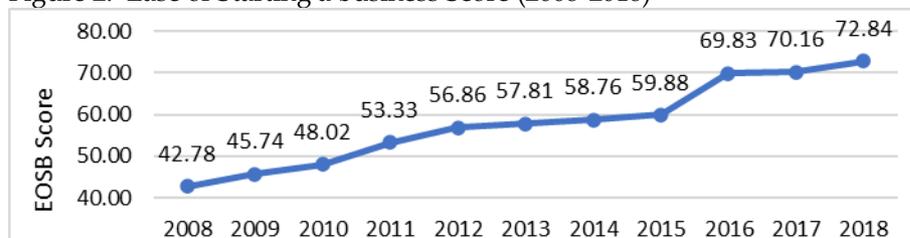


Source: www.policyuncertainty.com

Ease of starting a Business(EOSB)

The ease of starting a Business is a vital entry barrier to establish a foreign subsidiary by multinational firms (Mahuni & Bonga, 2017). The indicator measures paid-in minimum capital requirement, time, cost, and the number of procedures required for a small to medium-sized limited liability company to formally operate the business in an economy (World Bank, 2018). Over the last decade, the Indian government has made significant progress in streamlining the application processes via merging various documentations into a single form, online registration portals and automatic FDI approvals.

Figure 2: Ease of Starting a business Score (2008-2018)



Source: World Bank

3.3 Bilateral investment treaties (BITs)

BITs provide foreign investors the right against the host state during sudden changes in law or any other measures that essentially devalue or expropriate foreign investments. In the recent past, India faced numerous arbitrations claims under its BITs, which prompted the shift from an overly investor-friendly approach to a slightly protectionist approach. India adopted a new BIT model in 2015 and terminated BITs with over 66 countries, including 22 EU nations. To balance investment protection with the

state's right to regulate, India needs to evolve its BIT practice based on the twin framework of the international rule of law and embedded liberalism (Ranjan, 2019).

Research Methodology

The standard gravity model of international trade (Tinbergen, 1962) is widely used to investigate trade flow between countries. The GDP of a nation acts as a pull factor stimulating trade, whereas the distance between them is a push factor constraining trade. However, more recently, the augmented gravity models have found a broad empirical fit to predict FDI flows and stocks between partner countries (Welfens & Baier, 2018). The standard gravity model augmented with numerous policy and non-policy factors (Falk, 2016) examines their relevance, enabling trade and investment between partners. The present study uses an augmented gravity model to identify the determinants of India's FDI inflows from top sourcing nations, focusing on institutional quality estimated by domestic EPU and EODB as a proxy for regulatory environment quality and BITs as a proxy for the strong international rule of law. The study employs FDI flows instead of FDI stock to ensure consistency in measuring the dependent variable. Measurement of FDI stock flowing from different investing countries tends to be heterogeneous with many zeroes and negative values. Sparse data related to India's FDI stock from its investing partners also makes it appropriate to rely on FDI flows for our study's estimation procedure. The study uses a double log model for analyzing FDI determinants in India. The study uses a double log model to analyze FDI determinants in India. The dependent variable is expressed as $\log(1+FDI)$ to accommodate the periods with zero value into the double log model. Equation 1 represents the static gravity framework:

Equation 1:

$$\ln(FDI_{ijt}) = \alpha + \beta_1 \ln(|GDP_{pc_{it}} - GDP_{pc_{jt}}|) + \beta_2 \ln(FDI_{op_{ijt}}) + \beta_3 BIT_{ijt} + \beta_4 \ln(EOSB_{jt}) + \beta_5 \ln(EPU_{jt}) + \beta_6 \ln(LaborCost_{jt}) + \beta_7 \ln(GDPsum_{ijt}) + \beta_8 (PopGr)_{jt} + \epsilon_{ijt}$$

Equation 2 represents dynamic panel by incorporating the lagged value of $\log(1+FDI)$. The dynamic equation is specified as follows:

Equation 2

$$\ln(FDI_{ijt}) = \alpha + \beta_1 \ln(FDI(-1)_{ijt}) + \beta_2 \ln(|GDP_{pc_{it}} - GDP_{pc_{jt}}|) + \beta_3 (FDI_{op_{ijt}}) + \beta_4 \ln(EOSB_{jt}) + \beta_5 \ln(EPU_{jt}) + \beta_6 \ln(LaborCost_{jt}) + \beta_7 \ln(GDPsum_{ijt}) + \beta_8 (PopGr)_{jt} + \beta_9 (BIT)_{jt} + \epsilon_{ijt}$$

Were,

FDI_{ijt} is the FDI inflow from the source country i to the host country j during for year t ,

$FDI_{ijt}(-1)$ is one-year lag of FDI from the source country i to the host country j for the year t ,

GDP_{it} is the nominal GDP of the source country i ,

GDP_{jt} is the nominal GDP of the host country j (India),

$GDP_{pc_{it}}$ is the per capita GDP of the source country i ,

$GDP_{pc_{jt}}$ is the per capita GDP of the host country j (India)

$FDI_{op_{ijt}}$ is the financial openness of the host country j

BIT_{ijt} is the dummy variable taking value 1 if countries i & j have an active BIT in the year t , 0 otherwise

$PopGrowth_{jt}$ is the % change in population from period $t-1$ to period t of the host country j

$EaseofBusiness_{jt}$ is the ease of starting business score of the host country j in the year t

EPU_{jt} is the economic policy uncertainty index value of the host country j in the year t

$LaborCost_{jt}$ the share of labor income as a percentage of the nominal GDP of the host country j for the year t is used a proxy for labor cost

i is the source of FDI inflows, j is the host country into which FDI flows, t is the time indicator (annual) and ϵ is the error term.

The sum of the Gross Domestic Product of the host and source countries intends to capture the horizontal market size. The variable is expected to positively affect the dependent variable if the source country views the host as an extended market for its products and services, thus directing FDI. This variable's inclusion and coverage are similar to the variables found in several studies (Cieřlik, 2021).

The absolute difference in the GDP per capita between the home and the host nation helps measure the skill differential and captures the vertical FDI drive (Jang 2011). The variable's coefficient from the estimated model would either confirm the Linder hypothesis or the Heckscher-Ohlin (H-O) perspective. We expect a

positive coefficient, confirming the H-O theory asserting that countries benefit from their relative factor endowments.

Financial Openness of the host country j (India) is measured as the sum of FDI inflows and outflows as a percentage of the total GDP. Greater liberalization of foreign investment policies by the governing bodies should ideally result in a higher financial openness ratio. The variable is expected to exhibit a positive relationship with FDI inflows.

Bilateral Investment Treaties (BITs) are treated as a dummy variable and incorporated in the study. If the host country has an active treaty with the source country for the year t , the dummy is assigned the value 1, else 0. The study by Banga (2003) suggests that BITs signed between developing Asian nations (including India) and the developed nations significantly impacted FDI inflow compared to BITs entered with other developing nations during 1980 to 2000.

Population growth is considered a proxy for the availability of human capital in the host country. The increasing children to working adults' ratio and a fall in capital to labor ratio diverts household income from savings towards consumption besides pushing limited government resources towards health and education, compromising more productive enterprises Coale & Hoover, 1958). The host country's human capital plays a critical role in determining FDI inflows (Borensztein, 1998), but excessive population growth puts immense pressure on the available infrastructure. This may result in a low quality of available human capital, deterring investors from investing in the country. The variable will have a positive coefficient if the growing pool of available human capital attracts investors. However, beyond a certain limit, expansion in human capital negatively affects FDI (Abdouli & Omri, 2021). The *EODB score* identifies the barriers to entry faced by investors to start a business in a foreign country. The score captures the number of required procedures a firm must undergo, the actual time required in business days to complete the formal procedures, and the total cost of complying with the regulatory procedures. A higher score indicates lower entry barriers; thus, we expect the variable to correlate with FDI inflow positively. Economic policy uncertainty is assessed using the news-based index constructed by Baker, Bloom & Davis (2016). Lower policy uncertainty in the host country relative to the source countries positively affects FDI inflows into the host country (Nguyen et al., 2015). We expect the EPU index to have an inverse relationship with the dependent variable since policy uncertainties are detrimental to attract FDI. As a proxy for *labor costs*, the study includes labor income as a share of GDP estimated by the International Labor Organization. Labor income comprises of compensation of employees and income share of self-employed. Studies propose that labor market rigidity and strict employment protection, besides dampening MNCs' initial entry, also influence foreign firms' employment and production (Mina, 2020).

The study estimates the impact of institutional factors, BITs, EPU, and EOSB on the FDI inflow from 15 top investing nations in India. As widely suggested in the literature the study employs static panel models the fixed effects (FE) and random effects (RE) specifications to evaluate the relationship between institutional factors & FDI inflows (Asongu et al., 2018). FE model allows each cross-section to have its intercept and assumes similar slopes and constant variance across the various cross-sections. The specification is appropriate for analyzing specific entities such as countries, individuals, or firms. FE specification with 'within effect' estimates overcome the endogeneity problem, making it the most "simple and persuasive" econometric methodology (Vaisey & Miles 2017). Hausman specification test selects between FE and RE models. Dynamic panel regression proposed by Arellano & Bond (1991) is used to estimate the dynamic relationship between FDI inflows and regressors, including the lagged value of a dependent variable. The lagged dependent variable causing several econometric issues, including endogeneity, needs proper estimation to draw meaningful inferences.

Results And Discussion

Before running the regression, the study conducted descriptive statistics and multicollinearity tests, summarized in Table (Appendix A). The findings are reported in Table 1.

Table 1: Panel Regression Findings

	Random Effect		Fixed Effect		System GMM	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
$\ln\text{FDI}_{ijt}(-1)$	-	-	-	-	0.164*	0.000

					(0.029)	
lnGDP _{ijt} sum	6.311 (3.615)	0.225	0.8321 (6.015)	0.782	5.193** (2.3914)	0.032
ln GDP _{it} -GDP _{jt}	0.521** (0.234)	0.014	1.835* (0.516)	0.004	1.231** (0.712)	0.025
FDIop _{nj}	27.353** (0.920)	0.020	32.301** (1.172)	0.023	35.119* (6.271)	0.048
lnPoPG _{jt}	-7.216*** (1.372)	0.000	-12.421* (1.2829)	0.000	-7.930* (1.369)	0.003
BIT _{ijt}	-0.1421 (0.215)	0.429	-0.087 (0.253)	0.560	-2.893 (2.724)	0.432
lnEODB	2.860*** (1.620)	0.067	3.284* (1.37)	0.030	3.392* (0.892)	0.000
lnEPU	-0.004 (0.291)	0.982	0.121 (0.215)	0.728	0.229* (0.072)	0.009
lnLabCost _{jt}	-0.523 (0.054)	0.342	-0.068* (0.061)	0.232	-0.037** (0.039)	0.034
Const.	12.943 (19.298)	0.121	16.673** (19.123)	0.016	24.823** (27.204)	0.029
R-Square	0.335		0.371			
Hausman Test	Prob > χ^2	0.000				
Hansen J-Statistic					12.210	0.260
Arellano-Bond AR(1)					-1.932 (0.010)	
Arellano-Bond AR(2)					0.214 (0.649)	
Wald test for Heteroscedasticity				Prob > χ^2 = 0.000		
Wooldridge test for autocorrelation				Prob > F = 0.0026		

Note: *, **, *** indicate the statistical significance of the variable at 1 percent, 5 percent and 10 percent, respectively. All standard errors in parenthesis and p-values are robust for heteroscedasticity.

The study discusses the findings of dynamic two-step system GMM and FE specification.

Financial Openness measuring the impact of India's investment policies on FDI inflow is positive and consistently significant at a 5% level across GMM & FE models. In 2005, the Indian government substantially liberalized many sectors, allowing non-residents to take full ownership or raising participatory equity stakes across sectors. The pace of FDI reforms easing India's restrictive FDI rules further picked momentum since 2014 by introducing 37 reforms till date, such as replacing the Foreign Investment Promotion Board (FIPB) with the Foreign Investment Facilitation Portal (FIFP) to speed up the FDI inflow and increase the transparency in FDI approvals. The government further liberalized insurance, defence, railways, and retail sector regulations, among others, to expand the scope of investment.

The absolute difference between GDPs per capita is found positively significant across FE (1% level) GMM (5% level) model. This implies that the service sector in India attracts FDI due to relative factor endowment. The service industry is built on professional training and requires a highly specialized workforce to operate effectively. The availability of a skilled labor force with high productivity and output results in better prospects for foreign investors. This aligns with the Heckscher-Ohlin hypothesis of countries effectively utilizing their relative factor endowments while engaging in the international markets. The Indian service sector has been the largest recipient of FDI over 2000- 2020, significantly more than the manufacturing sector.

The impact of population growth was negative and highly significant (1% level) across FE & GMM specifications, contrary to the results reported by Bhasin & Manocha (2016) for the period 2001-2012. Rapid population growth can raise alarming economic situations such as high unemployment, lack of infrastructure, and government inability to provide basic facilities such as health and education to the growing population (Musambachime, 1990). According to Barro (1996), the rising population diverts the

nation's income towards ensuring capital for new workers rather than raising capital per worker, resulting in lower productivity among the labor force. However, countries may enhance their output per capita by increasing the capital per worker ratio to attract FDI. Research argues that sufficient absorptive capacity or a minimum level of human capital is required to boost growth via technology diffusion facilitated through FDI (Li & Tanna, 2019). BITs are found to be insignificant in determining FDI inflow into India across both specifications. During the study, total FDI inflows into India were almost evenly distributed between the years with an active BIT and years without a treaty.

Nevertheless, the total inflows in years with an active BIT were less than the total inflow in years without an active BIT by close to USD 40 billion, explaining the BIT's negative coefficient. 2016 onwards, India terminated BITs with over 50 nations, maintaining consistent FDI inflows. This explains the insignificance of BITs in Indian FDI. Thus, the present study (2008-2018) proposes that foreign investors have faith in the nations' 'rule of law' because even after Bit's termination, FDI inflow exhibited a significant rise.

Economic Policy Uncertainty has a significant positive relationship (1% level) with the dynamic panel model FDI inflows. The positive coefficient relates to the fact that from 2008 to 2018, India's policy uncertainty has fallen by a considerable margin, motivating investors to invest and start businesses in India. Investors also prefer simpler and shorter procedures for starting businesses. This is proven by the positive significance of ease of business score in driving FDI inflows across both specifications. The proxy for labor cost is negatively significant across FE (1% level) and GMM (5% level) models. The negative coefficient of labor cost indicates investors' preference for lower labor costs. Labor cost in India is significantly higher than other emerging nations and is thus a reason for losing substantial manufacturing FDI to our neighbors such as Sri Lanka and Bangladesh.

Conclusion

Foreign investors prefer locations that offer the best economic and institutional facilities. The host country's institutional quality and macroeconomic factors can thus attract foreign investments in the country. India's institutional quality in terms of the regulatory environment and the rule of law positively impacts FDI inflows throughout the study. Our analysis found that *BITs* are insignificant and tilted to the negative side in attracting FDI. This could be explained by the fact that India terminated multiple BITs in early 2016. However, despite the termination of treaties, FDI inflow in India has not been reduced, bestowing confidence in the nation's 'rule of law.' Coupled with the figures of FDI inflows from major nations with whom India has not signed any previous BITs, the total inflows for the years without any BITs edges out the years with BITs by almost USD 40 billion. Regulatory quality proxied by the ease of starting a business and the economic policy uncertainty index has significantly strengthened India's institutional quality attracting FDI inflows.

Foreign investors prefer locations that offer the best economic and institutional facilities. The host country's institutional quality and macroeconomic factors can thus attract foreign investments in the country. India's institutional quality in terms of the regulatory environment and the rule of law positively impacts FDI inflows throughout the study. Our analysis found that BITs are insignificant and tilted to the negative side in attracting FDI. This could be explained by the fact that India terminated multiple BITs in early 2016. However, despite the termination of treaties, FDI inflow in India has not been reduced, bestowing confidence in the nation's 'rule of law.' Coupled with the figures of FDI inflows from major nations with whom India has not signed any previous BITs, the total inflows for the years without any BITs edges out the years with BITs by almost USD 40 billion. Regulatory quality proxied by the ease of starting a business and the economic policy uncertainty index has significantly strengthened India's institutional quality attracting FDI inflows.

Throughout the study, the liberal FDI policies with greater openness and persistently improving institutional quality have attracted maximum FDI in the service sector based on the available skilled labor force. Since the early 20s, the service sector has been the largest recipient of investment in India. However, the high labor cost coupled with low productivity on account of the nation's rising population is the cause for low FDI in the manufacturing sector. The study indicates that high labor costs and stringent labor laws have been a significant barrier to FDI inflows, especially in manufacturing. Thus, the study recommends that India further strengthen its institutional quality to provide a business-friendly environment attracting more market-seeking (horizontal FDI) and efficiency-seeking (Vertical FDI) investments in the emerging Asian

region. The recent modifications of Labor laws are the efforts made in the right direction to improve the institutional environment and attract more FDI across manufacturing and service sectors. BITs are one of the various factors that attract FDI and promote investors' confidence.

Nevertheless, an institutionally strong nation with sound economic policies and regulations certainly has a more prominent role in drawing FDI. Findings indicate that the Government of India has been successfully improving nations' institutional quality by offering sustained business reforms and a regulatory business environment with judicial evolution, thus attracting FDI despite the termination of BITs. However, enacting a robust domestic law with a strong dispute resolution mechanism, signalling investors protection in the absence of BITs, may further encourage FDI and is highly endorsed. The study further recommends that India focus on improving the quality of education and health services to strengthen its human capital. The equal distribution of education tends to impact per capita income in most countries positively. Thus, as the findings suggest, institutional reforms have successfully influenced FDI inflows in India; however, India must further strategize enhancing human capital and propose liberal labour policies facilitating FDI inflows equally in the manufacturing sector, promoting exports.

References

- Abdouli, M., & Omri, A. (2021). Exploring the nexus among FDI inflows, environmental quality, human capital, and economic growth in the Mediterranean region. *Journal of the Knowledge Economy*, 12(2), 788-810.
- Akisik, O. (2020). The impact of financial development, IFRS, and rule of LAW on foreign investments: A cross-country analysis. *International Review of Economics & Finance*, 69, 815-838.
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, 58(2), 277-297.
- Arita, S., & Tanaka, K. (2013). FDI and investment barriers in developing economies (No. 431). Institute of Developing Economies, Japan External Trade Organization (JETRO).
- Asongu, S., Akpan, U. S., & Isihak, S. R. (2018). Determinants of foreign direct investment in fast-growing economies: evidence from the BRICS and MINT countries. *Financial Innovation*, 4(1), 1-17.
- Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The quarterly journal of economics*, 131(4), 1593-1636.
- Banga, R. (2003). Impact of government policies and investment agreements on FDI inflows (No. 116). working paper.
- Barro, R. (1996). Health and economic growth. World Health Organization.
- Bhasin, N., & Manocha, R. (2016). Do bilateral investment treaties promote FDI inflows? Evidence from India. *Vikalpa*, 41(4), 275-287.
- Blonigen, B. A., & Piger, J. (2014). Determinants of foreign direct investment. *Canadian Journal of Economics/Revue canadienne d'économique*, 47(3), 775-812.
- Borensztein, E., De Gregorio, J., & Lee, J. W. (1998). How does foreign direct investment affect economic growth? *Journal of international Economics*, 45(1), 115-135.
- Busse, M., Königer, J., & Nunnenkamp, P. (2010). FDI promotion through bilateral investment treaties: more than a bit? *Review of World Economics*, 146(1), 147-177.
- Canh, N. P., Binh, N. T., Thanh, S. D., & Schinckus, C. (2020). Determinants of foreign direct investment inflows: The role of economic policy uncertainty. *International Economics*, 161, 159-172.
- Choi, S., Furceri, D., & Yoon, C. (2021). Policy uncertainty and foreign direct investment. *Review of International Economics*, 29(2), 195-227.
- Cieślak, A. (2021). MNE activity in poland: Horizontal, vertical or both? *Emerging Markets Finance and Trade*, 57(2), 335-347.
- Coale, A. J., & Hoover, E. M. (2015). Population growth and economic development. Princeton University Press.
- Falk, M. (2016). A gravity model of foreign direct investment in the hospitality industry. *Tourism Management*, 55, 225-237.
- Gaies, B., & Nabi, M. S. (2019). Financial openness and growth in developing countries. *Journal of Economic Integration*, 34(3), 426-464.
- Hossain, M. T., Hassan, Z., Shafiq, S., & Basit, A. (2018). Ease of Doing Business and Its Impact on Inward FDI. *Indonesian Journal of Management and Business Economics*, 1(1), 52-65.
- Jang, Y. J. (2011). The impact of bilateral free trade agreements on bilateral foreign direct investment among developed countries. *The World Economy*, 34(9), 1628-1651.
- Khan, H., Khan, S., & Zuojun, F. (2020). Institutional quality and financial development: Evidence from developing and emerging economies. *Global Business Review*, 0972150919892366.
- Lankes, H. P., & Venables, A. J. (1996). Foreign direct investment in economic transition: the changing pattern of investments. *Economics of Transition*, 4(2), 331-347.

- Lee, S. H., & Song, S. 2012. Host country uncertainty, intraMNC production shifts, and subsidiary performance. *Strategic Management Journal*, 33: 1331-1340
- Li, C., & Tanna, S. (2019). The impact of foreign direct investment on productivity: new evidence for developing countries. *Economic Modelling*, 80, 453-466.
- Liu, P., Lu, Y., Sheng, B., Das, K. C., & Li, L. (2021). Can foreign direct investment promote BIT signing? *Journal of Asian Economics*, 75, 101324.
- Mahuni, K., & Bonga, W. G. (2017). Nexus between doing business indicators and foreign direct investment for Zimbabwe: A time series analysis. *Dynamic Research Journals' Journal of Economics and Finance (DRJ-JEF)*, 2(2), 01-08.
- Mallampally, P., & Sauvart, K. P. (1999). Foreign direct investment in developing countries. *Finance and Development*, 36, 34-37.
- Mina, W. (2020). Do GCC market-oriented labor policies encourage inward FDI flows? *Research in International Business and Finance*, 51, 101092.
- MogesEbero, E., & Begum, M. (2016). The desirability of doing business and flow of foreign direct investment nexus: the case of Ethiopia. *world*, 114, 37-81.
- Musambachime, M. (1990). The impact of rapid population growth and economic decline on the quality of education: the case of Zambia.
- Nguyen, T. V. H., & Cao, T. H. V. (2015). The impact of institutional quality on foreign direct investment (FDI) inflows to Vietnam. *EADN Working Papers*, 86.
- North, D. C. (1994). Economic performance through time. *The American economic review*, 84(3), 359-368.
- Nunnenkamp, P. (2002). Determinants of FDI in developing countries: has globalization changed the rules of the game? (No. 1122). *Kiel Working Paper*.
- Ranjan, P. (2019). *India and bilateral investment treaties: refusal, acceptance, backlash*. Oxford University Press.
- Rodríguez-Pose, A., & Cols, G. (2017). The determinants of foreign direct investment in sub-Saharan Africa: What role for governance? *Regional Science Policy & Practice*, 9(2), 63-81.
- Sabir, S., Rafique, A., & Abbas, K. (2019). Institutions and FDI: evidence from developed and developing countries. *Financial Innovation*, 5(1), 1-20.
- Singhania, M., & Saini, N. (2021). Demystifying pollution haven hypothesis: Role of FDI. *Journal of Business Research*, 123, 516-528.
- Uddin, M., Chowdhury, A., Zafar, S., Shafique, S., & Liu, J. (2019). Institutional determinants of inward FDI: Evidence from Pakistan. *International Business Review*, 28(2), 344-358.
- Vaisey, S., & Miles, A. (2017). What you can—and can't—do with three-wave panel data. *Sociological Methods & Research*, 46(1), 44-67.
- Welfens, P. J., & Baier, F. J. (2018). BREXIT and foreign direct investment: Key issues and new empirical findings. *International Journal of Financial Studies*, 6(2), 46.
- WIR, 2019. *Special Economic Zones*, available at: https://unctad.org/system/files/official-document/wir2019_en.pdf
- World Bank, 2018. *India: Systematic country diagnostic realizing the promise of prosperity*, Report no:126284-IN.
- Zhang, G., Han, J., Pan, Z., & Huang, H. (2015). Economic policy uncertainty and capital structure choice: Evidence from China. *Economic Systems*, 39(3), 439-457.
- Zhu, J., Jia, F., & Wu, H. (2019). Bankruptcy costs, economic policy uncertainty, and FDI entry and exit. *Review of International Economics*, 27(4), 1063-1080.

The work-life balance of employees and management staff working for newly established virtual organisation as a result of the COVID-19 Pandemic

Luka de Wet; Student
Seugnet Bronkhorst

University of Johannesburg, South Africa

Keywords

Work-life Balance, Virtual Groups, Covid-19, Working from home, Qualitative research, Conceptual Paper

Abstract

Purpose of the research: The purpose of the research was to determine whether the establishment of, and transformation to, virtual organisations due to the COVID-19 pandemic restrictions placed on the business sector, impacts drastically on the work-life balance of new virtual employees.

Design/methodology: A positivist, qualitative research that draws on a descriptive research design was used in order to provide a conceptual understanding of the impact on work-life balance that has been caused by a shift to virtual organisations as a result of the COVID-19 pandemic.

Results/findings: The restrictions placed on the business sector as a result of the COVID-19 pandemic resulted in the establishment of, and transformation to, virtual organisations. This had a drastic impact on the work-life balance of new virtual employees. The findings indicated varying opinions and understandings on work-life balance for virtual employees concluded prior to the pandemic.

Practical implications and Conclusions: The recognition of drastic impact on the work-life balance of new virtual employees should be recognised by businesses and taken into consideration when dealing with employees.

Limitations: The study was limited to only conceptual research. Further quantitative research will lead to additional, inclusive, knowledge

Introduction

The aim of this research is to determine the emphasis that virtual organisations place on the work-life balance of their employees and management staff.

Due to the COVID-19 pandemic, there has been an increase in the establishment, and transformation to, virtual organisations. As a result of restrictions and regulations, a limitation on the number of people allowed in a confined space is in place.

Virtual organisations offer many advantages in relation to the work-life balance of employees as it allows for balancing work and personal commitments (Jya & Shenoy, 2018:2). According to Deeb (2020:6) employees save time on travel and function in a work environment personally catered for themselves. However, employees working for companies adopting the practices of virtual organisations may find themselves in a position where their workspace and their leisure-space are the same and have to adapt to this way of work (Goodman, 2021). It becomes difficult for employees to separate their work-life balance in an environment where they are intertwined (Goodman, 2021). Goodman (2021) adds that clear boundaries need to be established to avoid a disturbance in the work-life balance of employees. This may result in employees experiencing difficulties in relation to knowing when to stop working, which leads to longer hours and greater work-related stress (Arntz, Berlingieri & Sarra, 2019:4).

Background and rationale

A virtual organisation consists of employees located in different geographical areas, communicating through technological sources such as phones, email, and the internet (Kerwin & Radulovic, 2018:54). These organisations have been defined over three decades since the establishment of the dotcom companies' era in the early nineties (Amorim, 2007). The companies are in a unique position in that their employees work virtually (away from an office setting) at a location of their choice. The distinguished advantages and disadvantages of virtual organisation are:

The advantage of flexibility that virtual organisations offer (Leimeister, Weigle & Krcmar, 2001:7), and The disadvantages such as the uncertainty around what is happening in an employee's home space that might affect his/her productivity and work-life balance (Hansen *et al.*, 2021:5).

Many virtual organisations were established in the early part of 2020, due to the COVID-19 pandemic resulting in regulations that restricted the number of people allowed in buildings/offices at one given time (Feitosa & Salas, 2020). This resulted in employees taking on a new work environment (such as their home) and performing their tasks remotely from these locations (Butahieko & Vyas, 2020:64).

It should be noted that employees working for newly established virtual organisations, as a result of the COVID-19 pandemic, were not prepared to work under this organisational structure, which has created further challenges in their ability to balance their work-life and their home-life.

1.2. Problem statement

Due to the COVID-19 Pandemic, many organisations have transformed from brick-and-mortar companies to online/virtual organisations. As a result, employees are now free to work from a location of their choice. This freedom of choice comes with the unclear distinction between the balance of work-life and personal-life, as it is difficult for employees to develop boundaries due to their location of choice now being their office environment, additionally making it challenging to recognise standard working hours. The problem statement can therefore be identified as determining the work-life balance of employees due to virtual organisations, as a result of the COVID-19 pandemic.

Research objectives

Primary objective

The primary objective of this study is to determine how the work-life balance of employees within virtual organisations, due to COVID-19 regulations, are influenced.

Secondary objectives

To determine the benefits of working virtually during the COVID-19 pandemic, prevalent to newly established virtual employees.

To determine the challenges of working virtually during the COVID-19 pandemic, prevalent to newly established virtual employees.

To determine if the change from an office setting to a home setting in a virtual organisation induced further stress and family conflict on employees.

To determine whether employees that form part of virtual organisations are as productive as brick-and-mortar organisations.

2. Literature Review

2.1. Introduction

This literature review will give context to the research question pertaining to virtual organisations by looking into and analysing the literature currently available in relation to these types of companies.

2.2. Definition of a virtual organisation/ virtual work

The understanding of what a virtual organisation actually is remains without a clearly outlined definition within academic literature. This is due to the constant evolution of such companies. Nevertheless, there are various characteristics and aspects of these organisations, and the manner in which they perform their work, that authors consider when elaborating on the fundamentals of virtual work. Authors consider virtual organisations to be entities that are established for a limited period of time, wherein the participants of that organisation are usually geographically distributed (Chung, Seaton & Cooke, 2016:32). Alawamleh and Ismail (2016:8) refers to a virtual organisation as being "a permanent or temporary collection of geographically dispersed individuals, groups, organisational units (who may or may not belong to the same organisation) that depend on technology and electronic linking in order to complete the production process of the joint work conducted by these units".

2.3. Aspects of virtual organisations

There are various aspects and common features that are prevalent in relation to virtual organisations. These include the members and employees of virtual organisations being geographically dispersed and not working in central office space. Furthermore, virtual organisations are heavily reliant on technology and

Information and Communication Technologies and are considered to be boundaryless while having unique organisational structures and increased flexibility. These aspects will be discussed below.

2.3.1. Geographically dispersed

According to Alawamleh and Ismail (2016:29), one of the necessary structural conditions that is needed for a virtual organisation to exist is the geographical dispersion of organisational units that are therefore not working in a central office space. An organisation is only considered to be spatially dispersed where members of the virtual organisation (individuals, divisions or groups) are dispersed at a minimum of two separate locations (Alawamleh & Ismail, 2016:29). This aspect is viewed to be most important when it comes to identifying if an organisation is considered to be one which is virtual, as the networking or linking of individuals, divisions, and even entire organisations, has to be done in a manner that is geographically remote from one another in order for it to be considered virtual work or virtual business practices (Bajdor, Dagmara & Lis, 2016:3).

The benefits that come with members of virtual organisations being geographically dispersed, include:

The organisation's ability to employ talented and diverse employees from any country, as the search for employees is not confined to the geographic location of the organisation (Domazet, Radović & Brandić, 2018:61).

The hiring of low-cost, but qualified, labour force from geographic areas where the labour cost is low (Domazet *et al.*, 2018: 61).

The luxury of competing in global markets without a concern about geographical restrictions to their business practices (Dulebohn & Hoch, 2017: 573).

There are, however, various drawbacks that come with the members of virtual organisations being geographically dispersed:

Domazet *et al.*, (2018: 62) express concerns over the restriction of face-to-face interactions that comes with virtual organisations

The authors further indicate the possibility for breakdowns in communication as a result of cultural differences that exist between the members located in different geographic regions.

2.3.2. Reliant on technology and ICT

Due to the geographical dispersion of employees, Information Technology (IT) is placed in a central role and is considered to be the driving factor in how virtual organisations are able to operate (Messenger & Gschwind, 2016: 197). Virtual organisations make use of information and communication technologies (ICT) to:

Aid the coordination and communication of members and activities performed for the company.

view the progress of team members, with whom they cannot make physical contact with (Waizenegger *et al.*, 2020: 429); and

succeed and operate telecommunications (which have made distance irrelevant), databases (which provide a virtual organisational memory, making time irrelevant), and multimedia (Messenger & Gschwind (2016:205).

Virtual organisations are often described as those that heavily make use of various technologies (specifically Information Technologies) in order to reduce common restrictions pertaining to geography, time and information that an organisation may face. However, technologies are constantly evolving, and newly developed technologies are not always universally available. The virtual organisations need to constantly adapt to these new technologies and ICT systems in order to maintain a virtual presence and provide easy access to their members (Jimenez *et al.*, 2017:5).

2.3.3. Boundaries and borders of virtual organisations

New boundaries need to be established by the virtual organisation in order to separate members of the organisation, as these virtual organisations do not have traditional physical boundaries (Čulo, 2016:36). This is done through the establishment and implementation of technological boundaries to ensure the sanctity of the organisation. This results in non-member not being able to enter. Messenger and Gschwind (2016: 204) contend that virtual organisations could establish boundaries through passwords, ID's, coded language, and even a specific computerised mailing list to which only the members of the organisation are part of and have access to.

An organisation is considered to be more virtual if its boundaries are more invisible. This would be a result of the technologies used (Grubb, 2021: 6). For instance, a physical entrance to a filing room that is only accessible by an employee's key card is far less virtual than an organisation protecting its virtual files using a firewall or online server.

Virtual organisations are often referred to as boundary-less organisations (Bui, 2020: 20). This is in reference to organisations that are considered not to have walls or limits, and those that are made more flexible as a result of the traditional boundaries of hierarchy, function and geography being eradicated within these virtual organisations (Čulo, 2016:36). Due to technology and ICT systems, virtual organisations transcended across geographical distances and organisational boundaries (Bui, 2020: 9). This resulted in unique business models and practices.

According to Domazet *et al.* (2018:57) one of the major characteristics of a virtual organisation is the permeable boundaries, referring to the quantity of new information that may be accessed by members of the organisation. This indicates the lack of rigid and systematic boundaries and would allow for more information to be accessed by its members (through systems such as ICT), resulting in a lesser degree of confined information. Jimenez *et al.* (2017:1) conferred working across organisational boundaries, specifically in terms of the labour force, as not an exception within virtual organisations, but rather considered to be the norm. Members of virtual organisations include full-time and part-time employees as well as contractors, suppliers and freelancers operating independently from the virtual organisation but conform to the same goal and business functions.

2.3.4. Organisational structure of virtual organisations

Due to the unique nature in which virtual organisations operate, the actual organisational structure needs to be different. Although different views exist on the organisational structure of a virtual organisation, the general consensus is that the overall structure pertains to the ability for it to be flexible. The majority of authors, since the emergence of literature pertaining to virtual organisations in the 1990's, viewed existing organisational structures as obsolete due to traditional organisational structures obstructing the true value and nature of Information and Communication Technology that virtual organisations promote. Even though the aforementioned organisational structures were viewed as obsolete, people had to rely on an incremental implementation of virtual organisations that still reflected the traditional organisational structure, rather than an instant change (Alawamleh & Ismail, 2016: 31).

Virtual organisations make use of various organisational structures and combine these structures in order to create new organisational capabilities and competencies, which allows for overhead costs and other structures to be kept to a minimum. This results in the efficiency of administrative work that the virtual organisation emphasises (Čulo, 2016:35). Domazet *et al.* (2018:69) state that the corporate structure of a virtual organisation is almost entirely egalitarian. The job responsibilities and power of employees are: shared equally, highly specific job descriptions, and guided by a common purpose.

Virtual organisations are far less rigidly structured compared to classical or traditional organisations (Bajdor *et al.*, 2016:3). With virtual organisations placing such an importance on flexibility in terms of its structure, Čulo (2016:37) indicates that there are important factors that enable this flexibility to work within a virtual organisation, including:

the trust among the partners of the organisation being vital as there is a lesser degree of a traditional hierarchy.

the ability to build and develop flexible work teams; and

the communication, coordination and cooperation required.

The organisational structure of a virtual organisation is generally horizontal (Chung *et al.*, 2016:9). This echoes what has been stated in the literature above in terms of the flexibility within the organisational structure, as well as the decrease of a traditional hierarchal organisational structure (known as a vertical structure) that occurs in traditional organisations.

2.3.5. Increased flexibility within a virtual organisation

Virtual organisations are flexible in the ability to exist without physical limits or walls, as well as expelling the traditional boundaries of hierarchy, function and geography which, in turn, creates more flexibility in relation to the organisational structure of the virtual organisation (Walzenegger *et al.*, 2020:432). This is emphasised by Domazet *et al.* (2018: 68), who states that virtual organisations do not have to worry about barriers such as place and time. However, an important aspect of the flexibility within virtual organisations that needs to further be elaborated on, is that of their virtual teams and virtual members.

According to Anthony and Petersen (2021:628), staffing arrangements are more flexible within virtual organisations, as employees are not fixed to a certain space-limit within the organisation, or geographic location. This flexibility results in lower overhead costs as employers do not have to provide office space for these employees. Further to this, virtual organisations could hire a low-cost but qualified labour force from geographic areas where the labour cost is low (Domazet *et al.*, 2018:61).

Flexible working arrangements afforded to virtual workers would:

influence productivity and employee commitment,

ultimately reduce stress,

provide more flexibility, and

provide better work-life balance towards these employees (Shenoy, 2020:2).

have a more flexible schedule and greater comfort (as they are working from a location of their choice), and

save on travel expenses, due to the fact that they are not travelling to an office every day (Shenoy, 2020:2; and Zuofa & Ochieng, 2017:5).

Another important characteristic of a virtual organisation is its ability to react flexibly to market changes (Alawamleh & Ismail, 2016:29). This is achieved through less standardised internal processes, due to the nature of the organisational structure within a virtual organisation being less hierarchal, more horizontal, and employee tasks being more general in nature (Chung *et al.*, 2016: 9; Domazet *et al.*, 2018:69). Therefore, virtual organisations can react quickly and more beneficially to more dynamic business and client requirements (Zuofa & Ochieng, 2017:5).

3. Research Methodology

3.1. Research paradigm

The study will use positivism as a research paradigm. Positivism applies natural science methods to social science and business research, in order to study the social reality of what is being observed (Ryan, 2018:4). Hence, to establish an objective truth, this scientific method is deemed the best as this paradigm views the world as having a single reality. Objectivity is the collective theme that runs through the positivism paradigm. The positivism paradigm is the best alternative, as the research is not establishing new understandings and norms, as would be the case in grounded theory research. The contribution from this study aims to establish an understanding and form an overall view of the combined literature on the nature of virtual organisations' effect on the work-life balance of employees. This research is aiming to determine the effect on the work-life balance of employees' party to newly established virtual organisations as a result of the COVID-19 pandemic. The existing literature on virtual organisations and their operations before the pandemic will be analysed. A further analysis will be made on the impact that the COVID-19 pandemic has had on the commerce sector, which forced many organisations to adopt a virtual structure.

3.2. Nature of research

This research study is qualitative in nature. Qualitative research refers to an iterative process wherein an improved understanding of a topic is achieved, through the establishments of significant distinctions as a result of analysing the phenomenon being studied (Aspers & Corte, 2019:155). This research study is entirely conceptual and is based on analysing literature on virtual organisations, as well as the constant, new inflow of current literature that is being established on the effects of the COVID-19 pandemic. Further, the aim of this research is to reach and provide an understanding of the work-life balance or virtual teams during the pandemic, meaning that it aims to improve the understanding that is novel to the scholarly community, of a phenomenon being studied, which further indicates the qualitative nature of the research. This contribution

is a literature study based on the current literature that is available in relation to the work-life balance of employees during the COVID-19 pandemic.

3.3. Research design

This research study is descriptive research design following the same methodology as a conceptual research study. A descriptive research design is non-experimental in nature, as it aims to describe a phenomenon that has occurred or is occurring (Siedlecki, 2020:8). In descriptive research, no variables are manipulated, and are rather observed and described (Siedlecki, 2020:8). The aim of this research study is to describe phenomena, being the work-life balance of virtual employees during the COVID-19 pandemic, which will be done by analysing various forms of literature.

There will be no interviews, nor experimental studies conducted in this research, as the research is solely conceptual and descriptive. Jaakkola (2020:19) states that conceptual research does not derive its conclusion from raw data, as it involves assessing and analysing a combination of evidence to a phenomenon, based off on previously developed concepts and theories. Therefore, conceptual studies are conducted using information that is already present, in order to form an understanding on an observation, which is the method being applied in this research study, through literature contained in academic journals and published books, on both virtual organisation and the COVID-19 pandemic, in order to formulate an understanding on the phenomena pertaining to work-life balance.

In summary of the above, this research study is aimed at formulating an understanding on the work-life balance of employee's party to virtual organisations as a result of the COVID-19 pandemic, which is done under the premise of the positivism research paradigm and makes use of qualitative research to ensure that the research study is descriptive and conceptual.

4. Research Results and Findings

Wolor *et al.* (2020: 445) defines work-life balance as "the balance between time someone spends working, compared to the time spent on one's personal life". In terms of this research, work-life balance is the single most important factor when analysing literature on the impact that the COVID-19 pandemic has had on working citizens, as it is their work-life balance that has been severely impacted.

At the start of 2020, the COVID-19 virus started to spread through various countries across the globe. In order to try and curb the COVID-19 infection rate, various countries implemented lockdown rulings that encouraged, and often mandated, corporate employees to work from home (in the South African context, it was only essential workers that took exception to stay-home mandate). As a result, over 3.4 billion people in 84 countries were confined to their homes before the start of April 2020 (Bouziri *et al.*, 2020:509). Traditional companies who employed workers to work at a specific geographic location, were now newly established virtual organisations. Scherling and Lind (2021:60) notes that there are major differences between the establishment of a virtual teams or companies from nothing, with a view to conduct business as a traditional virtual organisation, and those establishing a virtual team whose members had experience working together and co-located in the same geographical location. Both have their own unique benefits and challenges. It is the latter that this research has chosen to focus on, as it is these virtual teams and, new virtual organisations, that have been established as a result of the restrictions placed on the business environment, due to the COVID-19 pandemic. This drastic, unplanned change in working conditions occurred rapidly and was considered to be drastic in the sense of employees adapting to new working conditions, as well as an entirely new livelihood in how they went about living their daily lives (Scherling & Lind, 2021:60). With this being the case, it was crucial for companies to implement strategic steps pertaining to access to technology of employees working from home so that they had the required resources to do so, as well as ensuring that employees maintain a fair work-life balance as to ensure the motivation and performance of these employees (Wolor *et al.*, 2020:449).

With companies strategically provided their employees with technology, millions of people were exposed to telecommuting as a means of access to a virtual working environment (Bouziri *et al.*, 2020:509). This already proved to be a change relatively easy to implement, as Information and Communication Technologies (ICT's) became inveterate in traditional workspaces. Employees were able to alter the way they used this technology, with relative ease (Scherling & Lind, 2021:60). The majority of employees were not less efficient in their personal productivity. There was no decrease in team performance, due to this

familiarity with the inner workings of the technology at hand as employees been co-located before any virtual teams were established (Scherling & Lind, 2021:60).

Concerns were raised relating to the sudden establishment of virtual teams or organisations severally impacting on the work-life balance of new virtual employees. Dockery and Bawa (2020:3) found that employees working for newly established virtual teams, as a result of COVID-19 restrictions, tend to work longer hours as there is no disconnect between work-life and home-life. Working from home, and the longer hours accompany the lifestyle, seemingly enhanced family conflict within the household (Dockery & Bawa, 2020:3).

A further aspect identified was blurring of the roles within the family dynamic during the COVID-19 pandemic. Parents took on roles such as teacher, as well as caretaker, which would have not been the case pre-COVID-19. When these roles are in conflict with one another, the employee (the parent) is forced to compromise one role for another, which can create further conflict and stress within the household (Dockery & Bawa, 2020:3). Dockery and Bawa (2020:3) outline the existing literature as continuously indicating the ability of virtual work to either reduce or exacerbate the stress of the employee, especially in relation to possible family and household conflict if the employee does not implement boundaries and carries out virtual work in a reasonable manner.

The overall literature seems to point toward the understanding that working virtually during the COVID-19 pandemic proved more positive for the majority of virtual employees. Further to this, literature provides overwhelming indication that the work-life balance of employees increased during this time. Wolor *et al* (2020:449) indicates that the work-life balance, and motivation that comes with employees working virtually during the COVID-19 pandemic, had a significant positive impact on employee performance. This is echoed by the literature contributed by Dockery and Bawa (2020:3) outlining the fact working virtually during the pandemic led to a 13% increase in the work performance of employees.

Authors Putri and Amran (2021:33) concluded that virtual work has the potential to negatively impact the work-life balance of employees, if not carried out correctly, but yields a significant and positive affect when it is. These authors added that an increase in the application of virtual work, will provide a further increase in the work-life balance of an employee (Putri & Amran, 2021:33). It is therefore clear that employees who undertook to work virtually during the pandemic seems more satisfied in their ability to balance work and family life and experience an overall increase in job satisfaction.

However, in order to formulate a holistic understanding of the work-life balance of employee's party to virtual organisations as a result of the restrictions that have been placed on the business sector due to the COVID-19 pandemic, this research has formulated and combined the most frequent benefits and challenges pertaining to the work-life balance of the employees, based on the current literature.

4.1. Benefits

Perhaps the most pertinent benefit, and most widely accepted according to the literature, is these virtual employees, working during the COVID-19 pandemic, are ultimately provided with a greater work-life balance as more time is spent with their families. This is due to the fact that employees are saving on commuting time, which afforded the opportunity to devote more time to other family activities, as well as productive activities (Dockery & Bawa, 2020:3). Dockery and Bawa (2020:3) note that this, in itself, creates benefits such as virtual employees incurring direct financial saving due to their lack of commuting.

The digitalisation of work and processes accelerated as employees digitalised in order to ensure that the flow of work was not interrupted, and targets were not missed whilst working in the virtual environment (Scherling & Lind, 2021:60). This led to an additional benefit that authors agreed on which is the scale and speed of knowledge sharing between employees drastically increasing within the virtual working environment during the pandemic (Scherling & Lind, 2021:60). The communication between employees became more direct and clearer (Scherling & Lind, 2021: 62).

All three of these benefits directly relate to the advancement in work-life balance of employees, as the ease of work and communication allowed for a higher job satisfaction, as well as the advancement in time-saving business practices. Employees completed tasks a more frequent rate, allowing more time to spend on non-work-related activities.

The final two benefits that are prevalent in the current literature are:

Newly virtual employees working during the pandemic were exposed to a unique situation wherein they had a greater discretion in deciding the times that they worked, as well as the pace at which they wanted to work at (Dockery & Bawa, 2020:3). This directly influences the work-life balance of the employee, as it is ultimately their decision on when they preferred to work.

A further decrease in the work-family conflict that employees experienced before they worked in a virtual setting (Dockery & Bawa, 2020:4).

The benefits that outlined proved to be the most frequent benefits occurring throughout the research in the current literature.

4.2. Challenges

One of the biggest challenges that authors agree on, in terms of employees working from home in a virtual setting due to the pandemic, is the sheer timing of the necessity for companies to have to conform to this virtual organisational structure. This drastic shift to working virtually had occurred at an anxiety-provoking time as a result of the pandemic and the uncertainty that came with it (Bouziri *et al.*, 2020:509). This initial shift took some time for the worker to get used to, as it is a different environment the employee is exposed to than before, which may negatively impact the initial work-life balance of these employees. Authors further agree that the readiness (and even safety) of the home or virtual working environment was not guaranteed and ensured, as the sudden and drastic shift could not have been anticipated by these employees (Bouziri *et al.*, 2020:509). The anxiety and stress that had accompanied this shift was a prodigious factor as to why the initial work-life balance of these virtual employees was low and perceived to be negative.

Along with this shift into a new home or virtual working environment, employees, who were also parents, were pushed into new roles and family dynamics as school closures resulted in parents having to care for their children and work virtually at the same time (Bouziri *et al.*, 2020:509). This, again, had a major negative impact on the work-life balance of these virtual employees, as these employees to provide the same time to two completely different roles, which would also lead to further stress placed on the employee.

The above challenges all relate to the initial shift of employees taking up virtual work, and although there is evidence that these challenges are still relevant in the lives of virtual employees, the general consensus among authors is that these challenges and difficulties were greatly reduced once enough time had passed for these employees to grasp and get used to their new working reality. However, current challenges that are still being faced by these employees include the difficulty, and sometimes inability, for virtual workers to disengage from their work in their homework environment and ensure that a clear boundary is set between the work and non-work domains, respectively (Dockery & Bawa, 2020:3). This has an obvious impact of the work-life balance of virtual employees, as it is these lines that are being blurred. Further, the opposite situation is also found to occur, wherein, because these employees are working in their home environment, there is a lower motivation to work, resulting in the life aspect of work-life balance taking precedent at the detriment to the work aspect (Dockery & Bawa, 2020:4).

The challenges that have been outlined prove to be the most frequent challenges that have occurred throughout the research on the current literature, leading to the conclusions that these make up the main challenges and issues of the work-life balance of employees working from home in a virtual setting, as a result of the various restrictions placed on the global business sector due to the COVID-19 pandemic.

5. Conclusion

This conceptual research paper set out to provide an understanding of the work-life balance of employee's party to virtual organisations, as a result of the restrictions that have been placed on the business sector due to the COVID-19 pandemic. The findings provided general conclusions on the work-life balance of virtual employees, as well as an in-depth review on what various authors deemed to be the benefits and challenges of the work-life balance of these employees, in order to provide a more holistic understanding of the research objective. To this end, the findings indicate that there are both various benefits and challenges that come with working virtually during the COVID-19 pandemic. However, it is clear, based on the evidence that seems to be overwhelmingly positive in this aspect, that these virtual employees have a greater and more positive work-life balance, whilst working virtually amid the worldwide COVID-19 pandemic. This is based on the fact that employees have had the chance to spend more time with their families whilst

working from home, communication between virtual employees being more direct and the digitalisation of shared knowledge leading to a greater amount of time saved leading to employees have more time for non-work activities, the financial cost saving that comes with working virtually, and the decrease in work-family conflict. In order to ensure that employees who are working virtually attain and maintain a greater work-life balance, the general consensus among authors, as outlined throughout this research, is for virtual employees to set clear boundaries and working hours for themselves at home, as well as delineate between work and non-work domains.

6. Recommended Future Research

Due to the COVID-19 pandemic being an ongoing occurrence, as well as fluctuating in its severity, topics that are centred around the aspects pertaining to it, such as virtual work, need to be constantly researched, as well as researched in different context (such as the differences of these aspects between different countries). At the time of this research contribution being written, the world has implemented various COVID-19 vaccine rollout plans, which, in theory, would allow for vaccinated workers to return to their central geographical working environment at their place of employment. However, further research can be conducted on the willingness of employees to do so, after working in a virtual environment that has allowed them to positively increase their work-life balance. Further research could also be conducted on the willingness of companies to reinstate work at a central geographical working environment, when they themselves have saved costs (such as rent and utilities) and can see the positive impact that virtual work has had on their employees.

References

- Alawamleh, M., and Ismail, L.B. (2016). Towards a Risk Management tool to support collaboration in Virtual Enterprise. *Organisational Studies and Innovation Review*, 2(2): 28-35. Available at: https://www.researchgate.net/publication/319930843_Towards_a_Risk_Management_tool_to_support_collaboration_in_Virtual_Enterprise [Accessed 21 May 2021]
- Amorim, A.N.G.G. (2007). *Virtual Organization Theory: Current Status and Demands*. Research Gate [online]. Available from: https://link.springer.com/content/pdf/10.1007%2F978-0-387-75466-6_1.pdf
- Anthony, A.J., and Petersen, S.A. (2021). Examining the digitalisation of virtual enterprises amidst the COVID-19 pandemic: a systematic and meta-analysis. *Enterprise Information Systems*, 15(5): 617-650.
DOI: 10.1080/17517575.2020.1829075
- Arntz, M., Berlingieri, F., and Sarra, B.Y. (2019). *Working from Home: Heterogeneous Effects on Hours Worked and Wages*. SSRN Electronic Journal [online]. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3383408
- Aspers, P., and Corte, U. (2019). What is Qualitative in Qualitative Research. *Qualitative Sociology*, 42: 139-160. DOI: [10.1007/s11133-019-9413-7](https://doi.org/10.1007/s11133-019-9413-7)
- Bajdor, P., Dagmara, B., and Lis, T. (2016). Management Of a Virtual Organisation from The Aspect of Creating Business Processes. *microCAD International Multidisciplinary Scientific Conference*, 1-6.
DOI: [10.26649/musci.2016.050](https://doi.org/10.26649/musci.2016.050)
- Bouziri H., Smith, D.R.M., Descatha, A., Dab, W., and Jean, K. (2020). Working from home in the time of COVID-19: how to best preserve occupational health? *Occupation Environmental Medical journal*, 77(7): 509-510.
DOI: 10.1136/oemed-2020-106599
- Bryman, A., and Bell, E. (2015). *Research Methodology: Business and Management Contexts*. 5th Edition. Cape Town: Oxford University Press Southern Africa
- Bui, P.A. (2020). *The Roles of Leasers in Virtual Working Environment* (Master's thesis). Oulu, Finland: Oulu University of Applied Sciences.
Available at: https://www.theseus.fi/bitstream/handle/10024/341263/Bui_Anh.pdf?sequence=2&isAllowed=y
- Butahieko, N., and Vyan, L. (2020). *The impact of working from home during COVID-19 on work and life domains: an exploratory study on Hong Kong*. Tandfonline.com [online]. Available from: <https://www.tandfonline.com/doi/full/10.1080/25741292.2020.1863560>
- Chung, H.F., Seaton, J.S., and Cooke, L. (2016). Factors affecting employees' knowledge-sharing behaviour in the virtual organisation from the perspectives of well-being and organisational behaviour. *Computers in Human Behaviour*, 64: 432-448. DOI: [10.1016/j.chb.2016.07.011](https://doi.org/10.1016/j.chb.2016.07.011)

- Čulo, K. (2016). Virtual Organisations - The Future Has Already Begun. *Media, Culture and Public Relations*, 1(7): 35-42. Available at: VIRTUAL ORGANIZATION – THE FUTURE HAS ALREADY ...<https://hrcak.srce.hr> > file [Accessed 21 May 2021]
- Deeb, G. (2020). *The Pluses and Minuses of Virtual Teams*. Forbes.com [online]. Available from: <https://www.forbes.com/sites/georgedeeb/2020/05/04/the-pluses--minuses-of-virtual-teams/?sh=117102483aba>
- Dockery, M., and Bawa, S. (2020). Working from Home in the COVID-19 Lockdown. *Bankwest Curtin Economics Centre Research Brief*, 5: 1-5
Available from: https://bcec.edu.au/assets/2020/05/BCEC-COVID19-Brief-4_Working-from-home.pdf [Accessed 12 July 2021]
- Domazet, I., Marković, M.R., and Martinović, A.B. (2018). *Digital Transformation: New Challenges and Business Opportunities*. London: Silver and Smith Publishers
- Dulebohn, J.H., and Hoch, J.E. (2017). Virtual Teams in Organisations. *Human Resources Management Review*, 27(4): 569-574.
DOI:10.1016/j.hrmr.2016.12.004
- Feitosa, j., and Salas, E. (2020). Today's Virtual Teams: Adapting Lessons Learned to The Pandemic. *Elsevier Public Health Emergency Collection*.
DOI: 10.1016/j.orgdyn.2020.100777
- Garbe, A., Ogurlu, U., Logan, N., and Cook, P. (2020). *COVID-19 and Remote Learning: Experiences of Parents with Children during the Pandemic*. *American Journal of Qualitative Research*, 4(3), pp. 45-65.
<https://doi.org/10.29333/ajqr/8471>
- Goodman, R. (2021). *What Does Work-Life Balance Mean for Virtual Teams?* RickGoodman.com [online]. Available from: <https://www.rickgoodman.com/work-life-balance-mean-virtual-teams/>
- Grubb, A. (2021). An Ethnographic Study of Beneficent Boundaries in Virtual Voluntary Social Work. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, 1-11. DOI: 10.1007/s11266-021-00350-w
- Hansen, J.P., Ipsen, C., Kirchner, K., and van Veldhoven M, (2021). *Six Key Advantages and Disadvantages of Working from Home in Europe during COVID-19*. *International Journal of Environmental Research and Public Health* [online]. Available from: <https://www.mdpi.com/1660-4601/18/4/1826>
- Jaakkola, E. (2020). Designing conceptual articles: four approaches. *AMS Review*, 10: 18-26. Doi: 10.1007/s13162-020-00161-0
- Jha, N., and Shenoy, V. (2018). *Virtual Working and Work-Life Challenges of Virtual Employees*. Research Gate [online]. Available from: https://www.researchgate.net/publication/341385215_Virtual_Working_and_Work-Life_Challenges_of_Virtual_Employees
- Jimenez, A., Boehe, D.M., Taras, V., and Caprar, D.V. (2017). Working Across Boundaries: Current and Future Perspectives on Global Virtual Teams. *Journal of International Management*, 23(4).
DOI: 10.1016/j.intman.2017.05.001
- Kerwin, T., and Radulovic, D. (2018). *Digital Transformation: New Challenges and Business Opportunities*. London: Silver and Smith Publishers
- Koekemoer, E. (2020). *Taking a new approach to work-life balance amid COVID-19 – UP professor offers employees and employers pointers* (pg 1 – 3). UP.ac.za [online]. Available from: <https://www.up.ac.za/media/shared/799/2020/taking-a-new-approach-to-work-life-balance-amid-covid-19-up-prof-offers-employees-and-employers-pointers.zp192716.pdf>
- Leimeister, J. M., Weigle, J. and Krcmar, H. (2001): Efficiency of Virtual Organisations the Case of AGI. *Electronic Journal of Organizational Virtualness (eJOV)*, 3: 12-42.
- Messenger, J.C., and Gschwind, L. (2016). Three Generations of Telework: New ICT's and the (R)evolution From Home Office to Virtual Office. *New Technology, Work and Employment*, 31(3): 195-208.
DOI:10.1111/ntwe.12073
- Mihhailova, G., Öun, K., and Türk, K. (2009). Virtual work and its challenges and types. *Business Review (Federal Reserve Bank of Philadelphia)*, 2(2): 96-103. Available from: https://www.researchgate.net/publication/261144225_Virtual_work_and_its_challenges_and_types [Accessed 16 May 2021]
- Putri, A., and Amran, A. (2021). Employees' Work-Life Balance Reviewed from Work from Home Aspect During COVID-19 Pandemic. *International Journal of Management Science and Information Technology*, 1(1): 30-34.
DOI: <https://doi.org/10.35870/ijmsit.v1i1.231>
- Ryan, G. (2018). Introduction to positivism, interpretivism and critical theory. *Nurse Researcher*, 25(4): 41-49.
DOI:10.7748/nr.2018.e1466

- Scherling, D., and Lind, I.C. (2021). *Digital Transformation and Virtual Team Transition due to the COVID-19 Pandemic* (Master's Thesis). Jönköping: Jönköping International Business School. Available from: <http://hj.diva-portal.org/smash/get/diva2:1560965/FULLTEXT01.pdf> [Accessed 11 July 2021]
- Segal, J. (2013). *A South African Perspective on Work-Life Balance: A Look at Women in Academia*. Wits.ac.za [online]. Available from: <http://wiredspace.wits.ac.za/jspui/bitstream/10539/13637/5/Final%20research%20project.pdf>
- Shenoy, V., and Jha, N. (2018). Virtual Working and Work-Life Challenges of Virtual Employees. *International Journal of Economic and Management*, 8(5): 1-7. Available at: https://www.researchgate.net/publication/341385215_Virtual_Working_and_Work-Life_Challenges_of_Virtual_Employees [Accessed 16 May 2021]
- Siedlecki, S.L. (2020). Understanding Descriptive Research Designs and Methods. *Clinical Nurse Specialist*, 34(1): 8-12. DOI: 10.1097/NUR.0000000000000493
- Starner, T. (2016). *For virtual employees, work-life 'integration' is the goal*. HRDive.com [online]. Available from: <https://www.hrdive.com/news/for-virtual-employees-work-life-integration-is-the-goal/424492/>
- Thomas, G. F. (N.d.). *Virtual Organisations: Background and context*. References For Business [online]. Available from: <https://www.referenceforbusiness.com/management/Tr-Z/Virtual-Organizations.html>
- Uddin, M. (2021). Addressing work-life balance challenges of working women during COVID-19 in Bangladesh. *International Social Science Journal*, 71(3). DOI:10.1111/issj.12267
- Waizennegger, L., McKenna, Brad., Cai, W., and Bendz, T. (2020). An affordance perspective of team collaboration and enforced working from home during COVID-19. *European Journal of Information Systems*, 29(4): 429-442. DOI: 10.1080/0960085X.2020.1800417
- Wolor, C.W., Solikhah, S., Fidhyallah, N.F., and Lestari, D.P. (2020). Effectiveness of E-Training, E-Leadership, and Work Life Balance on Employee Performance during COVID-19. *Journal of Asian Finance, Economics and Business*, 7(10): 443-450. DOI:10.13106/jafeb.2020.vol7.no10.443
- Zuofa, T., and Ochieng, E. (2017). Working separately but together: Appraising virtual project team challenges. *Team Performance Management: An International Journal*, 3: 1-27. DOI: 10.1108/TPM-06-2016-0030

Anchoring AI/Machine Learning on the African Technological Innovation and Investment Table

Gabriel Kabanda

Secretary General

Zimbabwe Academy of Sciences, TREP Building, University of Zimbabwe
Harare, ZIMBABWE

Keywords

Knowledge generation, innovation, sustainable development, economic framework, Cybersecurity, Artificial Intelligence, Machine Learning.

Abstract

Research creates both knowledge and technology which are put into practical use through the process of innovation. The success in achieving applied scientific technologies can be measured in the form of technological solutions, patents, inventions, published research papers, etc. The purpose of the research was to formulate an economic framework and develop technological solutions for Zimbabwe with respect to knowledge generation, innovation and enterprise development. This was compounded by an exploration for opportunities in cybersecurity and machine learning for use in the knowledge generation and dissemination business. Cybersecurity is an amalgamation of technologies, processes and operations purposed to preserve and protect computer information systems from cyber-attacks or unauthorized access. Machine Learning (ML) entails the automatic data analysis of large data sets and production of models for the general relationships found among data. The Pragmatism paradigm was used as the research philosophy in this research as it epitomizes the congruity between knowledge and action. The qualitative aspect was primarily used in the knowledge generation component which was based on an integral research architecture which combines descriptive, narrative, theoretical, and experimental survey methods, through focused group discussions as the major research design. The quantitative dimension used an experiment as a research design to explore prototype models for cybersecurity and machine learning. Priority projects for strategic investment were identified for commercialization and these were on post-harvest technologies; small scale mining/mineral value addition/bio mining; clean water alternatives; tiles technologies from mining waste; ICT innovations in Machine Learning and Cybersecurity; and defence technologies. A Bayesian Network model for Cybersecurity was developed to guide implementation of future cybersecurity systems in Africa. The research used the KDDCup 1999 intrusion detection benchmark dataset in order to build an efficient network intrusion detection system. The sample comprised primary data with 42 variables in a set of 494,020 instances that was analysed using mainly the SNORT open-source software and other Bayesian Network supportive platforms. A Bayesian Network model was developed which took into consideration the most efficient ML algorithms.

1. Introduction

1.1 Background

Research creates both knowledge and technology which are put into practical use through the process of innovation. Knowledge co-creation is a synergetic process of combining selected value-adding content and process from disciplinary traditions to synthesize new ways of knowing. As a management initiative, knowledge co-creation brings forth a blend of ideas and harmonisation of different parties together to jointly produce a mutually valued outcome. Innovation is the successful exploitation of an idea, renewal and enlargement of the range of products and services, the establishment of new methods of production, supply and distribution, the introduction of changes of management, work organisation. Innovation is the process of creating and putting into use combinations of knowledge from different/multiple sources to create development impact and obtaining commercial value from inventions. Technology comprises objects,

knowledge, activities, processes and a socio-technical system that comes with it (Kabanda G., 2013). The success in achieving applied scientific technologies can be measured in the form of technological solutions, patents, inventions, published research papers, etc.

The Zimbabwe National Vision 2030 is *"Towards a Prosperous and Empowered Upper Middle-Income Society by 2030, with Job Opportunities and a High Quality of Life for its Citizens"*. The ultimate goal for Vision 2030 is to transform Zimbabwe to an upper middle-income economy with respect to its per capita Gross National Income from the current US\$1 440 to over US\$5000 in real terms by 2030. The National Vision for Zimbabwe, enunciated as Vision 2030, provided the basis upon which the National Development Strategy was formulated and is being implemented as the two successive Five-Year National Development Strategies: NDS1 (2021-2025) and NDS 2 (2026-2030).

The era of the Internet of Things (IoT) generates huge volumes of data collected from various heterogeneous sources which may include mobile devices, sensors and social media. A hybrid cybersecurity model which uses Artificial Intelligence (AI), and Machine Learning (ML) techniques may mitigate against IoT cyber threats on cloud computing environments. Cybersecurity consolidates the confidentiality, integrity, and availability of computing resources, networks, software programs, and data into a coherent collection of policies, technologies, processes, and techniques to prevent the occurrence of an attack (Berman, D.S., et al, 2019). Cybersecurity is an amalgamation of technologies, processes and operations purposed to preserve and protect computer information systems from cyber-attacks or unauthorized access (Sarker, I.H., et al, 2020). The major cybersecurity applications are intrusion detection and malware detection, which have had necessitated a radical shift in the technology and operations of cybersecurity to detect and eliminate cyber threats so that cybersecurity remains relevant and effective in mitigating costs arising from computers, networks and data breaches (Sarker, I.H., et al, 2020).

Artificial Intelligence (AI) is the simulating of human intelligence in machines, through programming computers to think and act like human beings (Nielsen, R., 2015). Machine Learning (ML) is a special category of AI where computers are instructed to learn. ML is essentially the automatic data analysis of large datasets and development of models for ascertaining the relationships found among data. ML algorithms require empirical data as input and then learn from this input. The three classes of ML according to Umamaheswari, K., and Sujatha, S., (2017) are:

Supervised learning: where the methods are given inputs labeled with corresponding outputs as training examples.

Unsupervised learning: where the methods are given unlabeled inputs.

Reinforcement learning: where data is in the form of sequences of observations, actions, and rewards.

Machine Learning essentially includes programming analytical model construction and is a technique of big data analytics (Napanda, K., et al, 2015). The emergence of big data analytics as a discipline of ways of data analysis and data mining most appropriate for large datasets beyond the capability of traditional data-processing methodologies has been witnessed worldwide (Nielsen, R., 2015). Big Data came into existence when the traditional relational database systems were not able to handle the unstructured data generated by organizations, social media, or from any other data generating source (Mazumdar, S., and Wnga, J., 2018). In an age of transformation and expansion on the Internet of Things (IoT), cloud computing services and big data, cyber-attacks have become enhanced and complicated (Wilson, B.M.R., et al, 2015), and therefore cybersecurity events become difficult or impossible to detect using traditional detection systems (Hashem, I.A.T., et al, 2015; Siti, N.M., et al, 2017). Big Data Analytics (BDA) is rich in functionality with respect to provision of security dimensions in network traffic management, web transactions access patterns, network servers' configuration, data sources for the network, and user identity and authentication information. These activities have brought a huge revolution in the domains of security management, identity and access management, fraud prevention and governance, risk and compliance.

The supervised machine learning algorithm which can be used for both classification and regression challenges is called the Support Vector Machine (SVM). The easiest and simplest supervised machine learning algorithm which can solve both classification and regression problems is the k-nearest neighbors (KNN) algorithm. Both the SVM and KNN are applicable to the determination of optimal handover solutions in heterogeneous networks derived from diverse cells. Given a set of contextual input cues,

machine learning algorithms have the capability to exploit the user context learned. The list of supervised learning algorithms includes Regression models, K-nearest neighbors, Support Vector Machines, and Bayesian Learning (Thomas, E.M., et al, 2013).

Intrusion detection involves monitoring events on networked computer systems and conducting analysis of possible intrusions or violation of various computer security policies. Network Intrusion Detection Systems (NIDS) have precipitated from the monotonic increase in the use of the internet and its associated threats. The NIDS is a type of computer software that can distinguish between the legitimate network users from malicious ones, and monitors system usage to identify behaviour breaking the security policy (Bringas, P.B., and Santos, I., 2010, p.229). NIDS exist in two categories, misuse network detectors and anomaly detectors. Misuse detection systems comprehensively invigilate all incoming network traffic and detect any sequence that appears in the knowledge base. Conversely, anomaly detection systems' focus is on detection of new unknown threats (Bringas, P.B., and Santos, I., 2010, p.229). Anomaly detection heavily relies on the use AI paradigms, and in particular on ML. Bayesian networks represent the most appropriate tool that can help us to achieve this integration of both misuse network detectors and anomaly detectors.

Bayesian Networks (BNs) are directed acyclic graphs that have an associated probability distribution function which are used as graphical probabilistic models for multivariate analysis (Bringas, P.B., and Santos, I., 2010, p.231). Boudali, H., and Dugan, J.B., (2006, p.86) define a Bayesian network simply as a directed acyclic graph comprising nodes and arcs, where the nodes represent random variables (RV), and directed arcs between pairs of nodes represent dependencies between the RV. Furthermore, the probability function illustrates the strength of these relationships in the graph. Formally, let a Bayesian Network B be defined as a pair, $B = (D, P)$, where D is a directed acyclic graph; $P = \{p(x_1 | \Psi_1), \dots, p(x_n | \Psi_n)\}$ is the set composed of n conditional probability functions (one for each variable); and Ψ_i is the set of parent nodes of the node X_i in D. The set P is defined as the joint probability density function (Bringas, P.B., and Santos, I., 2010, p.232).

$$P(x) = \prod_{i=1}^n p(x_i | \Psi_i)$$

A Bayesian network G is a probabilistic graphical model that encodes a joint probability distribution over a set of variables $X = \{X_1, X_2, \dots, X_n\}$ based on conditional independencies. This is also a directed acyclic graph (DAG) where each node represents a random variable and an edge denotes a direct probabilistic dependency between the two connected nodes (Xiao, L., 2016, p.10).

The Bayesian network accurately represents the joint probability distribution as

$$P(X_1, X_2, \dots, X_n) = \prod_{i=1}^n p(X_i | \text{PaG}(X_i))$$

where $\text{PaG}(X_i)$ denotes the set of parent nodes of X_i in G, and $p(X_i | \text{PaG}(X_i))$ specifies the conditional probability distribution (CPD) of X_i given $\text{PaG}(X_i)$ (Xiao, L., 2016, p.10).

The greatest strength of Bayesian Networks is in their ability to determine from a given a historical dataset the probability that a certain hypothesis is true. According to Margaritis, D. (2003, p.2), the reasons for choosing Bayesian networks for this type of research are that they:

1. Are graphical models, capable of displaying relationships clearly and intuitively.
2. Are directional, thus being capable of representing cause-effect relationships.
3. Can handle uncertainty.

1.2 Statement of the Problem

Zimbabwe faces a sustainable development problem with a limited capacity for industrialisation and modernisation. There is a need to create wealth and establish an innovation-led knowledge economy through breaking silos, synergising and creating smart partnerships in the National Science, Technology and Innovation System (NSTIS). The Government of Zimbabwe is faced with a limited fiscal space where its ability to mobilize resources to finance scio-economic programmes is very thin.

Firewall protection on computer systems and networks in Information Communication Technologies (ICTs) has proved to be inadequate because of gross limitations against external threats. The fact is that the most network-centric cyberattacks are carried out by intelligent agents and combating them with intelligent semi-autonomous agents that can detect, evaluate, and respond to cyberattacks has become a requirement

(Kabanda, G., 2021). The rapid development of computing and digital technologies has necessitated the need to revamp cyberdefense strategies for most organisations (Kabanda, G., 2021). Consequently, there is an imperative for security network administrators to be more flexible, adaptable, and provide robust cyber defense systems in real-time detection of cyber threats. It's of paramount importance to explore the opportunities of Machine Learning (ML) and Big Data Analytics (BDA) paradigms for use in Cybersecurity.

1.3 Purpose or Aim

The purpose of the research was to formulate an economic framework and develop technological solutions for Zimbabwe with respect to knowledge generation, innovation and enterprise development. The ultimate aim was to generate, exploit and commercialise at least 2 priority applied scientific technologies within 100 days, and then explore the opportunities in Machine Learning and Cybersecurity.

1.4 Main Research Question

How do we formulate an economic framework and develop technological solutions for the sustainable development of Zimbabwe in the context of advances in technologies such as Machine Learning and Cybersecurity?

1.5. Research Questions

- a) How is knowledge generated in the National Science, Technology and Innovation System (NSTIS) of Zimbabwe through?
- b) How do you exploit and commercialise innovative technological solutions?
- c) What are the indicators for successful knowledge generation and enterprise development in the NSTIS of Zimbabwe?
- d) How are the Machine Learning and Big Data Analytics paradigms effectively used in Cybersecurity to ensure secure ICTs?
- e) How do you develop a Bayesian Network Model that can handle the complexity in Cybersecurity?

1.6. Rationale and Justification for the Research

The vision of the African Union is "An integrated, prosperous and peaceful Africa, an Africa driven and managed by its own citizens and representing a dynamic force in the international arena" which was clearly enunciated in its Agenda 2063. The mission of the Science, Technology and Innovation Strategy for Africa (STISA-2024) is to "accelerate Africa 's transition to an innovation-led, knowledge-based economy". The STISA-2024 research and innovation priority areas for Africa are shown on Table 1 below and will focus on addressing six distinct socio-economic priorities, of which particular interest is placed on priority areas 3 (communication - physical and intellectual mobility) and 6 (wealth creation).

Table 1: STISA 2024 Priority Areas

PRIORITIES	RESEARCH AND/OR INNOVATION AREAS
1. Eradicate hunger and ensure food and nutrition security	Agriculture/ Agronomy in terms of cultivation technique, seeds, soil and climate Industrial chain in terms of conservation and/or transformation and distribution infrastructure techniques
2. Prevent and Control Diseases and ensure Well-Being	Better understanding of endemic diseases - HIV/AIDS, Malaria Hemoglobinopathy Maternal and Child Health Traditional Medicine
3. Communication (Physical and Intellectual Mobility)	Physical communication in terms of land, air, river and maritime routes equipment and infrastructure and energy Promoting local materials Intellectual communications in terms of ICT

4. Protect our Space	Environmental protection including climate change studies Biodiversity and Atmospheric Physics Space technologies, maritime and sub-maritime exploration Knowledge of the water cycle and river systems as well as river basin management
5. Live Together - Build the Society	Citizenship, History and Shared Values Pan Africanism and Regional Integration Governance and Democracy, City Management and Mobility Urban Hydrology and Hydraulics Urban Waste Management
6. Create Wealth	Education and Human Resource Development Exploitation and management of mineral resources, forests, aquatics, marines, etc. Management of water resources

The National Innovation System (NIS) comprises a set of institutions which interact and drive the innovative performance of a nation. The innovation system of any country often includes the institutions, policies, legal framework, and practices and procedures on the creation, dissemination, preservation and application of knowledge. In all these initiatives, excellence, innovation and leadership are the critical success factors. However, a careful balance is required on the three facets of innovation, which are creativity, entrepreneurship and commercialisation, and diffusion and adaptation. The Government of Zimbabwe has continued to prioritise the eradication of poverty, as was the key agenda for the development blue print for the period from October 2013 to December 2018, publicly called the 'Zimbabwe Agenda for Sustainable Socio-Economic Transformation' (Zim-Asset). The Government of Zimbabwe, through the Ministry of Finance and Economic Planning of Zimbabwe is now implementing the National Development Strategy which whose implementation is being done through the two successive Five-Year National Development Strategies: NDS1 (2021-2025) and NDS 2 (2026-2030).

2. Review of Literature

2.1. The Sustainable Development Goals (SDGs) Context

The Research Council of Zimbabwe (RCZ) appointed a team of prominent scientists led by the researcher from the Zimbabwe Academy of Sciences to embark on a ground-breaking research programme purposed "to generate, exploit and commercialise at least 2 priority applied scientific technologies within 100 days". The Knowledge Generation research priority areas for Zimbabwe are informed by the Sustainable Development Goals (SDGs), the African Science, Technology and Innovation Strategy for Africa 2024 (STISA 2024) priority areas, Vision 2030 and the national research priority areas. The United Nations published the SDGs where SDG Goal 9 is about the need to "build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation" (<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>). Zimbabwe as a country prioritised goals 2,3,4,5,6,7,8,9,13 and 17. However, Zimbabwe as a nation must not be viewed as just gravitating from one developmental guideline to another without making any meaningful progress during each dispensation.

The vision for the Zimbabwe Academy of Sciences (ZAS) is "The Zimbabwe Academy of Sciences seeks to be the leading catalyst for knowledge-sharing, innovative solutions, evidence-based policy formulation and advisory services in Zimbabwe, Africa and beyond". The Mission states that ZAS exists to "Monitor the environment, identify problems and opportunities, provide and communicate the ultimate evidence-based solutions that benefit society for sustainable development by mobilising the science community and other resources through smart partnerships with government, academia, private sector, development partners and civil society". However, there is need for self-renewal, task-oriented, relevancy, agility, flexibility and consistency in the renewed Mission to develop innovative solutions to address Zimbabwean challenges and strategically advance Zimbabwe to be a global power. The ZAS guiding philosophy is about mutual respect and quality, stated clearly as "Mutual

respect and equality is important because my humanity is bound up with yours". This is buttressed by the core values of Innovativeness, Integrity, Professionalism, Reliability, Institutional Independence, Respect and Ethics. At a national level, ZAS is desirous to provide national leadership on scientific initiatives and innovations in key areas that include heritage studies, water and sanitation, climate change, sustainable environmental management, national security, etc., as guided by the national research priorities and key projects of national significance. The national research priorities are as follows:

1. Social Sciences and Humanities
 - ❖ Fiscal Reform Measures
 - ❖ Public Administration, Governance and Performance Management
 - ❖ Strengthening social and economic fabric
 - ❖ Strengthening policy making processes
 - ❖ Social Services and Poverty Eradication
 - ❖ Culture and Heritage
 - ❖ Creative and Cultural Industries
 - ❖ Regional and world cultures

2. Sustainable Environmental and Resource Management
 - ❖ Food Security and Nutrition
 - ❖ Land
 - ❖ Water
 - ❖ Minerals
 - ❖ Aerospace and other sensing technologies
 - ❖ Energy
 - ❖ Sustainable livelihoods
 - ❖ Transforming Agriculture
 - ❖ Value addition and Beneficiation to Natural Resources
 - ❖ Impact of new technologies to sustainability and / or resource management.
 - ❖ Promoting and Maintaining Good Health
 - ❖ Revitalising Health Delivery Systems
 - ❖ Increasing access to health facilities
 - ❖ Preventive Health Care
 - ❖ Food Security and Nutrition
 - ❖ Social Services and Poverty Eradication

3. National Security
 - ❖ Geo-Information Sciences
 - ❖ Terrorism and crime
 - ❖ Transformational defence technologies
 - ❖ Invasive species, diseases and pests
 - ❖ Infrastructure and Utilities

The new priority areas that require special attention include the following:

1. Natural and Cultural Heritage
2. Indigenous Knowledge Systems
3. Post-harvest technologies
4. Rural transformation
5. Small scale mining/ mineral value addition/bio mining
6. Clean water alternatives
7. Tiles technologies from mining waste
8. Cyber security systems
9. Defence technologies (double use technologies (drones))

The 17 Sustainable Development Goals (SDGs) describe the major development challenges for humanity in order to secure a sustainable, peaceful, prosperous and life of equitability, and these are depicted by the diagram below on Figure 1. Zimbabwe prioritised Goals 2,3,4,5,6,7,8,9,13 and 17. At the core of the 2030 Agenda are 17 Sustainable Development Goals (SDGs) which describe the major development challenges for humanity in order to secure a sustainable, peaceful, prosperous and life of equitability. Humanity needs to build peace and drive sustainable development. The world faces a sustainable development problem with a limited capacity for industrialisation and modernisation in developing nations.

The African Union has a clearly defined Mission on Science, Technology and Innovation (STI), which was considered by Zimbabwe as an African country. The African Union, through its Agenda 2063, desires a prosperous and peaceful Africa. The Science, Technology and Innovation Strategy for Africa (STISA-2024) is to "*accelerate Africa 's transition to an innovation-led, knowledge-based economy*". At a national level, there is a need to create wealth and establish an innovation-led knowledge economy through breaking silos, synergising and creating smart partnerships in the National Science, Technology and Innovation System (NSTIS).

Scientific Knowledge Generation in Zimbabwe is led by ZAS and involves various stakeholders that include Zimbabwe Academy of Sciences, Sectorial Research Councils, Universities and Colleges, Statistical Agencies, Standards Measurement Bodies, Public Laboratories, Research Centres, Private Laboratories, Intellectual Property Agencies, Custodians of Indigenous Knowledge, Heritage Statutory Bodies, etc. Zimbabwe Academy of Sciences works in partnership with a number of national institutions to meet its objectives and goals. These institutions include the Government institutions, research institutions, Universities, parliamentarians, etc.

The basic driving force behind economic growth is technological change, where the main catalyst is investment on research and development. A comparison is made between two countries, Israel and Zimbabwe, where Israel has made extensive investment in R&D, as shown on the Table 2 below (Kabanda G., 2013).

Table 2: Effects of R&D to economic performance

	Zimbabwe	Israel
Population	14,627,000	7,700,000
Size	200,000 SQ km	20,000 SQ km
GDP - Per Capita	\$1,530	\$31,004
Infant Mortality Rate	79 dead per 1000 live births	4 dead per 1000 live births
Life Expectancy	50	81

It is noted that Israel, which has half the population of Zimbabwe and a geographical land ten times smaller than that of Zimbabwe, has invested extensively in Research and Development (R & D) over the years and that its economy has grown to be in the league of developed nations and now boasts of a GDP per capita of \$31,004 and life expectancy of 81 years whilst Zimbabwe remains with a GDP per capita of \$1,530 and life expectancy of 51 years, respectively. Israel, which has half of its land in a desert, now exports more oranges and agricultural products than Zimbabwe and South Africa put together because of the huge investments in R&D. How does Zimbabwe improve its average life expectancy of 50 years to the life expectancy of Israel of 81 years, or improve its GDP per capita from just \$1,530 to \$31,004 like Israel? In Southern Africa (SADC Region), high GDP per capita are evidenced in Seychelles which has a GDP of \$16,434, Mauritius with a GPD per capita of \$11,228 and Botswana has \$8,258. South Africa has a GDP per capita of 6,354 and Namibia \$6,013.

The GDP per capita analysis for Southern Africa as of August 2021 is shown on the table 3 below.

Table 3: SADC Regional GDP per capita - August 2021

Country	Population	Annual GDP (US\$)	GDP per capita (US\$)
Angola	30,809,762	105,902M	3,437
Botswana	2,254,126	18,615M	8,258
DRC	84,068,091	47,099M	560
Lesotho	2,108,132	2,739M	1,299
Madagascar	26,262,368	13,853M	528
Malawi	18,143,315	7,065M	389
Mauritius	1,266,000	14,210M	11,228
Mozambique	29,495,962	14,396M	488
Namibia	2,414,000	14,513M	6,013
Seychelles	96,762	1,590M	16,434
South Africa	57,939,000	368,135M	6,354
Swaziland	1,136,191	4,711M	4,146
Tanzania	56,318,348	56,852M	1,009
Zambia	17,351,822	26,720M	1,540
Zimbabwe	14,439,018	20,401M	1,530

The Zimbabwe Academy of Sciences (ZAS) was established in October 2004 following research work done by the Research Council of Zimbabwe with the purpose to provide independent evidence-based advice to the government and the nation at large on addressing national challenges using scientific knowledge and innovative expertise; and to recognize, honour, and perpetuate the achievements of those Fellows of ZAS who have made immense contributions to the scientific development of Zimbabwe and the rest of the world and have helped to bring recognition, honour, distinction, and excellence to science, technology, engineering, and mathematics (STEM) related programmes, projects and research.

The Knowledge Generation work for the NSTIS of Zimbabwe is guided by Goal 9 of the globally defined 17 Sustainable Development Goals (SDGs), which largely inform some of the national developmental programmes, are listed in Table 4 below. Zimbabwe as a country prioritised goals 2,3,4,5,6,7,8,9,13 and 17.

Table 4: The 17 Sustainable Development Goals (SDGs)

(<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>)

Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote well-being for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9	<i>Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</i>
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns

Goal 13	Take urgent action to combat climate change and its impacts*
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development

Capital for the infrastructure and equipment and extensive investments into people (labour) are required in the ICT revolution (Kabanda G., 2008). The revolutionary technological change or productivity levels from an ICT perspective is related to labour and capital by the Cobb-Douglas production function in the form:

$$Q = A K^a L^b$$

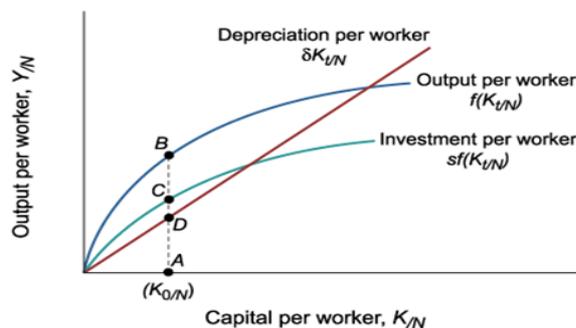
is used for the analysis of technological progress and attended economic growth, where A , a and b are empirical parameters.

K = capital input (very meaningful mounts)

L = labour input (high technical competence)

Production capacity can be multiplied several times more through an investment in technology. Technological change is the basic driving force behind economic growth. Technological change is determined by deliberate activities of economic agents in response to the financial incentives, and so is endogenous. High-skilled workers enhance technological innovations and their diffusion, and so high-skilled labour is complementary with capital and low-skilled labour. The Brain Drain problem is a result of a continuous outflow of high - skilled labour from a country. An endogenous neoclassical economic growth model is illustrated by the diagram below which relates the output per worker to the capital per worker in how it relates to the investment per worker and the output per worker.

Neoclassical Endogenous Growth Model



Source: Jones, 1988, Chapter 2, Solow Neoclassical Growth Model

Figure 2: Neoclassical Endogenous Growth Model

2.2. Classical Machine Learning (CML)

Machine Learning (ML) is a field in artificial intelligence where computers learn like people. We present and briefly discuss the most commonly used classical machine learning algorithms, as shown on Table 5.

Table 5: The Classical Machine Learning Algorithms

Name of ML Algorithm	Description
Logistic Regression (LR)	As an idea obtained from statistics and created by Sit, N.M., et al (2017), logistic regression is like linear regression, yet it averts misclassification that may occur in linear regression, but its results are basically either '0' or

	'1'.
Naive Bayes (NB)	Naive Bayes (NB) classifier is premised on the Bayes theorem which assumes independence of features and overcomes the curse of dimensionality.
Decision Tree (DT)	A Decision tree has a structure like flow charts, where the root node is the top node, and a feature of the information is denoted by each internal node.
K-Nearest Neighbor (KNN)	K-Nearest Neighbor (KNN) is a non-parametric approach which uses similarity measure in terms of distance function classifiers other than news cases, and this stores the entire training data, requires larger memory and so is computationally expensive.
Ada Boost (AB)	Ada Boost (AB) learning algorithm is a technique used to boost the performance of simple learning algorithms used for classification.
Random Forest (RF)	Random forest (RF), as an ensemble tool, is a decision tree derived from a subset of observations and variable and gives better predictions than an individual decision tree.
Support Vector Machine (SVM)	Support Vector Machine (SVM) can be used to solve classification and regression problems and belongs to the family of supervised machine learning techniques.

2.3 Modern Machine Learning

Deep learning has the capability of taking raw inputs and learning the optimal feature representation implicitly.

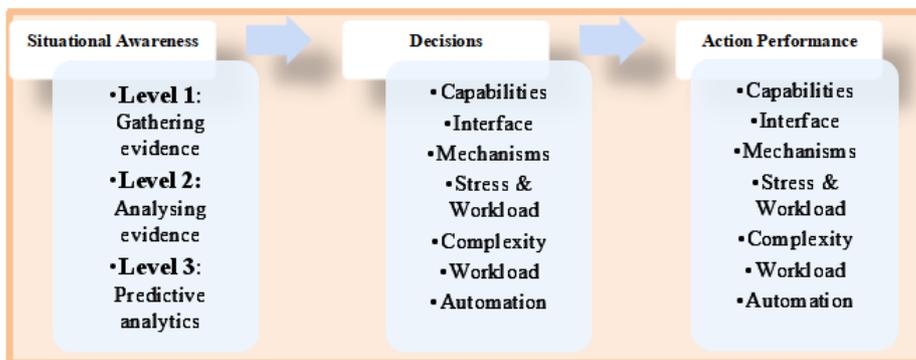
2.2.1 Deep Neural Network (DNN)

An artificial neural network (ANN) is characteristics of biological neural networks. The family of ANN includes the Feed forward neural network (FFN), Convolutional neural network and Recurrent neural network (RNN). The traditional examples of machine learning algorithms include Linear regression, Logistic regression, Linear discriminant analysis, classification and regression trees, Naïve bayes, Support Vector Machines (SVM), K-Nearest Neighbour (K-NN), Kmeans clustering, Learning Vector Quantization (LVQ), Monte Carlo, Random Forest, Neural networks and Q-learning.

2.2.2 The future of AI in the fight against cybercrimes

Big Data Analytics requires new data architectures, analytical methods, and tools. Threat intelligence is the process purposed to gather threats from big data, analyze and filter information about these threats and create an awareness of cybersecurity threats (Sarker, I.H, et al, 2020). The situation awareness model consists of situation awareness, decisions and action performance as shown in Figure 3. There is consensus in prior literature that cybersecurity has evolved to become a problem for big data analytics. Further, even the data mining models that have been used in the past are no longer sufficient for the challenges in cybersecurity (Hashem, I.A.T., 2015). A big data analytics model for cybersecurity can be evaluated on the basis of its agility and robustness (Hashem, I.A.T., 2015).

Figure 3: simplified theoretical model based on situation awareness



2.3 Cybersecurity in Network Intrusion Detection and Prevention System

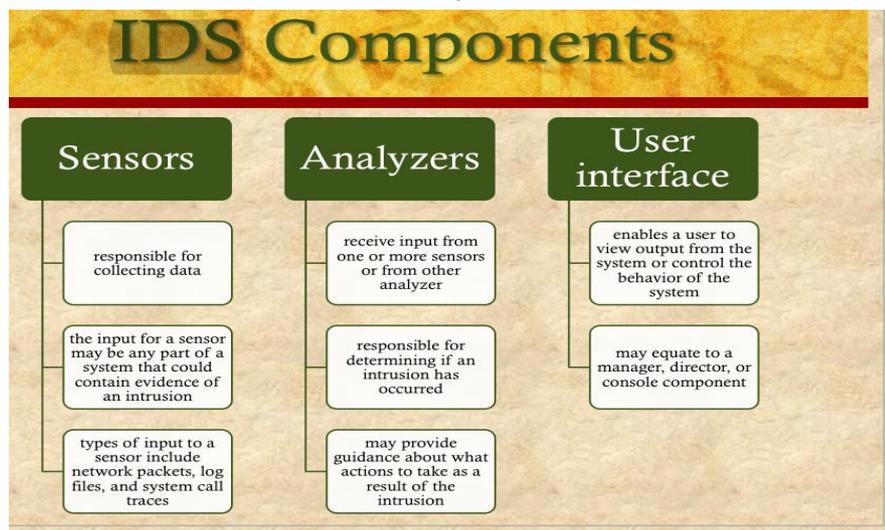
Infocommunication is a natural scientific discipline that studies the structure of objects and the process of interaction between these objects whose objective is the construction of formalized models of data structures and data transmission from one object to another (Kuznetsov, N.A., 2005, p.1). The digital convergence process initially affected the information technology and telecommunications sectors by amply manifesting the unification of the technologies, the integration of their markets and the harmonization of their regulation (Sallai, G., 2012, p.2). Accordingly, the various contents have been associated with separated networks, services and user terminals and their markets and regulation have been separately managed. The term information and communications technology (ICT) is generally used and usually refers to the integration of information and telecommunication technology sectors involving their convergence with the media technology sector based on common digital technology.

Information systems security comprises computer and communications security dimensions. The weakest link in Cybersecurity determines its overall strength (Nielsen, R., 2015, p.8). Access controls and security mechanisms must be clearly enunciated in the company objectives. It's important to give the employees internet access only for the purposes which are of great importance to the organization. However, the privileges given need to be constantly monitored, especially when accessing from outside the company premises. All network traffic in network security should be redirected through a single point and only open the ports on the firewall necessary for business traffic. The network configuration can be strengthened by the provision of VPN support (Nielsen, R., 2015, p.18). Both an Intrusion Detection Systems (IDS) and Intrusion Prevention Systems (IPS) are required in network security. However, organizational policies should spell out the procedures for handling information security, with some legal assistance. As shown on Figure 4 below, the Intrusion Detection System (IDS) usually operates with sensors, analyzers and a user interface. The policies should cover the following areas (Nielsen, R., 2015, p.14):

- ❖ Personal Electronic Devices (PED)
- ❖ Acceptable Use
- ❖ Records Retention
- ❖ Identity Protection
- ❖ Server, Service and Project Computing Security
- ❖ Data Encryption

The IDS can either be network-based or host-based.

Figure 4: The IDS Components (Source: Stallings, W., 2015, p.6)



A firewall provides network security against external threats and is essentially a computer server that interfaces with external computer systems with a mechanism to protect sensitive files on computers within the network (Stallings, W., 2015, p.10). Operating Systems Hardening secures an operating system (Stallings,

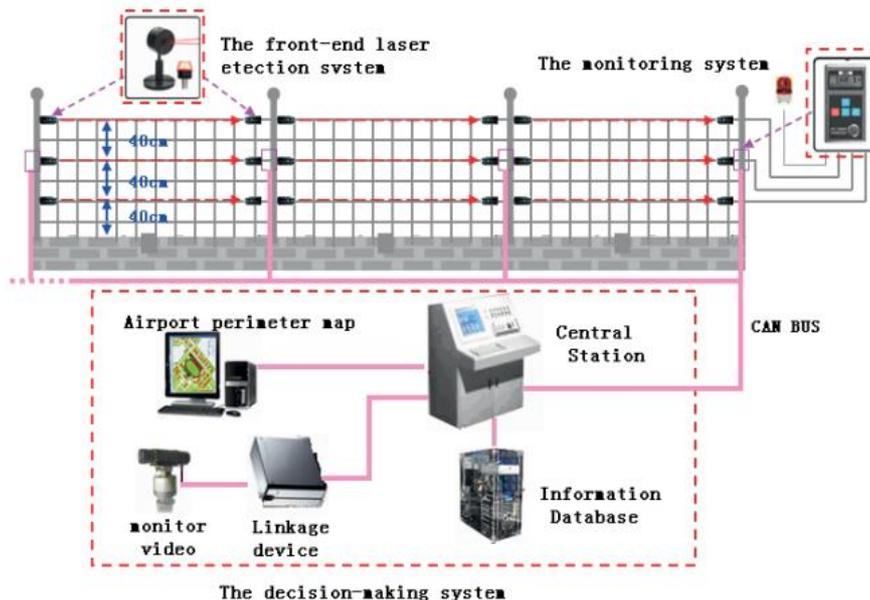
W., 2015, p.28), and involves installing and patching the operation system, and then hardening and/or configuring the operating system to protect the system by:

- ❖ removing unnecessary services, applications, and protocols
- ❖ configuring users, groups and permissions
- ❖ configuring resource controls
- ❖ additional security controls installation and configuration.
- ❖ The Bayesian network creation and setup comprises the following phases:
- ❖ Traffic sample obtaining to establish the information source in order to gather the sample
- ❖ Structural Learning, which defines the operational model
- ❖ Parametric Learning of the quantitative model
- ❖ Bayesian Inference
- ❖ Adaptation.

Next generation access networks are expected to support an increased number of users, increased bandwidth demand and longer-range coverage. Optical fiber as the prevailing solution for next generation fixed access network has been adopted and deployed worldwide. Network intrusion and the probability of risk can be adequately handled by a probability model. Principal component analysis (PCA) method is applied to preprocess the network signal to avoid the problem of denoising methods involving the use of low (high) pass filter (Wei and Liu, 2016). The network signal is transformed into a new coordinate system by the orthogonalized linear transformation through making the first variance of the data projected at the first and second coordinates (referred to as the first principal component and the second principal component, respectively). PCA can eliminate noise from the background environment and reduce the dimension of the network signal collected on the receiving device (Wu, 2018, p.2).

The current detection technologies for airport perimeter security usually include infrared detection, vibration cables, underground cables, microwave detection, video surveillance, tension fencing, and other technologies, but it is rare that laser detection technology is used (Wu *et al*, 2016, p.1). In consideration of the airport surroundings, Wu *et al* (2016) divided the laser anti intrusion security system into three parts: the decision-making system, the monitoring system, and the front-end laser detection system, as shown on Figure 5.

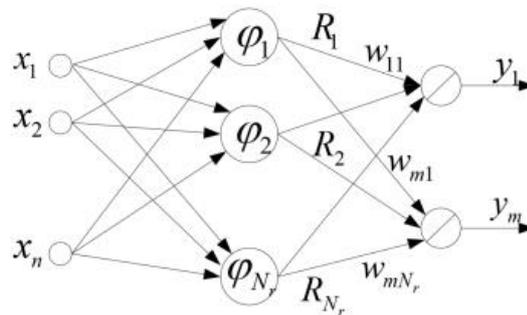
Figure 5: The antiintrusion laser alarm system (Source: Wu et al 2016, p.2).



Intrusion incidents at airport perimeters currently uses pattern recognition methods comprising use of artificial intelligence, fuzzy theory, expert systems, neural networks, genetic algorithms, and other relevant methods. Artificial neural networks have emerged to possess the unique capability of processing nonlinear

information and distributed storage ways for information (Wu *et al*, 2016, p.6). The radial basis function (RBF) neural network is constructed as a two-forward type neural network whose value for RBF is determined by the intermediate layer node's output, as shown on the network model on Figure 6.

Figure 6: The structure of the Radial Basis Function (RBF) neural network (Source: Wu et al, 2016, p.6)



$X = \{x_1, x_2, \dots, x_n\}$ are n-dimensional input vectors and the output of the hidden layer nodes are the RBF values. The input mapping to a new space is provided by the hidden layer unit which performs a nonlinear transformation. RBF is essentially a Gaussian function which is expressed as follows (Wu *et al*, 2016, p.6):

$$R_j = \varphi_j(X) = e^{-\|X - c_j\|^2 / (2\sigma_j^2)}, \quad j = 1, 2, \dots, N_r$$

Network intrusion detection systems were developed to detect any network attack. The attacks or malicious behavior can be determined from an analysis of packet contents of the network. However, the packet inspection is a complex resource-hungry process usually impossible to attain. Karimpour *et al* (2016, p.1) reveal the attacks by combining flow-based and graph-based procedures. Karimpour *et al* (2016, p.2) categorized the general overview of intrusion detection approaches in four approaches as follows:

- 1) *Feature-based approaches*: these approaches are based on the concept of similar graphs sharing common attributes inclusive of diameter, eigenvalues, and a distribution of degree. These methods can be used for checking the structure of a graph in order to find patterns and explore anomalies.
- 2) *Decomposition-based approaches*: use tensor decomposition and graph structure to interpret eigenvectors and convergence of graph attributes to find the patterns, respectively.
- 3) *Community-based approaches*: the main action in these approaches is graph clustering where the clustering algorithms are employed to create cluster parameters of data, and the anomalies are recognized based on their values.
- 4) *Window-based approaches*: in this category, the patterns of the evolutionary behavior are revealed by the time intervals, and thereby determine whether the behavior of the network is a normal or malicious case.

A general view of these intrusion detection methods according to the above 4 categories are shown on Table 4 below.

Table 4: Anomaly detection methods (Source: Karimpour et al (2016, p.3))

Method	Data type	Attack	Proposed system	Accuracy
Graph in time series	Flow-based	DDoS	Graph-based	94.2%
Dispersion graph	Flow-based	DDoS	Graph-based	100%
Using flow concept	Flow-based	Dictionary	Flow-based	99%
Graph clustering and local deviation coefficient	Packet-based	DoS, Scan	Graph-based	95.3%
Graph clustering and local deviation factor	Packet-based	DoS, Scan	Graph-based	97.2%
Packet heard analyzing	Packet-based	DoS, Scan	Packet-based	95.4%

An attack in the network was detected by using the flow and graph-clustering concepts by Karimpour *et al* (2016, p.3) in a manner that reflected the nodes, the edges, and the weight of edges through the IPs, the flows, and the number of flows in the graph, respectively. The anomaly points could be detected from the average weight of clusters that are reached from the graph-clustering algorithm and comparing it in several time intervals and threshold points. The outcome of the research by Karimpour *et al* (2016, p.4) involved 7 weeks of network traffic and 5 types of attacks: DoS, scan, local access, user to root, and data, which are shown on Table 5 below, indicating the number and types of attacks in each categorized attack.

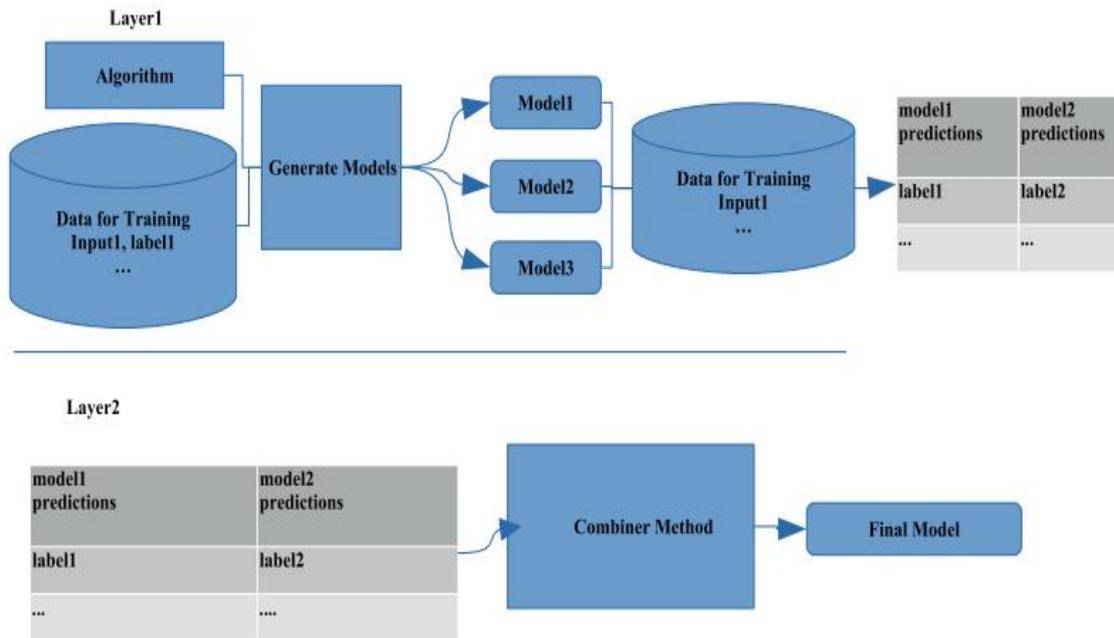
Table 5. Various attack types and their descriptions (Source: Karimpour et al, 2016, p.4)

Attack type	Description
DoS	Denial of service; an attempt to make a network resource unavailable to its intended users: temporarily interrupt services of a host connected to the Internet
Scan	A process that sends client requests to a range of server port addresses on a host to find an active port
Local access	The attacker has an account on the system in question and can use that account to attempt unauthorized tasks
User to root	Attackers access a user account on the system and are able to exploit some vulnerability to gain root access to the system
Data	Attackers involve someone performing an action that they may be able to do on a given computer system, but that they are not allowed to do according to policy

When the cluster-based data are given as input to the model, the final model of attack detection can be developed, and the proposed criterion is then calculated in the time series based on defined threshold points. Accordingly, the best threshold is identified within the time series and extracted from the detection rates of the suggested way (Karimpour *et al*, 2016, p.5). Li (2018) developed a collaborative intrusion detection method with data mining techniques for a marine distributed network. An efficient the marine distributed network intrusion model created was very efficient, used less memory space and had a detection rate above 92%. The marine distributed network provides guarantees for the normal sailing of a ship as used in a ship navigation system. ML can provide researchers with opportunities to detect network intrusion without using a signature database. Demir and Dalkilic (2017) improved the model generation and selection techniques by using different classifications algorithms as a combiner method. Model generation was performed using subsets of the dataset with randomly selected features and obtained better accuracy levels than pure machine learning techniques. In comparison with other studies, the study obtained the highest detection rate for user-to-root attacks.

In ML the same classification or regression problem is solved by ensemble learning whose methods develop a set of models which are then combined. Demir and Dalkilic (2017) established that weak learners could be assisted to become strong learners. Boosting, bootstrap aggregating, and stacking are the three most commonly used types of ensemble techniques (Demir, N., and Dalkilic, G., 2017, p.1). Bootstrap aggregating is when each model is trained by drawing random subsets of the training set. The random forest algorithm combines random decision trees and uses bagging. Boosting incrementally builds an ensemble model by using the misclassified training instances that previous models misclassified for training each new model. Stacking, also known as stacked generalization, is a method where an algorithm is used. Stacking is the generalization of other ensemble methods and involves using an algorithm to to combine the outputs of other models' predictions. Models are generated from the training algorithm using data. The "model generation" phase generates n models during the stacking implementation by using the algorithm with randomly drawn sub-datasets. A two-layered training phase consists of a training set with each algorithm and then the predicted labels of each model, as shown on Figure 7 below.

Figure 7: Training phase of tracking approach (Source: Demir, N., and Dalkilic, G., 2017, p.4)



Demir and Dalkilic (2017) developed a threat model that collects information on the packet level. The following four assumptions may possibly occur:

- ❖ The attacker can exploit various vulnerabilities of the applications running on the target host and get access to a user right,
- ❖ The attacker already can gain root access by exploiting various vulnerabilities of the applications running on the target host,
- ❖ The attacker can the vulnerabilities of the applications running on the target host to launch a denial of service (DoS) attack, and
- ❖ The target host is probed by an attacker with various techniques to gain information.

The IDPS components must first and foremost be secure since it is the primary target of attackers who try to prevent the IDPSs functioning of detecting attacks or to access the sensitive data on IDPSs like host configuration and known vulnerabilities.

3. Research Methodology

3.1. Overview

The research philosophy, methodology and research design were guided by the research onion shown on Figure 8 below. The Pragmatism paradigm was used in this research, and this is intricately related to the Mixed Methods Research (MMR). Knowledge Generation for Strategic Investment in STI with opportunities for Machine Learning and Cybersecurity is a huge area for consideration and in order to address problems within it, there is need for contextualisation.

The Research methodology is a way of solving a research problem thoroughly and meticulously and includes steps followed in carrying out the research and the reasoning behind (Kotari, C.R., 2004). The Mixed Methods Research methodology was used and underpinned by the pragmatic paradigm. The researcher adopted mainly a qualitative approach in the form of focus group discussion for the knowledge generation stage and followed by the quantitative approach with the experimental research design that involved the development of a Bayesian Network Model for Cybersecurity using the Snort platform. The researcher adopted a descriptive research design because of the need to systematically describe the facts and characteristics of big data analytics models for cybersecurity. The purpose of the study was essentially an in-depth description of the models (Burt, D., et al, 2013). The researcher adopted a postmodern philosophy to

guide the research. The researcher noted that the definition, scope and measurement of cybersecurity differs between countries and across nations (Wilson, B.M.R., et al, 2015). Prior research has tended to use case studies in relation to the study of cybersecurity (Wilson, B.M.R., et al, 2015).

The research onion

(Saunders et al., 2009:138)

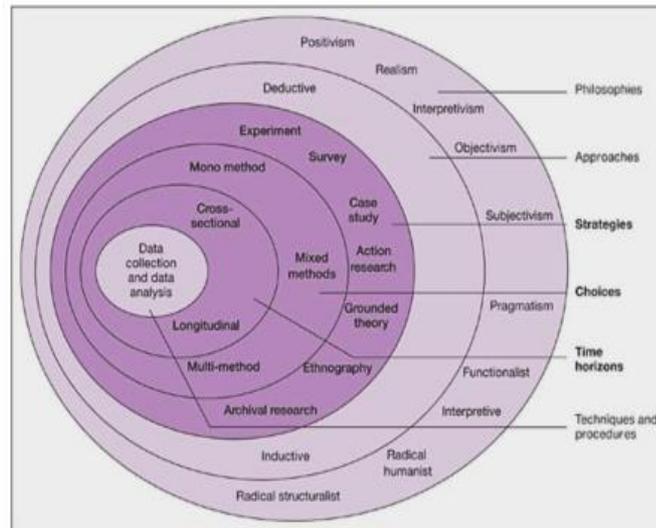


Figure 8. Research onion

The research methodology being used in the research Programme on Knowledge Generation is largely qualitative and based on an integral research architecture which combines descriptive, narrative, theoretical, and experimental survey methods, through focused group discussions as the major research design. The integral research architecture, which is illustrated in Figure 9 below, uses a combination of descriptive methods, experimental and survey methods, methods of theorising, and narrative methods. These methods are related to the four (4) human modes (being, doing, knowing, and becoming), respectively. The core methods used in integral research methods are (empirical phenomenology (descriptive methods), storytelling (narrative methods), grounded theory (methods of theorising) and case study (experimental and survey methods)).

The Integral Worlds approach puts emphasis on a holistic way of research and social innovation that is built on the dynamics of the symbolic four worlds of South, East, North and West. It helps to understand the strengths and weaknesses of each world, and what lessons each one can learn from the other. Each of the four worlds both metaphorically and in reality, reflects more concretely a certain part of the world. Thus, the south is more concretely linked with Africa, the East with Asia, the North with Europe, and the west with America. In reality, the four worlds are metaphorically present in every society, in every organization and in each person. There is in each society, each organization and each person, a southern relational spirit of nature and community (human security), an eastern holistic spirit of culture and spirituality, a northern spirit of reason and, finally, a western spirit of enterprise, structure and continuity. One of the four worlds usually predominates in a particular society, organization or individual.



Figure 9: Integral Research Architecture

The research design used was a Focus Group discussion. A Focus Group was setup from the 22 Knowledge Generation institutions in Zimbabwe which participated in the National Indaba on the National Science, Technology and Innovation System of Zimbabwe held on 4th October 2017 at the HICC, Harare. Focus Group discussions were held by this Working Group on Knowledge Generation every week from 4th October until end of November 2017. Knowledge generation in Zimbabwe is primarily done by the following entities:

- ❖ Zimbabwe Academy of Sciences
- ❖ Sectorial Research Councils
- ❖ Universities and Colleges
- ❖ Statistical Agencies
- ❖ Standards Measurement Bodies
- ❖ Public Laboratories
- ❖ Research Centres
- ❖ Private Laboratories
- ❖ Intellectual Property Agencies
- ❖ Indigenous Knowledge Systems

The Work Plan for the Working Group on Knowledge Generation (the Focus Group) used this research programme was developed and is as shown below on Table 6, indicating the action steps for each milestone.

Table 6: Work Plan for Knowledge Generation

Milestone	Action step
1 Knowledge Prioritisation	Identification of priority areas Engagement of institutions Identification of two technologies Map way forward for commercialisation
2 Advocacy of the National Science Technology and Innovation System of Zimbabwe	Develop Communication and publicity Framework Interfacing with the media for publicity
3 Knowledge co-creation and collaboration	Institution to institution collaboration Interministerial collaboration Institution to company collaboration Country to Country collaboration
4 Knowledge Acquisition	Diaspora engagement Formulate skills exchange programme in identified priorities Identify expired patents for utilisation

5 Knowledge Enterprenuerising Commercialisation and	Develop and adopt solid ideation protyep process (SIPP) in 10 days Establish and maintain a national support (NSN)network in 10 days Develop and disseminate a national scheme to promote, incentives and recognise innovation Set up and maintain database of ongoing project works
6 Fusion and Adaption	Literature review Identification of technologies that will address priority areas Identify relevant local prayers who can take up the technologies Creation of database for commercially viable science End user experimentation of identified technologies for adaption Development of technology usage tracking mechanism

The Knowledge Generation Working Group (Focus Group) is guided by the following governance structure at the national level.

- ❖ Political leader (Chief Secretary - OPC)
- ❖ Sponsor (Deputy Chief Secretary)
- ❖ Results Leader (RCZ Board Chair)
- ❖ Strategic Leader (Executive Director of RCZ)
- ❖ Team Leader/ Deputy Team Leader
- ❖ Team Secretary
- ❖ Team Members
- ❖ Coach

3.2. Quantitative data collection of the KDD'99 data set for the development a Bayesian Network Model

The research used the KDDCup 1999 intrusion detection benchmark dataset in order to build an efficient network intrusion detection system. The population was the primary data obtained from <http://kdd.ics.uci.edu/databases/kddcup99/kddcup99.html> and comprised about 10 million records with 42 variables (attributes). The data was obtained from the archived source at UCI KDD Archive, Information and Computer Science, University of California, Irvine, Irvine, CA 92697-3425. From this population, a sample of 494,020 records with 42 instances was selected for data analysis.

3.3. Population, sampling and Model for analysis

The researcher gets the required information from a selected sample size of respondents (Kumar, R., 2011). The full set of cases from which a sample is taken from constitute the population (Saunders, et al, 2009). Population signifies the full set which the researcher wishes to study. According to Saunders, et al (2009), the comprehensive list of members of the population from which a sample is drawn is referred to as the sampling frame. The Researcher used the Yamane's formula to compute the sample size using a 95% confidence level (Saunders et al, 2009), since the population size is finite.

The KDD'99 Dataset with 494,020 intrusion detection records was the sample and the purposive sampling method was used. In probability sampling, each item has a nonzero chance of being has an equal probability of being selected from the population. Nonprobability sampling does not give all the participants or units in the population equal chances of being included. When the researcher faces challenges of limited resources, time and workforce, the nonprobability sampling method would be most appropriate, and it can also be used when the research does not aim to generate results that will be used for generalizations of the entire population. The purposive sampling technique, also called judgment sampling, is the deliberate choice of a participant due to the qualities the participant possesses (Etikan, I., 2016, p.2).

By virtue of knowledge or experience, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the required information. According to Etikan (2016, p.2), purposive sampling is typically used in qualitative research to identify and select the information-rich cases for the most proper utilization of available resources, and often involves selecting targeted groups or individuals as data sources. The Maximum Variation Sampling (MVS) type of purposive sampling was used.

The research population for the purpose of this study consists of all data analytics models for cybersecurity that have been proposed and developed in literature, journals, conference proceedings and working papers. The researcher identified two data analytics models or frameworks from a review of

literature and the sample size of 8. Eight participants in total were interviewed. However, while this may be limited data, it will be sufficient for the present needs of this study. The researcher used secondary data in order to investigate the application of data analytics models in cybersecurity. In analyzing the different data analytics models for cybersecurity, the researcher makes reference to the characteristics of an ideal data analytics model for cybersecurity. The basic framework for big data analytics model for cybersecurity consists of three major components which are big data, analytics, and insights (Hashem, I.A.T., et al, 2015). This is depicted in Figure 10 below. The first component in the bigdata analytics framework for cybersecurity is the availability of big data about cybersecurity. Traditional sources of big data are systems logs and vulnerability scans (Hashem, I.A.T., et al, 2015). However, sources of big data about cybersecurity have extended to include computer-based data, mobile-based data, physical data of users, human resources data, credentials, one-time passwords, digital certificates, biometrics, and social media data (Truong, T.C., 2020). Basic sources of big data identified for cybersecurity work include business mail, access control systems, CRM system and human resources system, a number of pullers in linked data networks, intranet/ internet and industrial internet of things (IIoT) /IoT, collectors and aggregators in social media networks and external news tapes (Stallings, W., 2015). To address the concerns of big data about cybersecurity, more robust big data analytics models for cybersecurity have been developed in data mining techniques and machine learning (Hashem, I.A.T., et al, 2015). In cybersecurity, big data analytics employs data mining reactors and algorithms, intrusion and malware detection techniques, and support vector machine learning techniques (Hashem, I.A.T., et al, 2015). However, the greatest challenges faced in intrusion detection systems include data nonstationarity, unbounded patterns, individuality, uneven time lags, high false alarm rates, and collusion attacks (Menzes, F.S.D., et al, 2016). This necessitates a multi-layered and multidimensional approach to big data analytics for cybersecurity. In other words, an effective big data analytics model for cybersecurity must be able to detect intrusions and malware at every layer in the cybersecurity framework.

The research population for the purpose of this study consists of all data analytics models for cybersecurity that have been proposed and developed in literature, journals, conference proceedings and working papers. The researcher identified two data analytics models or frameworks from a review of literature and the sample size of 8. Eight participants in total were interviewed. However, while this may be limited data, it will be sufficient for the present needs of this study. The researcher used secondary data in order to investigate the application of data analytics models in cybersecurity. In analyzing the different data analytics models for cybersecurity, the researcher makes reference to the characteristics of an ideal data analytics model for cybersecurity. The basic framework for big data analytics model for cybersecurity consists of three major components which are big data, analytics, and insights (Hashem, I.A.T., et al, 2015). This is depicted in Figure 10 below.

The first component in the big data analytics framework for cybersecurity is the availability of big data about cybersecurity. Traditional sources of big data are systems logs and vulnerability scans (Hashem, I.A.T., et al, 2015). However, sources of big data about cybersecurity have extended to include computer-based data, mobile-based data, physical data of users, human resources data, credentials, one-time passwords, digital certificates, biometrics, and social media data (Truong, T.C., 2020). Sources of big data about cybersecurity that have been identified by other researchers include business mail, access control systems, CRM system and human resources system, a number of pullers in linked data networks, intranet/ internet and industrial internet of things (IIoT) /IoT, collectors and aggregators in social media networks and external news tapes (Stallings, W., 2015).

To address the concerns of big data about cybersecurity, more robust big data analytics models for cybersecurity have been developed in data mining techniques and machine learning (Hashem, I.A.T., et al, 2015). Big data analytics employ intrusion and malware detection techniques, data mining reactors and algorithms, and vector machine learning techniques for cybersecurity (Hashem, I.A.T., et al, 2015). However, intrusion detection systems face challenges such as data nonstationarity, collusion attacks, unbounded patterns, uneven time lags, individuality, and high false alarm rates (Menzes, F.S.D., et al, 2016). This necessitates a multi-layered and multi-dimensional approach to big data analytics for cybersecurity. In other words, an effective big data analytics model for cybersecurity must be able to detect intrusions and malware at every layer in the cybersecurity framework.

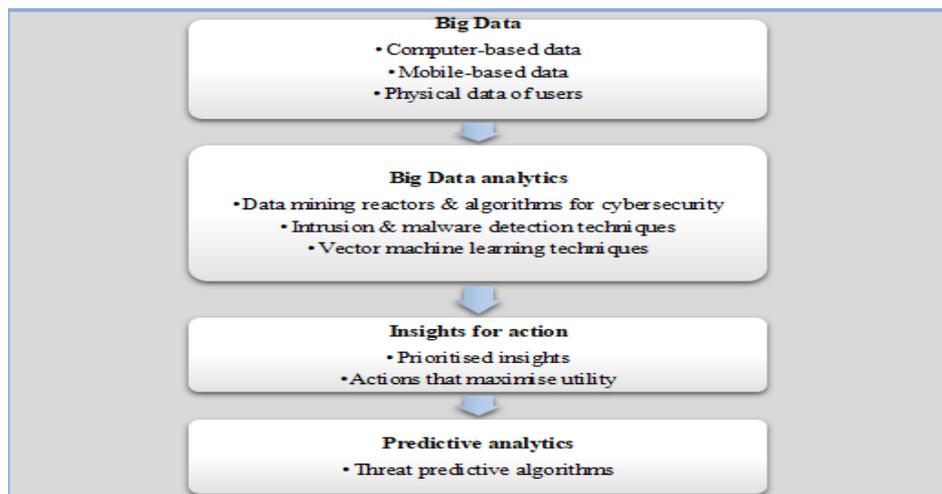


Figure 10: Big Data Analytics Model for Cybersecurity

4. Results and Analysis

4.1 Knowledge Generation for STI Investment Projects

Research creates knowledge and technology, and the process of innovation goes further to include putting that knowledge into practical use. Knowledge co-creation is a synergetic process of combining selected value-adding content and process from disciplinary traditions to synthesize new ways of knowing. The innovative support instruments may include applied research, idea/proof of concept up to commercialisation stage, venture capital, and foreign direct investment (FDI). The possible contributing factors to why African scientific contribution globally is only 2% may include:

- ❖ Weakness or nonexistence of an environment advantageous for research.
- ❖ Deficient budget dedicated to research.
- ❖ Not rewarding status of the researchers.
- ❖ Rough evaluation of the impact of research on development.

The strategies for knowledge generation through the Rapid Results Initiative (RRI) are:

- ❖ Advocacy of the National Science, Technology and Innovation System
- ❖ Knowledge co-creation and collaboration
- ❖ Knowledge acquisition
- ❖ Knowledge prioritization
- ❖ Knowledge fusion and adaption
- ❖ Knowledge enterprenuerising and commercialization

Following a review of the national research priorities, SDGs and STISA 2024. The following key projects were identified as key projects to be pursued in the next 100 days:

1. Post harvest technologies
2. Small scale mining/mineral value addition/bio mining
3. Clean water alternatives
4. Tiles technologies from mining waste
5. ICT innovations for applications /Cyber security systems
6. Defence technologies (double use technologies, drones, puma vehicle, land mine detectors, etc.)

The critical success factors for the successful knowledge generation, exploitation and commercialisation of priority scientific projects were identified as:

- ❖ High level sponsorship
- ❖ Resources
- ❖ Skills
- ❖ Project management

- ❖ Teamwork
- ❖ Excellence
- ❖ Convergence of mindset

A visit was made to the higher education institutions in Zimbabwe to ascertain the availability and possible exploitation of the new innovations in line with the key priority projects. The best technologies identified for practical and urgent exploitation at least cost is shown on the schema below on Table 7 below:

Table 7: Key priority technological innovations in Zimbabwe

Priority Technology	Schema
1. Kwekwe Polytechnic Brick Machine	
2. Chinhoyi University of Technology Animal drawn Lime Spreader	
3. Harare Polytechnic Floor tile manufactured	

The growth of the Zimbabwean economy, anchored by the National Development Strategy, is purposed to achieve the following elements:

- ❖ Improved access to credit and liquidity by key sectors of the economy such as agriculture.
- ❖ Establishment of a Sovereign Wealth Fund.
- ❖ Improvement of revenue collection from key sectors of the economy such as mining.
- ❖ Increased investment in infrastructure such as energy and power development, rail, roads, telecommunication, ICTs, aviation, water and sanitation, through acceleration in the implementation of Public Private Partnerships (PPPs) and another private sector driven initiatives.
- ❖ Increased Foreign Direct Investment (FDI).
- ❖ Establishment of Special Economic Zones.
- ❖ Continued use of the multi-currency system.
- ❖ Implementation of effective Value Addition policies and strategies; and
- ❖ Improved supply of electricity and water.

The National Development Strategy must therefore be premised on the scientific technological solutions and economic framework inferred by the national science, technology and innovation system of Zimbabwe. Special attention should be given to the following sectors of the economy:

- ❖ Agriculture
- ❖ Mining

- ❖ ICT
- ❖ Research and Development
- ❖ Manufacturing
- ❖ Construction
- ❖ Human capital development
- ❖ Health and social services
- ❖ Defence and security

The financing model for the National Development Strategy has the following elements:

- ❖ National resource mobilisation programmes from domestic resources driven by the Government of Zimbabwe
- ❖ The establishment of the National Wealth and Innovation Fund
- ❖ Collaboration with all the development partners in STEM-related projects and programmes
- ❖ Public Private Partnerships (PPPs) in the proposed Special Economic Zones.

However, it is envisaged that a number of fiscal reform measures shall be undertaken in order to improve fiscal policy management and financial sector stability. Progress shall be monitored against registered re-engagement process with the International Financial Institutions (IFIs) and creditors through various strategies.

4.2 Performance of Machine Learning Algorithms

The gross inadequacies of classical security measures have been overtly exposed. Therefore, effective solutions for a dynamic and adaptive network defence mechanism should be determined. Intrusion attack classification requires optimization and enhancement of the efficiency of data mining techniques. Table 8 shows a comparison of the data mining techniques that can be used in intrusion detection.

TABLE 8: Advantages and disadvantages of data mining techniques (Source: Berman, D.S., et a, 2019)

Technique	Advantages	Disadvantages
Genetic Algorithm	Finding a solution for any optimization problem Handling multiple solution search spaces	Complexity to propose a problem space Complexity to select the optimal parameters The need to have local searching technique for effective functioning
Artificial Neural Network	Adapts its structure during training without the need to program it	Not accurate results with test data as with training data
Naive Bayes Classifier	Very simple structure Easy to update	Not effective when there is high dependency between features
Decision Tree	Easy to understand Easy to implement	Works effectively only with attributes having discrete values
K Mean	Very easy to understand Very simple to implement in solving clustering problems	Number of clusters is not automatically calculated High dependency on initial centroids.

An intrusion detection system determines if an intrusion has occurred, and so monitors computer systems and networks, and the IDS raises an alert when necessary (Bloice, M., and Holzinger, A., 2018). However, Bloice, M., and Holzinger, A. (2018) addressed the problems of Anomaly Based Signature (ABS) which reduces false positives by allowing a user to interact with the detection engine and raising classified alerts. The advantages and disadvantages of ABSs and SBSs are summarised on table, Table 3, below.

TABLE 3: Advantages and disadvantages of ABSs and SBSs models (Source: Bloice, M., and Holzinger, A., 2018).

Detection model	Advantages	Disadvantages
Signature-based	Low false positive rate Does not require training	Cannot detect new attacks Requires continuous updates

	Classified alerts	Training could be a thorny task
Anomaly-based	Can detect new attacks Self-learning	Propne to raise false positives Black-box approach Unclassified alerts Require initial training

The performance of each of the classical Machine Learning algorithms is presented below from Figure 11.

4.2.1. Classification and Regression Trees (CART)

Table 4 below shows the performance results of our CART algorithm in predicting bank failure on the training set. The algorithm’s level of accuracy on the training dataset was 82.8%. The best tune or complexity parameter of our optimal model was 0.068. On the test dataset, the algorithm achieved an accuracy level of 92.5% and a kappa of 88.72%. The algorithm only misclassified 2 instance as moderate and 1 as satisfactory.

Complexity Parameter	Accuracy	Kappa	AccuracySD	KappaSD
0.06849315	0.8275092	0.7519499	0.04976459	0.07072572
0.15753425	0.7783150	0.6683229	0.07720896	0.14039942
0.42465753	0.5222344	0.1148591	0.08183351	0.18732422

TABLE 4: CART model performance.

The accuracy of the CART model based on the complexity parameters of different test runs is shown on Figure 11 below. The complexity parameter or the best tune parameter of 0.068 optimized the model performance.

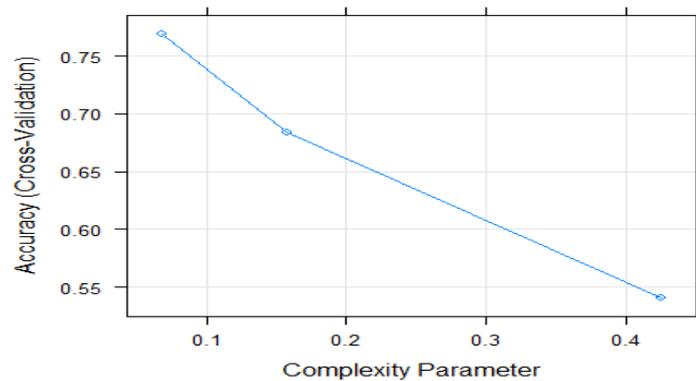


FIGURE 11: CART accuracy curve.

4.2.2. Support Vector Machine

The accuracy level of the SVM model on the training dataset was 79.1% in predicting bank solvency as shown in table 5. The best tune sigma and cost values of our highly performing model where 0.05 and 1 as shown on Figure 12 below. The Kappa statistic and the Kappa SD where 67.9% and 0.13 respectively. On the test dataset, the algorithm achieved an accuracy level of 92.5% and a kappa of 88.54%. The algorithm only misclassified 3 instance as moderate in comparison to the CART algorithm.

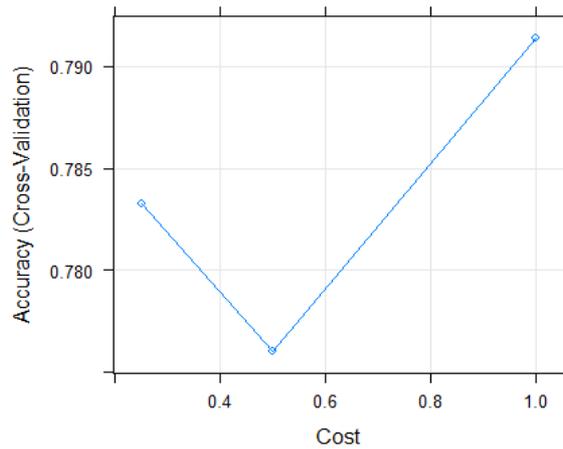


FIGURE 12: SVM accuracy curve

sigma	c	Accuracy	Kappa	AccuracySD	KappaSD
0.050398	0.25	0.783223	0.678536	0.095598	0.140312
0.050398	0.50	0.776007	0.661354	0.087866	0.132552
0.050398	1.00	0.791391	0.678694	0.080339	0.126466

TABLE 5: Support Vector Machine performance

4.2.3. Linear Discriminant Algorithm

Accuracy	Kappa	AccuracySD	KappaSD
0.8042399	0.7038131	0.1016816	0.159307

TABLE 6: Linear Discriminant algorithm performance

On the training dataset, the LDA achieved an accuracy level of 80% as in table 6. The Kappa statistic and the Kappa SD were 70% and 0.16 respectively. On the test dataset, the algorithm achieved an accuracy level of 90% and a kappa of 84.64%. The algorithm only misclassified 4 instances as moderate whose performance is poor in comparison to the CART algorithm.

4.2.4. K-Nearest Neighbor

Table 7 shows the K-NN algorithm performance and confusion accuracy on Figure 10.

K	Accuracy	Kappa	AccuracySD	KappaSD
5	0.5988645	0.3698931	0.1280376	0.2158109
7	0.6268864	0.4072928	0.1564920	0.2703504
9	0.6621978	0.4715556	0.1747903	0.2881390

TABLE 7: K-NN algorithm performance

The level of accuracy on the training dataset was 66.2%. The best tune parameter for our model was k=9 or 9 neighbors as shown on the accuracy curve in Figure 13 below. The Kappa statistic and the Kappa SD were 47.2% and 0.17 respectively. On the test dataset, the algorithm achieved an accuracy level of 67.5% and a kappa of 49%. The algorithm was not highly effective in classifying bank performance in comparison to other algorithms.

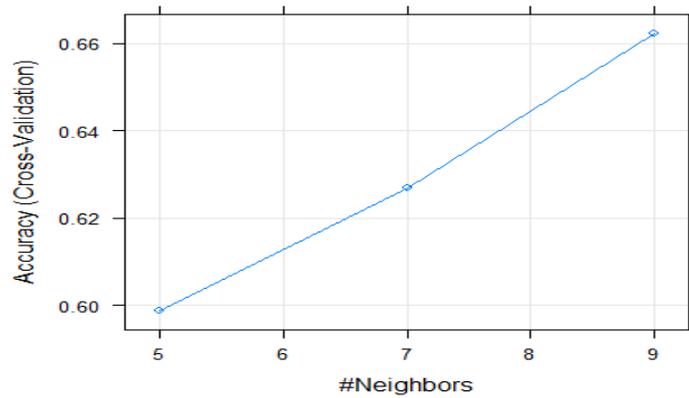


FIGURE 13: K-NN confusion accuracy graph

4.2.5. Random Forest

TABLE 8: Random Forest performance

mtry	Accuracy	Kappa	AccuracySD	KappaSD
2	0.8272527	0.7421420	0.10396454	0.15420079
14	0.8554212	0.7829891	0.06069716	0.09303130
16	0.8482784	0.7718935	0.06455248	0.09881991

On

the training set, the accuracy of our random forest was 85.5% as designated in table 8. The best tune parameter for our model was the mtry of 14 which is the number of randomly selected predictors in constructing trees as shown on Figure 14. The Kappa statistic and the Kappa SD where 78.3% and 0.09 respectively. On the test dataset, the algorithm achieved an accuracy level of 96% and a kappa of 96%. The algorithm was highly effective in classifying bank performance in comparison to all algorithms.

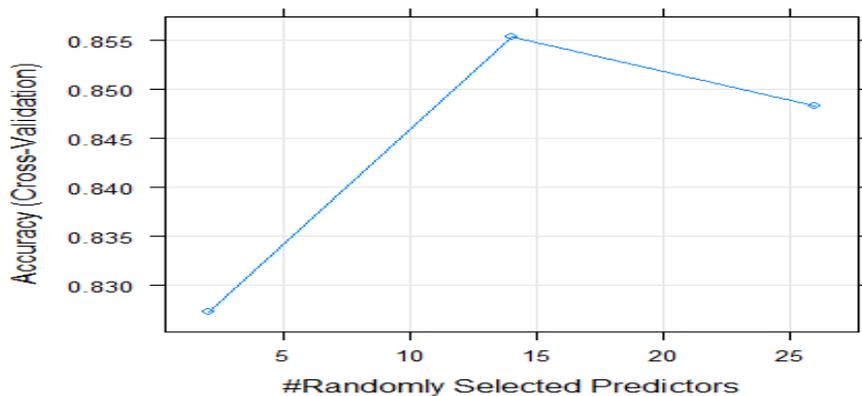


FIGURE 14: Random Forest accuracy graph

4.2.6. Challenges and Future Direction

As the number of banking activities increase, also it implies that the data submission to the Reserve Bank of Zimbabwe continues to grow exponentially. This challenging situation in combination with advances in machine learning (ML) and artificial intelligence (AI) presents unlimited opportunities to apply neural network-based deep learning (DL) approaches to predict Zimbabwean Bank’s solvency. Future work will focus on identifying more features that could possibly lead to poor bank performance and incorporate these in our models to develop a robust early warning supervisory tool based on big data analytics, machine learning and artificial intelligence.

The researcher analyses the two models that have been proposed in literature with reference to an ideal data analytics model for cybersecurity presented in Section 3.

4.2.7. Model 1: Experimental/ Prototype Model

In the first case the researcher makes reference to the model presented in Stallings, W. (2015) which although developed in the context of the public sector can be applied to the private sector organizations. Table 9 below summarizes the main characteristics of the experimental model. [The reader is referred to the prototype model also demonstrated in Stallings, W. (2015).

TABLE 9: EXPERIMENTAL BIG DATA ANALYTICS MODEL FOR CYBERSECURITY

1. MODEL ATTRIBUTES	2. DESCRIPTION
3. HBase working on HDFS (Hadoop Distributed File System)	4. HBase, a non-relational database, facilitates analytical and predictive operations 5. Enables users to assess cyber-threats and the dependability of critical infrastructure
6. Analytical data processing module	7. Processes large amounts of data, interacts with standard configurations servers and is implemented at C language 8. Special interactive tools (based on JavaScript/ CSS/ DHTML) and libraries (for example jQuery) developed to work with content of the proper provision of cybersecurity
9. Special interactive tools and libraries	10. Interactive tools based on JavaScript/ CSS/ DHTML 11. Libraries for example jQuery developed to work with content for 12. Designed to ensure the proper provision of cybersecurity
13. Data store for example (MySQL)	14. Percona Server with the ExtraDB engine 15. DB servers are integrated into a multi-master cluster using the Galera Cluster.
16. Task queues and data caching	17. Redis
18. Database server's balancer	19. Haproxy
20. Web server	21. nginx , involved PHP-FPM with APC enabled
22. HTTP requests balancer	23. DNS (Multiple A-records)
24. Development of special client applications running Apple iOS	25. Programming languages are used: Objective C, C++, Apple iOS SDK based on Cocoa Touch, CoreData, and UIKit.
26. Development of applications running Android OS	27. Google SDK
28. Software development for the web platform	29. PHP and JavaScript.
30. Speed of the service and protection from DoS attacks	31. CloudFare (through the use of CDN)

(Source: Stallings, W. , 2015).

4.2.8 Model 2: Cloud computing/Outsourcing

The second model involves an organization outsourcing its data to a cloud computing service provider. Cloud computing service providers usually have advanced big data analytics models, with advanced detection and prediction algorithms and better state of the art cybersecurity technologies and better protocols because they specialize in data and networks. However, it is to be noted that cloud computing service providers are neither exempt nor immune from cyber-threats and attacks.

4.3. Development of the Bayesian Network Model

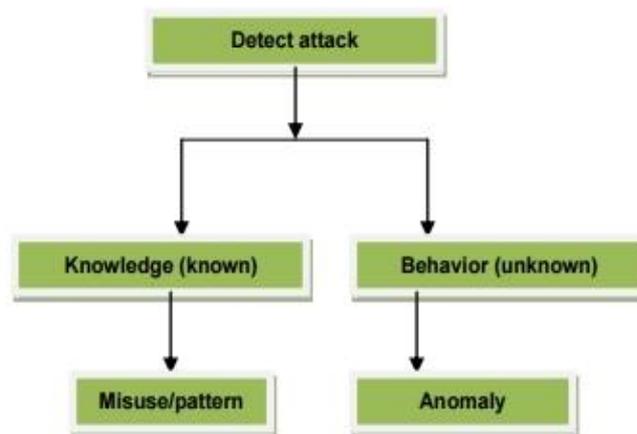
Bayesian networks allow for prediction, generalization, and planning. It must be noted that network traffic behaviour as well as payload protocol lexical and syntactical patterns may differ substantially depending on the sort of service provided from each specific equipment, i.e., from each different IP address and from each specific TCP destination port. Bringas, P.B., and Santos, I., (2010) proposed the use of a multi-instance schema, with several Dynamic Bayesian Networks, one for each combination of TCP destination address and port. Bringas, P.B., and Santos, I., (2010) argue that it must be able to simultaneously offer

efficient response against both well-known and zero-day attacks. Bayesian networks require many computational resources. Hence, several of the tasks to be performed must be designed in a parallel way to accelerate it (Bringas, P.B., and Santos, I., 2010, p.240).

Adjusting the whole behaviour of the Network Intrusion Detection System to special needs or configurations has a high degree of complexity in Bayesian structures and conditional probability parameters. The dynamic regulation of knowledge representation model can be accomplished by using the sensibility analysis so as to avoid denial of service attacks, automatically enabling or disabling expert modules by means of one combined heuristic measure which considers specific throughputs and representative features (Bringas, P.B., and Santos, I., 2010, p.242). Furthermore, it is also possible to perform model optimization, to obtain the minimal set of representative parameters, and also the minimal set of edges among them, with the subsequent increase of the general performance. In order to improve inference and adaptation time of response, approximate evidence propagation methods can also be applied.

Intrusion Detection System (IDS) operates differently from a firewall and antivirus. Firewall and antivirus software can be bypassed and does not stop internal intrusion and as well as external attacks efficiently. Firewall generally works on static rules via which it filters traffic but never has ability to detect intrusion. IDS detects intrusion after its first occurrence in order to prevent such future attacks (Murugan, S., and Rajan, M.S., 2014, p.1). The simple rules for the analysis of attack are shown on Figure 15 below. Any kind of unusual behaviour on the network triggers an alarm on the IDS for the anomaly-based intrusion detection method.

Figure 15: Analysis of Attack (Source: Murugan, S., and Rajan, M.S., 2014, p.2)



Defence security agencies and other militarily related organizations are highly concerned about the confidentiality and access control of the stored data. Therefore, it is really important to investigate on Intrusion Detection System (IDS) to detect and prevent cybercrimes to protect these systems (Alocious, C., *et al*, 2014, p.1). Distributed Denial of Service (DDoS) attacks are carried out to make system inaccessible by flooding the server's network and end user systems with fake generated traffic. In this way, legitimate users would be prevented from accessing the system resources. Signature based detection also called as rule-based detection determines the user behavior with a comparison of some rules defined related to legitimize the user's behavior. Signature based IDS consists of a database of known signatures of known attacks, these attacks are predefined based on the attack analysis. There is a phenomenal growth in modern cyber-attacks and their formations are changing regularly. A genetic algorithm is a computational model, where the basic concepts behind genetic algorithm is an evaluation and natural selection. This means only the fittest will be survived in the process of natural selection. Genetic algorithms are used by creating a set of rules for network data.

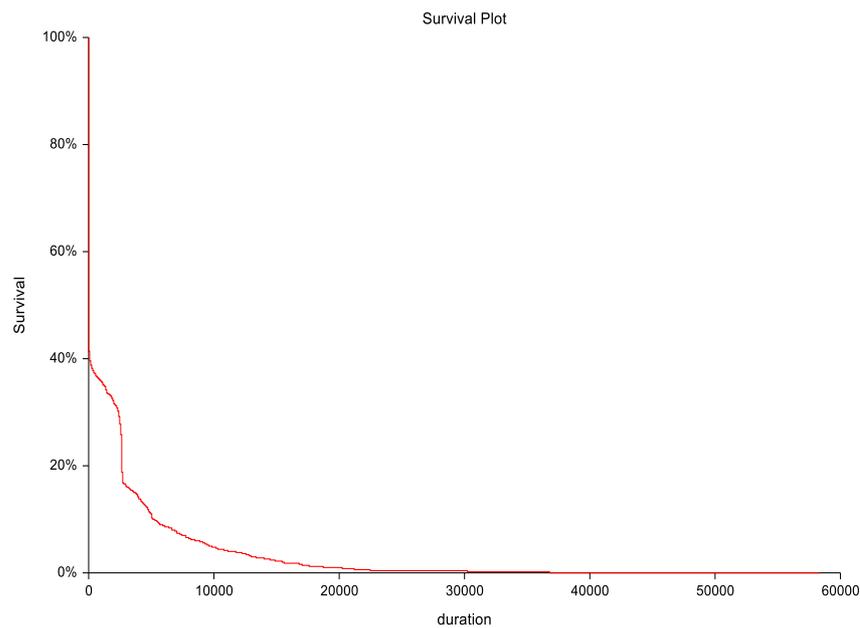
The analysis of the quantitative data was done using the SNORT open-source software and other Bayesian Network supportive platforms such as NCSS 2019, Pass 2019, GeNIe 2.3, WinBUGS14, BayES and Analytica 5.1. In sniffer mode, the program will read network packets and display them on the console. In

packet logger mode, the program will log packets to the disk. The SNORT IDS mode was used to illustrate the results of the research. SNORT was chosen due to the following reasons:

- ❖ Support multiple packet processing threads
- ❖ Shared configuration and attribute table
- ❖ Use a simple, scriptable configuration
- ❖ Make key components pluggable
- ❖ Autodetect services for portless configuration
- ❖ Support sticky buffers in rules
- ❖ Autogenerate reference documentation
- ❖ Provide better cross platform support
- ❖ Development for the project will be fast paced

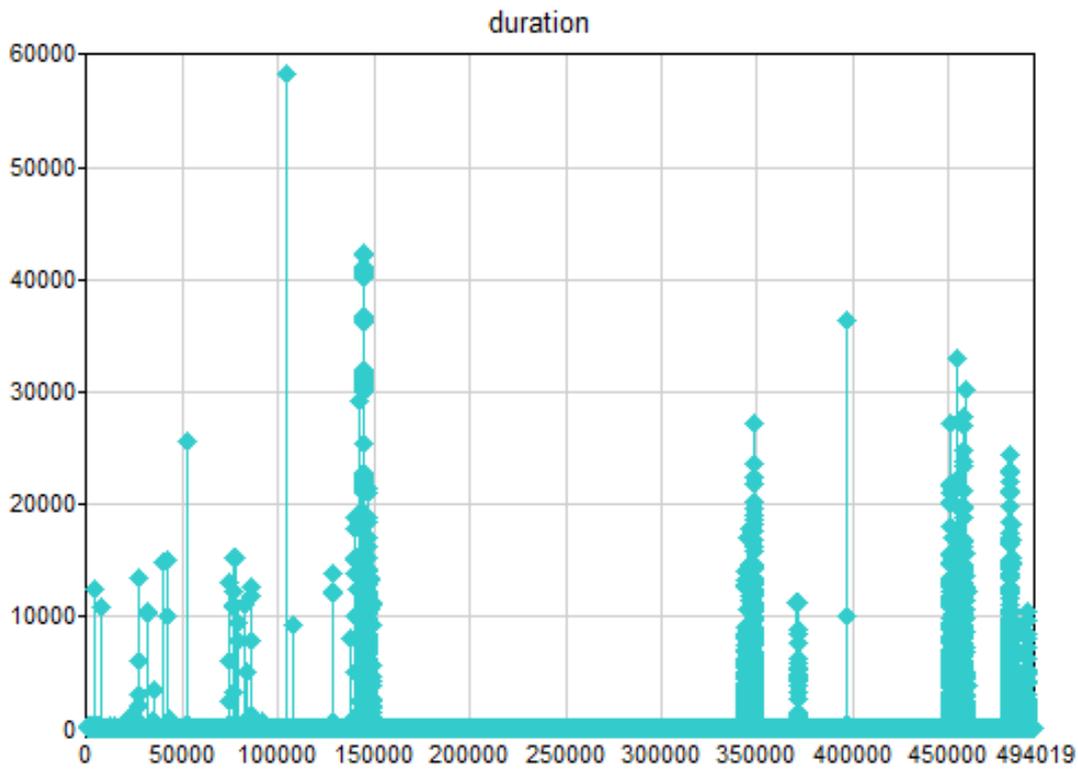
A non-parametric Survival Analysis was conducted with respect to one variable, *duration*, and the result is shown as Kaplan-Meier Survival Curves on Figure 16 below.

Figure 16: Kaplan-Meier Survival Curve(s)

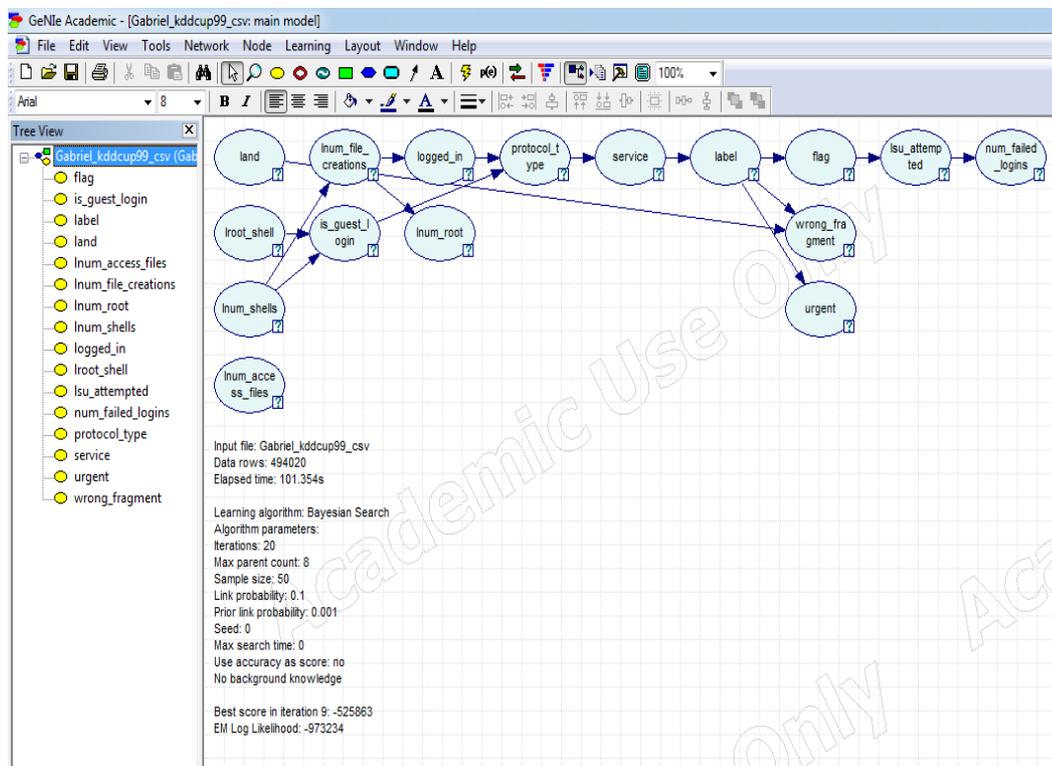


Time Series analysis of the variable *Duration* is shown on Figure 17 below.

Figure 17: Time Series of the variable Duration

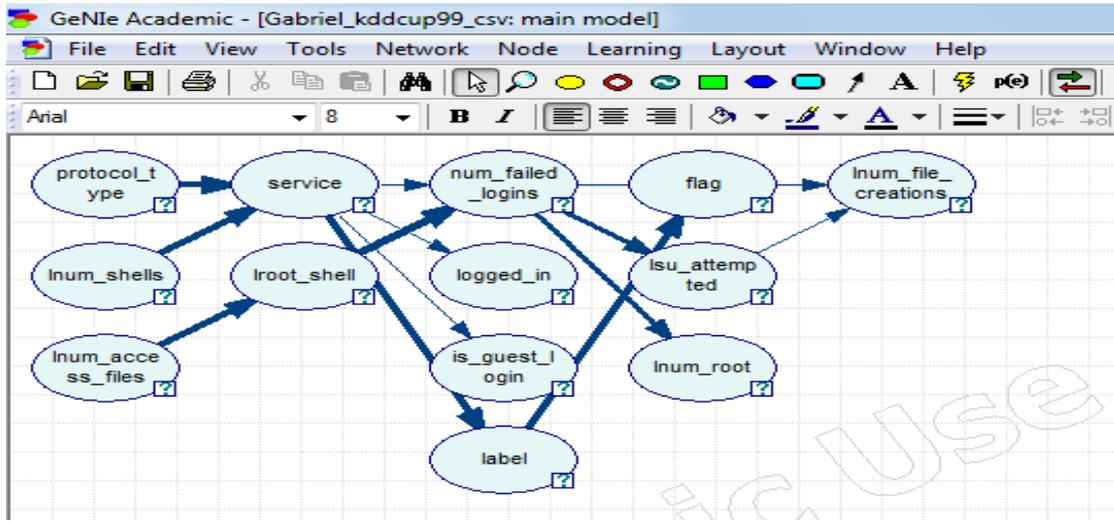


A new Bayesian Network model was created from the dataset and is shown on Figure 18 below.
 Figure 18: Bayesian Network Structure



The Strength of Influence of the Bayesian Network is shown on Figure 19 below.

Figure 19: Strength of Influence



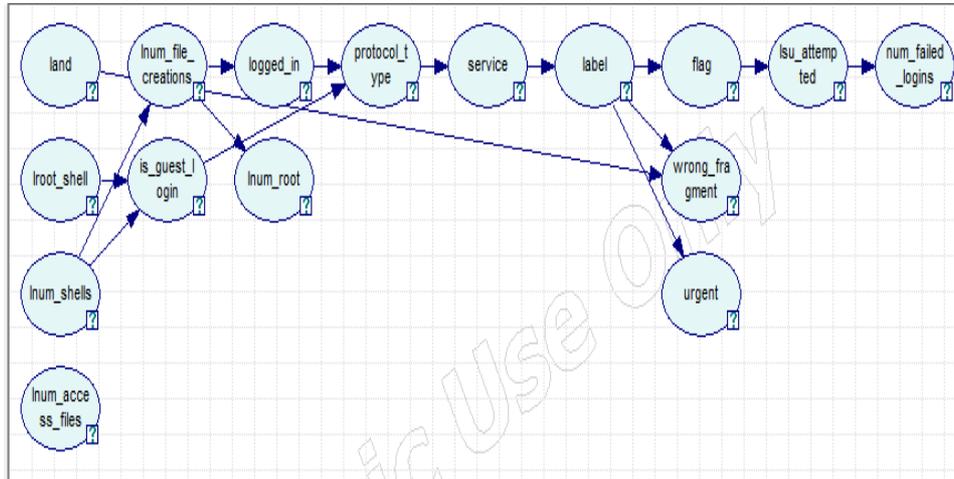
The Adjacency Matrix was computed for the network and is shown on Figure 20 below.

Figure 20: Adjacency Matrix

	is_guest_login	inum_file_creations	inum_root	isu_attempted	logged_in	num_failed_logins	num_root	num_access_files	flag	label	service	inum_shells	protocol_type
is_guest_login													
inum_file_creations													
inum_root													
isu_attempted		X											
logged_in													
num_failed_logins			X	X									
num_root													
num_access_files						X							
flag		X											
label									X				
service	X	X			X	X				X			
inum_shells												X	
protocol_type											X		

The Bayesian Network structure derived from the dataset is shown below on Figure 21.

Figure 21: Bayesian Network structure



There are several problems in the use of Bayesian Networks, one of which is about the correspondence between the graphical structure and associated probabilistic structure which allows us to reduce all the problems of inference problems in graph theory. The other problem is in the operation for transposition of the causal graph to a probabilistic representation. However, BNs have been applied in anomaly detection in different ways, one of which is the Naive Bayes, which is a two-layer Bayesian network that assumes complete independency between the nodes.

From the sample dataset of 494,020 instances with 42 variables analysed, the mean values of the key variables are shown on the table below, Table 10:

Table 10: Mean values of the selected key variables

Variable	Mean
duration	47.9794
protocol_type	tcp
service	http
flag	SF
src_bytes	3025.62
dst_bytes	868.531
land	4.45E-05
wrong_fragment	0.00643294
urgent	1.42E-05
hot	0.0345188
num_failed_log+	0.000151816
logged_in	0.148245
lnum_compromis+	0.0102121
lroot_shell	0.000111332
lsu_attempted	3.64E-05
lnum_root	0.0113518
lnum_file_crea+	0.00108295
lnum_shells	0.000109307
lnum_access_fi+	0.00100806
is_guest_login	0.00138658

count	332.286
srv_count	292.907
serror_rate	0.176687
srv_serror_rate	0.176609
rerror_rate	0.0574335
srv_rerror_rate	0.0577191
same_srv_rate	0.791547
diff_srv_rate	0.0209824
srv_diff_host_+	0.0289962
dst_host_count	232.471
dst_host_srv_c+	188.666
dst_host_same_+	0.753781
dst_host_diff_+	0.0309058
dst_host_same_+	0.601936
dst_host_srv_d+	0.00668351
dst_host_serro+	0.176754
dst_host_srv_s+	0.176443
dst_host_rerro+	0.0581177
dst_host_srv_r+	0.0574118
label	normal

It's possible that abnormal behavior can happen as also be a result of factors such as policy changes or the offering of new services by a site. The solution to these two problems is the introduction of a hybrid detection which takes advantage of misuse detection to have a high detection rate on known attacks and capacity to detect unknown attacks. The most common type of hybrid system is to combine a misuse detection and an anomaly detection together. Arguably, a hybrid IDS can be used by combining both misuse detection and anomaly detection components, in which a random forest algorithm was applied firstly in the misuse detection module to detect known intrusions. Evaluations with a part of the KDDCUP'99 data set used in this research showed that the misuse detection module generated a high detection rate with a low false positive rate, and at the same time the anomaly detection component had the potential to find novel intrusions.

Zekrif, D.M.S. (2014, p.17) proposed a two-stage hybrid intrusion detection and visualization system that leverages the advantages of signature-based and anomaly detection methods, which potentially could identify both known and unknown attacks on system calls. A suggested improved IDS would be a novel hybrid IDS system consisting of an anomaly detection module, a misuse detection module, and a decision support system. The decision support system would be used to combine the results of the two previous detection modules. Instead of combining signature detection techniques and anomaly detection techniques, some other hybrid systems fuse multiple anomaly detection systems according to some specific criteria considering that the detection capability for each anomaly detection technique is different. The hybrid system is purposed to keep an acceptable detection rate and reduce the large number of false alerts generated by current anomaly detection approaches (Zekrif, D.M.S., 2014, p.19).

The cybersecurity challenges that are being faced in developing countries, like Zimbabwe, include the following:

1. Infrastructure
2. Legal frameworks
3. Harmonization of legislation
4. Balancing harmonization and country specific needs

updated. The wonderful thing about recursive bayesian updating is that it is simple and has a wide variety of applications. The methodical and efficient method of clustering is provided by the junction tree algorithm. This method involves performing bayesian propagation on an updated graph called a junction tree. The Junction tree approach eliminates cycles in a network by clustering them into single nodes (Soberanis, I.V.D., 2010, p.70). Reasoning with Bayesian network is done by updating the probabilities, which involves using new information or evidence to compute the posterior probability distributions. Bayesian updating for any probabilistic inference is the computation of the posterior probability distribution for a set of query nodes, given values for some evidence nodes.

Learning can be assisted by the use of existing knowledge, which we can refer to as the training data. In fact, prior knowledge can be enormously useful in learning. The knowledge that we compile or is given can greatly aid in the speeding up the decision-making process. There are a variety of learning techniques that can be utilized based on the data. The learning method can be supervised, unsupervised or reinforced. Supervised learning is the adjustment of the state of the network in response to the data generated in the environment (Soberanis, I.V.D., 2010, p.74). In unsupervised training, the network is provided with inputs but not with desired outputs, that is the training data is provided and the likely or unlikely data is derived. The system itself must then decide what features it will use to group the input data or the network has to make sense of the inputs without outside help. Soberanis, I.V.D. (2010, p.126) proposed an online traffic classification method, in which the unigram payload distribution model is applied to extract the required set of features. Thereafter the J48 decision tree is employed to classify the network applications based on the unigram features and observed that the signatures are present in some designated positions in the payload. It is important to place more weight on the features that appear in these more important positions through a weighted scheme over the features using a genetic algorithm.

Almutairi, A., (2016) identified two main challenges; the first one is that signature-based intrusion detection systems such as SNORT lack the capability of detecting attacks with new signatures without human intervention. The other challenge is related to multi-stage attack detection, it has been found that signature-based is not efficient in this area. Almutairi, A. (2016) handled the first challenge by developing a multi-layer classification methodology. The first layer was premised on a decision tree and the second layer was derived from a hybrid module which uses neural network and fuzzy logic as the two data mining techniques. The second layer was purposed to detect new attacks in case the first one fails to detect. This system detects attacks with new signatures, and then updates the SNORT signature holder automatically, without any human intervention. The obtained results showed that a high detection rate was obtained with attacks having new signatures. However, it has observed that the false positive rate needs to be lowered. The second challenge was approached by evaluating IP information using fuzzy logic. This approach looked at the identity of participants in the traffic, rather than the sequence and contents of the traffic. The results showed that this approach can help in predicting attacks at very early stages in some scenarios. Almutairi, A. (2016) conceded to the fact that combining this approach with a different approach that looks at the sequence and contents of the traffic, such as event- correlation, will achieve a better performance than each approach individually. However, building an effective solution using data mining faces some major challenges, one of which is the massive increase in the amount and complexity of data to be analysed. This makes data mining quite expensive in terms of computation, and so data mining in may consume a lot of CPU and memory resources that are expensive or not available. Hence, carrying out analysis on network traffic using a sample of the data and not all of them for the purpose of generating profiles may cause false conclusions.

5. Conclusion

It is envisaged that the national innovation programme would:

- ❖ make Zimbabwe's innovation system truly international, by supporting partnerships, collaboration and foreign investment in Zimbabwean R&D.
- ❖ build a culture of innovation and new ideas by strengthening investment in creativity and knowledge generation.
- ❖ accelerate the take up of new technology, so Zimbabwean firms can access the best ideas from around Zimbabwe and the rest of the world.
- ❖ focus incentives for business R&D to promote global competitiveness, delivering the best outcomes for exports and economic growth; and

- ❖ Enable resource mobilisation for the specific national innovations and industrialisation programmes which are STEM-related.
- ❖ Advocacy and publicity work was achieved through a series of communication/ visibility events; media coverage; social media profile; promotional materials; and research publications and bulletins.

Machine learning algorithms as part of Artificial Intelligence can be clustered into supervised, unsupervised, semi-supervised, and reinforcement learning algorithms. The main characteristic of ML is the automatic data analysis of large data sets and production of models for the general relationships found among data. Big data analytics is not only about the size of data but also clinches on volume, variety and velocity of data.

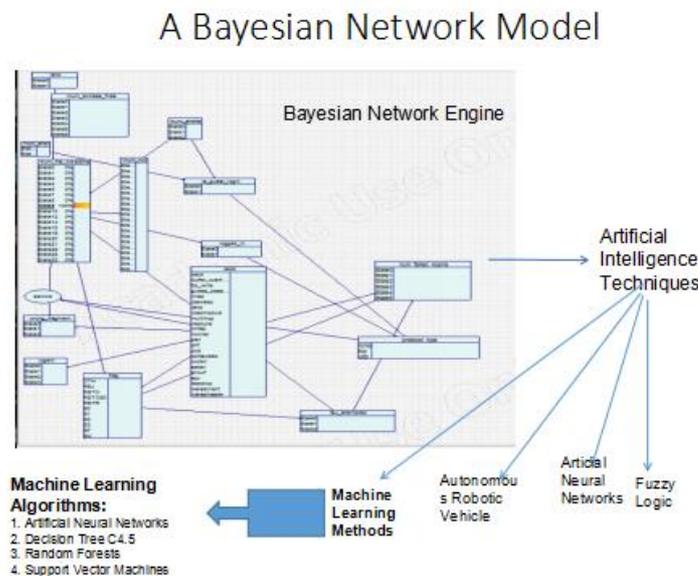
While the review of literature showed that institutions and countries adopt different big data analytics models for cybersecurity, the researcher also demonstrated that beside the unique requirements these models share major common characteristics for example reactors and detection algorithms are usually present in every model but differ in terms of complexity. Further, using the models presented in this section it is worthy of note that many small organizations will usually adopt Model 2 whereas very large organizations and sensitive public sector organizations will adopt Model 1. This may also explain why models used may differ although the framework used in designing a data analytics model for cybersecurity in a cloud computing services provider may share similar characteristics with that developed by an institution on its own.

In this section the researcher presented two models for adopting data analytics models to cybersecurity. The first experimental or prototype model involves the design, and implementation of a prototype by an institution and the second model involves the use serviced provided by cloud computing companies.

Future research work is envisaged to focus on new algorithmic performance in ML and applications in responsible AI for e-learning.

The final Bayesian Network model developed is shown on the diagram below on Figure 23.

Figure 23: The Final Bayesian Network model



However, the Bayesian Network must be supported by the Artificial Intelligence paradigms for network detection and prevention systems that include machine learning methods, autonomous robotic vehicle, artificial neural networks, and fuzzy logic. Furthermore, these algorithms ought to be used in the basic network intrusion detection and prevention system:

- ❖ Support Vector Machines,
- ❖ Artificial Neural Network,
- ❖ K-Nearest Neighbour,

- ❖ Naive-Bayes and
- ❖ Decision Tree Algorithms

Alternative improved solutions include the use of machine learning algorithms specifically Artificial Neural Networks (ANN), Decision Tree C4.5, Random Forests and Support Vector Machines (SVM). However, the use of Bayesian Networks has its own limitations which include the fact that the correspondence between the graphical structure and associated probabilistic structure will allow to reduce all the problems of inference problems in graph theory, which requires further research. However, these problems are relatively complex and give rise to much research. There is also a challenge in the operation for transposition of the causal graph to a probabilistic representation.

References

- BERMAN, D.S., Buczak, A.L., Chavis, J.S., and Corbett, C.L. (2019). "Survey of Deep Learning Methods for Cyber Security", *Information* 2019, 10, 122; doi:10.3390/info10040122.
- BLOICE, M. & Holzinger, A., (2018), *A Tutorial on Machine Learning and Data Science Tools with Python*. Graz, Austria: s.n.
- BURT, D., Nicholas, P., Sullivan, K., & Scoles, T. (2013). Cybersecurity Risk Paradox. *Microsoft SIR*. Government of Zimbabwe's Various Budget Statements by the Ministry of Finance, accessed at <http://www.zimtreasury.gov.zw/>
- Government of Zimbabwe's Various Monetary Policy Statements by the Reserve Bank of Zimbabwe, accessed at <http://www.rbz.co.zw/>
- HASHEM, I. A. T., Yaqoob, I., Anuar, N. B., Mokhtar, S., Gani, A., & Ullah Khan, S. (2015). The rise of "big data" on cloud computing: Review and open research issues. In *Information Systems*. <https://doi.org/10.1016/j.is.2014.07.006>.
- JONES, C. (1998) *Introduction to Economic Growth*, (W.W. Norton, 1998 First Edition, 2002 Second Edition).
- KABANDA, G. (2013), "African context for technological futures for digital learning and the endogenous growth of a knowledge economy", *Basic Research Journal of Engineering Innovation (BRJENG)*, Volume 1(2), April 2013, pages 32-52, <http://basicresearchjournals.org/engineering/pdf/Kabanda.pdf>
- KABANDA, G., (2021), "Performance of Machine Learning and Big Data Analytics paradigms in Cybersecurity and Cloud Computing platforms", *Global Journal of Computer Science and Technology: G Interdisciplinary* Volume 21, Issue 2, Version 1.0, Year 2021; Type: Double Blind Peer Reviewed International Research Journal; Publisher: Global Journals Online ISSN: 0975-4172 & Print ISSN: 0975-4350; Performance of Machine Learning and Big Data Analytics Paradigms in Cybersecurity and Cloud Computing Platforms (globaljournals.org).
- KOTHARI, C.R.(2004) .Research Methodology Methods and Techniques 2nd Revised Edition .New Age International Publishers
- MAZUMDAR, S., and Wang, J., (2018). Big Data and Cyber security: A visual Analytics perspective in S. Parkinson et al (Eds), *Guide to Vulnerability Analysis for Computer Networks and Systems*.
- MENZES, F.S.D., Liska, G.R., Cirillo, M.A. and Vivanco, M.J.F. (2016) Data Classification with Binary Response through the Boosting Algorithm and Logistic Regression. *Expert Systems with Applications*, 69, 62-73. <https://doi.org/10.1016/j.eswa.2016.08.014>
- MURUGAN, S., and Rajan, M.S., (2014). Detecting Anomaly IDS in Network using Bayesian Network, *IOSR Journal of Computer Engineering (IOSR-JCE)*, e-ISSN: 2278-0661, p- ISSN: 2278-8727, Volume 16, Issue 1, Ver. III (Jan. 2014), PP 01-07, www.iosrjournals.org
- NAPANDA, K., Shah, H., and Kurup, L., (2015). Artificial Intelligence Techniques for Network Intrusion Detection, *International Journal of Engineering Research & Technology (IJERT)*, ISSN: 2278-0181, IJERTV4IS110283 www.ijert.org, Vol. 4 Issue 11, November-2015.
- NIELSEN, R. (2015). CS651 Computer Systems Security Foundations 3d Imagination Cyber Security Management Plan, Technical Report January 2015, Los Alamos National Laboratory, USA.
- SARKER, I. H., Kayes, A. S. M., Badsha, S., Alqahtani, H., Watters, P., & Ng, A. (2020). Cybersecurity data science: an overview from machine learning perspective. *Journal of Big Data*. <https://doi.org/10.1186/s40537-020-00318-5>
- SITI Nurul Mahfuzah, M., Sazilah, S., & Norasiken, B. (2017). An Analysis of Gamification Elements in Online Learning to Enhance Learning Engagement. *6th International Conference on Computing & Informatics*.
- STALLINGS, W., (2015). Operating System Stability. Accessed on 27th March 2019. <https://www.unf.edu/public/cop4610/ree/Notes/PPT/PPT8E/CH15-OS8e.pdf>
- THOMAS, E. M., Temko, A., Marnane, W. P., Boylan, G. B., & Lightbody, G. (2013). Discriminative and generative classification techniques applied to automated neonatal seizure detection. *IEEE Journal of Biomedical and Health Informatics*. <https://doi.org/10.1109/JBHI.2012.2237035>
- TRUONG, T.C; Diep, Q.B.; & Zelinka, I. (2020). Artificial Intelligence in the Cyber Domain: Offense and Defense. *Symmetry* 2020, 12, 410.

- UMAMAHESWARI, K., and Sujatha, S., (2017). Impregnable Defence Architecture using Dynamic Correlation-based Graded Intrusion Detection System for Cloud, *Defence Science Journal*, Vol. 67, No. 6, November 2017, pp. 645-653, DOI : 10.14429/dsj.67.11118.
- WILSON, B. M. R., Khazaei, B., & Hirsch, L. (2015, November). Enablers and barriers of cloud adoption among Small and Medium Enterprises in Tamil Nadu. In: 2015 IEEE International Conference on Cloud Computing in Emerging Markets (CCEM) (pp. 140-145). IEEE.
-

Enterprise transformation projects in the financial industry and ethics (TPFI&E)

Antoine Trad

Institute of Business and Information Systems Transformation Management, France

Keywords

Financial Activities, Ethics, Transformation and Artificial Intelligence, Machine Learning, Artificial Intelligence, Operational Research, Heuristics, Enterprise Architecture, Mathematical Model, Business Transformation Projects.

Abstract

The last three decades' global financial, societal and geopolitical crisis can be analysed by using an adapted holistic societal transformation framework. Such a framework is able to deliver recurrent patterns of organized global financial misdeed models and their related crime schemes. The use of, an ethical approach, governance framework, enterprise architecture models and control services-based processes, are crucial to support such a complex crimes detection-based framework. The proposed framework uses measurable Critical Success Factors (CSF) and Critical Success Areas (CSA) which characterize the evaluation of risk factors related to Global Financial Predators Activities (GFPA), mainly misdeeds. This article presents the concept of a framework, that can be used for proactive detection and tracking of financial problems and misdeeds, which are organized and done by GFPAs. Such GFPAs are in general ranked as the most ethical organizations, because of such ranking organisations are chosen by major financial circles. In this article the author presents an artificial intelligence based decision-making concept that is the framework's kernel. This generic decision making concept uses a mathematical model, which manages various types of algorithms. A Transformation Project (or simply a Project), depends on, the capacities of the decision-making system, the profile of the Organizational/Societal Transformation Manager (or simply the Manager) and his team who should be supported by a holistic cross-functional framework. Project's complexity as well as the usage of underlying Decision-Making System (DMS) and enterprise architecture can be evaluated by a tuneable CSF based mathematical model. This framework's and related research works' originalities are that it can be used in any stage of the transformation project for the detection of any type of GFPA misdeed(s). The main limitation is the ongoing ethical and regulatory bodies that are governed by corrupt organizations and political bodies.

Introduction

Today finance related risks' management, ethical and legal standards are not mature and are even very chaotic. These facts (in the form of risk CSFs) can damage an organization's *Project*. The proposed framework is applied for financial risk management and is aimed mainly to support the proactive detection of financial irregularities, locked-in traps and major financial crimes, which can be fatal for an organization, enterprise and even a country (simply an *Entity* will be used). Some of major states and financial powers are responsible of most of GFPA crimes, and astonishingly, they even enjoy excellent world class reputations. In this article various cases are mentioned, because they are related to known financial centres, who enjoy top worldwide position in transparency and ethical rankings (Transparency, 2020; Swissinfo, 2021), and who in the same time have committed major financial irregularities and crimes. The main reason for this global contradiction is that they have overwhelming legal, political and financial advisory support, who block any attempt to divulgate such unethical behaviour. Therefore, questions arise, like: What are the roles of ethics, ranking, control, transparency and legal regulations? And are they credible? Are ethics and regulations bodies, in so-called ethical and advanced countries biased? Can Artificial Intelligence (AI) approach be used to dissimulate unethical and even illegal GFPA patterns of behaviour ?

An AI Approach

Artificial Intelligence Basics

AI is a concept that is much older than Information and Communication Systems (ICS) and its role is to inspect if it is possible to create computational units that contain *human-like* cognitive abilities, which would

support *Projects*. It emerged as a practical domain in the middle of the 20th century. In 1950, Alan Turing developed a fundamental test for computational intelligence, which is known as the *Turing Test*. The term AI was coined in the proposal for a seminal AI conference that took place at Dartmouth in 1956 (Schmelzer, 2021). AI's main domain is concentrated on learning processes, which can be used to support the TPFI&E. The author's framework includes the Heuristic Decision Trees (HDT) that supports an incremental learning process.

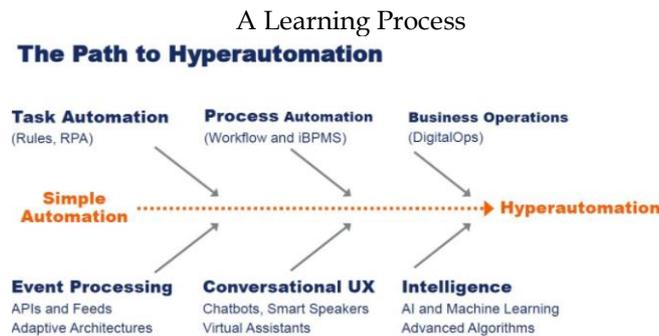


Figure 1. The growing role of OR on Hyperautomation (Kapoor, 2021).

The author's Transformation, Research and Architecture Development framework (*TRADf*) promotes techniques to ensure *Project's* success, by using: 1) Enterprise Architecture (EA) modelling; 2) Implementing Machine Learning (ML) with Operations Research (OR) components; 3) DMS' support; 4) Using a Generic AI Module (GAIM) as an interface for OR and ML operations; 5) Applying complex AI algorithmics; and 6) TPFI&E to capture GFPAs' misdeeds.

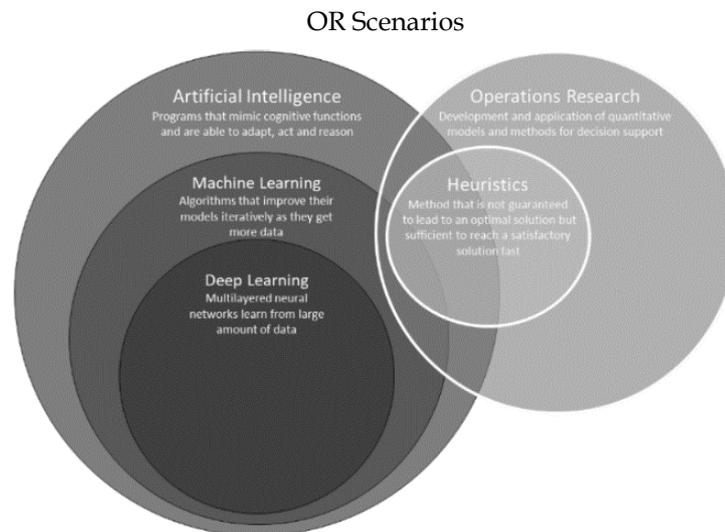


Figure 2. Subfields of AI and OR (Dornemann, Rückert, Fischer, & Taraz, 2020)

The implementation of such *Projects*, requires significant skills in EA, forensics, financial auditing, DMS, AI and OR domains; and above all courage. GAIM handles OR calls and offers: 1) A generic algorithm architecture; 2) A generic services interfaces; and 3) Software modelling patterns. GAIM is a part of the *TRADf* and supports the *Project* resources to interact with all the *Entity's* EA phases, by using services oriented architecture. OR's main advantages and trends for 2021 are tremendous, as shown in Figure 1 (Kapoor, 2021); and is a leading domain in quantitative finance. AI emulates intelligent behaviour by using the tuneable Applied Holistic Mathematical Model for the Detection of GFPAs (AHMM4DGFPA). OR uses GAIM as an interface to interact with the *Entity's* EA models by using a Natural Programming Language (NLP) for the development of AI/OR scenarios. As shown in Figure 2, ML and OR scenarios are based on techniques similar to the HDT, that uses Artificial Neural Networks (ANN). ANN promotes iterative learning, which can be: 1) Supervised; 2) Semi-supervised; or 3) Unsupervised. OR methods are applied to deliver information for developing optimal decisions, for production or scheduling. Logistics uses OR for

optimizing their processes, like for example, GFPA's detection and other types of financial crimes. OR is used to coordinate operations, processes and activities in *Entities* and is based on mixed methods combining quantitative models, with the aim to deliver the optimal solution for a planning problem. The main OR domains: Linear (LP), Mixed (MIP), and Non-Linear Programming (NP). It includes also simulations, Markov chains and game theory. OR uses two types of procedures: 1) Searching for the optimal solution by using algorithms, like, *Simplex* or the *Branch and Bound* method. These methods need heavy computing resources; 2) In case of heuristics, ML is based on HDT that offers a set of decisions and their possible consequences; where the HDT consists of nodes and branches. HDT's processing is based on GFPA's types of problems and predefined constraints. ML/OR is used to learn from various GFPA problems by recursively partitioning the source problem type into subsets, which constitutes a set of nodes. This approach is efficient for learning about GFPA's behaviour and for building corrective actions; where deep learning is a specialized form of learning.

Deep Learning

A subdomain of ML is Deep Learning (DL) that is also based on ANN. Where, DL focuses on implementing vast parametric approximators using Deep Neural Networks (DNN), which in turn uses a high number of layers to model complex, non-linear relationships between variables or CSFs. DL uses large datasets for predictive analytics in OR. Figure 2, illustrates AI's domains and their relation to OR, which need a GAIM and HDT to offer a generic learning approach. AI includes ML, OR, DL, intelligent algorithms and HDTs, like, genetic algorithms. AI and ML are used to complement OR's optimization functions, where ML and OR use iterative methods and are formulated as a constrained maximization or minimization process. In OR, an Objective Function (OF) defines the quality of TPFI&E solution. A learning process is the optimization of a function, which is the measure of discrepancy between the output (meaning the predictions of the model being trained) and the solution's path and the target, which can be modelled using the HDT. A found solutions for GFPAs can be tuned using quantitative methods like Data Science (DS).

Data Science and OR Basics

DS represents the entire process of finding meaning in data by using ML and OR algorithms, which assists the HDT process, who is capable of tuning its learning process by using data sources, like financial crimes records. Europeans define OR, as *Operational Research*, whereas in the USA it is defined as *Operations Research*, in both case they carry the OR abbreviation. The terms *Management Science* (MS) and OR are combined as ORMS. The main OR characteristics are: 1) It was invented during World War II and is flourishing today; 2) The main domains are: optimization, production management, rescheduling, inventory management, and many other...3) *Operations* are activities of an *Entity*; 4) *Research*, is the process of analysis and testing supported by a scientific method; and 5) It is a quantitative approach to support the DMS in detecting GFPAs. OR supports the DMS by: 1) Using *mathematical modelling*, like the proposed AHMM4DGFPA; 2) Developing *solution techniques*; 3) To *communicate* results; 4) Provides rational bases for DMS in order to analyse complex TPFI&E situations; and 5) It is an analytical and numerical tool. OR models can be used for TPFI&E planning, inventory management, transportation, queuing systems and other.

Major OR Models

Deterministic Models

Deterministic models include: 1) NP, which is an optimization problem using an OF, which is nonlinear and/or uses a feasible region that is determined by nonlinear constraints; 2) LP can be applied to find optimal solution(s) and uses a linear OF, which is conform to linear equality and linear inequality constraints. It's OF is a real-valued tuned function defined on an area; 3) In some situations, LP is not optimal like in discrete choices. For such situations, it is recommended to use Integer Programming (IP); 4) MIP is used for problems that include both discrete and continuous choices; 5) Network Optimization (NO) and IP are used for a large set of decision problems; and 6) Inventory Models make a decision that optimizes inventory cost and tries to reduce the total costs.

Stochastic Models

Stochastic models include: 1) Markov process, which tries to proactively estimate changes in a defined period frame and their influence on the *Project's* behaviour, which has different phases and states. The probability of transition from one state to another is known and depends on the actual state and is

independent of how the HDT reached a particular state; 2) Discrete-Time Markov Chains (DTMC) uses sets of just in time independent variables (CSFs), it is named the stochastic process, where CSFs' contents are influenced by the contents of actual depend variables and its past states. The process is continuous and is indexed by sets of natural numbers. The stochastic process uses a defined matrix, that contains the probabilities related to exchanging states. The used matrix includes the probability of having a targeted state, and actions to instantiate a new state. Most of stochastic processes that comply to Markov's constraints, that mainly demand that previous actions do not alter the process, but they can later the actual states' contents: 3) A Continuous-Time Markov chain (CTMC), is always an available stochastic process for all existing states, and it can modify their contents. The modification process is coordinated by an exponential random variable and afterwards it selects another state according to the behaviour stochastic matrix's probabilities; 4) Queueing Theory (QT) is a mathematical model that describes waiting objects, known as queues. A queue is created so that its maximum length and elapsed waiting time periods can be calculated. A QT is mainly an OR sub-domain, because its results are always processed to facilitate the decision-making process that supports the *Project's* activities and resources that are essential to support a defined business service; and 5) Many other application domains, like Data based Decision Analysis, Games Theory, Inventory processes, models and Simulation. The DMS uses OR models which can be deterministic or scholastic models.

Deterministic Approach versus Stochastic Models

Deterministic approach-based models, are based on the concept that *Project's* data are well known and will involve well-focused optimization activities, like stochastic processes which: 1) Use an explicit approach to represent unverified data which are represented in random variables (or CSFs); and 2) Use CSFs to evaluate system various types of risks and performances; to support models' development.

Models Development

Models in general and more specifically transformational models are representations of the real world and they are based on: 1) Three forms of models, the iconic, analogue and mathematical; 2) Iconic models are physical replicas of real objects; 3) Analogue models are physical in form; and 3) Mathematical models, like this chapter's AHMM4DGFFA, represent real world problems that are modelled by using a system of mathematical formulas, as shown in Figure 3, which a skeleton of a composite AI model.

A Composite AI Model

AI, DS, ML and OR are based on composite models' mechanisms, which are (Schmelzer, 2021): 1) The use of classifications that are in constant the evolution of items relationships; 2) OR which is optimal when combining it with DS and other AI domains; 3) *TRADf* goes further to combine them with EA, business engineering and decision making; and this Research and Development Project (RDP) proves this approach.

The Research and Development Project RDP

This RDP applies a cross-domain Literature Research and Evaluation Process (LR&EP). The LR&EP uses the author's specific qualitative analysis methodology to support this article's Experiment in the form of a Proof of Concept (E&PoC). A CSA contains an enumerated set of CSFs. Each CSF contains an enumerated set of Key Performance Indicators (KPI) and a each KPI corresponds to a unique *Project* feature or requirement, where a requirement corresponds to a GFPA problem type to be solved. Each *Project* requirement or problem type has a default set of CSAs and corresponding CSFs which are managed by an OR analyst, who configures GAIM to assist the DMS. The AHMM4DGFFA based DMS applies processes to evaluate the real values of the CSA sets and deliver a possible set of solutions for GFPA problems and/or misdeeds.

The AHMM4DGFFA

The AHMM4DGFFA has a customizable and dynamic nomenclature to assist GAIM's integration by using also the *Project's* EA interface model. EA's main sub-system, the Architecture Development Method (ADM) supports the *Project's* development phases. The AHMM4DGFFA defines the *Entity's* overall structural model that supports a pool of parallelly synchronized OR threads' activities, in order to offer solutions that are possible to implement in a *Project*, and it also modifies the central matrix of CSAs, CSFs and KPIs. AHMM4DGFFA's nomenclature, which is shown in Figure 4 in a primitive form so that it can be understood. The DMS launches AHMM4DGFFA runtime instances which are responsible for solving

Project's problems. This article uses a generic approach to OR that has a specific adaptation of the AHMM4DGFFPA, which supports various types of transformation projects and their DMS processes. The AHMM4DGFFPA uses a tree-based heuristics structure, aimed to support the evolution of an enterprise learning process. The AHMM4DGFFPA based OR is used for the development of the enterprise information systems and their kernel decision-making system, which can be based on AI, OR and Machine Learning. The authors try to prove that a heuristics or action research's approach can generalize OR and other AI domains usage, by using generic HDT. *TRADf* is based on the AHMM4DGFFPAs which is shown in Figure 3 and its underlying CSF management structure. The experiment uses the HDT and action research to solve GFPA problems related to an insurance case, which is used in the E&PoC.

Basic Mathematical Model's (BMM) Nomenclature

<i>Iteration</i>	= An integer variable "i" that denotes a <i>Project/ADM</i> iteration	
microRequirement	= KPI	(B1)
CSF	= \sum KPI	(B2)
Requirement	= CSF = \bigcup microRequirement	(B3)
CSA	= \sum CSF	(B4)
microKnowledgeArtefact	= \bigcup knowledgeItem(s)	(B4)
neuron	= action->data + microKnowledgeArtefact	(B5)
microArtefact / neural network	= \bigcup neurons	(B6)
microArtefactScenario	= \bigcup microartefact	(B9)
AI/Decision Making	= \bigcup microArtefactScenario	(B10)
microEntity	= \bigcup microArtefact	(B7)
Entity or Enterprise	= \bigcup microEntity	(B8)
EntityIntelligence	= \bigcup AI/Decision Making	(B11)
BMM(<i>Iteration</i>) as an instance	= EntityIntelligence(<i>Iteration</i>)	(B12)

The Generic AHMM's Formulation

$$\text{AHMM} = \bigcup \text{ADMs} + \text{BMMs} \quad (13)$$

Figure 3. The applied AHMM4DGFFPA's basics nomenclature (Trad & Kalpić, 2020).

Heuristics, Empirics and Action Research

In this *Project* OR modules run on a pool of synchronized AHMM4DGFFPA threads, in which, each AHMM4DGFFPA thread launch's an HDT process (Della Croce, & Camarinha-Matos T'kindt, 2002). Evaluations based on weightings and ratings mechanisms, supports the AHMM4DGFFPA to process DMS' requests to find optimal solutions for a given GFPA problem. The AHMM4DGFFPA is dispatcher for the OR's modules processing for problem solving and the synchronization of the set HDT instances, which are based on the following facts: 1) ANNs that are basically computing units based on the biological neural networks concept, constitute the central brain, which in turn uses sets of connected intelligent ANN nodes. ANNs try to simulate biological brain's neurons. The synapses or an ANN connection of a biological brain, transfers a signal to connected neurons; 2) OR algorithms can be considered as ML subset. These algorithms use various layers to synthesize higher-level requirements that are inputted, like in the cases of: 1) Image synthesis. OR algorithms are supported by ANNs that include an iterative learning process. Learning processes are: supervised, semi-supervised or unsupervised. DL architectures use: DNN infrastructure, deep belief networks concepts, and others...; and 3) A learning process is an adaptation of the ANN, in order to optimize tasks responsible for pattern observations. The learning process includes the tuning of weightings of ANNs, in order to improve result's precision. A learning process is considered finished, when analysing supplementary observations does not decrease error's CSF significantly. This HDT approach is supported by *TRADf*.

TRADf's Main Components and Characteristics

The author's, *TRADf* can be used to evaluate risk and control of GFPA misdeeds; which uses CSA (and their corresponding CSFs) and the KPI must be selected and weighted to evaluate possible GFPA pitfalls and problems' risk, using an adapted mathematical model. The Research Question (RQ) is: "What is the impact of the GFPA on Entities and can we detect them?". (Trad, Nakitende, & Afe Babalola, 2021). And: "What is the impact of the OR on Projects, and can a generic HDT be its basic structure?".

Predators and Ethics

The Nobel prize winner, the British economist, Angus Deaton, warns about the destructive predator's professional graduating business schools and to stop this type of brutalities. The leading school with such a perception is the Chicago school, the Swiss HEC and many others (Le Monde, 2019). Such profiles can be classified as major GFPA profiles. The probable motivation is extreme cupidity which is destroying Europe's industrial and engineering capacities. Revelations of the Swiss Leaks affair, the Swiss HSBC condemned for tax avoidance shows the need for an evolution towards ethical banking and that future generations of students in finance, economics and management, must be aware of ethical values. In this article it is related to many concrete cases, like, the Swiss: 1) Union des Banques Suisse (UBS) (Stupples, Sazonov & Woolley, 2019), in which 32 trillion US dollars were hidden; 2) A gigantic fraud organized by the Swiss Fidusuisse, which shows the state of mind of such a GFPA accountant approach (Cornevin, 2020); and 3) Global tax fraud by Credit Suisse (Financial Times, 2021). As already mentioned, the AI based DMS approach, enables the localization of GFPAs.

A Decision-Making Approach

The Role and Risks of Intermediaries

Entities have standardized their audit, governance, control and monitoring environments. This proves that a *TRADf* is crucial for the *Entities'* financial subsystems for tracing GFPA acts. **GFPA's Detection (GFPAD) combines AI, management sciences, audit, law and economics with Finance for Technologies (FinTech) services.** GFPA depends on the structural, behavioural and cultural predispositions.

Structural, Behavioral and Cultural Predisposition

- The major problems with GFPAD are the following:
- National legal systems, used to ignore any attempt to investigate financial criminal acts.
- The Swiss Federal Court leaders of the far right-wing Swiss People's Party (SVP) that is Switzerland's ruling and most popular party, guilty of racism and anti-Semitism, over propagating extreme racism, using racist symbols (The Local, 2017). Racism based on the color of skin as shown in Figure 4. Where the black sheep denotes a colored person.
- GFPA based states tend to become leaders in FinTech.
- National Police and information services are used to block any attempt to pursue financial criminal acts. They even will attack the parties looking for deposits, like in the Libyan case. On Figure 4, the black sheep depicts foreigners and colored people...



Figure 4. The Swiss ruling party's poster (The Local, 2017).

- Legal and Regulatory Constraints to Integrate: An adequate regulatory component must be integrated to support the GFPAD which can be integrated with the *Entity's* concept to combat fraud and financial crimes. The International Organization of Securities Commissions (IOSCO) identified eight domains that constitute FinTech. Before applying a FinTech strategy a *Project* or a transformation process must take into account ethics, financial crimes and irregularities.
- Organized financial crimes and irregularities.

Exponential Economic Growth of GFPFA Entities

GFPFA *Entities* organizes, abuses and plunders countries by destabilizing like the case of Lebanon, Malaysia, Mozambique and many other countries... This can be noticed by analysing Growth Domestic Product (GDP) diagrams. Analysing GDP diagrams' slopes and it seems obvious that the Lebanese declining GDP slope is inversely equivalent to the GFPFA's. GFPFAs are the unique beneficiaries from such tragedies.

Classical GFPFA Behaviour

The classical GFPFA behaviour is based on the following facts:

- The notion of states applying state crime exists, so various means are used to support GFPFA actions.
- GFPFA placed role in the Sri-Lanka civil war where GFPFA crimes were done.
- Credit Suisse backs GFPFA tactics in fraud worth \$2 billion in loans to Mozambique.
- In the case of Greece more 200 billion were plundered, while Greece is extremely suffering.
- Banks like the UBS is a GFPFA and is due to the following facts: 1) It is the skeleton of the Swiss financial system; and 2) It hides 32 trillion US dollars and it is not declared (Stupples, Sazonov & Woolley, 2019).
- GFPFA's behavior is related to major fraud scandals, like the case of the UBS that was hit with a historic fine and this incredible Fraud crime (Alderman, 2019).
- GFPFA accountancy crimes, like the ones committed by Swiss accountants are routine daily business (Cornevin, 2020).
- GFPFA banks orchestrated the dilapidation of the victims of the Second World War.
- Banks' Influence.

Credit Suisse Group AG

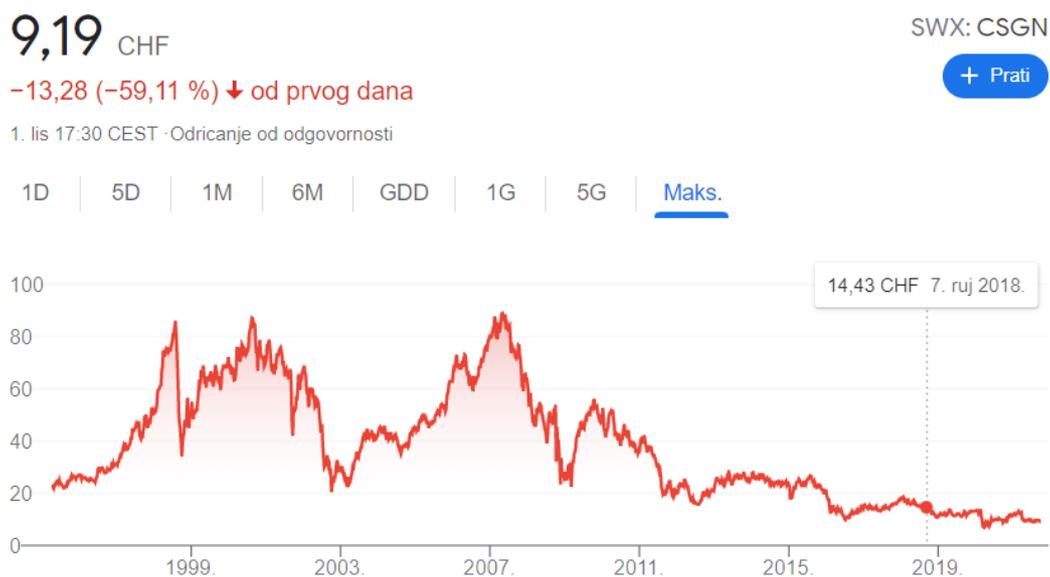


Figure 5. Shows Credit Suisse's downslide.

GFPFA oriented banks' influence strategy is to:

- Destroy various banking and financial institutions worldwide, like the case of the Lebanese banking system.
- Prevent financial concurrent to get close to the immense Arab oil-based wealth.

- Sabotage of elite tourism that can endanger the Swiss one.

Tax Fraud

This section analyzes the notions of the GFPAs' tax fraud mechanisms:

- There many GFPAs Fraud cases that damage practically all countries, like the USA, France, Germany, Greece, and many other countries... The hidden capital is reused as a credit many countries.
- Corrupt transparency makes it impossible to mitigate risks.
- GFPAs accountancy that blurs financial flows and to disable any type of transparency.
- *Entities* can easily slip in a locked-in situation and should try to avoid that.



Figure 6. Shows UBS's downslide.

In fact, GFPAs are shortsighted and the cupidity resulted that related financial institutions were localized and have become a synonym for major financial crimes. Figures 5 and 6, clearly illustrated the collapse of these institutions' reputations and operational capacities. At the same time these financial institutions continue their GFPAs behavior and in spite of the collapse of their values; they seem to have dissimulated illegal immense amounts of money (Stupples, Sazonov & Woolley, 2019).

Regulated Financial Systems

Figures 5 and 6 show the cases of institutions that do not respect ethics and regulations; opposite to these two cases, the case of the French Société Générale, shown in Figure 7, demonstrate clearly a well-controlled, human and ethical approach that is imposed by the French government and system. The French financial system can be considered as the most secure and reliable one; knowing that France is doing well in coordinating a global human, financial and industrial vision; such can become a raw model for the West and the world. These cases show clearly the need for an ethical approach, which is the main CSF for a long-term business and financial sustainable strategy. After applying an ethical financial system there is a need for a holistic security concept.



Figure 7. Shows the French Société Générale robust approach.

**The Security Concept
Cybersecurity Requirements**

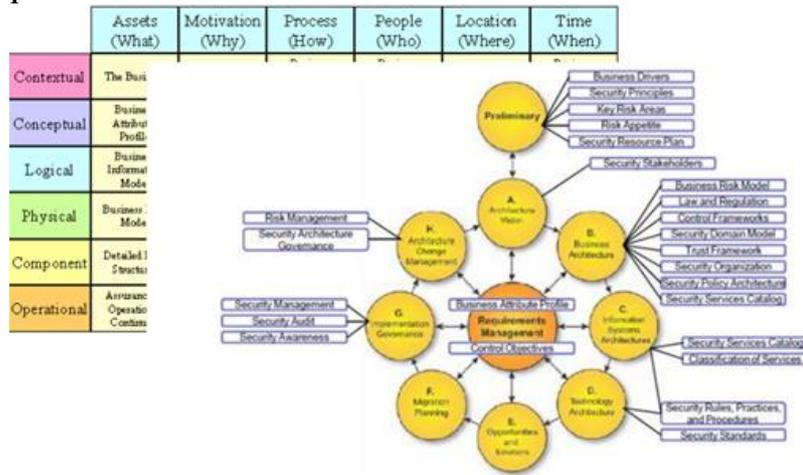


Figure 8. The architecture interface with security modules (Unwin, 2013)

Cybersecurity is the state of a business system that can be prone to any type of danger or threat; where the *Project* must deliver a system that is designed to provide maximum security (Oxford Dictionaries, 2017a). This section presents the CSFs that influence the TPFi&E and this first CSA tries to argue the various aspects of cybersecurity requirements. Cybersecurity depends on the following fields: 1) Cyber technologies; 2) National security requirements; 3) International security requirements; 4) Organizational security requirements; and 5) Financial security and regulations. Cybersecurity requirements are the most fundamental for the *Entity's* business survival and they enclose various subdomains. The optimal cybersecurity architecture should fit in the company's global enterprise architecture framework that in turn is based on best practices. The resultant cybersecurity architecture is a mixture of technical solutions, business engineering, and security concepts. TOGAF includes sub-frameworks like the Sherwood Applied Business Security Architecture (SABSA) to handle cybersecurity requirements, as shown in Figure 8 (Unwin, 2013).

Cybersecurity Domains

Governance defines the interaction between various components and their Cyber or information technology security that understands the security of: 1) Data; 2) Technology resources; 3) Networks; 4) Web and Internet infrastructure; and 5) Applications, development and operations.

Security Development and Operations' Integration

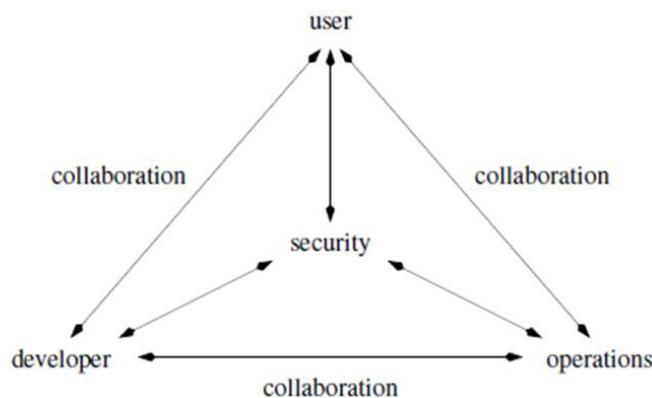


Figure 9. SecDevOps relationships between stakeholders (Mees, 2017)

Applications development and operations are coordinated by a secure development/operations (DevOps) process known as the SecDevOps. SecDevOps manages developers, operations and security *Project* members, as shown in Figure 9. The *Project* agile SecDevOps procedures to identify patterns for managing transformation requirements (Mees, 2017).

Cybertransactions' Security Violations

The European Commission defines a legislation to govern Cyberbusiness and progress has been done in its assertion. European Commission member states have implemented and enforced business-engineering related national practices. Cybertransactions outcomes have to be continually legally asserted, traced, and their periodic summaries are reported to the executive management (Fu & Mittnight, 2015). Cyberbusinesses are orthogonal to cybersecurity requirements, where the business environment roles define the responsibility for enterprise's resources. Management of the enterprise's legal interests, resources, and accesses, should be managed by enterprise architect(s). Thus, the Cyberbusiness structure is an important consideration in the legal assertion and access management of Cybertransaction's security. The regulation for the Cybertransaction's security and law needs qualified time-stamps for robust (e)certification like those used in the European Union (European Union, 2014).

Cybertransaction Law

Cybertransaction is influenced by the Uniform Law Commissioners who promulgated the Uniform Electronic Transactions Act in 1999. It is the first adaptable effort to prepare a Cyberlaw for Cyberbusiness. Many countries have adopted Cyberbusiness regulations. The Uniform Electronic Transactions Act represents the first effort in providing some standardized rules and legislation to govern Cybertransactions. (The Uniform Law Commissioners, 2015).

Cyberbusiness legislation assertion

The integration of the business engineering module is done with the use of the standardized legal environment of The Open Group's Architecture Framework. This legal environment supports data protection laws, contract law, procurement law, fraud law and many other legislation domains to counter organized financial crimes.

Financial Crime Model

Brutal dictators like neo-Nazi brigands have a special status in states where the ownership of substantial financial assets can remain anonymous. Some Third World dictators maintain strong financial relationship to banks in financial havens. Some of these banks have even been established by criminals emerged from former wars. An example can be the notorious Nazi banker Francois Genoud (Brown, 2016). A country where the money cannot be transparently audited can provide security to dubious investors, although otherwise the same country may serve as role model of law obeying common citizens. Some of financial havens and their financial institutions have been the main leaders in worldwide financial scandals, misdeeds, and criminal acts including: 1) The Libor manipulation; 2) Currency manipulations; 3) credits manipulations; 4) Supporting arms dealing transactions; 5) Hijacking people's wealth; 6) Financial fraud; 7) The subprime crisis; 8) War victim wealth confiscation; 9) Tax evasion and Fraud; 10) Drug dealing financial support; 11) War support against future financial competitors; 12) Forced confiscations; 13) Drastic fines; and 14) Arms dealing; the major problem with combating such a system is that some *Entities* have hermetically closed system characterised by the following attitudes:

- Police and information services, blocking any attempt to pursue financial criminal acts.
- The legal system, ignoring any attempt to investigate financial criminal acts.
- Legal support too expensive, to discourage any action of law enforcing.
- Psychological harassment, to discredit investigators.
- Intolerance and discrimination, to block any foreign request.
- A powerful global network, to embed and hide various dubious operations.
- Financial guerrilla-like and hit and run tactics, to confiscate wealth.
- Occurrence of financial locked-in situations.
- Some financial haven states target to become leaders in FinTech, which is not very assuring; because FinTech should combat state criminality and enforce Cybersecurity international law.

Cybersecurity International Law

Facts show that international law on Cybersecurity is inefficient and is actually agonizing. Advanced *Entities* are hesitant to integrate international law that is based on the emergence of non-government norm-making initiatives. States insist on their traditional central legal system that marginalizes the inter-state

governance of Cyberspace (Mačák, 2016). *It is strongly recommended to avoid any form of financial collaboration with GFPA oriented organizations in countries acting as financial and business havens. France and the European Union are optimal models for innovation and global activities.*

The experiment as a proof of concept

The Implementation Environment

The E&PoC is implemented using the *TRADf* which uses AI based microartefacts on the basis of the “1:1” mapping concept

CSFs, Rules and Constraints Setup

OR’s integration process execution starts with the use of the inputted data collection in the *TRADf*’s data storage and then these data are filtered using the selected set of CSFs. The execution of the HDT follows. The inputted data collection is considered to be the root or initial node that helps in the establishment of the basic state that is enhanced with the adopted solution(s). The HDT reasoning goal is to select the optimal solution(s).

RDP’s Phases 1 and 2

The *Project*’s enumeration of CSAs were processed using *TRADf*. This E&PoC uses *Project*’s components, having a constraint, that the target CSA average must be higher than 7.5. The E&PoC in Phase 2, has given the average of 8,75, as shown in Table 1. The RDP and E&PoC, are based on the AHMM4DGFPA that can adapt to any type of GFPA problem type by integrating a set of algorithms. This RDP’s RQ is qualified by using a E&PoC, that was implemented by employing Microsoft’s VS2020, JEE and an EA tools. The E&PoC contains the *TRADf*’s major components for OR’s processing that is based on a HDT mixed reasoning engine. The OF calculates the best solution for the encountered problems and a set of recommendations is presented. The deductions were done by using the analysis of all the selected CSAs, where a *TRADf*’s NLP script is used, in which all its CSFs are stored and appear in Table’s 1 1st column. The *TRADf*’s scripts in the background, are automated to calculate the weightings and ratings; known as the KPIs and a value from the enumerated sets; and they are tuned and stored in column 2. This RDP’s concept proposes a standardized and automated manner to evaluate LRPs, what is an evolution in regard to the very subjective method that is used in general, which may or may not make sense. If the automated LR&EP’s evaluation is successful, only then the experiment can be completed. The *TRADf* and its RDP automates complex RDP’s feasibility in phase 1, and estimates the values for each selected KPI, as described in the authors’ related works; on how to use CSA, CSF, KPI processing in the RDP. AHMM4DGFPA’s main constraint is that CSAs for simple research components, having an average result below 8.5 will be ignored. In the case of the Machine Language’s implementation an average result below 6.5 will be ignored. As shown in Table 1, the results justify (with an average of 8,75) the usage of the OR and HDT and how it can be used with the final E&PoC or phase 2. AHMM4DGFPA’s instances support the OR process, by using CSFs weightings and ratings (in phase 1), and are based on multicriteria evaluation (selected and defined constraints). Based on the LR&EP and the related evaluation processes the most important CSFs are used and processed by the internal heuristic engine (Trad & Kalpić, 2020). CSFs have bindings to specific RDP resources, where the AHMM4DGFPA formalism was designed to launch NLP microartefacts. The results in Table 1 show clearly that the OR proposal is feasible. The HDT represents the relationships between RDP’s requirements, NLP generic and microartefacts, unique identifiers and the CSAs. The E&PoC uses the *TRADf* client’s interface. From the *TRADf* client’s interface, the NLP development setup and editing interface can be launched. Once the development setup interface is activated, the NLP interface can be launched to implement the needed microartefact scripts to process the defined CSAs. These scripts make up the kernel DMS set of actions that are processed in the background.

Critical Success Factors	KPIs	Weightings
CSF_TPFI&E_GFPAD	Feasible	From 1 to 10. 09 Selected
CSF_TPFI&E_AI_Approach	Mature	From 1 to 10. 09 Selected
CSF_TPFI&E_RDP	Complex	From 1 to 10. 08 Selected
CSF_TPFI&E_TRADf	Proven	From 1 to 10. 10 Selected
CSF_TPFI&E_Financial_Crimes	Feasible	From 1 to 10. 09 Selected
CSF_TPFI&E_Security_Concept	Feasible	From 1 to 10. 09 Selected
CSF_TPFI&E_EA_Concept	Complex	From 1 to 10. 08 Selected
CSF_TPFI&E_Integration_PoC	Complex	From 1 to 10. 08 Selected

valuation

Table 1. The sheet that concludes phase 1 with an average 8.75

The Tree Processing and Resources and Possible Solutions

OR's HDT contains a collection of nodes that uses the following artefacts and resources: 1) Actions; 2) Constraints; 3) Problem types to solve; and 4) A set of possible solutions and recommendations. A tree node contains is a CSF suggestion that is linked to a an actual HDT state. A state contains an aggregate of a resource linked with a 1:1 mapping link. The selected CSFs were fed in the HDT in order to reveal the optimal OR prerequisites for a selected problem. The CSFs were configured and weighted; afterwards they were processed in order to deliver a set of possible solutions. The HDT is launched with a default set of CSFs that map to a GFPA problem type. Then the HDT deliver a set of of possible solutions which are in fact transformation steps (Vella, Corne, Murphy, 2009). As shown in Figure 10, the E&PoC's layers are: 1) EA using TOGAF and GAIM to link OR to various artefacts; 2) The client side includes modules which interface: Relational Databases, Various types of spreadsheets, Standard Files Interfaces and a first tier interface; 3) Data management services level contains a dispatchment hub; 4) The resources management level contains the following set of modules: A database entity-relational model, an XML based extensible mark-up language transformer; 5) The system level contains: monitoring component based on a generic log management system; and 6) The technical platform level contains the following modules: An portable and open *Entity* service bus, an object database interface, and a JEE data management module. This E&PoC's HDT uses Google's OR library (Google Developers, 2021) and serves to confirm the research's RQ. The used OF finds the best solution for the selected problems. The E&PoC's results are delivered as a set of solution and recommendations. OF helps to find the best solution to a problem; in this E&PoC an *Entity* delivers packages to end-system's end-users. In a day, it assigns modules to financial inspections, afterwards is processes to deliver the optimal solution. The usage of modules and its stocked experience processed from the various cases of financial crimes and mapped to selected CSFs.

The E&PoC's main difficulty is the selection of the assignments modules and similar cases having optimal solutions, like detected and judged cases. The LP algorithm has the following elements: 1) OF is related to the optimized quantity and is to minimize GFPAs; 2) The best solution is the one with the best value of the OF's (having maximum or minimum); 3) The defined constraints are the restrictions on solutions, based on the problem type , like if the *Entity* cannot assign modules superior to a defined weighting; and 4) A feasible solution is one that satisfies all the defined constraints for the problem type, without necessarily being best. The OF and the constraints are given by linear expressions, which makes this a linear problem and for the NLP script the steps for setting up and solving a problem are the following: 1) Import the required libraries; 2) Integrate the solver; 3) Define the variables, constraints and OF; 3) Invoke the OR solver and offer solutions. The next step is to identify the OF and constraints; using LP, in which the OF and the constraints are defined as linear expressions, like to maximize the OF goals to validate the set of constraints. As already mentioned, The LP algorithm is called from HDT's node, like all other quantitative methods. The LP algorithm receives an input array of arguments that contains: 1) The OF; 2) The set of constraints; and 3) Decision variables. The LP function is called from HDT's node to generate a set of new HDT nodes and offers the best solution in a given node.

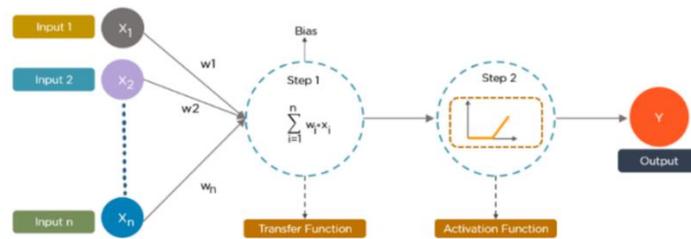


Figure 10. The activation of OF.

Conclusion

The RDP is based on OR and presents the GAIM to interface other *Project's* resources. There are several trends shaping the future of OR; first, OR tasks in the life-cycle are automated that increases the *Entity's* stability and GFPAD. Another important element is that OR resources become accessible to more domains. GAIM has the ability to make OR algorithms transparent, that makes *Project's* oversight possible. The most important recommendations are: 1) Define OR's default CSFs and CSAs; 2) AI based *Projects* should be supported by OR tools that can integrate with the EA principles; 3) The integration of data standards is crucial, and OR must integrate various data standards; 4) GAIM enables OR's usage, that glues the various OR algorithms; 5) OR's integration needs a meta-model and a synchronized mapping concept; 6) Unbundling through the use of GAIM services in the context of a system that applies a holistic approach; 7) Use data management services to synchronize the implementation and integration of data models; 8) Use data transformation models to identify the major relationships between elements of the data models and data sources; 9) Design a generic data normalization and interoperability concept that uses the major market standards; 10) Prepare ADM's integration with the *Project's* data building and solution blocks concepts; 11) Define the overall OR constraints and rules; 12) Design the *Project's* conceptual views that are implemented to enable the usage of OR modules; 13) Generate common class diagrams for the OR(s) to be the building block that is designed in the initial phase and which is tuned in incoming phases; 14) Create in-house HDT algorithms that can replace commercial OR tools and support ML; and 15) OR and HDT can support activities related to transparency, fraud and corruption, especially the ones related to effective exchange of crucial data (OECD, 2011). In this article the focus is on the GFPAD, which proposes a concept to detect financial crimes and locked-in situations that from financial predators, like banks who made impressive but illegal trillions gains. The evolution of ethics in finance might bring an end to such financial manipulations and eventually bring to trial GFPAD *Entities* for committing major crimes against humanity. These crimes caused the deaths of hundreds of thousands of people and the looting of their belongings. Some countries can be taken as an example, like France, which has convicted the Swiss UBS with a multi-billion euros fine for fraud and tax evasion; and is an example to followed. The GFPAD is used to transform a financial environment where *Entities* have been implementing control measures to respond to major risks, legal problems and challenges in relation with GFPAD crimes. The GFPAD's E&PoC showed that such a concept is feasible and offers the following set of recommendations:

- The *Manager* must deploy AI based GFPAD to enforce an anti-locked-in and detect crimes approach.
- The GFPAD team skills encompass the knowledge of: 1) Financial engineering and the needed logging, monitoring and assertion concepts; and 2) governance and controls integration to detect GFPAD misdeeds.
- To design and implement a GFPAD subsystem, there is a need to implement a decision system.
- Global transparency organizations must be equitable and treat countries equally.
- Entities should avoid any form of financial collaboration with GFPAD oriented organizations.
- France and the European Union have optimal models for innovation, education, ethical standards and global activities.

References

- Alderman, L. (2019). French Court Fines UBS \$4.2 Billion for Helping Clients Evade Taxes. *The New York Times*. USA. Retrieved from <https://www.nytimes.com/2019/02/20/business/ubs-france-tax-evasion.html>
- Brown, J. (2016). Wafic Said: businessman, philanthropist and political fixer. *Financial Times*. Retrieved on May 3, 2017, from: <https://www.ft.com/content/a3cb764a-ecf1-11e5-bb79-2303682345c8>

- Cornevin, Ch. (2020). La police démantèle un vaste système de blanchiment de fraude fiscale... [Police dismantles massive tax fraud laundering scheme]. *Le Figaro*. France. Retrieved from <https://www.lefigaro.fr/actualite-france/la-police-demantele-un-vaste-systeme-de-blanchiment-de-fraude-fiscale-20200110>
- Della Croce F, T'kindt V (2002). A recovering beam search algorithm for the one-machine dynamic total completion time scheduling problem. *J Oper Res Soc* 2002.
- Dornemann J, Rückert N, Fischer K, Taraz A. Artificial intelligence and operations research in maritime logistics. Econstor. Leibniz Information Centre for Economics. Germany, 2020
- European Union (2014). Regulation (EU) No 910/2014 of the European Parliament and of the Council - on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. The European Parliament and of the Council - Regulation. European Union.
- Financial Times (2021). US Senate probes Credit Suisse after allegations of tax settlement breach. *Financial Times-Nikkei*. USA.
- Fu, Zh., & Mittnight, E. (2015). Critical Success Factors for Continually Monitoring, Evaluating and Assessing Management of Enterprise IT. ISACA. Retrieved on May 9, 2017, from: <http://www.isaca.org/COBIT/focus/Pages/critical-success-factors-for-continually-monitoring-evaluating-and-assessing-management-of-enterprise-it.aspx>
- Google Developers (2021). Get Started with OR-Tools for C#. 2021. Google. <https://developers.google.com/optimization/introduction/dotnet>
- Kapoor A. Artificial intelligence and machine learning: 5 trends to watch out for in 2021. AI Zone. 2021 DZone. <https://dzone.com/articles/artificial-intelligence-amp-machine-learning-5-dev>
- Le Monde (2019). Le Prix Nobel d'économie Angus Deaton : Quand l'Etat produit une élite prédatrice [Nobel Laureate in Economics Angus Deaton : "When the state produces a predatory elite]. *Le Monde*. Retrieved from https://www.lemonde.fr/idees/article/2019/12/27/angus-deaton-quand-l-etat-produit-une-elite-predatrice_6024205_3232.html
- Mačák, K. (2016). Is the International Law of Cyber Security in Crisis? Law School-University of Exeter. Exeter, United Kingdom. Cyber Power. 8th International Conference on Cyber Conflict. Tallinn: Estonia: NATO CCD COE Publications.
- Mees, W. (2017). Security by Design in an Enterprise Architecture Framework. Royal Military Academy, Department CISS. Renaissancelaan 30, 1000 Brussel. Belgium: NATO.
- OECD (2011). Global forum on transparency and exchange of information for tax purposes peer review: switzerland 2011, Phase 1. OECD Publishing, Paris, France 2011.
- Oxford Dictionaries (2017a). Security. London: Oxford Dictionaries. Retrieved on September 3, 2017, from: <https://en.oxforddictionaries.com/definition/security>
- Schmelzer R. (2021). Data science vs. MLI vs. AI: How they work together. TechTarget 2021.
- Stupples, B., Sazonov, A., & Woolley, S. (2019, July 26). UBS Whistle-Blower Hunts Trillions Hidden in Treasure Isles. *Bloomberg*. Retrieved from <https://www.bloomberg.com/news/articles/2019-07-26/ubs-whistle-blower-hunts-trillions-hidden-in-treasure-islands>
- Swissinfo (2021). Switzerland diplomatically rejects Biden's 'fiscal paradise' label. 2021 Swissinfo. https://www.swissinfo.ch/eng/business/diplomacy_switzerland-diplomatically-rejects-biden-s--fiscal-paradise--label-/46578996
- The Uniform Law Commissioners (2015). Electronic Transactions Act Summary. New York: The Uniform Law Commissioners.
- The Local (2017). SVP ad ruled racist by Swiss supreme court. *The Local*. <https://www.thelocal.ch/20170413/svp-ad-ruled-racist-by-swiss-supreme-court>
- Trad, A., & Kalpić, D. (2020) Using applied mathematical models for business transformation. IGI-Global. USA 2020.
- Trad, A., & Nakitende, M., & Afe Babalola, T. (2021). Tech-based Enterprise Control and Audit for Financial Crimes: The Case of State Owned Global Financial Predators (SOGFP). IGI Global. USA.
- Transparency (2020). CORRUPTION PERCEPTIONS INDEX. Transparency International. <https://www.transparency.org/en/cpi/2020/index/nzl>
- Vella, A., Corne, D., & Murphy, C. (2009). Hyper-heuristic decision tree induction. Sch. of MACS, Heriot-Watt Univ., Edinburgh, UK. Nature & Biologically Inspired Computing, 2009. NaBIC 2009. World Congress.
- Unwin, D. (2013). Security Architecture-Enterprise Architecture. Business Aspect.

The role and adequacy of disaster management unit within the South African Municipalities

Malemela Angelina Mamabolo

University of Limpopo, South Africa

Mokoko Piet Sebola

University of South Africa, South Africa

Keywords

Disaster, Disaster Management, National Disaster Management Centre, Municipalities

Abstract

This paper evaluates the role of municipalities in disaster management and its adequacy in handling the disaster management problems and challenges. It is argued in this paper that despite the existence of the National Disaster Management Centre (NDMC) within the three spheres of government, South Africa is still among countries that are at risk of wide range of natural disaster such as floods, drought, fire and manmade disasters such as misuse of technology, transitions in cultural practice and lack of awareness and information which causes damage or harm to the society at large. However, it is argued that disasters which are natural are not preventable, but disaster management strategies such as prevention, mitigation, preparedness, and response can be put in place within institutions to ensure that all citizens are able to respond to any possible disasters which may occur. The Methodology followed in this paper is qualitative in the sense that secondary sources are used to argue about the adequacy of Disaster Management Unit capacity in South African municipalities to handle disaster problems. The question that remains to be answered in this paper is: Does the Disaster Management Units as established within South African municipalities have the means to ensure planning and preparation for emergencies and protection against possible disasters which may occur in their setting.

The argument in this paper is based on the assumption that disasters may happen at any time and consequently affect vulnerable rural people than those who reside within urban areas. This in essence means that South African municipalities are still faced with major challenges in addressing disaster related issues particularly in rural areas. It is also argued that municipalities struggle to put in place their disaster management plans which includes the assignment of primary and secondary responsibilities for priority disaster risks posing a threat in their municipalities. This paper, therefore, conclude that the existence of the Disaster Management Units in improving disaster management are inadequate in functions and it is recommended that possible awareness campaigns that can help rural people to respond in terms of emergencies that can lead to disasters be commenced.

Introduction

Disasters are said to have imposed a heavy cost in human material and physical resources and damage to the environment globally (Rupp, 2012:1). Such disasters represent a potential significant obstacle to economic growth and development throughout the globe. In South Africa disasters such as poverty, population growth and rapid urbanisation are commonly known as causal factors contributing to problems which affect both the government of the day and private organisations in different ways. It is argued therefore that most countries are ill-prepared when coming to such types of disasters. To prevent such disasters, adequate procedures to deal with disaster situations and relief measures must be planned prior to the event together with strong legislation to empower those who are responsible to carry out their tasks given to them. Thus, South Africa has established the *National Disaster Management Framework of 2005* and *Disaster Management Act, (Act no 57 of 2002)* which recognises the wide-ranging opportunities in South Africa to avoid and reduce disaster losses through the concerted energies and efforts of all spheres of government, civil society and private sector organisations.

The existence of the above-mentioned piece of legislation should therefore bring about change on problems of disaster related issues in the country and ensure an adequate procedure to deal with disaster events in the country. Uys (2005:404), however, acknowledged that disasters in South Africa have been historically managed in an uncoordinated manner, which leaves it prone to lack of proper management. This

can be argued from the concept of disaster management perspective, because according to *Disaster Management Act, 2002*, the concept is clearly defined as a continuous and integrated multisectoral and multidisciplinary process of planning and implementation of measures aimed at addressing the four disaster elements namely, disaster prevention, mitigation, preparedness response, recovery and rehabilitation (van Niekerk; 2006:98). Without any of the above-mentioned disaster strategies, disastrous situations in the country may continue to be managed in an uncoordinated manner. Furthermore Uys, (2005) pointed out on the complexity of disaster management due to its multidisciplinary and multi-institutional functions and argue that disaster management usually comprises a number of interventions and actions that may be occurring simultaneously and not always in phased succession. In addressing the purpose of this paper, the paper is outlined as follows: to describe the legislative frameworks governing municipalities in carrying out their task in disaster risk management, giving an overview of the role of the disaster management unit in the South African municipalities, common challenges facing municipalities in addressing disaster situation and the adequacy of South African municipalities in dealing with disaster Management.

Legislative frameworks governing municipalities in carrying out task in disaster management

The *Constitution of the Republic of South Africa, 1996*, places a legal obligation on the government of South Africa to ensure the health of both personal and environmental and safety of its citizens at large (Zuma, Luyt, Chirenda, & Tandlich, 2012). In terms of this (section 41(1) (b) of the Constitution, all spheres of government are required to “secure the well-being of the people of the Republic”. Section 152(1) (d) also requires that local government must “ensure a safe and healthy environment”. Therefore, in essence the primary responsibility for disaster risk management in South Africa rests with government at all spheres. Section 26(g) of the Municipal Systems Act 32 of 2000, as well as sections 25 and 53 of the Disaster Management Act 57 of 2002 compels each municipal entity to develop a disaster risk management plan as part of and an integrated part of their Integrated Development Plans (IDP). This emphasis that all municipalities must prepare their disaster management plans in accordance with the requirements of the Disaster Management Act of 2002 and section 26(g) of the Municipal Systems Act of 2000.

The National Disaster Management Framework of 2005 (NDMF) also requires the establishment of the National Disaster Centre (NDMC) responsible for promoting integrated and coordinated national disaster risk management policy. The framework gives explicit priority to the application of the principle of cooperative governance for the purpose of disaster risk management and emphasises the involvement of all stakeholders in strengthening the capabilities of national, provincial and municipal organs of the state to reduce the likelihood and severity of disasters. In essence the framework calls for the establishment of arrangements for cooperation with international role players and countries in the region to address disaster situation. In terms of the establishment of the above legislation, the NDMC is therefore legally instructed to ensure the means to proper planning and preparation for emergencies and protection against possible disaster which may occur in the country.

An overview of the role of disaster management unit in south Africa

Since the proclamation of the Disaster Management Act of 2002 ten years ago, the South African municipalities still fails to comply with the full legal requirements of its implementation (Wentink and Van Der Merwe, 2017) and therefore the effective implementation of the act becomes difficult. Historically the Disaster Management Act of 2002 is regarded as the cornerstone of disaster management in South Africa. The Act provides disaster management officials with a new focus on disaster management issues. It presents new challenges in not only negotiating and writing up disaster management plans, but also in developing management plans for general public scrutiny. However, one can argue that since the disaster management concept provides four common elements namely, disaster prevention, mitigation, preparedness, response, recovery and rehabilitation which are regarded the most important elements to reduce risk. Disaster risk management as an activity of all spheres of government relates to an integrated, multi-disciplinary approach aimed at reducing the risk associated with hazards and vulnerability (SALGA;2011).

The responsibilities of disaster management in South Africa are a decentralised function to the sphere of government hierarchy in an integrated manner (Van Niekerk, 2014). It is established as a public sector function within each sphere of government, but disaster risk management goes beyond pure line function responsibility. Despite its establishment the disaster management unit challenges to address risk in the

country is burdened in the municipalities because they are closer to the people at local level. Further to that the Disaster Management Act of South Africa places the largest responsibility of disaster assessment and management on local government (Local Government Seta, 2014:10). Although other spheres of government are accorded same responsibilities, but lack of budgets and other resource relevant limitations makes implementation difficult (Cherish and Wright, 2019). The success of Disaster Management Act plan could be dependent on collaborative efforts between the private sector, civil society, non-governmental organisations and research institutes (Nkabane and Nzimankwe, 2017). It is indeed significant to engage diverse stakeholders in disaster risk management to ensure proper achievement of good results and policy implementation (Setas, Reyers, Gundit, Nel and Ester, 2016).

Challenges of disaster management in the south African municipalities

Disasters are generally defined as unprepared events which occurs in an unexpected manner, which often triggers haphazard reactions (South Africa, 1998). South Africa is suffering from a high magnitude of increasing hazards such as drought, epidemics, water shortage, floods, fires, social unrest and storms (Kunguma, 2020:1) and hence such has an increasing impact on human lives (Wentink and Van Niekerk, 2017). It is the role of each municipality to prepare a Disaster Management Plan as stipulated in Section 52(1) (a) of the Disaster Management Act of 2002, as part of its Integrated Development Plan (IDP) to enhance service delivery to avoid any disasters that may occur in the country. However, many South African municipalities are still facing challenges to put in place the principles of Disaster Management outlined in the Green Paper on Disaster Management. Sokupa (2012:1) emphasis that many municipalities have a huge challenge in developing a disaster management plan which accommodates all stakeholders and the community, and which reduce any disaster threat that may occur. Whether a disaster is major or minor, of national or local proportion, it is the people at the community or village level who suffer its adverse effects. Therefore, a common characteristic relevant to all disasters and crisis is that decisions must be made quickly. Roth & Becker (2011:443) acknowledged that South Africa is still facing challenges to protect the life of its citizens, property. The existing infrastructure and the environment from disasters that are emerging daily. However South Africa has since established a National Disaster Management Framework of 2005, which focuses on disaster risk reduction. Despite the introduction of the framework there are still challenges in most South African municipalities when coming to manage disasters particularly at local level. The most common challenges in the country include among others; poverty, information management related to communication and awareness, financial challenges, lack of community participation and lack of involvement of other government departments in disaster risk management. This paper documented the following challenges complicating the disaster risk management particularly at local government level.

Poverty

In developing country such as South Africa, poor people tend to be the most vulnerable to environmental disturbance because they do not have enough resources to help them to cope with disaster situations. Poverty in South Africa is a disaster, and it is the widening gap between the rich and the poor, rural and urban incomes that contributes to poverty and cause people to be vulnerable to certain disasters. Increasing rapid population also remains a challenge to many South African municipalities.

In South Africa rural communities are the most vulnerable to disaster because of their inability to cope with their weak socio-economic conditions (Zamisa and Mutereko, 2018). It is widely known that in South Africa many people rely on government social grants to survive and that almost 2.4 million of young people between the ages of 18-25 in South Africa are unemployed. This will result in the increased number of illiteracies, crime rate, and the spread of HIV/AIDS diseases in most local communities, and it is only through quality education where people can improve their living condition and escape poverty (Coetzee, Lourens, Nel & van der Westhuizen; 2007). However, there are many reasons behind poverty levels in South Africa, but one of the most reasons is the increasing amount of unemployment. Hence the issue of poverty in most local communities remain a critical challenge for most local municipalities to manage crisis and disasters that result in poverty and unemployment. South Africa is affected by poor socio-economic conditions realities with the highest population in informal settlements (Stauton, Swanepoel and Labuschaine, 2020). About 38% of the population is concentrated on a 2% land (Zuma and Luyt, 2012), resulting in potential uncontrolled disaster if something unexpected occur in the area.

Information management, Communication and awareness

It is through effective information management and good communication of disasters where people can reduce the risk of disasters of any kind that may occur (Igglesden, Monson & Polzer; 2009: 90). Information should be spread to the people, so that they can be aware of any possible disaster that may occur and that could save many lives of the people through early warnings. There are still local people who do not have access to information and such people are vulnerable to disasters. It is the responsibility of the National Disaster Management Centre and other stakeholders to provide better media coverage to all the South Africans in order to reduce disasters of any kind. In most municipalities there is still lack of communication of different stakeholders and disaster management officials at national, provincial and local level is of vital importance to avoid disasters. The disaster management must communicate with the local community in order to come up with innovative ideas, including tapping into indigenous knowledge systems on how to prevent and mitigate the impact of disasters.

Political disparities

The issue of land reform in most local communities and in South Africa as a whole still remain a debatable topic. There are differences between the government and the community with regard to the issue of land use. Other local communities prefer to occupy their land while the government might want the land to be used for development purposes, for instances community facilities such as schools, libraries and community centres may be implemented for development purposes.

Financial challenges

South Africa is still among other countries faced with lack of budgeting and access to funding following disaster occurrences. There is allocation of funds gaps between the national, provincial and local level. Provision and maintenance of infrastructure at local level requires adequate funds. However, communicates are also contributing to financial challenges, because they often refuse to pay for any services that they receive, citing low efficiency levels and lack of affordability. When following a disaster that has occurred, disaster management units are faced with challenges of reconstruction due to lack of funds.

Lack of community participation

Community participation has been widely acknowledged as the additional element in disaster management necessary to reverse the worldwide trend of exponential increase in disaster occurrence of and loss from small- and medium- scale disasters, build s culture of safety and ensure sustainable development for all. However, in most rural area's community participation remains a critical challenge and affects municipalities in complying with the Disaster Management Act. Local community participation should be taken as the primary focus of attention in disaster reduction because it is the lack of disaster management communication which has an influence on leadership decision making regarding response and relief.

The adequacy of South African Municipalities in dealing with disaster management

South Africa is noted to be a country vulnerable to disasters. The country has organised national disaster risk management based on national, provincial and municipal disaster centres and advisory forums (Tredea, Coetzee and Rautenbach, 2020). Although the systems of South Africa in terms of disaster management looks so perfect and setup, the inability to implement the act remains difficult. One of the challenges of the Disaster Management Act Implementation Act in South Africa became when President Ramaphosa declared the State of Emergency on COVID 19 pandemic. Indeed, the emergence of the pandemic revealed the inadequacies of the Disaster management Act in South Africa (Kunguma, 2021). The uncontrollable spread of the various and the deadly impact it caused to the society showed the South African public that it failed to curb the spread of the pandemic within a reasonable time frame. Despite systematic problems in the administration of municipalities to afford the function, there are budgetary limitations and human resources capital to deal effectively with disaster related issues in South African municipalities. In order for South African municipalities to afford the functions of disaster management within their locality, there is a need to deal with systematic problems, resources issues and training of officials.

Conclusion

This paper evaluated the role of municipalities in disaster management and its adequacy in handling the disaster management problems and challenges. It has been argued in this paper that despite the existence of the National Disaster Management Centre (NDMC) within the three spheres of government, South Africa is still among countries that are at risk of wide range of natural disaster such as floods, drought, fire and manmade disasters such as misuse of technology, transitions in cultural practice and lack of awareness and information which causes damage or harm to the society at large. Some of the identified cause of the failure to implement the Disaster Management Act effectively are lack of human and capital resources as well as systemic administrative problems. This paper, therefore, concluded that the existence of the Disaster Management Units in improving disaster management are inadequate in functions and it is recommended that possible awareness campaigns that can help rural people to respond in terms of emergencies that can lead to disasters be commenced as soon as possible, that there should be capacity building programmes to improve stakeholder collaboration and understanding by all stakeholders about disaster management and response.

References

- Cherish, MF and CY, Wright. (2019). Climate change Adaptation in South Africa: A Case study on the role of the health sector. *Globalisation and Health*, (15):22
- Coetsee, T., Lourens, A., Nel, m., & van der Westhuizen E. (2007). Disasters and diseases in Africa: Information support for animal and human health. University of Pretoria. Available online: <http://www.ais.up.ac.za/vet/index.htm>.
- Igglesden, V., Monson, T., & Polzer, T. (2009). Humanitarian Assistance to internally displaced persons in South Africa. Lesson learned following attacks on foreign national in May 2008. Forced migration studies programme. Johannesburg; University of the Witwatersrand.
- Kunguma, O. (2020). South African Disaster Management Framework: Assessing the status and dynamics of establishing information management and communication systems in provinces. Unpublished Doctoral thesis. University of Free State: Bloemfontein.
- Kunguma, O, Ncube, A and Mokhele, O. (2021). Covid 19 Disaster response: South Africa Disaster managers faith in mandating legislation tested. *Journal of Disaster Risk Management*, 13(1):1099
- Nkabane, N.P and T.I Nzimakwe, (2017). Transcending the divide between indigeneous and scientific knowledge in disaster risk reduction. *Administratio Publika*, 9(7):25-40
- Local Government Seta, (2014). Climate change and disaster management in local government: skills needs and development. A report for Local Government seta. Pretoria: LGSETA
- Reyers, B, Gundit, G, Nel, G and K. Ester. (2016). Fostering collaboration for knowledge and action in disaster management in South Africa: Current opinions in South Africa. *Environmental Sustainability*, (19):94-102
- Roth, A.S & Becker, P. (2011). Challenges of disaster risk reduction: A study of stakeholder's perspective in Imzamo Yethu, South Africa. *Journal of Disaster Risk Studies*, 3(2):443-451.
- Sokupa, T., (2013). 'Need for Disaster Preparedness', Afesis, 26 July 2013. Available online <http://www.afesis.org.za>.
- Uys, F. (2005). Disaster Management: An Overview. *Journal of Public Administration*, 40(3.2): 4004-417.
- Republic of South Africa. (1996). The Constitution of the Republic of South Africa. Pretoria: Government Printer.
- Republic of South Africa. (2002). Disaster Management Act 57 of 2002. Pretoria: Government Printer.
- Republic of South Africa (2000). Municipal Systems Act 32 of 2000. Pretoria: Government Printer.
- Republic of South Africa. (2005). National Disaster Management Framework of 2005. Pretoria: Government Printer.
- Rupp, S. (2012). Emergency preparedness and disaster planning in Africa.
- South Africa. (1998). Green paper on Disaster Management. Government printer: Pretoria
- South African Local Government Association (SALGA) .(2011). Disaster risk management status assessment at municipalities in South Africa. Pretoria: SALGA.
- Stauton, C, Swanepoel, C and M. Lubaschain. (2020). Between rock and hard place: Covid 19 and South African response. *Journal of Law and Bioscience*, 7(1):1-2
- Tredea, G, Coetsee, S and V, Rautenbach. (2020). Cloud-based integration and standardisation of address data for disaster management: A south African case study. International Conference of Archives and photogrammetry, remote sensing a spatial information science, Sidney, Australia, 30- 04 December 2020
- Van Niekerk, D. (2006). Disaster risk management in South Africa: the function and the activity-towards an integrated approach. *Politeia*; Vol 25 (2):96-116.
- Van Niekerk, D. (2014). Critical analysis of South African Disaster Management Act and policy framework. Northwest University: Potchefstroom

-
- Wentink, G.J and D. Van Niekerk. (2017). The capacity of personnel in disaster risk management in South African municipalities. *The Journal for Transdisciplinary Research in Southern Africa*, 13(1):1-10
- Zamisa, NA and S. Mutereko. (2018). The role of traditional leadership in disaster management and disaster risk governance: A case of Ugu district municipality by-laws. *Journal Of Disaster Risk Studies*, 11(1):1-9
- Zuma, B.M., Luyt, C.D., Chirenda, T., & Tandlich, R. (2012). Flood Disaster Management in South Africa: Legislative Framework and Current Challenges. International Conference on Applied Life Sciences (ICALS2012). Turkey.
-

Land expropriation model in South Africa: A consequent impact on food security

Malemela Angelina Mamabolo
University of Limpopo, South Africa

Mokoko Piet Sebola
University of South Africa, South Africa

Keywords

Economic Activities, Food Security, Land Expropriation, Land Redistribution

Abstract

The paper seeks to evaluate the land expropriation model and its effect on food security. Since the announcement by President Cyril Ramaphosa two years ago about land expropriation without compensation, the concern about how that will be implemented topped high in both political and academic debates. South Africa's land issue has been topical for many decades and with little progress achieved in resolving the identified problem. This paper is conceptual in approach, and it uses literature to argue that land expropriation without compensation will threaten food security in South Africa. The paper concludes that land expropriation without compensation that will not consider threat to food security will not achieve intended justice for the people it intends to serve in the country.

Introduction

Since the announcement of land expropriation without compensation in South Africa by President Cyril Ramaphosa two years ago, many debates and questions rose about implementation challenges facing such proposal. While others argue about pieces of legislation in place to fairly regulate that, others are seriously concerned about whose land to expropriate, which land is going to be affected and what will happen if the country expropriate land without compensation. Land in South Africa is owned invariably so, such as by the state, private individuals, companies and different trusts. Hence, the South African citizens are much concerned about who 's land will be expropriated when that time come. Notably, the idea on land expropriation without compensation was accepted and supported by different political parties such as the African National Congress (ANC), Economic Freedom Fighters (EFF) apart from other opposition parties which were aligned to white capitalists' class. Oppositions of the idea are concerned about the state of corruption in the country and argue that even with the expropriation which can constitutionally take effect, only those who are politically connected will enjoy benefits associated with expropriation while the poor will continue to suffer (Branson, 2016; Maimane, 2018). Access to land has been identified as an action that can reduce the level of hunger and increase access to food security in the country. That is, food security can only be visible when all citizens have access to economic resources such as land that will assist them to create economic activities that promote their standard of living. Land expropriation in South Africa has been construed to be more about government correcting the imbalance of the past with little attention on the political and economic consequences thereof (Cousins, 2018). Since the announcement of land expropriation without compensation in South Africa farmers started experiencing land problems such as illegal land occupation.

On the other hand, more political debates are concentrated on the way the process of land expropriation is going to be implemented. In the contrary, Stofberg (2018) asserts that the issue of land expropriation must be seen as a mere marketing tool for election. Indeed, the matter was prominent before the elections, and it took a quite stand after the 2019 general elections. The reality is that the South African Constitution does make provision for expropriation without compensation (Crosby, n.d) on public interests. Considering that the country has different portions of land owned by the state, private individuals, different companies and trust, the question is which land is targeted for such expropriation without compensation. Evidently, the Land Audit Report (2017) indicated that 82% of land in the country is owned by private landowners as compared to those owned by other sectors of the economy. Arguably, the government's decision to expropriate land without compensation will undoubtedly, like in other African countries such as Zimbabwe,

lead to famine and much greater poverty across the society. Despite all the failure of land reform models such as farm management model, strategic partnership model, the equitable share model, Land Redistribution for Agricultural Development (LRAD), Proactive Land Acquisition Strategy (PLAS), the Department of Rural Development and Land Reform Recapitalisation and Development Programme (RADP) and the willing buyer willing seller model, Kilian (2018) asserts that land expropriation model will strengthen land redistribution.

Land redistribution and expropriation in south africa

Land redistribution in the country has been argued to be moving very slow (Bennett, 2013; Sebola & Tsheola, 2014; Khoza, 2016) and despite political noises made the status quo remain unchanged. According to the Department of Rural Development and Land Reform (2014), 30% of land should have been redistributed by 2014, but to date, however, only 8% has been redistributed. Just when the country is still working towards correcting the imbalance of the past by redistributing land to the disadvantaged communities, then the land issue gained a new focus on "Land Expropriation". Accordingly, land expropriation refers to land that is taken by the state and redistributed fairly back to the dispossessed black citizens (Head, 2018). Seemingly, the government announced land expropriation without compensation with the intention to drive land reform (The Institute of Race Relations, 2018). However, it is still not known as to whether through expropriation the government will be able to distribute land fairly without problems. In as much as land redistribution was never enough for the government to successfully distribute land to the African communities, the question is will expropriation be enough. Clearly the expropriation of land without compensation is the government's new agenda and it is made clear in the agenda that the approach must be done in a manner that is fair, sustainable and strengthen the economy (Bosshoff, Sihlobo & Ntombela, 2018).

The government of South Africa has assured that the expropriation of land without compensation will be done in a manner that ensures food security, increases agricultural production and improves economic growth. It is therefore evident that the government is on a mission to strengthen land reform, however little has been recorded of economic viability of the redistributed land through land reform programmes. As Sebola (2018) have argued, the financial models of the current distributed land by the government are failing to achieve the model of land allocation. The existing policies must be amended and provides for protection of the rights of the South African citizens. The South African Human Rights Commission (SAHRC) also warned that if the Expropriation Bill B4-2015 is passed in its current form, people with traditional land use rights particularly those in former homeland areas as well as farmers who own their farming land, could see their assets and land being expropriated by the government for the purposes of developments and other state use. Furthermore, the SAHRC is concerned that if the Bill is passed, more and more land will become vested in the government and this will disempower people by making them more dependent on the government, and is likely to create economic challenges, by further entrenching poverty and inequality. Hence, it is argued that land expropriation without compensation in South Africa is likely to threaten food security. On other hand Sebola & Mamabolo (2018) have argued that the reality of the land benefit from the South African local communities through land models is not workable. Accordingly, land redistribution in the country was mainly designed to create a new class of black commercial farmers who would inherit existing white commercial farms (Bank & Hart, 2018). However, due to incapacity by black beneficiaries the government find itself having to control existing commercial farms on behalf of the beneficiaries. It can be argued that such action taken by government shows lack of capacity by identified South African black landowners. The benefits options and how will the government ensure fairness and sustainability of the affected beneficiaries remain likely impossible.

Land expropriation and food security in south africa

Land expropriation without compensation continue to be a controversial topic for discussion in the South African political discussion (Kabamba, 2018) and which caught a global attention. Few political rhetorics are concerned about how such expropriation will threaten food security in the country, while the majority are concerned about the achievement of redistributive justice from the process. It has been widely acknowledged that food security is not only a South African problem but also remain a global challenge (du Toit, 2011) which has affected many African countries to extent that charity organisations have to intervene. South Africa if affected is likely to be worse since most neighbouring countries are dependent on its fair

stable political and agricultural economies. Evidently, not only the commercial agriculture does contribute to food security in the country, but also small-scale farmers do contribute to agricultural production in the country (Altman, Hart & Jacobs, 2009). Despite agricultural production from both the commercial and small-scale farming, the increasing number of food insecurity remains a critical challenge (Abdu-Raheem & Worth, 2011). While food security in the country is not in abundance with new models of land management in the country which are not been able to change the status quo. The Human Science Research Council (HSRC) (2011) indicated that almost half of the South African citizens still do not have enough access to regular food. Food security includes the natural aspects of food which include accessibility, availability, utilisation, and stability (Takavarasha, 2016). To date existing literature, indicate that the country is still battling to solve all aspects associated with food security crisis, however, the President of the country have always cautioned everyone that in taking such steps the government will take care that food security is not threatened. It is, however, notable that in the said caution, no clarity was given as to how that surety will be done. Despite that, in South Africa, the land redistribution process had already created avenues for food shortages. As articulated by Sebola & Tsheola (2014), numerous economically active farms had collapsed immediately after being handed to African beneficiaries for use Although such happened there is only little effort which the government did to resolve such a challenge. Instead, they worsen the situation by attempting to change the constitutional provisions as a way of resolving the problem.

Notably, Land reform cannot be achieved without considering its future effect on food security. Such a political neglect can cause a hilarious economic disaster. Moreover, land reform projects are likely to be handled better in a corrupt free environment. South Africa's corruption level had in the recent past reached a pick level where almost all state parastatals have economically collapsed. Hence leading to Jacob Zuma being recalled from his Presidential seat prior to its expiry. Land expropriation without compensation and food security are inseparable in economic context and cannot be discussed or implemented separately from each other. The two are indeed concepts of mutual implications. Even if restorative justice is important but achieving it without looking at the economic disaster it would cause would not show much wisdom from country governors. The Government of the Republic of South Africa self-admitted that 90% of the farms bought for land reform purposes are lying fallow with a total of over 4 000 farms. With this taking place continually and the 4 000 farms are increased substantially with the new ones being redistributed, South Africa will not have enough production to live from in future. Sebola (2014) also complained about the African emerging farmers failing to use restituted farms to promote sustainable tourism.

The current state of affairs with land reform in South Africa, especially where farms were given to African beneficiaries through land restitution, there is no guarantee for food security (Grain SA, 2018). Indeed, evidence showed a decline in farm production and the potential threats for food security in many aspects. Evidently there is no time in South Africa where agricultural production ever threatened food security than now. This shows that land use plays a major role in promoting food security through agricultural production. Accordingly, when the government started the land reform programme the believe was that redistribution of farmland, together with other rural development programs, can make a significant contribution to poverty alleviation (Amusan & Kgotleng, 2015). However, the progress had been argued to be very slow with little success on the restored or redistributed land by government to South African beneficiaries (Bennett, 2013; Sebola & Tsheola, 2014; Amusan, Kgotleng, 2015; Khoza, 2016). With the recent government agenda on land expropriation without compensation, it can be argued to be the beginning of the end to sustainable economic growth, wealth and prosperity for South African through agricultural production. Sebola & Tsheola (2014) have argued that no political justification can be achieved without economic considerations of the land restituted or redistributed to individuals for benefit.

The impact of land expropriation on economic activities in restituted farms

There are different approaches of land use that are argued to be more influential on the productivity of land in the South Africa. Farms achieved by South African Communal Property Associations through land reform have a variety of economic activities such as Livestock farming, Field crops, Game farming, Citrus and a combination of livestock and other activities (Department of Rural Development and Land Reform, 2015:19). These economic activities are considered the most contributor to the Gross Domestic Product (GDP) in the country. Contrary to that, Pringle (2013:39) asserts that South Africa has 12, 6% of dry land crop production with only 4% of high potential land, while the remaining percentages account for livestock and

game farming. Notably, Mmbwengwa, Nyhondo, Myeki, Ngethu & Schalkwyk (2015) emphasis that the economic contribution of communal farming remains relatively unknown.

Notably, the majority of South African citizens particularly those who reside in rural areas, depend on farming as their major sources of income (Wiggins, 2016:). On the other hand, most community members depend on agricultural produce from different communal farms as their nearby fresh produce market. The agricultural sector in the county is one of the largest industries that contribute to the increased level of job creation (Benhin, 2008; Hachigonta et al. 2013 in Ransom, 2015; den Hartigh, 2016). The sector has created 876 000 jobs in the first quarter of 2016, which is an increase of 2% from the previous quarter but down by 2% from the same period last year (den Hartigh, 2016). Arguably, the commercial sector is comprised of 46 000 commercial farmers with 86% of agricultural land with small scale communal farmers who owns only 14% of land in the country (Ortmann, 2005; Sebola & Tsheola, 2014). This explains that all farms in the country contribute to the society's job creation through different economic activities in farming. Many farms in the country have a variety of economic activities for practising agricultural activities. Notably, all available farms in the country are likely to have certain economic potential which differs from one another. Agricultural production such as livestock, crop produce, game lodging and citrus (Mahanjana & Cronje, 2000; Bennette, Ainslie & Davis; Mmbengwa, et.al 2015;) have been argued to be more influential on the productivity of land in the country and are also considered the most the contributing factor to the country's Domestic Product (GDP). However, there is doubt that support for other farmers particularly small-scale farmers can also contribute to the agricultural sector market (Mkhabela, 2018). To date these are the most common farming systems that promote sustainable development. This also promote an opportunity for communal farms to be in the market produce and provide food security to South Africa's population (Mmbengwana et.al, 2015). However, not all economic activities in communal farms are found to be economically viable. Arguably, if the government provide support to the economic activities found ion the restituted land, economic viability in communal farms is likely to improve.

Conclusion and recommendations

The paper evaluated the land expropriation model and its effect on food security in South Africa. The paper took its perspective from the announcement by President Cyril Ramaphosa two years ago that South Africa will adopt the land expropriation without compensation approach in dealing with land ownership inequality in the country. The paper argued about the concern on how that will be implemented while acknowledging both the political and academic debates that surrounded the issue. South Africa's land issue has been topical for many decades and with little progress achieved in resolving the identified problem. Our land issue had even been an issue of concern that attracted criticism from the Western powers. This paper used a conceptual approach, and it used literature to argue that land expropriation without compensation will threaten food security in South Africa. The paper concludes that land expropriation without compensation that will not consider threat to food security will not achieve intended justice for the people it intends to serve in the country. The paper therefore recommended the following:

The country should consider the economic impact before restorative justice and find a striking balance to benefit both the country and its citizens

The country to resolve land issue problems by balancing the economic imperatives and restorative justice.

The country to adopt a feasible redistributive and restoration plan to benefit both the economy and the citizens

The country should consider food security as of primary importance before adopting any land reform programme

Reviewing the Capacity models used for holders of already restituted and redistributed farms

References

- Abdu-Raheem, K.A., & Worth, S.H. (2011). Household food security in South Africa: evaluating extension's paradigms relative to the current food security and development goals. *S. Afr. J. Agric. Ext*, 39(2): 91-103.
- Altman, M, TGB Hart & P T Jacobs .(2009). Household food security status in South Africa. *Agrekon*, 48:4, 345-361, DOI: 10.1080/03031853.2009.9523831

- Amusan, L., & Kgotleng, M. (2015). South Africa's Food Security Development Challenges in the Era of Globalisation, Affirmative Action and Land Reform.
- Bank, L.J., & Hart, T.G.B.(2018). How land reform and rural development can help reduce poverty in South Africa. The conversation. University of Cape Town: Cape Town
- Bennett, J.E. (2013). Institutions and governance of communal rangelands in South Africa. *African Journal of Range & Forage Science*, 30(1&2):77-83.
- Boshoff, T , Sihlobo, W & Ntombela.(2018). Redistribution of Agricultural Land: Expropriation Without Compensation Debate. Available on ...<https://www.researchgate.net/publication/343290764>. Accessed on 19 October 2021
- Cousins, B. (2018). Can land reform help reduce poverty and inequality? Institute for poverty, land and agrarian studies (PLAAS), School of Government, University of the Western Cape: Cape Town
- Crosby, A. (2021). Land expropriation: 'Farmers alone can't bear burden of addressing apartheid dispossession. Available on <https://www.news24.com/news24/southafrica/news/land-expropriation-farmers-alone-cant-bear-burden-of-addressing-apartheid-dispossession-20210325>. Accessed on 10 October 2021
- Du Toit, A. (2011). Comment on the newly released Green Paper on Land Reform, September 26, 2011. Programme for Land and Agrarian Studies (PLAAS), School of Government, University of the Western Cape, Cape Town, South Africa
- Gladwin, C. (2017). Expropriation Without Compensation? Schindlers Attorneys - <http://www.schindlers.co.za> (Accessed: May 14, 2018).
- Grain, SA. (2018). Land Reform and Food Security. Grain SA Communications: Pretoria
- Head, T. (2018). Land expropriation and land reform: What's the difference? Available on <https://www.thesouthafrican.com/news/what-is-land-expropriation-land-reform/>. Accessed on 19 October 2021
- Khoza, A. (2016). Do not Give Back your Land to White Farmers, KZN Premier. <http://www.news24.com/SouthAfrica/News/do-not-give-back-your-land-to-white-farmers-kzn-premier-20160225> (Accessed on 19 October 2021)
- Kabamba, P. (2018). The effect of land expropriation without compensation on your business. Available on <https://www.rsm.global/southafrica/news/effect-land-expropriation-without-compensation-your-business>. Accessed on 19 October 2021
- Kilian, A. (2018). Unpacking the ANC resolution on land expropriation without compensation at a seminar, in Pretoria, he said land expropriation should not be seen as a destructive measure, but rather as a developmental measure. Available on <https://www.engineeringnews.co.za/article/land-expropriation-without-compensation-key-for-economic-growth-masonda-2018-03-06>. Accessed on 19 October 2021
- Land Audit Report. (2017). Phase 11. Private Land Ownership by Race, Gender and Nationality. Department of Rural Development and Land Reform: Pretoria
- Maimane, M. (2018). DA has proud record on land reform, and we reject land expropriation without compensation. Available on <https://www.google.co.za/search?q=Maimane%2C+M.+2018.+DA+has+proud+record+on+land+reform%2C+and+we+reject+land+expropriation+without+compensation.&ei=zbRuYZihLdCPhbIP8KyQgAM&ved=0ahUK>. Accessed on 19 October 2021
- Mahanjana, AM & P.B., Cronje. (2000). Factors affecting goat production in a communal farming system in the Eastern Cape region of South Africa. *South African Journal of Animal Science*. 30. 149-154. 10.4314/sajas.v30i2.3864.
- Mmbengwa, V., Nyondo, L., Ngethu, X. and Van Schalkwyk, H. (2015). Communal livestock farming in South Africa: Does this farming system create jobs for poverty stricken rural areas? *Sylvan*, 159(10):176-192
- Mkhabela, T. (2018). Dual moral hazard and adverse selection in South African agri-businesses: It takes two to tango. *International Food and Agri-business Management Review*, 21 (1030):391-406
- Sebola, MP. (2014). Sustaining tourism in South African game farms: the benefits of ownership of restituted land by African communities. *Sustainable Tourism VI*, (187):16-26. doi:10.2495/ST140021
- Sebola. M.P & J.P. Tsheola .(2014). Economics of Agricultural Land Restitution and Redistribution in South Africa: Willing-Seller, Willing-Buyer Business Imperatives Versus Socio-political Transformation? *Journal of Human Ecology*, 46:2, 113-123, DOI: 10.1080/09709274.2014.11906712
- MA Mamabolo & MP Sebola. (2018). The engagement of beneficiaries in farm governance of restituted land through the Communal Property Association Model : the ideal versus the reality of beneficiary farms in South Africa. *Commonwealth Youth and Development Journal* ,16 (2): 1-19
- MP Sebola. (2018). Financing emerging black farmers for agricultural development in South Africa: A wasteful and unworkable model for creating black farmers. *The Journal for Transdisciplinary Research Southern Africa*. 14(1): 1-10
- Takavarasha, T. (2016). Issues of food security in South Africa and FAO's role in eradication of food insecurity and malnutrition. Pulses and Food Security Discussion Forum: Kempton Park

Business transformation project's architect's profile (BTPAP)

Antoine Trad

Institute of Business and Information Systems Transformation Management, France

Damir Kalpić

University of Zagreb, Faculty of electrical engineering and computing, Croatia

Keywords

Business Transformation Projects, Enterprise Architecture, Mathematical Model, Artificial Intelligence, Profile Management, Human Resources, Critical Success Factors and Performance Indicators.

Abstract

This article proposes a holistic mathematical model for the selection, supporting and evaluation of a transformation architect's or manager's profile. The model uses critical success factors, natural programming language environment and an adapted decision-making system to define the optimal BTPAP. The authors propose the use the BTPAP in various types of transformation projects, like for example, in the case of transformation of enterprise's human resources activities, financial systems transformation, logistics transformation projects, or even in audit operations. The BTPAP is a specific profile which is mainly based on the manager's original capabilities and affinities, which are in turn supported by the optimal educational curriculum, by worthwhile experiences in transformation projects and above all, such profile should be supported by a tuneable transformation framework. A transformation framework is a set of existing frameworks that are integrated to support all types of transformation activities, like the selection of the optimal BTPAP. This framework's originality is that it can be used in any stage of the transformation project for any type of problem and to audit the BTPAP's effectiveness. The main limitation is the enterprise's capacity to restructure and unbundle its legacy environments.

Introduction

The BTPAP for a transformation manager (or simply the *Manager*) has become a central issue in managing complex problems. The authors use the term *Manager* for a business architect, because in hyper evolution of technology and methodologies, classical project management activities have become an automated process.

BTPAP's main concepts are based on: 1) Farhoomand's work that describes three basic profiles, the Advocate, the Technocrat and the Samaritan (Farhoomand, 2004); 2) An Applied Mathematical Model for Business Transformation and Enterprise Architecture: The Holistic Profile Management System (HPMS) (Trad, & Kalpić, 2020a, 2021a); 3) The Selection and Training Framework (STF) for Managers in Business Innovation Transformation Projects (Trad, & Kalpić, 2013a); 4) The Selection and Training Framework (STF) for Managers in Business Innovation and Transformation eProjects - The Profile of a Business Transformation Manager (Trad, & Kalpić, 2014d); and 5) The Selection and Training Framework (STF) for Managers in Business Innovation and Transformation Projects - Integrating the restructuring process of the global economy (Trad, & Kalpić, 2014f).

The authors will try to prove that the BTPAP is a combination of many skills, by using the Applied Holistic Mathematical Model for Architect's Profile (AHMM4AP), used for the selection and support to a *manager*, who is the *Project's* leader and main architect. The AHMM4AP is based on Critical Success Factors (CSF) and on a unique mixed research method (Trad & Kalpić, 2017a, 2018a, 2020a). The BTPAP can be used to support Human Resources (HR) activities. BTPAP's activities are supported by a Decision-Making System for AP (DMS4AP), Knowledge Management System for architect's profile (KMS4AP) and an Enterprise Architecture (EA) (Blackburn & Rosen, 1993; Neumann, 2002). The Proof of Concept (PoC) uses a case from the insurance domain (Jonkers, Band & Quartel, 2012a; Trad, 2013), where the focus is on the *Manager's* profile who is capable of managing a BTP (simply a *Project*). *Managers* are supported by a framework that can estimate the risks of failure of a *Project*. The BTPAP supports the selection of *Managers*, who manage the implementation phase of complex *Projects*. There, the selection process identifies BTPAP's main

characteristics and background. *Project's* main issue lies in the transformation of a Legacy Environment (LE) into a lean and automated system, where the role of the *Manager* and his/her capabilities in managing the implementation phase of the *Project* is critical. The BTPAP and his or her optimal education's curriculum have no precise description and this article's main goal is to deliver such a description, using a systemic and cross-functional approach. A BTPAP must be capable of managing *Project's* Complex Implementation Phase (PCIP) that requires a set of in-depth DMS4AP, KMS4AP, EA, and implementation skills. The PCIP is the major cause of high failure rates. Therefore, there is a need to investigate the BTPAP who needs skills for the PCIP. The authors' previous works have located a gap in the existing methodologies related to *Projects* that offer no insight into the BTPAP and have concluded that the Architect of Adaptive Business Information System (AofABIS) is to be considered as the optimal choice. The BTPAP is an enhanced version of the AofABIS and corresponds to the evolution of technology. Today *Projects* rely on business schools' accountants' profiles to deliver *Managers*. However, this is not the optimal approach.

The AofABIS and the BTPAP

A BTPAP must be capable of transforming LE's Information and Communication Systems (ICS) and to exploit avant-garde technologies in order to successfully conduct a *Project*. Such *Managers* and organizations need holistic methodologies, like The Open Group's Architecture Framework's (TOGAF). This article shows that the BTPAP needs holistic or cross-functional skills, and is mainly a technocrat, which is in contradiction with the applied methods of business schools who engage cheap interface accountants, who are schooled to deliver tuned balance sheets and cannot manage PCIPs (The Economist, 2000). The BTPAP uses the *Framework* that is based on the Research and Development Project (RDP) (Trad & Kalpić, 2018a). The BTPAP is agnostic to any specific application field and is based on the Architecture Development Method (ADM) (The Open Group, 2011a). The used EA method and its ADM are central to implement *Projects*, where the BTPAP is used for the *Manager's* selection. The authors will try to prove that a qualified technocrat's profile would be a base for the BTPAP (Farhoomand, 2004), who needs to be assisted by a DMS4AP (Trad & Kalpić, 2013a). *Projects* lack a holistic approach and need a BTPAP. Figure 1 describes the relation between the BTPAP and the AofABIS. The *Framework's* and RDP's interactions, include three components: 1) DMS4AP; 2) KMS4AP; and 3) BTPAP.

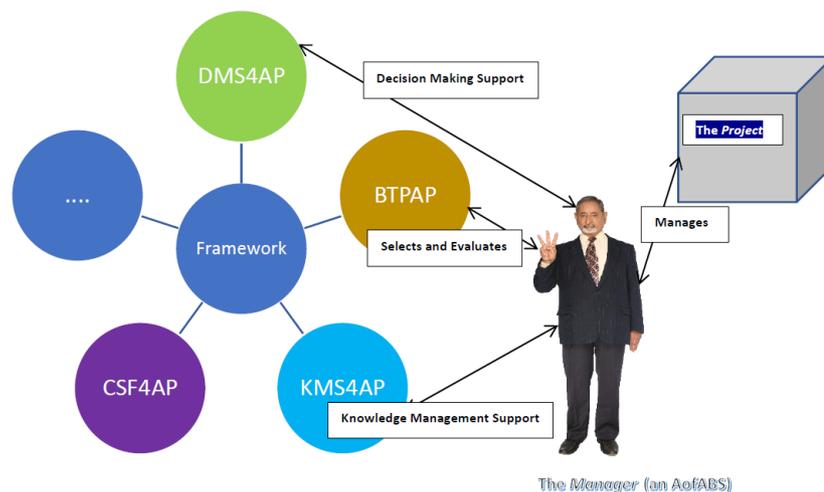


Figure 1. The relation between the BTPAP and the AofABIS

The research development project

The Researched Literature Review and the Gap

Projects high failure rates (Bruce, 1994) that is due to the PCIP, needs a *Framework*, which recommends linking the AHMM4AP-based Heuristics Decision Tree (HDT) to all levels of the *Project*, as shown in Figure 2 (Agievich, 2014). The BTPAP can be applied to various types of HR activities and the Research Question (RQ) is: "Which transformation managers' characteristics are optimal for the complex implementation phase of transformation and enterprise architecture projects?"

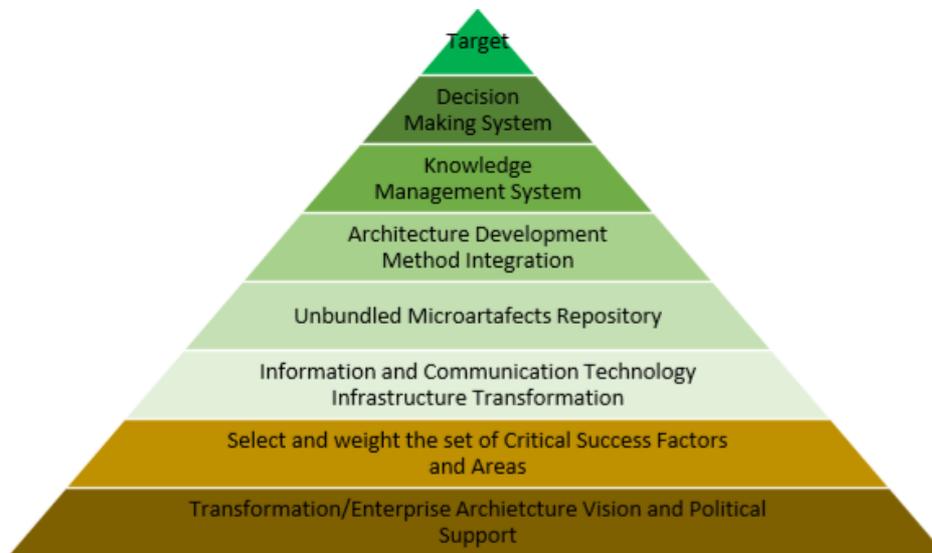


Figure 2. Levels of *Project's* interaction.

The knowledge gap was acknowledged mainly because the existing literature on failure rates and methodologies treating *Projects* offers no insight into the BTPAP, who can manage *Projects* and their PCIP (Trad & Kalpić, 2013a, 2013b). This RDP inspects the BTPAP, which is mainly based on the already defined AofABIS, enforced with new discovered features. The uniqueness of this RDP promotes a holistic unbundling process and the alignment of standards and strategies to support BTPAP for *Projects* (Farhoomand, 2004). The RDP uses a holistic approach that combines: 1) *Project* topics; 2) AHMM4AP and HDT; 3) Software modelling and implementation; 4) Business engineering; 5) Financial analysis; 6) BTPAP definition; 6) EA; 7) Integrating standard market standards; and 7) it offers a concrete methodology.

Review and Check of the Critical Success Factors/Critical Success Areas

The *Framework* promotes the transformation using Critical Success Area (CSA) that contains a set of CSFs, where a CSF is a set of Key Performance Indicators (KPI), where each KPI corresponds to a single *Project's* requirement and/or an item that can be a profile requirement or skill that has a column in each evaluation table (Putri & Yusof, 2009; Peterson, 2011). A *Project* starts with the first phase called the feasibility phase to check the basic CSFs, to check if the *Project* makes sense; it ends with success or failure. Based on the literature review and evaluation processes, the CSFs are used and evaluated using the following rules:

- References should be credible and are estimated by the authors and follow a classification process.
- *Projects* are the result of defined changes measured by CSFs.
- Applied modelling language should be limited in order to make the *Projects* manageable.
- The ADM is mature and can be used to manage the PCIP.
- The ADM manages the *Framework's* iterations and CSFs tuning.
- If the aggregations of all the *Project's* CSA/CSF tables are positive and exceed the defined minimum, the *Project* continues to its PoC or can be used for problem solving that uses a business case.

The Business Cases

Business Case Basics

The PoC uses an Applied Case Study (ACS), developed by the Open Group as a concrete study which represents the possibilities to implement a *Project* that transforms the company ArchiSurance. This study is suitable because it integrates cross-functional domains. BTPAP CSF are measurable by a weighting that is roughly estimated in the 1st iteration and then tuned through ADM iterations. In each iteration the BTPAP evolution is verified by using the DMS4AP; where EA CSFs are essential (Felfel, Ayadi, & Masmoudi, 2017).

The Architecture Development Method and Projects

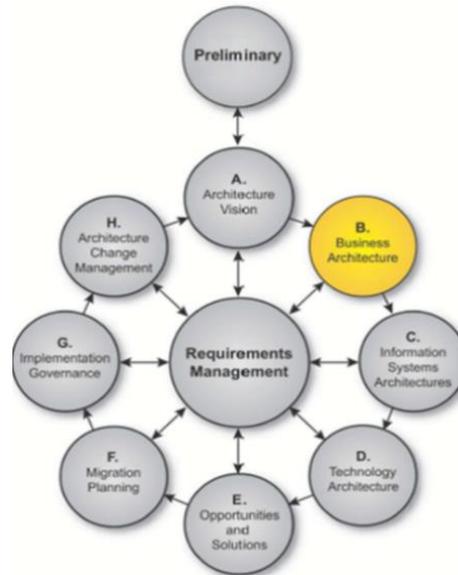


Figure 3. Business architecture phases (The Open Group, 2014b)

This RDP focuses on the design of *Project's* integration and presents the influence of BTPAP to select the *Manager*. In the actual age of distributed intelligence, complexity, knowledge, economy, and technology (Gardner, 1999), the *Framework* offers a HDT that supports a set of BTPAP problem types (Markides, 2011), where the DMS4AP offers a set of BTPAP solutions in the form of recommendations (Trad & Kalpić, 2014d). The *Framework's* parts must synchronize with the ADM shown in Figure 3.

Mathematical model usage

The Mathematical Model Basics

CSFs define the initial nodes that are identified as vital for successful targets to be reached and maintained and is the AHMM4AP's basic element that is needed for the *Project* evaluation (Morrison, 2016). The BTPAP uses a CSF based AHMM4AP uses a proprietary environment, for the *Project*. The AHMM4AP nomenclature is presented to the reader in Figure 4 in a simplified form, to be easily understood, on the cost of a holistic formulation of the model. The Domain is the Architect's Profile (AP), as shown in Figure 4:

The symbol \sum indicates summation of weightings/ratings, denoting the relative importance of the set members selected as relevant. Weightings as integers range in ascending importance from 1 to 10.

- The symbol \cup indicates sets union.
- The AHMM4AP defines the *Project* as a model, using CSFs weightings and ratings.
- The selected corresponding weightings to CSF $\in \{ 1 \dots 10 \}$ are integer values.
- The selected corresponding ratings to CSF $\in \{ 0.00\% \dots 100.00\% \}$ are floating point percentage values.
- A weighting is defined for each BTPAP CSF, and a rating for each KPI.

A Quantitative-Qualitative Research Mixed Model

Basic Mathematical Model's (BMM) Nomenclature

microRequirement	= KPI	(B1)
CSF	= ∑ KPI	(B2)
Requirement	= CSF = ∪ microRequirement	(B3)
CSA	= ∑ CSF	(B4)
microKnowledgeArtefact	= ∪ knowledgeItem(s)	(B4)
neuron	= action → data + microKnowledgeArtefact	(B5)
microArtefact / neural network	= ∪ neurons	(B6)
microArtefactScenario	= ∪ microArtefact	(B9)
AI Decision Making	= ∪ microArtefactScenario	(B10)
microEntity	= ∪ microArtefact	(B7)
Entity or Enterprise	= ∪ microEntity	(B8)
EntityIntelligence	= ∪ AI Decision Making	(B11)
BMM(Iteration) as an instance	= EntityIntelligence(Iteration)	(B12)

The Generic AHMM's Formulation

AHMM	= ∪ ADMs + BMMs	(B13)
------	-----------------	-------

AHMM's Application and Instantiation for a Specific Domain

Domain	= EARM	(B14)
AHMM4(Domain)	= ∪ ADMs + BMMs(Domain)	(B15)

AHMM's Application and Instantiation for National Security and ABDS

Domain	= ABMT	(B16)
AHMM4(Domain)	= ∪ ADMs + BMMs(Domain)	(B17)

Figure 4. The applied mathematical model's nomenclature (Trad, & Kalpić, 2020a)

A BTPAP problem, RQ, CSF or phenomenon are examined in iterations relating breadth and depth, using the HDT, which is specialized for unknown problems or the ones that appear in a preliminary phase or initial iterations. Then, the *Framework* qualitative research module input data stream(s) consist of(s) of sets of numbers that are collected from sets generated by using designed/structured and approved/validated statistically processed data object collection modules. Just analysing data is a partial, limited static solution. There is a need for a dynamic proactive qualitative heuristic method like the author's HDT algorithm. There is also a need to control the activities and behaviour of persons (and groups), which are an important part of the *Entity's* internals and to proactively detect any probable violations. Possible violations can be modelled to deliver controlled access to *Entity's* internals through political backup, spying services, assigned roles, responsibilities & credentials, and defined standards.

The Applied Business Transformation Mathematical Model

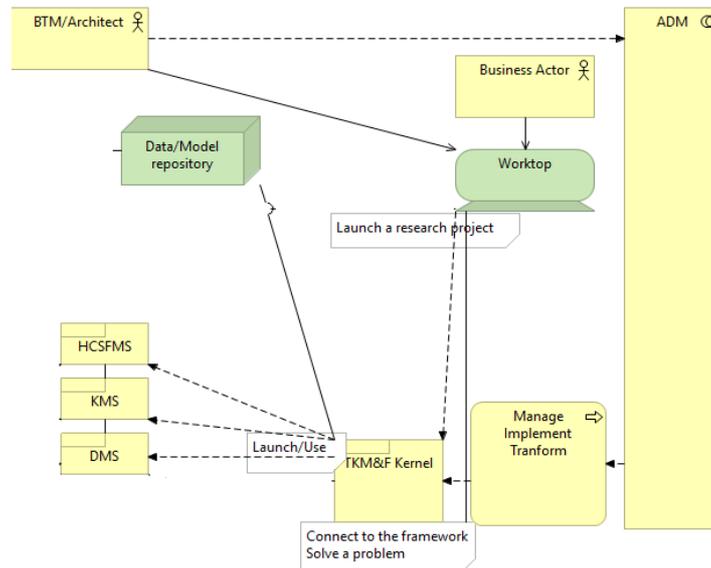


Figure 5. The decision making and knowledge management interface.

The AHMM4AP for BTPAP has a composite structure that can be viewed as follows: 1) The static view; 2) The behavioural view; and 3) It is the skeleton of the *Framework* that uses microartefacts' scenarios. The

AHMM4AP can be modelled after the following formula for Business Transformation Mathematical Model (*BTMM*) that abstracts the *Project*:

$$\text{AHMM4AP} = \text{Weigthing}_1 * \text{AHMM4AP_Qualitative} + \text{Weigthing}_2 * \text{AHMM4AP_Quantitative} \quad (\text{B18}).$$

$$\text{AHMM4AP} = \sum \text{AHMM4AP for an enterprise architecture's instance} \quad (\text{B19}).$$

$$\text{BTMM} = \sum \text{AHMM4AP instances} \quad (\text{B20}).$$

The objective function of the *BTMM*'s formula can be optimized by using constraints and with extra variables that need to be tuned using the AHMM4AP. The variable for maximization or minimization can be, for example, the *Project*'s success, costs, or another CSF. For the BTPAP PoC the success will be the main and only constraint and success is quantified as a binary 0 or 1, where the objective function definition will be:

$$\text{Minimize risk BTMM} \quad (\text{B21}).$$

The *BTMM* is a combination of *Project* methodologies and a holistic mathematical model that integrates the enterprise organisational concept and ICS. The AHMM4AP is a part and is the skeleton of the *Framework* that uses microartefacts' scenarios to support BTPAP requests (Kim & Lennon, 2017). The BTPAP components interface the DMS4AP and KMS4AP as shown in Figure 5, to evaluate, manage and map CSFs for BTPAP's selection activities; if the aggregation of all the *Project*'s CSA/CSF tables exceeds the defined minimum, the *Project* continues to its second part of the PoC. The initialization phase generates the BTPAP types of problems to be analysed. The AHMM4AP is a part of the *Framework* to support BTPAP requests (Agievich, 2014).

USAGE OF KMS4AP

Unit of Work as the Building Block

The *Framework*'s Microartefact granularity and responsibility for a given AHMM4AP scenario is a complex undertaking (Kim & Lennon, 2017). The implementation of the "1:1" mapping and classification concept ensures that resources pass from one component to the other with a mapping concept. The EA concept uses methodologies like the ADM to support BTPAP's activities (Neumann, 2002).

EA, Technology, Services and Standards

A *Manager* must have in-depth skills to manage an agile *Project* and its PCIP; where adequate mapping and synchronization concepts can be used to integrate various types of standards; this is a major recommendation for the BTPAP. The strategy is enabled by the establishment of an ADM based iterative model that can map *Project*'s microartefacts in a "1:1" manner (The Open Group, 2011b). The scope complexity lies in capability of the BTPAP to synchronize the *Project*'s vision with its capabilities (Trad & Kalpić, 2015b). The BTPAP must be capable of integrating the *Framework* using a mixed bottom-up approach that is based on Service Oriented Architecture (SOA) or Microservices standards, which are the backbone of the *Project*'s unbundling process.

Enterprise Security Strategies

Entities face a set of barriers and difficult situations, which need the management of security Risks (sRisk), using a specialized framework to support their activities. sRisks may include CSFs related to reputation, routine operational procedures, legal and human resources management, financials, the risk of failure of internal controls systems related to the Sarbanes-Oxley Act (SOX) and global governance. The BTPAP defines capabilities to protect the *Project* from attack by 1) Localizing gaps in the infrastructures of partners; 2) Review of detection, and real-time security solutions; 3) Blocking of cumulative attacks; 4) Defining a security strategy to locate potential weaknesses; 5) Building a robust defence; 6) Integrating security in transactions; and 7) Applying qualification procedures (Clark, 2002).

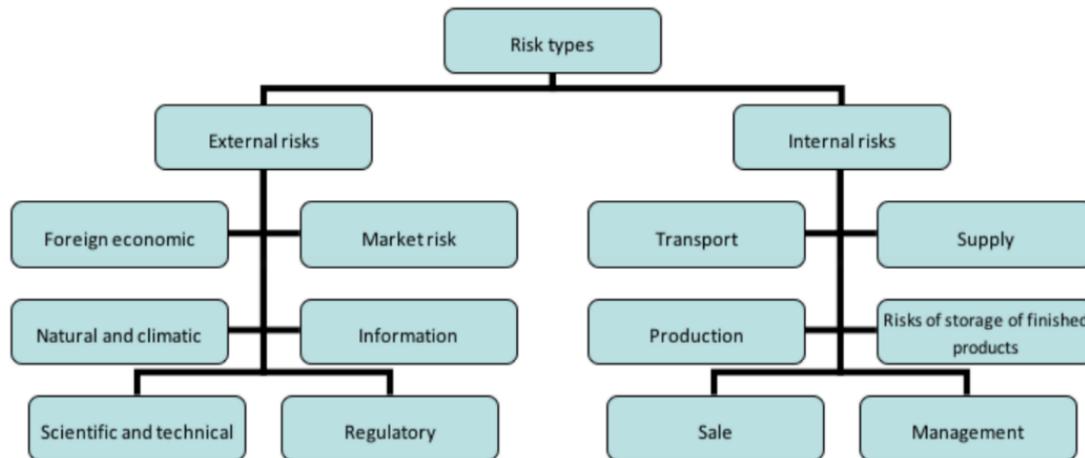


Figure 6. Types of economic risks (Kiseleva, Karmanov, Korotkov, Kuznetsov, & Gasparian, 2018)

sRisks' management integration is complex and needs massive use of tools and technology to radically improve performance and ensure tangible benefits by using the *Framework*. Accounting-oriented management of sRisks promotes off-shoring and ruthless growth. It can have a negative effect on *Projects* because it may promote confused and contradictory conclusions. Management of sRisks is of strategic importance and if a *Project* is successful, the transformed *Entity* will excel. Transformed *Entities* with an efficient sRisks management automate this management by using the *Framework*, which is in turn supported by the ADM. The *Entity* chooses a strategy to achieve its goals and tries to find ways to avoid sRisks. Evaluation of sRisks and the definition of the probability of hazardous events and the choice of solutions is specific to *Entity* and its eco-system. sRisks are, in most cases, difficult to discover and classify, due to their diversity and complexity. There are various types of sRisks that are related with each application domain. sRisks' neutralization is a technical, financial, and mathematical process for the implementation of decisions for the transformation measures. The sRisks' management structures sRisks by using CSAs, weights them and uses delimiters to select the related CSFs. The sRisks' management analyses the CSAs by applying scenarios for mitigation. sRisks management system's key principles are: 1) Principle of integration using a systemic and holistic approach; 2) Principle of continuity using a set of procedures; and 3) Principle of validity. It provides an analysis of the ratio of costs to reduce possible sRisks. Figure 2 shows an example of sRisk classification that is used in economic practice (Kiseleva, Karmanov, Korotkov, Kuznetsov, & Gasparian, 2018).

Resources, Artefacts, Factors Management and Qualification Procedures

Actual design, development, qualification, and operations for *Projects* are still in infancy stage, or simply chaotic. Tools for the PCIP are still confronted with serious issues. These issues show that tools are still inappropriate for large *Entities* of intelligent systems and the authors recommend using the HDT concept. The *Manager* must have the capacity to manage the *Framework's* repository and continuum that map BTPAP CSFs to types of *Project's* resources. This mapping concept is supported by the ADM which associates CSFs, resources and Microartefact scenario instances to *Project's* requests (The Open Group, 2011a).

Architecture development method usage skills

The ADM is a generic method and recommends a set of phases and iterations to develop the *Projects*; it designs parts of the transformed system interfaces, other *Project* deliverables and standard frameworks. The BTPAP must be capable of defining the set of basic EA requirements for the *Project* that are stored in the *Framework* KMS4AP database (Trad & Kalpić, 2014e).

Architecture Phases

The ADM manages the *Project's* development iterations; in this section the authors present main ADM's phases and *Project's* interactions: 1) The preliminary phase selects the relevant BTPAP CSFs and interactions; 2) The architecture vision and Business Architecture (BA); 3) The ICS architecture; 4) The technologies architecture, and 4) The requirements management and tests. For BTPAP the BA is important.

Business Architecture

The *Manager* must use the *Framework* to apply standards that deliver added value and robustness to *Projects*. In order to move towards a just-enough BA that is known as the target or the final interaction architecture, where important adjacent domains are clearly shown and the others are blurred, because of their low level of importance. The BTPAP must be capable to align: 1) BA's traditional vision; 2) BA's principles; and 3) Standards management to support BA and EA. The traditional BA layers represent a silo model of the fundamental components. It is very hard to merge these four components into an agile system.

Decision making and knowledge management systems

A Complex and Risky Process

BTPAP management is supported by the BTPAP' selection, training and evaluation using the DMS4AP. The DMS4AP's results are presented as a set of possible solutions or possible BTPAPs for the *Project*. The best solution proposes the right BTPAP in relation to the selection, evaluation, and training activities. BTPAP and DMS4AP integration may face selection problems due to complex HDT processing evaluation process, what implies that the analysis and management of risk is one of the important pre-requisites to ensure the success of BTPAP activities, which are supported by the KMS4AP (Hussain, Dillon, Chang & Hussain, 2010).

The Knowledge Management System

The BTPAP must be capable of managing profile Knowledge Items (pKI); where eKIs and microartefact scripts are responsible for the manipulation of intelligence and they control various knowledge processes. The KMS4AP supports the *Project's* underlying mechanics to manage pKI microartefacts. The *Manager* is responsible for designing extraction of pKIs using holistic systemic approach (Daellenbach & McNickle, 2005; Trad & Kalpić, 2016a). A *Framework* interfaces the KMS4AP to enable an efficient search process. The KMS4AP manages various types of information related to *Projects* which helps the selection process. A *Project* interfaces the KMS4AP/pKI, where sets of CSFs are stored (Trad & Kalpić, 2017a). The intelligence strategy is included in EA's roadmap and the *Manager* selects tools for KMS4AP and DMS4AP operations (Alhawamdeh, 2007).

The Decision-Making System

The DMS4AP is supported by the AHMM4AP formalism that uses a holistic approach for delivering a set of BTPAP suggestions in form of recommendations (Daellenbach & McNickle, 2005). The *Project* interfaces the DMS4AP, in which various profile templates are selected, enhanced, and tuned, using selected CSF sets for BTPAPs, then this process is orchestrated by the AHMM4AP's HDT, used to select the optimal BTPAP.

THE OPTIMAL PROFILE

Basics, Main Role and Skills Set

The BTPAP should have a deep understanding of *Projects* and the DMS4AP that is the first step towards the transformation process. S/he (in further text he) needs also in-depth knowledge of 1) Lean BAs; 2) Integrated development environments; 3) Businesspeople integration, 4) Agile project management, and 5) Coordination of ICS engineers. The ATPAP acts as business and ICS solution designer and architect. His estimated skills require a profound knowledge of the EA, BA, Business Processes (BP), DMS4AP, KMS4AP, services technologies and management fields. That rounds up the BTPAP whose main role is to act as the *Project's* coordinator of teams (Trad & Kalpić, 2014f). BTPAP's skills have an enormous impact on the concrete PCIP of *Projects*, where the managerial aspects of such *Projects* are not well defined. Currently, there is no precise BA or EA set of recommendations and educational curriculum for such a BTPAP. There is an essential need for more investigation, especially regarding his role in increasingly competitive business environments. *Projects* influence the way BPs are implemented, managed, and integrated, what consequently forces business environments to continuously innovate. Many BTPAP selection CSFs directly or indirectly affect the *Project*. BTPAP's role can be defined by a set of CSFs, where the main CSF is the capacity to ensure the reusability of existing requirements, resources, microartefacts, components, and EA/BA paradigms. A BTPAP qualified specialist can help executive management select a *Manager* for *Project's* PCIP. The *Manager* will be challenged to use *Project's* status results, to change PCIP's business operations, re-engineer the ICS, or to re-schedule various tasks in the *Project* plan; all these mentioned activities can be automated. A BTPAP qualified *Manager* should be capable of offering: 1) The concept of PCIP, by using emerging technologies; 2)

Solutions that are based on LEs as a better balance between costs, benefits, sustainability, and risk; and 3) A realistic EA/BA concept. The resultant adaptive business environment can be based on stateless business services/objects respecting a strict EA/BA paradigm and BTPAP's role and recommendations.

Framework and the Manager

Meta-management and business integration require a BTPAP who is also an innovation *Project* manager (Pm). The *Manager* must be an excellent agile Pm, who can implement a very light version of the disciplines TOGAF's EA/BA, services, and BPs. The use of BPs will enhance the management of KMS4AP and also help in the selection of a *manager*. The BTPAP's specific characteristics require a special educational curriculum based on ICS and business engineering. Future *Managers* need to have the ability to deeply understand *Entity's* unique EA/BA paradigm, and to swiftly identify Pm plans and to effectively implement them in the transformation process. According to the latest Gartner Study, "the ability to apply versatile and extensive methodological skills in managing business processes is the number one business priority for successful entrepreneurial activities" (Gartner, 2020). The implementation of this managerial recommendation is done by selection of the right *Manager* who has the proposed qualities and at least some education in business and ICS; and many years of concrete experience. The *Manager* needs to be supported by a *Framework*, that interfaces TOGAF and is used to establish *Project's* patterns. Such patterns structure the PCIP that needs to execute the following tasks: 1) Unbundling through services, and 2) Modelling and integration.

Needed Experience

The RDP is also based on the authors' experiences who have often encountered *Projects* with serious problems and having high rates of failure. That is why they want to pursue this RDP and contribute to this visceral problem related to complex *Projects* and to offer a BTPAP. The main difficulty lies in the duration of *Projects* that take many years to be finalized. The complex activity of interconnecting the company's business processing nodes, that is known as unbundling, is extremely complex, and in general it causes major resistance. Consequently, it may cause *Projects* to fail (Farhoomand, Lynne, Markus, Gable, & Khan, 2004).

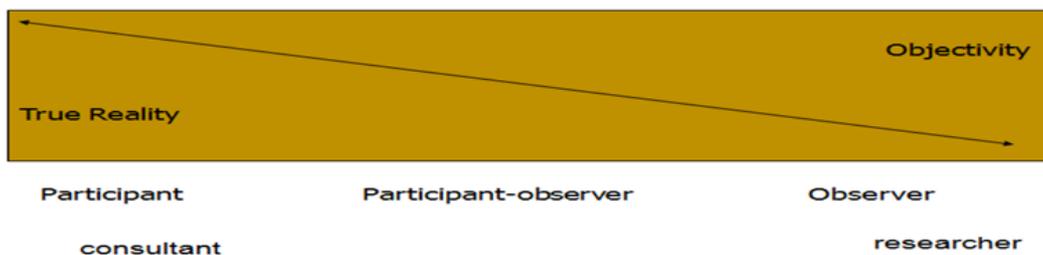


Figure 7. The synergy between real world experience and research outcomes (Trad, & Kalpić, 2020a)

The *Framework* offers selection and training concepts, where the training part is supposed to enhance the *Manager's* knowledge by adopting holistic skills that include EA/BA modelling. And as show in Figure 7, the relationship between the reality of *Projects* (X axis) and its objective status (Y axis) may diverge.

Business Modelling and Integration

The *Manager* must have extensive knowledge of BP in *Projects* to manage the implementation of complex business scenarios. Scenarios can be used to automate the value chains which rationalize the *Entity's* activities and enable them to communicate with partners. The implementation of this important BTPAP recommendation is done by the training of the *Manager* who should have had the minimal experience in these domains before. The *Manager* must have extensive knowledge of infrastructure integration in *Projects* to manage the implementation of the existing scalable platforms. These CSFs are needed, to ensure that the *Manager* can rationalize the *Entity's* platform nodes and to enable cloud business communication through the *Framework*. For various LEs that must be transformed using an EA/BA approach, where the infrastructure is a crucial CSF to link its ICS to partners and clients. The *Manager* should implement performance CSFs to monitor the *Project's* progress. The main recommendation is provided by the training of the selected *Manager* for such tasks.

Holistic Characteristics and a Generic Profile

The *Manager* must have holistic affinities and the most important recommendation is that he has cross-functional skills. The preferred basic BTPAP is a flexible and agile person, who can transform the LE and is

also capable of exploiting the inter-related avant-garde technologies in order to successfully conduct *Projects*. Managing of complex skills and educational concepts, requires an HDT. The implementation in the real world is done by the BTPAP selection of the right *Manager* that has this main quality and has been proven in industry, which requires a generic role. *Managers* are visionaries, coaches, Pm leaders, business to technical coordinators, data scientists, and domain/industry experts. The following is an effective description for a *manager's* generic role (The Open Group, 2011d):

- The *Manager* has a responsibility for ensuring the feasibility of the EA/BA paradigm, in terms of optimally analysing pertinent concerns of the *Project's* stakeholders. The integrity of the *Project*, in terms of presenting all EA/BA views to various partners, optimally reconciling conflicting concerns of different parties (like the phenomena of resistance), and finding trade-offs for various *Project* problems, like security, availability and performance.
- The definition of an EA/BA paradigm is a key decision that the *Manager* should make. The defined paradigm has to be constrained by particular requirements, and that EA should be developed only to achieve the defined goals, and not reiterated ad infinitum as a reorganizational process...
- The role of a *manager* resembles more to that of a city planner than that of a building architect, and the resultant EA/BA paradigm can be characterized as a planned city (as opposed to an unconstrained slum), rather than as a well-designed building or set of buildings.
- A *Manager* does not create the ICS vision of the *Entity* but has the needed relationships with executives of the *Entity* to push the EA/BA vision, and to implement the strategic Pm for the *Project*. This Pm is tied to the business objectives/plans of the *Entity*. Design decisions are traceable to the final Pm and defined goals.
- The strategic Pm defined by the *Manager* is tied to the EA/BA governance processes and procedures of an *Entity*, therefore modelling and design decisions are not adapted to tactical and personal objectives.
- The *Manager* produces EA/BA documentation of design decisions for the *Project's* development team's external partners to execute.
- A *Manager* is involved in the entire *Project*, starting with collaborating with the customer to understand *Project* needs, as opposed to imagined goals, and then throughout the *Project* to translate the collected requirements into concrete capabilities, prototyped to meet the needs. Added to that, the *Manager* has to present EA/BA different models to clients that communicate and how the *Project* requirements should be implemented. He is therefore an essential participant in all ADM phases.
- The *Manager* is not an implementer, and he must remain at a level of abstraction, necessary to support PCIP's practical realization.

The Role of Soft Skills

The soft skills are subject to many research projects, that is why the authors do not treat how does the *Manager* manage the human factor, and the staff's para-psychological, behavioural and cultural aspects. The implementation of this managerial recommendation is done by the selection of a right *Manager* who has this very important soft qualities and primarily is a technocrat. The subject is out of this RDP's scope and the authors consider that it has been already researched by other scholars. However, they would like to point out that the classical business school graduate *Manager* often uses a human personification of complex ICS and other *Project* problems, which can be viewed as a sign of incompetence and is probably the main reason for *Projects'* failures. Such methods can be also the reason for enforcing responsibilities and engaging of an accountant for quantification of due processes, which undermines the essential hands-on skills.

Needed Hands-on Skills

The AofABIS must have extensive skills in *Projects* and especially PCIPs. His empirical hands-on skills must encompass: 1) Business architectures and BP management; 2) Automated environments (Krigsman, 2008); 3) Agile project management; 4) Integration processes; 5) Organizational engineering; 6) Decision-making; 7) EA/BA; and 8) Other concrete domains.

Therefore, it is recommended to adopt technocrat profile. A technocrat or a system architect depicts these notions (The Open Group, 2011d):

- The *Manager's* responsibility to know and concentrate on the critical *Project* topics and interfaces that have high priorities, and to manage other critical topics.
- The *Manager's* focus is on understanding the client's requirements, where qualitative approach is used more than quantitative measures. The *Manager* uses more inductive skills than the deductive skills of the implementor/developer. The *Manager* manages *Project's* guidelines, rather than traditional rules that implementor/developer uses as a necessity.
- The role of a *manager* may be performed by an experienced engineer, where the main *Project's* goal is to transform the *Entity*.
- The *Manager* must understand and interpret requirements, by probing for information, listening to information, to influence people, facilitate consensus building, synthesize and translate features into actionable requirements, articulate those ideas to others.
- The *Manager* identifies uses or purpose, constraints, risks, ...
- The *Manager* participates in the discovery and documentation of the client's business scenarios that are driving the solution.
- The *Manager* is responsible for requirements understanding and embodies understanding of those requirements in the EA/BA specifications.
- The manager has to create an EA/BA model: take the requirements and develop EA/BA models of the components of the solution, augmenting the models as necessary to fit all the circumstances. To show multiple views through models to communicate the ideas effectively.
- The *Manager* is responsible for the overall EA integrity and maintaining the vision of the offering from an architectural perspective.
- The *Manager* ensures leverage *Project* opportunities are identified, using building blocks, and is a liaison between the functional groups to ensure that the leverage opportunities are well implemented.
- The *Manager* provides and maintains these models as a *Framework* for understanding the domain(s) of development work, guiding what should be done within the *Entity*, or outside the organization.
- The *Manager* must represent the *Entity's* view on the architecture by understanding all the necessary business components.
- The *Manager* validates, refines, and expands the EA/BA model. He verifies assumptions, brings in subject matter experts, ... in order to improve the EA model and to further define it, adding as necessary new ideas to make the result more flexible and more tightly linked to current and expected *Project* requirements.
- The *Manager* should assess the value of solution-enhancing *Project* developments emanating from field work and incorporate these into EA models as appropriate.
- The *Manager* manages and continuously monitors EA and BA models and updates them as necessary to show changes, additions, and alterations.
- The *Manager* is an *agent of change*, representing that need for the implementation of the EA/BA.

Using the Enterprise Continuum

Complex *Projects* require additional *Managers* to support the *Project's* effort. The different categories of *Managers* who are mainly AofABIS, perform cross-functional tasks. The combination of foundation, systems, solutions, and customer architects may be utilized, as a *Project* team. Each *Project* member may have a specific focus, or specific roles and responsibilities, within ADM's phases of the development process. For a PCIP an experienced *Manager* should be assigned to manage and lead the team members. The *Manager* has the role of a Foundation Architect, whose responsibility includes architectural design and documentation at a technical reference model level; and the main types of architects are (The Open Group, 2011d):

- The Foundation Architect leads a group of the System and/or Industry Architects related the *Project*. The main focus of the Foundation Architect is on *Entity's* business functions required.
- The System Architect has the responsibility for architectural design and documentation at a system or subsystem level, like the management of the security sub-system. A System Architect shields the Foundation Architect from unnecessary *Project* details. The focus of the System Architect is on the ICS and related solutions.

- The Industry Architect has the responsibility for EA design and documentation at an industry or domain level. The focus of the Industry Architect is on industry problems and finding optimal solutions.
- The Organization Architect has the responsibility for architectural design and documentation of specific organizations. An Organization Architect re-uses artefacts from all other architects. The focus of the Organization Architect is on enterprise-level business solutions in a given domain.

Existing Skills Frameworks

The authors based the BTPAP on existing skills frameworks like TOGAF's *Enterprise Architecture Skills*, shown in Figure 8, which categories of Skills. BTPAP's and his team's skill set needs to include the following essential categories of skills (The Open Group, 2011d):

- Generic skills, which include leadership, teamwork, inter-personal skills, ...
- Business skills and methods, which include implementing business cases, BP management, strategic Pm, ...
- EA skills, which include modelling, building block design, applications and role design, systems integration, ...
- Program or Pm skills, which include managing business change, project management methods and tools, ...
- ICS general skills, which include brokering applications, asset management, migration planning, service management, audit, ...
- Technical ICS skills, which include software engineering, security, data interchange, data management, ...
- Legal and governance environments, which include data protection laws, contract law, procurement law, fraud, ...

The authors would add the knowledge and skills needed to transform an *Entity*, that is practically formalized in the proposed *Framework*. The key characteristics of a *manager* are (The Open Group, 2011d):

- Skills and experience in producing designs: he must be proficient in the techniques that go into delivering designs of complex ICS systems, requirements discovery and analysis, modelling solution context, identification of solution alternatives and their assessment, technology selection, and design configuration.
- Extensive technical breadth, with technical depth in one or a few disciplines. A *Manager* should possess an extensive technical breadth through his concrete experiences in ICS. This breadth should be in areas of software development and deployment, and in the creation and maintenance of the infrastructure to support the complex business environment. Current environments are heterogeneous, and the experienced *Manager* will have skills across multiple platforms.
- Method-Driven approach to execution. The *Manager* manages the *Project* through the consistent use of recognized design methods like the ADM. The *Manager* must have a working knowledge of more than one design method and be comfortable deploying parts of methods appropriate to the *Project's* context

IT Architect Roles	Architecture Board Member	Architecture Sponsor	IT Architecture Manager	IT Architecture Technology	IT Architecture Data	IT Architecture Application	IT Architecture Business	Program or Project Manager	IT Designer
Enterprise Architecture Skills									
Business Modelling	2	2	4	3	3	4	4	2	2
Business Process Design	1	1	4	3	3	4	4	2	2
Role Design	2	2	4	3	3	4	4	2	2
Organization Design	2	2	4	3	3	4	4	2	2
Data Design	1	1	3	3	4	3	3	2	3
Application Design	1	1	3	3	3	4	3	2	3
Systems Integration	1	1	4	4	3	3	3	2	2
IT Industry Standards	1	1	4	4	4	4	3	2	3
Services Design	2	2	4	4	3	4	3	2	2
Architecture Principles Design	2	2	4	4	4	4	4	2	2
Architecture Views & Viewpoints Design	2	2	4	4	4	4	4	2	2
Building Block Design	1	1	4	4	4	4	4	2	3
Solutions Modelling	1	1	4	4	4	4	4	2	3
Benefits Analysis	2	2	4	4	4	4	4	4	2
Business Inter-working	3	3	4	3	3	4	4	3	1
Systems Behavior	1	1	4	4	4	4	3	3	2
Project Management	1	1	3	3	3	3	3	4	2

Figure 8. Enterprise Architecture Skills (The Open Group, 2011d)

The proof of concept

The already mentioned ACS which has an archaic ICS, a mainframe, claim files service, customer file service.

Application Portfolio Rationalization Scenario, ICS Unification and CSFs

The PoC will try to select the *Manager* and uses a structured pool of CSFs to satisfy the BTPAP requirements. The ACS has already *Project* goals as shown in Figure 9, which can be considered as the base sets of CSAs.

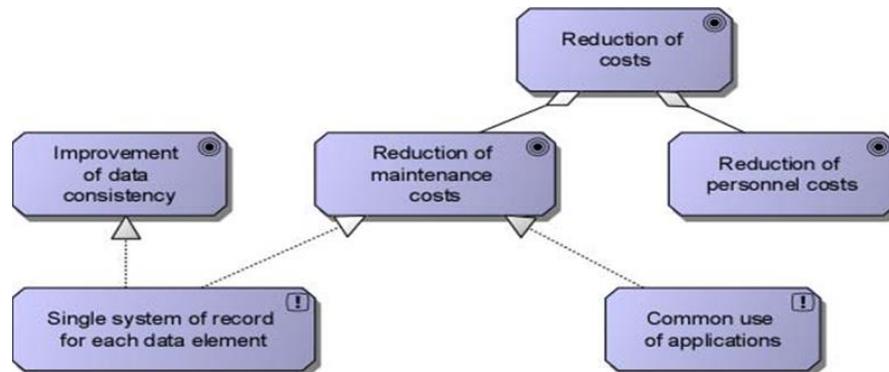


Figure 9. Transformation goals (Jonkers, Band & Quartel, 2012)

The BTPAP’s needed EA skills for: 1) phase A or the Architecture Vision phase, needs EA roadmap; 2) Phase B or the BA phase, needs *Project’s* target architecture and requirements definition; 3) Phase C or the Gap Analysis phase, needs for modelling a target application landscape; 4) Phase D or the Target Technology Architecture and Gap Analysis phase needs the final *Project’s* infrastructure design; 5) Phases E and F, Implementation and Migration Planning, need the transition architecture, proposing possible intermediate situation and evaluates the *Project’s* status. This PoC focuses on the *Manager’s* capability to make a common application architecture.

The Execution

The PoC is implemented using the *Framework* and is based on the AHMM4AP’s instance. The BTPAP interfaces the DMS4AP that uses the selected sets of CSFs which are presented and evaluated in Table 1. The BTPAP required skills have mappings to specific *Projects* resources like CSFs and the used microartefacts are

designed using EA/BA methodologies. The BTPAP also defines relationships between the skills needed for *Project* requirements and microartefacts. The PoC was implemented using the *Framework* client's interface, where the starting activity is to setup BTPAP CSFs. Once the development setup interface is activated, the scripting interface was launched to implement the needed microartefacts to process the defined CSAs. After starting the *Framework's* client, the sets of CSFs were selected and linked to a specific node of the HDT and the pool of microartefacts. The scripts link the AHMM4AP instance to the set of actions that are processed in the background. The AHMM4AP-based HDT uses servi

CSA Category of CSFs/KPIs	Influences transformation management	Average Result
The Applied Case Study Usage	CredibleStable	From 1 to 10. 9.00
The Usage of the Architecture Development Method	FullyIntegrated	From 1 to 10. 9.50
The Information and Communication Technology System	Transformable	From 1 to 10. 9.00
The Mathematical Model's Integration	IsApplicable	From 1 to 10. 9.00
The Decision Making System	Implementable	From 1 to 10. 9.00
The Knowledge Making System	Implementable	From 1 to 10. 9.00
The BTPAP Feasibility	Implementable	From 1 to 10. 8.00

Evaluate First Phase

Table 1. The BTPAP's research's outcome is 8.90

ces that are called by the DMS4AP actions. The BTPAP instance and its related CSFs, for selecting *Managers*, were setup to be used; then the scripts were launched. This article's decision table and its result conclude the PoC's first initial phase, as illustrated in Table 1, which shows clearly that the BTPAP can be used in *Projects*. BTPAP is not an independent component and is bonded to all the *Project's* overall architecture. The *Framework* and hence the AHMM4AP's main constraint to implement the BTPAP is that CSAs for simple *Projects* components, having an average result below 8.5 will be ignored. In the case of the current CSF evaluation an average result below 7.5 will be ignored. This work's conclusion with the result of 8.90 implies that BTPAP's integration is feasible for all types of *Projects*, where the complexity is integrating the BTPAP in *Projects* that must be done in multiple transformation iterations, where the first one should try to define the basic BTPAP and iterate to reach the final state.

Conclusion and recommendations

In this article, the focus is on the optimal BTPAP who can manage the design and PCIP of a *Project*. There has been a lot developed and written on enabling success in transformation projects, but the authors propose to inspect why *Managers* fail in the PCIP of a *Project*. That is mainly due to the *Manager's* lack of knowledge in managing business integration and implementation and the non-existence of adequate EA integration for such RQs. The RDP proposes a set of recommendations on how to proceed with the *Projects* where *Managers* must attempt holistic implementation that is "a proven approach that unites all disciplines in an organization to collaborate together to enable disruptive change" and where "...a few things have become clear: business transformation leaders require technical skills to define comprehensive and complete technical solutions and equally important, also require skills to build consensus among all affected stakeholders". In a meta-managerial business driven coordination, the information technology is a commodity used to glue the various business components (Uppal & Rahman, 2013). There has been a lot of development and research work on the reasons for success or failure in *Projects*, but the authors propose to inspect the holistic aspects of *Projects*. The managerial recommendations are offered to help *Managers* to decrease the high failure rates and are a result of the resources review, surveys outputs, interviews, simulation, and prototyping. BTPAP managerial recommendations, and the *Framework*, round up the approach needed for PCIPs, and the roadmap for selection and educational capacities, on how to select and train a *manager*. The most important managerial recommendation that was generated by the previous research phases was that the business transformation manager must be an AofABIS. The managerial recommendations for the BTPAP are based on the processing

of CSFs which resulted from the literature review and surveys' outputs; these inputs were fed in the HDT. In this article, the focus is on the BTPAP's capabilities, roles, skills, and educational prerequisites. These characteristics and prerequisites are needed to holistically manage the design of PCIPs. The RDP tries to define the optimal BTPAP and his educational curriculum, which should be capable to finalize a *Project*. There has been a lot developed and written on enabling success in *Projects*, but the authors propose to inspect why they fail in the PCIP. Because of the satisfactory score, above 8.5, Table 1 shows that BTPAP's usage in *Projects* is possible and that today the *Framework* is ready and is the only methodology that can in parallel construct *Projects*, EA/BA blueprints, KMS4AP, DMS4AP and *Projects*. The resultant technical and managerial recommendations are:

- As BTPAP was established, the PoC checked its feasibility, and it replaces traditional manager's profile.
- The PCIP is the major cause for failure, therefore there is a need for optimal and qualified *Manager*.
- The *Manager* is an architect and a technocrat (Farhoomand, Lynne, Markus, Gable & Khan, 2004).
- The *Manager* must have experience in *Projects* (Neumeier, 2009; Capgemini, 2007; Capgemini, 2009).
- The *Manager* must be an agile Pm, who can implement EA blueprints.
- The *Manager* must have cross-functional skills (The Economist, 2000); such a person can be described as flexible and adaptable, capable of managing complexity (The Open Group, 2011b, 2011c).
- The literature review proved the existence of a knowledge gap between the traditional management skills and educational prerequisites for *Projects*.
- An evolutionary HDT supported the RDP is used to create the initial BTPAP prerequisites.
- The RDP proposes a concrete *Framework* on how to select, train and evaluate a *manager*.
- BTPAP's educational prerequisites produce general profiles that can cope with heterogeneous complexity and fast changes. High frequency changes are mainly due to the hyper-evolution of technology.
- The RDP confirms the role of *Manager* as an AofABIS.
- The actual business environments produce general profiles that can hardly cope with complexity of heterogeneous business systems.
- The PoC proved the research feasibility and delivered the recommendations on how to select and support *Managers*.

The *Framework* supports the *Projects* by using the BTPAP and delivers a set of managerial recommendations.

References

- Agievich, V. (2014). Mathematical model and multi-criteria analysis of designing large-scale enterprise roadmap. PhD thesis - Mathematical modelling, numerical methods and complexes of programs.
- Alhawamdeh, M. (2007). The Role of Knowledge Management in Building E-Business Strategy. Proceedings of the World Congress on Engineering and Computer Science 2007 WCECS 2007, October 24-26, 2007, USA.
- Blackburn, R., & Rosen, B. (1993). Total quality and human resources management: lessons learned from Baldrige Award-winning companies. *Academy of Management Perspectives* Vol. 7, No. 3 Articles. Published Online: 1 Aug 1993.
- Bruce, C. (1994). *Supervising literature reviews*. UK: in Zuber-Skerritt, O. and Ryan, Y. (eds), *Quality in postgraduate education*, Kogan Page.
- CapGemini (2009). Business transformation: From crisis response to radical changes that will create tomorrow's business. A Capgemini Consulting survey. France.
- CapGemini (2007). Trends in Business transformation - Survey of European Executives. CapGemini Consulting and The Economist Intelligence Unit, France.
- Farhoomand, A. (2004). *Managing (e)Business transformation*. UK: Palgrave Macmillan.
- Farhoomand, A., Lynne, M., Markus, M., Gable, G., & Khan, H. (2004). *Managing (e)Business Transformation: A global Perspective*. UK: Palgrave Macmillan.
- Gardner, H. (1999). *Intelligence Reframed: Multiple Intelligences for the 21st Century*, Basic Books, New York.

- Clark, D. (2002). *Enterprise Security: The Manager's Defense Guide*. USA: Addison-Wesley Professional.
- Daellenbach, H., McNickle, D., & Dye, Sh, (2012). *Management Science - Decision-making through systems thinking*. 2nd edition. Palgrave Macmillian. USA.
- Gartner (2020). IT Talent Drives Digitalization. Bridge the digital skills gap with the right IT talent strategy. Gartner. <https://www.gartner.com/en/information-technology/insights/digitalization-transforms-it>
- Hussain, O., Dillon, Th., Chang, E., & Hussain, F. (2010). Transactional risk-based decision-making system in e-business interactions. *International Journal of ComputSystSci & Eng* (2010) 1: 15-28. CRI Publishing ltd Computer Systems. Science & Engineering.
- Felfel, H., Ayadi, O., & Masmoudi, F. (2017). Pareto Optimal Solution Selection for a Multi-Site Supply Chain Planning Problem Using the VIKOR and TOPSIS Methods. *International Journal of Service Science, Management, Engineering, and Technology (IJSSMET)*. IGI Global. DOI: 10.4018/IJSSMET.2017070102.
- Jonkers, H., Band, I., & Quartel, D. (2012a). ArchiSurance Case Study. The Open Group.
- Kim, J., & Lennon, Sh. (2017). Descriptive Content Analysis on E-Service Research. *International Journal of Service Science, Management, Engineering, and Technology (IJSSMET)*. IGI Global. DOI: 10.4018/IJSSMET.2017010102.
- Kiseleva, I., Karmanov, M., Korotkov, A., Kuznetsov, V., & Gasparian, M., (2018). Risk management in business: concept, types, evaluation criteria. *Revista ESPACIOS*. ISSN 0798 1015.
- KPMG (2014). Over 90 Percent of U.S. Companies Are Changing Existing Business Models: KPMG Survey.
- Krigsman, M. (2008). Business change failures: 9 success tips. Reviewed from <http://www.zdnet.com/blog/transformationfailures/business-change-failures-9-success-tips/1080>. USA.
- Markides, C. (2011). Crossing the Chasm: How to Convert Relevant Research into Managerially Useful Research. *Journal of Applied Behavioral Science*, March 2011 vol. 47 no. 1 121-134. London, UK.
- Morrison, M. (2016). Critical Success Factors - Analysis made easy, a step-by-step guide. rapidBI.
- Neumann, G. (2002). Programming Languages in Artificial Intelligence. Bidgoli (ed) *Encyclopaedia of Information Systems*, Academic Press, San Diego, CA, ISBN 0-12-227240-4, 2002, pages 31-45.
- Neumeier, M. (2009). *Innovation Workshop: Brand Strategy + Design Thinking = Transformation*. UK: Pearson.
- Peterson, S. (2011). Why it Worked: Critical Success Factors of a Financial Reform *eProjects* in Africa. Faculty Research Working Paper Series. Harvard Kennedy School.
- Putri, N., & Yusof, SM (2009). Critical success factors for implementing quality engineering tools and techniques in malaysian's and indonesian's automotive industries: An Exploratory Study. *Journal Proceedings of the International MultiConference of Engineers and Computer Scientists*. Volume 2. Pages 18-20.
- The Economist (2000). Inside the machine. A survey of E-management. *Special report: E-management*. The Economist. UK.
- The Open Group (2011a). Architecture Development Method. The Open Group. USA. The link was reviewed and extracted in February 2018, <http://pubs.opengroup.org/architecture/togaf9-doc/arch/chap05.html>.
- The Open Group (2011b). TOGAF 9.1. The Open Group. USA. The link was reviewed and extracted in August 2018, <http://www.opengroup.org/subjectareas/enterprise/togaf> . The Open Group. The Open Group. USA. 2011.
- The Open Group (2011c). *Enterprise Architecture Standards*. <http://www.opengroup.org/standards/ea>. The Open Group. USA.
- The Open Group (2011d). Architecture Skills Framework. <https://pubs.opengroup.org/architecture/togaf8-doc/arch/chap30.html> . The Open Group. USA.
- Trad, A., & Kalpić, D. (2013a). The "Selection and Training Framework" (STF) for Manager's in Business Innovation Transformation Projects" / The Profile. IEEE, ITI Conference. Croatia.
- Trad, A., & Kalpić, D. (2013b). The Selection, and Training framework (STF) for Managers in Business Innovation Transformation *eProjects* - The Literature Review. *IEEE 2013, Centeris*. Portugal.
- Trad, A., & Kalpić, D. (2014a). The "Selection and Training Framework" (STF) for Manager's in Business Innovation Transformation *eProjects*" / The mathematical model. EUROPMENT, Conference. Switzerland.
- Trad, A., & Kalpić, D. (2014d). The Selection and Training Framework (STF) for Managers in Business Innovation and Transformation *eProjects* - The Profile of a Business Transformation Manager. *IMRA, USA*.
- Trad, A., & Kalpić, D. (2014e). The Selection and Training Framework (STF) for Managers in Business Innovation and Transformation Projects - The TOGAF recommendations. *EUROPMENT, Venice, Italy*.
- Trad, A., & Kalpić, D. (2014f). The Selection and Training Framework (STF) for Managers in Business Innovation and Transformation Projects - Integrating the restructuring process of the global economy, *IMRA, Cambridge, UK*.
- Trad, A., & Kalpić, D. (2015b). The Selection, Control, Decision making and Training Framework for Managers in Business Innovation and Transformation *eProjects*- Managerial Recommendations for enterprise architecture. EUROPMENT, Conference. Switzerland.
- Trad, A., & Kalpić, D. (2016a). The (e)Business Transformation Framework for (e)Commerce Architecture-Modelling Projects. *Encyclopaedia of E-Commerce Development, Implementation, and Management*. IGI-Global. USA.
- Trad, A., & Kalpić, D. (2017a). An Intelligent Neural Networks Micro Artefact Patterns' Based Enterprise Architecture Model. IGI-Global. USA. 2017.

- Trad, A., & Kalpić, D. (2018a). The Business Transformation Framework and Enterprise Architecture Framework for Managers in Business Innovation-Knowledge and Intelligence Driven Development (KIDD). Encyclopaedia, IGI-Global. USA.
- Trad, A., & Kalpić, D. (2020a). Using Applied Mathematical Models for Business Transformation. IGI Complete Author Book. IGI Global. USA.
- Trad, A., & Kalpić, D. (2021a). An Applied Mathematical Model for Business Transformation and Enterprise Architecture: The Holistic Profile Management System (HPMS)
- Uppal, M., & Rahman, T. (2013). Business Transformation Made Straight-Forward. QR Systems Inc. Canada.
-

Assessing the role of China in Africa's infrastructure development and its impact on the African continent.

Jean-Marie Mwepu Mbuya

Amanda Mphahlele

College of Business & Economics, School of Management
Department of Business Management, University of Johannesburg, South Africa

Keywords

Infrastructure, China, development, economic growth

Abstract

China is one of the fastest growing economies in the world. In 2019, statistics shows that - China's economy grew by 6.3 %. In addition, it has now become a major development partner for countries throughout the continent, and its trade, investment, diplomatic, and political relationships with sub-Saharan African countries continue to strengthen.

In 2015, foreign direct investments into Africa totalled \$66.4 billion for a total of 705 projects, with infrastructure-related commercial activities like energy, building, and ICT & internet infrastructure accounting for 13% of all projects into Africa, and 44% of capital invested.

This paper aimed to assess the role of China in Africa's infrastructure development and the impact these projects have on the African continent, in order to determine their worth for informed decisions to the governments involved. For this purpose, literature was reviewed and found that, while Chinese projects largely provide job prospects and access to utilities such as electricity, water and etc, working conditions in these projects are very unfavourable with poorly administered policies. The paper proposes proper monitoring and evaluation by relevant government agencies at the sites of constructions.

Introduction

"Africa suffers from poor quality and expensive infrastructure services compared to other parts of the world. It is estimated that this constraints productivity by up to 40% and reduces the continent's GDP by about 2 percent per year" (Mofor, 2019).

According to Ondiege, Moyo and Chouchane (2013), Infrastructure development is crucial for economic development for any economy. However, African countries are characterised by inadequate infrastructure that have raised the transactions costs of doing business in the continent. This implies that today, African countries exhibit the lowest of productivity of all income countries and are classified under the least competitive economies in the world. Further, Ondiege et al (2013) also indicated that the lack of infrastructure in the African continent is estimated to shave off at least 2 percent of African annual growth. According to a study conducted by the Programme for Infrastructure development in Africa (PIDA), an investment of about 93 billion US dollars is needed until 2020 for both capital and maintenance. Therefore, with the huge investment needed, Governments are required to investigate for innovate and sustainable approaches in order to raise the finances needed to develop and modernise their infrastructure. This implies that with their budgetary resources, African countries were unable to finance infrastructure projects.

Currently, According to Jayaram, Kassiri & Sun(2017) , over 10,000 Chinese-owned firms are currently operating throughout the African continent, and the value of Chinese business there since 2005 amounts to more than \$2 trillion, with \$300 billion in investment currently on the table (China Global Investment Tracker, 2020). To keep this momentum building, Beijing recently announced a \$1 billion Belt and Road Africa infrastructure development fund (Silk Road Briefing, 2019)and, in 2018, a whopping \$60 billion African aid package,(Sow, 2018), with several other developments that were stopped due to Covid-19 in 2019 and 2020. As a result, Africa's pull to the east is expected to continue as commercial relations with China become more widespread and robust.

The problem

As indicated earlier, Chinese investment play a crucial in infrastructure development in the African continent over the past years. African governments are therefore able to collaborate with Chinese government on various project in exchange of mineral resources or other related benefits. However, the challenge remains the fact the Chinese companies are now taking total control of the African market, and this is negatively affecting local business development. In addition, most of the African government do not have systems and measures in place to actually evaluate the quality of the work delivered by the Chinese partners and this end up not to be a win-win situation for African countries.

Methodology

The research followed a qualitative approach and made use of secondary sources in the form of reports, journal articles and other case studies on focusing on China's involvement in Africa infrastructure development.

Research objective

This research aims to assess China's involvement in developing Africa's infrastructure by means of reviewing various studies done in Africa over the past years. In addition, the research aims to provide recommendations to stakeholders and policymakers based on findings of the different research that have been done.

Literature review

The state of African Infrastructure

In the African context, developing infrastructure is crucial in order to alleviate the high-rate poverty that the continent is experiencing (Khumalo, 2013:5644). According to Stachtebeck and Mbuya (2016), infrastructure development plays an important role in both rural and urban areas. In rural areas, infrastructure development can boost agricultural production and commercialisation. Further, Mesegan and Bello (2018) also point out the fact that an adequate supply of infrastructure services is a key requirement for the structural transformation of any economy from the production of primary products to the secondary services. Therefore, a reliable transport network can significantly reduce the high cost associated with the shipping of agricultural product as well as improving access to arable land. In addition, economic interactions are in much closer proximity in urban areas, as this enables more efficient use of space due to ease of access to nearby public facilities, job opportunities and housing.

The word Infrastructure originates from Latin, and namely the word "infra" is understood as grounds or fundamentals while "structure" refers to distribution of elements of certain undefined setup. Infrastructure is the basic systems and services, such as transport and power supplies that, a country or organisation uses in order to work effectively. Infrastructure is a component of the territorial structure of national economy, which is formed by the transport, communications, trade, energy and water management systems as well as dwellings, schools, objects of health protection, culture, sports and other objects for the wellbeing of inhabitants and their arrangement in any territory (Skorobogatova & Merlimo, 2017).

According to Azam and Bakar (2017), infrastructure can be classified into two broad categories namely, economic infrastructure and social infrastructure. Economic infrastructure comprises transport and communication, irrigation, energy, banking ect., whereas social infrastructure comprises sectors such as housing, health, education ect. The level of development of the different areas influences infrastructure development. Therefore, it can be argued that the improvement of infrastructural services is crucial in order to enhance efficiency of the productive process and to raise productivity of any economic entity.

Kauffman (2008) stated that the lack of adequate infrastructure has important direct and indirect human implications and negatively impact of business development. In her study titled "Engaging the Private Sector in African Infrastructure", the authors also reported that due to the lack of infrastructure, the cost of doing business in the African continent was 30% higher than in other region, with high level of indirect expenses estimated to 20 to 30% of the cost. Some of the factors identified by the authors that caused this situation included economic legislation and weak legal systems, inadequate infrastructure ect. Further. Kauffman (2008) also stated that investment in infrastructure related projects is highly capital intensive associated with long payback periods with disparate commercial rates of return across sectors. It has been reported that Bank rates ranges from 5 to 10% in the water sector, 17-25% in the power sector and nearly 25

to 30% in the telecoms sector. Therefore, this profile generates high contractual and risks in the context of political instability.

Chinese Infrastructure Investments in Africa

Kirchhner, Disselhoff and Charles (2016) stated that China is a major investor in Africa's infrastructure. It has been reported that China's investment is estimated to approximately two-thirds of the total infrastructure investments since 2007. In addition, it has also been reported that about 16% of China's foreign direct investment in the African continent is directed to infrastructure with an estimated 31% in mining, a 20% into the finance industry. However, it has been reported that the majority of investment are focusing on the power sector.

Some examples of Chinese investment in Africa include the following namely, The Tanzania-Zambia railway with 1800 km; the project costed nearly USD 450 million. In Addition, roads, wells and telecommunication facilities were also among the projects done. The Caxito irrigation projects in Angola (2007-2010), the Kuito Water supply in Angola ect. Other example of Chinese infrastructure project in Africa includes Senegal; the Dakar Container Terminal and the Main one Cable System. It is important to note that the Main one Cable System is crucial in the way that it was aimed to improve Internet access at lower cost in West Africa (Schiere & Rugamba,2011) to name a few.

One may ask why China seems to be succeeding as a primary financier of infrastructure development in projects in Africa with loans estimated to approximately 6.5 billion US dollars Bosshard (2007). Reality is, the Chinese government noticed that Africa's most pressing need is infrastructure, but it is unaffordable to the continent as a whole, even if they join forces. According to the recent World Finance projections, Africa's countries will need to invest \$130-170 billion each year on infrastructure to meet their needs (Ballard 2018). However, the African Development Bank estimates that they will fall short by \$68-\$108 billion (WallStreet, 2018).

Also, many African contractors simply lack the capacity for large-scale development projects, so when it comes to conducting large-scale construction, is either the western firms or the Chinese firm, but the Chinese firm are always able to offer lower prices. Hence, China has been the most important actor in Africa's infrastructure development since 2011, with a 40% share that is still growing. Meanwhile, other players' shares are plummeting Europe's stake has dropped from 44% to 34%, while the participation of US contractors has dropped from 24% to only 6.7 percent. See figure 1 which indicates China's share in the African development market against other counties around the world.

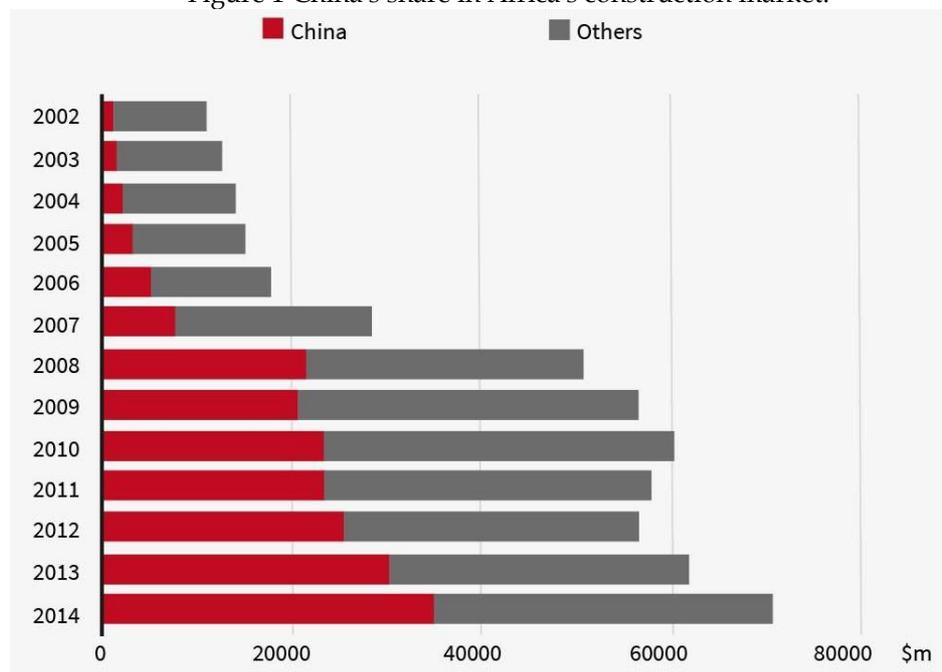
Scholars also argue that China's model of investment in the Africa continent is far different from the western traditional partners. No wonder it has overtaken the United States and Europe as Africa's most important trading partner, with huge shares in Africa's construction market, see figure 1. And today most African countries have huge trade deficits with China, selling resources and purchasing manufactured commodities from the Chinese Adisu & Sharkey (2010) stated that China's approach in relationship with African government was unique; the authors further explained that their approach is not to get involved with local politics of the country there are interested in. Western governments often provide financial or material aid to African countries, which some contend is only a bandage over complex and entrenched structural problems. Clearly, this method has failed to result in Africa's inclusive and long-term growth (Brown, 2018). Also, this means that factors such as democracy, good governance and poverty reduction to name a few are not part of their agenda when investing in Africa. Whereas the West prefers to impose values on the countries it aids (often in accordance with foreign policy aims), China is all about business transactions. China's government does not impose its political or foreign policy objectives on African nations. Focusing solely on business and investment, Africans are more welcoming of China's presence, as it is in many ways the polar opposite of Western governments' neocolonial mindset, which seeks to actively participate in local African affairs (Brown, 2018)

Rather, Chinese model of investment in Africa focus on assisting African government in developing their infrastructure in exchange of rich natural resources found in the continent. For instance, Africa provides about a third of China's oil, as well as 20% of the country's cotton. Africa holds about half of the world's manganese reserves, a crucial component of steel production, while the Democratic Republic of the Congo alone holds half of the world's cobalt reserves (Shepard, 2019). Africa also possesses a large supply of

coltan, which is used in electronics, as well as half of the world's known supply of carbonatites, which are the principal source of rare earths (Herskovitz, 2011).

Example of this model can be seen in countries such Angola, where Chinese secured a US 2 billion dollars in aid for infrastructure projects, thereby securing a form shell oil block in Angola by outbidding an offer from the Indian Government. In line with the investment in Angola, China also promised US 7 billion in investments and rehabilitation of power stations to secure an oil investment from the western investment. One important benefit that African government get from the new Chinese partners is the fact that their investment does not require a package of reform usually required by the World Bank under its "Conditionality provisions". Therefore, it can be argued that Chinese investment come with "no strings attached" and a crucial for African governments in need of resources for their development.

Figure 1 China's share in Africa's construction market.



Source: (Huang & Chen, 2016)

Another reason that makes Africa is a more fertile ground for such investments is that it has the highest population growth potential of any continent on the planet. The continent, which already has the world's youngest and fastest-growing population, is urbanizing at a faster rate than any other portion of the globe. The world economic Forum on Africa of 2016 in Kigali Rwanda, it was predicted that the population is expected to double by 2050. More than 80% of that growth will occur in cities, especially slums (Muggan & Kicullen, 2016).

It's no surprise that China wants to take advantage of some of Africa's fastest-growing economies. Countries, such as Kenya and Ghana, are experiencing a growing middle class, resulting in a rise in consumerism. Africa's expanding consumer class is particularly appealing This is beneficial to Chinese producers (Brown, 2018), considering a drop in demand for Chinese goods in Europe and the United States illustrated in table 1, beaten 2014 and 2015 (UNCRAD, 2016).

Table 1: Table 2: Changes in the value of the largest bilateral trade flows between 2014 and 2015, by product group: Manufacturing

Exporter (Billion)	Importer	Change 2014 vs 2015 (%)	Value in 2015 (US\$ Billion)
European Union	China	-15%	191
European Union	European Union	-12%	2320
United States	Canada	-8%	173
China	European Union	-6%	417

Canada	United States	-3%	183
China	Hong Kong S.A.R.	-3%	249
China	United States	3%	490
European Union	United States	3%	371
Mexico	United States	7%	251
United States	European Union	9%	288

Source: UNCTAD 2016 (calculations based on Comtrade data.

The impact of Chinese investment in Africa

The involvement of China in African development has since been perceived with mixed feelings. While it is perceived with skepticism due several issues, there're are those who welcome the interventions as optimistic for African development (Alden, 2005), only a strategic vision needs to be developed, for the continent to optimally benefit from the Chines investments (Schiere & Rugamba, 2011), as similar to the neo-colonialism of the past (De Lorenzo, 2007).

Labour market and socio-economic factors

Although in the early 2000s it was perceived that Chinese firms employ less locals, things seem to changing. For instance, over the last five years, the number of Chinese laborers in Africa has decreased by 30.7 percent. The Chinese labor force in Africa has been steadily declining since 2015, when it peaked at 263,659 people (Idris, 2021). Resent research conducted by the Industrial Development, Construction and Employment in Africa (IDCEA) in Angola and Ethiopia also confirmed growth in localization rates, for instance, rates were 90% for all workers in Ethiopia, and 100% for low-skilled workers, and 74 percent in Angola, where rates are often significantly lower due to skill shortages (Oya and schaffer 2019). Similarly, Kirchher, Disselhoff & Charles (2016) indicated that only 2 out of 10 workers hired during the Bui dam construction in Ghana were Chinese. While the total number of Chinese workers in Africa is generally declining, some countries, such as Guinea, Mauritania, Uganda and Zimbabwe, are seeing an increase (Ani, 2020). For instance, Zimbabwe had at least 10,000 Chinese residents, the majority of whom work in the mining, telecom, and construction industries. The presence of such a high number of Chinese people in the country causes tensions among locals (ANI, 2021).

In addition to increasing employment prospects for locals, he contracted projects have contributed to the transfer of technical and management skills from Chinese specialists to African workers (Baah and Jauch, 2009). As a result, some residents have established their own construction firms. However, there are other labor relations and employee wellness issues, which these firms allegedly ignore. There is consistently great concern about working conditions in Chinese enterprises (Laryea and Mensah (2010). And most often, improvements are only implemented if workers and trade unions protest (Kirchher, Disselhoff & Charles 2016). In 2019 the Zimbabwe Environmental Lawyers Association (ZELA) exposed rampant abuse local workers experience, to an extend that the assassination advised the government to reconsider the country's relationship with China (ANI, 2020).

In some cases, local workers are not given contracts of employment, because for some reasons Chinese authorities do not expect to find organized labour in Africa (Baah and Jauch 2009). It is reported that Chinese authorities when establishing a project in Arica, the "implement industrial revolution capitalism" Kirchher, Disselhoff & Charles 2016:5),make it difficult for labour union formation, and pose threats and intimidation whenever workers try to challenge their systems (Hensengerth, 2011). Further allegations include dismissing workers absent on health grounds, not proving workers with safety uniform, physically abusing workers. While other workers were sleeping on the bare floor because of shortage of mattresses, The project manager commented that "After all, some of them are living in better accommodation here than most of the villagers around," (The Ghanaian Times, 2008). More health and safety concerns were raised by Laryea and Mensah (2010), after investigating 14 construction sites of different Chinese projects in Ghana. Though health and safety policies were in place to ensure some form of structure for assuring health and safety on the job, the data showed that there was a significant disparity between what is stated in the policy and what actually occurs in practice. Contractors did not implement the majority of the policy's provisions on the job site. Some of the key motives behind these actions were found be maximization of profits to make the most money

possible, as well as the lack of substantial penalties for health and safety offenses. These scenarios indicate a gap when it comes to monitoring and evaluation in other African countries.

Concerning trade and business, recipient African countries have benefited from investment inflows, however, there have been certain downsides. They have, for example, had a negative impact on local trade and business. Furthermore, Chinese investment has not always benefited African workers. (Adisu, Sharkey & Okoroafo, 2010). China has been accused of only being concerned about the globalization of Chinese construction and IT corporations, as well as the development of infrastructure to better exploit and export African resources. (Shepard, 2019)

Socially, in many countries, people's lives were positively impacted, mostly in urban areas. For instance, hydropower infrastructure made electricity more accessible (Tang and Shen, 2020). However, lack of social safeguards is a major accusation leveled against Chinese players in Africa. Local rules and regulations are often underdeveloped, if not non-existent, in many developing markets. Kirchher, Disselhoff, and Charles (2016), for example, criticized Chinese participants for the lack of an effective consultation process during the construction of the Bui Dam in Ghana. "Constructors had no idea when they would be relocated, when they would be compensated, or how to express their dissatisfaction" (Kirchher, Disselhoff & Charles 2016:41). Scholars examining Chinese dam projects in the Mekong River Basin agree with this conclusion about roles and duties in dam development (Matthews and Motta, 2013). Another concerning issue is the threat of transmission of diseases among workers. Though workers employed in Chinese projects come from local areas, usually due to insufficient skills at the immediate regions, most of them come from outside the construction area (Baah and Jauch, 2009). This inflow of labor will almost certainly have social consequences. Large influxes of laborers from other zones are typically linked to an increase in prostitution and the spread of diseases (Lerer and Scudder, 1999).

Indebtedness

When we look at Africa, we see many countries chasing aspirations of a brighter economic future while burying themselves in tremendous infrastructure-related debt that they may not be able to repay. There were previously warning signs: Ethiopia's \$4 Addis Ababa-Djibouti Railway cost roughly a fourth of the country's total 2016 budget. Nigeria had to renegotiate a contract with their Chinese contractor when they failed to pay, while in 2017 in Kenya's 80 percent Chinese-financed railway from Mombasa to Nairobi is already four times over budget, costing the country upwards of 6% of GDP (Pheiffer, 2017). According to the IMF, China owned 15% of Africa's external debt in 2012, yet just three years later, China accounted for roughly two-thirds of all extra loans (Brown 2018). As a result, some analysts are predicting debt traps, while others are calling China's efforts a new type of colonialism.

Conclusion and managerial implications

From the above, it can be argued that China plays a crucial role in Africa's infrastructure development. Having good infrastructure in Africa is crucial in order to develop the private sector but also challenges related to poverty and inequality. However, a number of studies have criticized China investment model in Africa in a number of ways. For instance, a study conducted by Chen (2009) highlighted the fact that infrastructure related project done by Chinese companies were not of good quality; this evidence was obtained from officials in Botswana who pointed out some irregularities in some of the work done.

In absolute terms, China has been the biggest contributor to job creation, particularly in recent years, despite raised labour relations issues. It has been recorded that some African countries do have good labour relations legislations, however, these laws are not enforced at construction sites at all, or except by the intervention of labour unions. Therefore, responsible government agencies should ensure proper monitoring and evaluation at these sites. Chinese partners had the tendency of bringing their own labour directly from China instead of favouring local labour. Though in recent years a change has been detected, some areas still experience the concentrations, which create tensions among workers. Social responsibility, language and cultural differences have also been highlighted as problems. In order to avoid disappointment, African government should agree with the Chinese partners on clear deliverables for the various projects and put in place mechanisms to ensure that the partnership results on a win-win outcome beneficial for both. In addition, a third-party partner should also be involved in order to provide his expertise on the quality of the various projects.

References

- Adisu, K and Sharkey T (2010). The impact of Chinese Investment in Africa. *International Journal of Business Management*. 5 (9): 3-9
- Alden, C. (2005). China and Africa. *Survival*, 47(3), 147-164.
- Baah, A.Y. and Jauch, H., 2009. *Chinese investments in Africa: A labour perspective*. African Labour Research Network.
- Bosshard, P (2007). China's role in Financing Africa Infrastructure. International Rivers report.
- Chen, A.Y (2009). China's role in Infrastructure development in Botswana. Working paper. African perspectives.
- De Lorenzo, M. (2007). African Perspective on China. American Enterprise Institute for Public Policy Research, Wed. October 3, 2007.
- Hensengerth, O., 2014. Interaction of Chinese institutions with host governments in dam construction: the Bui Dam in Ghana. In *Evolution of Dam Policies* (pp. 229-271). Springer, Berlin, Heidelberg.
- Kauffman, C (2012). Engaging the private sector in Africa Infrastructure. Investment and transport infrastructure.
- Kirchherr, J, Disselhoff, T and Charles, K (2016). Safeguards, financing and employment in Chinese infrastructure projects in Africa: the case of Ghana's Bui Dam. 31(1): 38-58.
- Moyo, L (2020). Africa has a 100 billion Infrastructure problem. What is missing? Available from <https://www.brinknews.com/africa-has-a-100-billion-infrastructure-problem-whats-missing/>
- Laryea, S. (2010) Health and safety on construction sites in Ghana. In: The Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors, 2-3 September 2010, Dauphine Université, Paris, France. Available at <http://centaur.reading.ac.uk/16289/> [accessed 28 June 2021]
- Lerer, L.B. and Scudder, T. (1999) 'Health impacts of large dams', *Environmental Impact Assessment Review* 19(2): 113-23 <<http://www.sciencedirect.com/science/article/pii/S0195925598000419>>.
- Matthews, N. and Motta, S. (2013) *China's Influence on Hydropower Development in the Lancang River and Mekong River Basin* [pdf], State of Knowledge Series 4, Vientiane, Lao PDR: Challenge Program on Water and Food <https://cgspace.cgiar.org/bitstream/handle/10568/35102/Chinainfluence-_Eng.pdf?sequence=1> [accessed 20 June 2012].
- Skororobotogotova, O and Merlino, I.K (2017). Transport Infrastructure Development performance. 16th Conference on Reliability and statics in transportation and communication. 178: 319-329.
- Odienge, P, Moyo, JM and Chouchane, AV (2013). Developing Africa's Infrastructure for enhanced competitiveness. The Africa competitiveness report
- Oya, C. and Schaefer, F., 2019. Chinese firms and employment dynamics in Africa: A comparative analysis. IDCEA Synthesis Report.
- Schiere, R. and Rugamba, A., 2011. Chinese infrastructure investments and African integration. African development Bank Group, Series N° 127, Tunis, Tunisia.
- Shinn, D.H., 2016. The Environmental Impact of China's Investment in Africa. *Cornell Int'l LJ*, 49, p.25.
- Tang, K. and Shen, Y., 2020. Do China-financed dams in Sub-Saharan Africa improve the region's social welfare? A case study of the impacts of Ghana's Bui Dam. *Energy Policy*, 136, p.111062.
- The Ghanaian Times* (2008) 'Ghanaians working on Bui Dam clash with employers' [online], Modern Ghana <www.modernghana.com/news/167064/1/ghanaians-working-on-bui-damclash-with-employers.html> [accessed 28 June 2021].
- Xiaoyang, T. and Sun, I.Y., 2016. Social responsibility or development responsibility-what is the environmental impact of Chinese investments in Africa: What are its drivers, and what are the possibilities for action. *Cornell international Law Journal*: 9 (1) 3

Current Account Balances, External Debts and Exchange Rates in Selected African Countries

Ohioimoje Abubakar Iyemifokhae

Department of Economics, School of Economics,
University of Ibadan, Ibadan, Oyo State, Nigeria.

Keywords

Current Account Balances, External Debts, Exchange Rates, Generalised Method of Moments, Instruments.

Abstracts

Most African countries had been bedeviled by the problem of deficits in their current account balances (World Bank, 2020). In a bid to overcome this challenge, they usually resorted to contracting external debts from institutions and countries that required them to repay these loans in the currencies of the creditors. Thus, the rate of exchange between the creditors and debtors should be of concern. Several studies have been carried out to examine the relationship between current account balances, external debts and the exchange rates. Some studies found a unidirectional relationship among these variables. In some other studies, the relationship knitting these variables was bi-directional. In most of these studies, the methods of analysis ranged from the ordinary least squares, panel data analysis and the vector error correction model. This study fills the gap in the literature by examining the relationship across these variables making use of the generalized methods of moments (GMM). The GMM estimation technique will correct for unobserved heterogeneity, endogeneity and measurement errors which were observed in the data. The study found that a 9.46% increase in external debts leads to a percentage increase in current account balances in the selected African countries. Also, there is a positive and significant relationship between the exchange rates and the current account balances in the group.

1 Introduction

The difference between the export and import of goods and services is known as the current account balances. When the exports of a country surpass her imports, this is current account deficits. Here, such a country is buying more from foreigners than it sells to them, and the former country must search for ways to finance this deficit. A country has a current account surplus when its exports exceed her imports. Such a country sells more goods to foreigners than it buys from them. In this case, the former country lends its surplus to foreigners. In deficit financing, the sources of borrowings could take the form of bond finance, bank finance, official lending (from institutions like International Monetary Fund, African Development Bank), foreign direct investment and portfolio investment in the ownership of firms. These sources of financing can be in the form of debt or equity finance. When a country's liabilities are knitted in debt, its scheduled repayments to creditors do not fall if her income falls. It carries fixed repayment structure. In equity financing, creditors are considered to be shareholders and share in the good or bad times of debtors (Aigbokan, 1991). When a country incurs debts outside its geographical boundary to finance her deficits, this is termed external debts. The repayments of such debts are overwhelmingly denominated in foreign currencies (usually in the currency of the creditor nation or where the credit institution is domiciled). Lending institutions from the developed countries do not want to be overwhelmed, given the high rate of devaluation and inflation that thrive in developing economies. Thus, such institutions usually insist that debtors from developing countries repay them in lenders' own currencies (Mike, 2012). Economists like Barry Eichengreen of the California University and Berkeley and Richardo of Harvard University described the phenomenon in which developing countries cannot borrow in their own currencies as original sin. Other economists argue that the sin of developing countries is not original but stems from their antecedents of ill-advised economic policies. The debate is far from being over. The inference drawn from these arguments is that the rates of exchange between countries need to be examined side by side with macroeconomic variables. This study limits itself, however, to the current account balances, external debts and exchange rate in selected countries in Africa.

In 1979, the Federal Reserve Bank in the United States (US) adopted tight inflationary policies that pushed the global economy into recession. This made it difficult for underdeveloped countries to meet their prior debt obligations that were denominated in the US dollar. For instance, Mexico raised an alarm that its central bank was running out of foreign reserves and that the country could not repay its foreign debts. Given the similarities between Mexico and other Latin American countries, creditors (in developed countries) started to hedge their risks by reducing credits and demanded for the repayments of their existing loans from debtor countries and institutions. The underlying problem that the creditors envisaged is that, given the high rate of inflation and devaluation (of local currencies) that characterized the economies of developing and emerging countries, most of these debtor nations could not obtain favorable trade balances to offset their external debts. This problem did not rescind until 1989 when the United States, while trying to avert impending political instability, insisted that American banks granted some debt reliefs to indebted developing countries. The early 90s saw the resurgence of private capital flows into developing countries. Many developing countries relied on financial inflows to finance domestic investments and built their inadequate infrastructures. At the end of 2007, developing countries had accumulated external debt to the tune of \$3.5 trillion (World Bank, 2020). Since these external debts had to be repaid in the currencies of creditor nations and institutions, indebted developing countries ought to be concerned about their respective countries' exchange rates and current account balances. This was what informed the decisions of researchers to examine the economic relationship among these variables.

Several studies have been carried out on the relationship between external debts, current account balances and the exchange rates. Some studies found that there were causalities on this relationship. In some other studies, the relationship was bi-directional; that is, moving from current account balances to external debts and exchange rate and drifting back from exchange rate via external debts and to current account balances. In other words, the relationship guiding these three variables was not a uni-directional one. This study will examine this relationship with special interest in the selected countries in Africa.

Furthermore, in most of the earlier studies of the subject matter, the method of analyses ranged from the ordinary least square techniques in which endogeneity would be a major concern to the Vector Error Correction model, Panel Data analysis and the Autoregressive Distributed Lag (Fratzscher and Samo, 2010; Rehman and Rehman, 2010; Taoufik, 2019; Oyakhilome, 2018; David and Olohitare, 2013; James and Kennedy, 2018). This study will fill the vacuum in the literature by making use of the Generalised Method of Moments (GMM) in its analysis.

2. Background of the Study

It has been observed that the current account balances of most developing countries (like those considered for this study) had hitherto been on deficits. The value of imports purchased from their trading partners exceeded those of exports. This has been the trend in several decades. The graph below gives a representation of the current account balances of the selected countries in Africa

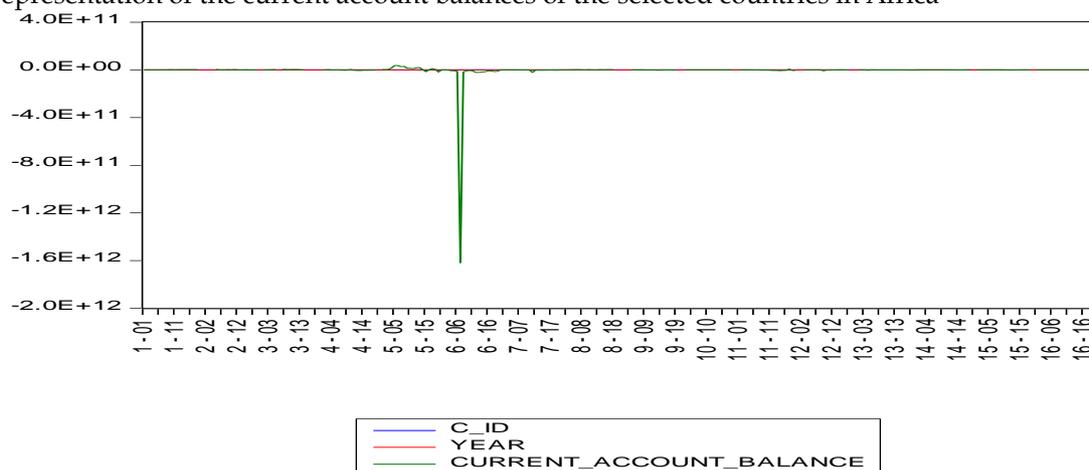


Figure 1. Current Account Balances in the Selected Countries.

Source: Author's Computations.

The x-axis represents the countries identifications (C_ID) and the years in consideration (2001-2019) while the y-axis shows the current account balances of the group. In the graph, the current account balances of the selected African countries were predominantly on deficits in most of the sample period. Apart from the country with C_ID 5 (Nigeria) that recorded some current account surpluses in few years, there was hardly a semblance of this in the group.

The volume of external debts contracted by developing countries had been high during the sample period. This metamorphosed from the fact that it was exigent for these countries to uplift their infrastructures to boost their productive capacity and the desideratum for such countries to be competitive in the international market. The figure 2 gives a diagrammatic representation of the size of external debts of the selected countries over the period under review.

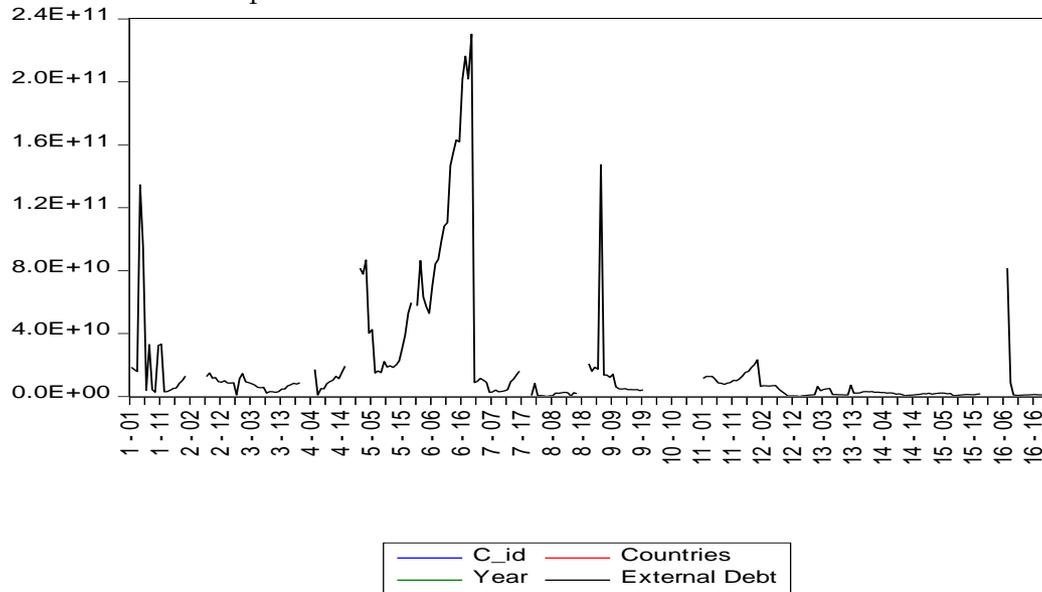


Figure 2. External Debts of the Selected African Countries.

Source: Author's Computation.

It can be seen from the figure above that there had been volatilities in the size of external debts contracted by the selected African countries in the sample period. The number of external debts rose to almost \$3 trillion in 2016. Although, there were periods when the tides of external debts were in their minimum, the graphical representation showed that members of this group of selected countries had been engaged strongly in different volumes of external debts in the periods under consideration (2001 - 2019).

The Figure 3 shows the exchange rates of the selected African countries over the sample period. The exchange rates of this set of indebted African countries had been very low relative to the currencies of institutions and countries that stood as creditors to the debts. In Figure 3, there were periods of break, suggesting that data on exchange rates were omitted in some countries (in the group) in certain number of years.

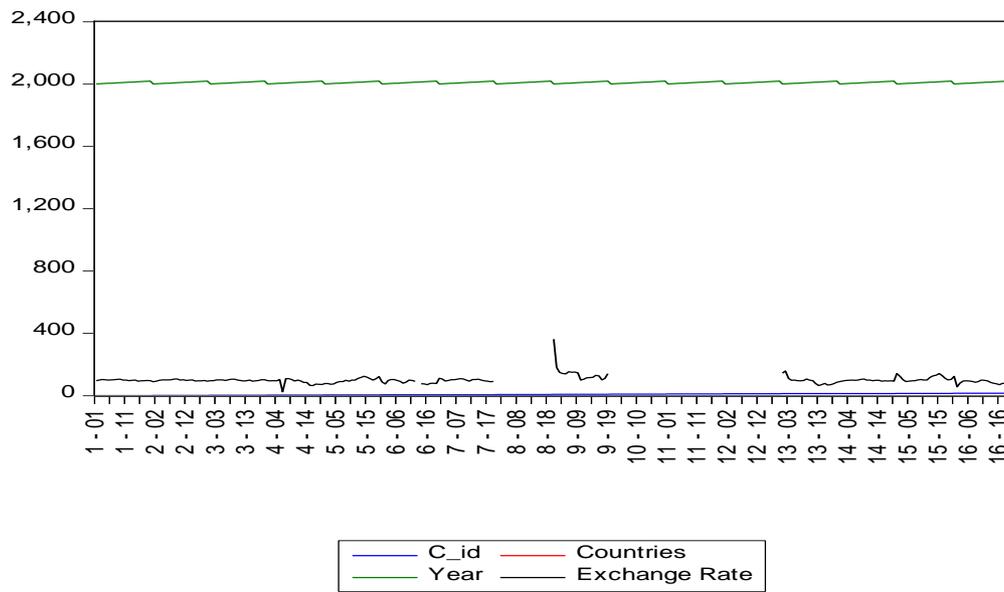


Figure 3. The Exchange Rates of the Selected African Countries.

Source: Author's Computation.

3. Literature Review

Several studies had been conducted on the relationship between current account balances and external debts. In few other instances, exchange rates were included in the framework. For instance, James and Kennedy (2018) examined the relationship between external debt servicing and current account balances in Kenya. The study found that external debt servicing granger caused current account balances in Kenya. The exchange rate variable was not inclusive, and the emphasis of the study was on Kenya. Similarly, Oyakhilome (2018) carried out a study on external debts and current account adjustments (with a focus on the role of trade openness) in Sub Saharan Africa. The study discovered that external debts were significantly responsible for the variations in trade openness in the region. David and Olohitare (2013) examined exchange rate misalignments and balance of payment adjustments in Nigeria. Apart from the fact that the study placed its search light exclusively on Nigeria, the data used (between 1973 and 2012) was not contemporaneous with recent happenings in respect to the considered variables.

Besides, the methodologies adopted by most of the literature ranged from the vector error correction model (James and Kennedy, 2018; David and Olohitare, 2013)) to panel data analysis (Oyakhilome, 2018). This research shall fill the gap in literature by examining (in a single study) the relationship of current account balances, external debts and exchange rate in sixteen countries in Sub Saharan Africa. Furthermore, the GMM technique is used (in this study) to estimate the relevant variables because of the peculiarities of the data. This technique will help to solve the problems of unobserved heterogeneity, endogeneity and measurement errors (Arrelano and Bond, 1991).

4 Methodology

4.1 Model Specification

On the stationarity or otherwise of the variables in the model, the Levin, Lin and Chu t^* unit root tests were conducted. The tests showed that the probability value (at intercept and trend) of the variables fell below 5%. This proved that the null hypothesis that stated that the series were stationary should be rejected for the alternative hypothesis that indicated the presence of unit roots in the variables in the model. First differencing the series did not alter the probability outcome. It still fell below 5%. This indicated that there was heterogeneity in the data set. Given this shortcoming, the study adopted the Generalised Methods of Moments (GMM) to control for endogeneity of the lagged dependent variables, unobserved panel heterogeneity and measurement errors in the data. The basis of method of moments is that given certain sets of assumptions, a sample statistic will converge in probability to some constant. The constant is a function of the unknown parameter of the distribution. Let us consider the independent identically random sampling

from a distribution as $f(y | \theta_1, \dots, \theta_k)$ with finite moments of $E[y_i^k]$. The sample consists of n observations which are given as y_1, \dots, y_n . The k th moment is

$$M_k = \frac{1}{n} \sum_{i=1}^n Y_i^k \dots\dots\dots (1)$$

(Given that $E[M_k] = \mu_k = E[[Y_i^k]]$)

It is argued that each sample statistics has a counterpart in the population. For example, there is a correspondence between the sample mean and the population expected value (Khinchine Theorem). μ_k is the mean of the K^{th} parameter which is the sample mean while $E[[Y_i^k]]$ is the expected value of the population. By convention, the variance of the K th moment is

$$\text{Var } M'_k = \frac{1}{n} \text{Var } [Y_i^k] = \frac{1}{n} [\mu'_{2k} - \mu_k'^2] \dots\dots\dots (2)$$

The Lindberg-Levy Central Limit Theorem states that

$$\sqrt{n}(M'_k - \mu'_k) \xrightarrow{d} N [0, \mu'_{2k} - \mu_k'^2] \dots\dots\dots (3)$$

By computing K raw moments and equating them to these functions, K equations are obtained that can be used to provide estimates for the K th unknown parameters.

The GMM estimator is based on the set of population orthogonality conditions.

$$E[M_i(\theta_0)] = 0 \dots\dots\dots (4)$$

Where θ_0 denotes the vector of the true parameter. The subscripts i on the term refers to dependence on the observed data Y_i, X_i, A_i and Z_i . Let current account balances be represented by Y_i , external debt be denoted by X_i and exchange rate, A_i . The vector Z_i is the instruments. The moment is a set of L equations involving the k parameters. It is assumed that the sample converges to these parameters. Averaging i over the sample observations generates the sample moment equation.

$$E[M_n(\theta_0)] = 0 \dots\dots\dots (5)$$

Where $M_n(\theta_0) = \frac{1}{n} \sum_{i=1}^n M_i(\theta_0)$

Let us consider empirical moment equations which define the instrumental variable estimator for a linear or non-linear regression model as

$$E[M_i(\beta)] = E\left[\frac{1}{n} \sum_{i=1}^n z_i (y_i - h(x_i, a_i, \beta))\right] = 0 \dots\dots\dots (6)$$

In equation (6), there are L instrumental variables in z and k parameter in β . These define L moment equations, one for each instrumental variable. For there to be convergence of the sample parameters with those of the population, certain assumptions must hold.

The conditional mean function $h(x_i, a_i, \beta)$ is a continuous function of β , although not necessarily of x and a . Given this assumption, we may assume that the derivative of the moments converges to a

$$G_n(\theta_0) = \frac{\partial M_n(\theta_0)}{\partial \theta_0^2} = \frac{1}{n} \sum_{i=1}^n \frac{\partial M_{i,n}(\theta_0)}{\partial \theta_0^2} \dots\dots\dots (7)$$

probability limit $G_n(\theta_0) = G(\theta_0)$. The continuity assumption and its derivative enable us to invoke the Slutsky Theorem for time series data.

Another assumption is that the number of moment conditions is at least as large as the parameter. This implies that $L \geq K$.

Thirdly, the number of rows \geq number of columns (in its matrix)

It is also assumed that the moments have a finite asymptotic covariance matrix $(1/n) \Phi$.

In this study, the specification of the variables was adopted similar to the framework of Dahlberg and Johansson (2000) which estimated local government expenditures of hundreds of municipal councils in Sweden. The model for this study took this form:

$$Y_{ij} = \alpha_i + \sum_{j=1}^m \beta_j Y_{ij-1} + \sum_{j=1}^m \rho_j X_{ij-1} + \sum_{j=1}^m \delta_{ij} A_{ij-1} + f_i + \varepsilon_{it} \dots\dots\dots (8)$$

For $i = 1, \dots, n; t = m+1, \dots, 19$. Equation (8) contained a specific effect, f_i , which was not stated to be fixed or random. To eliminate the individual effect, the model was converted to first differences (see Greene, 2008) which produced the equation (9)

$$\Delta Y_{ij} = \alpha_i + \sum_{j=1}^m \beta_j \Delta Y_{ij-1} + \sum_{j=1}^m \rho_j \Delta X_{ij-1} + \sum_{j=1}^m \delta_j \Delta A_{ij-1} + u_{it} \dots (9)$$

Where $\Delta Y_{ij} = Y_{ij} - Y_{ij-1}$; $\Delta X_{ij} = X_{ij} - X_{ij-1}$; and $\Delta A_{ij} = A_{ij} - A_{ij-1}$

The orthogonality conditions were given as

$$E [Z_i' u_i] = 0 \dots (10)$$

Where u_i was the vector of error term.

4.2 The Variables Measurement and Methodology

The variables used in this study are the current account balances, external debts and exchange rate of the selected African countries. The dependent variable, current account balances, is regressed against the endogenous variables of external debts and exchange rates of the sampled countries, given some instruments. There is also the stochastic term that will take care of unobserved characteristics in the model. Thus, the variables of the model of this study are spelt out in the following format.

$$Y_{ij} = \alpha_i + \sum_{j=1}^m \beta_j Y_{ij-1} + \sum_{j=1}^m \rho_j X_{ij-1} + \sum_{j=1}^m \delta_j A_{ij-1} + f_i + \varepsilon_{it} \dots (11)$$

Current account balances are represented by Y_i , external debt is denoted by X_i whilst exchange rate is given as A_i . The vector Z_i is the instruments. Let us consider empirical moment equations which define the instrumental variable estimator as:

$$E [M_i(\beta)] = E \left[\frac{1}{n} \sum_{i=1}^n z_i (y_i - h(x_i, a_i, \beta)) \right] = 0 \dots (12)$$

In equation (12), there are N instrumental variables in z and k parameter in β . These define N moment equations, one for each instrumental variable. For there to be convergence of the sample parameters with those of the population, certain assumptions must hold. The orthogonality condition was given as

$$E [Z_i' u_i] = 0 \dots (13)$$

Where u_i was the vector of error term.

4.3 Data

The data was obtained from the World Bank Development Indicators. The data covered selected African countries of Angola, Benin, Cameroon, Congo Democratic Republic, Cote d’Ivoire, Gabon, Ghana, Lesotho, Liberia, Kenya, Malawi, Nigeria, Sierra Leone, South Africa, Togo and Uganda. The dataset was between 2001 and 2019. The data was analysed using Eviews.

5. Results and Discussions

The Arrelano-Bond Serial Correlation Test was conducted on the series and the outcome estimate gave a probability value of 69.25% which was greater than 5%. This implied that the study should accept the null hypothesis which stated that there was no serial correlation in the series. Given that Panel data analysis placed much emphasis on group data rather than the information available in the individual countries, the findings of the summary statistics showed that current account balances in all the selected countries had a mean value of -6.21E+09, external debt averaged 1.88E+10 while exchange rate in the group had a mean value of 100.83 to the US dollar. The standard deviation for current account balances, external debts and exchange rate were 9.73E+10, 3.81E+10 and 25.24 respectively. These were the average measures of scores (current account balances, external debts and exchange rates) from their respective mean values in the group. The current account balances of the selected African countries were negatively skewed as the mean value (-6.21E+09) was lesser than that of the median (-1.84E+08). However, external debts and exchange rates were positively skewed, given that their respective mean values (1.88E+10 and 100.8) were greater than those of their median (5.70E+09 and 99.1). In sum, the distribution of the sample was not normally distributed, and this was corroborated by the probability of Jarque Bera which was less than 5%.

When we estimated the data based on equation (8) in which the model contained specific effects, the result of the generalized method of moments (GMM) showed that about a 1% increase in current account balance brought about 35.5% decline in external debts in the group of selected African countries. This result was not watertight as the probability level was beyond the 5% significant level. Similarly, an inverse relationship was also seen between current account balances and exchange rates, but the result could not be

reported because it was insignificant. Given these shortcomings, the model was first differenced to remove the individual effects.

Also, relevant instruments were incorporated in the model in order to take care of unobserved heterogeneity, endogeneity and measurement error in the data set. The transformed model of equation (9), after first differencing, generated a GMM estimates that deciphered the relationships of current account balances, external debts and exchange rates. It could be seen from the result that among the list of included instruments was lag 2 of current account balances. This, in other words, meant that this particular instrument was internal, and it was incorporated to take care of endogeneity arising from this particular variable with the residual.

From the GMM estimates, a unit increase in current account balances in the current period led to a decline of 11.58% in the balances in the previous time or period. This estimate was significant at less than 5% level. Intuitively, this means that in the selected African countries, a fall in the current account balances in the previous time or lag 1 by 11.58% results to a percentage increase in the balances in the present period. This suggests that the net balances in the current account today (in the group) is negatively and significantly related with the values of the previous time. The current account balances or equilibrates when receipts are equal to payments or exports are equal to imports. However, this rarely exists in practice. The current account is in surplus or positive if exports exceed imports. It falls into deficit or negative when the reverse is the case. Interpreting the result of an 11.58% decline in current account balances in lag 1 means that a drift in the gap between import and exports by 11.58% in the immediate past period generates a unit increase in the gap between exports and import in the current period in this group of selected African countries.

A 9.46% increase in external debts in the selected African countries led to a percentage increase in the current account balances in the group. This implied that if the quantum of debts contracted by the selected countries rose by 9.46%, the value of exports surpassed that of imports by a percentage in the group. This result was significant at less than 5% significant level. Thus, there was direct relationship between current account balances and external debt in the selected African countries. This outcome aligns with theoretical expectations. Most of the economies of the selected African countries are emerging. Ideally, these economies are driven by the need to boost productive capacity if they contract external debts. Quite often than not, the debts are put into the development of infrastructures and to improve the technical know-how of these economies. It is, therefore, expected that as the volume of these debts' soars, domestic capacity and export should move northward. This is strongly responsible for the positive relationship between external debts and current account balances in these selected countries.

There was positive and significant relationship between current account balances and the exchange rate. A percentage increase in the exchange rate led to 6.02E+08 variation in the current account balances in the selected African countries. This result was significant at less than 5% level of significance. Favorable current account balances (a situation where export is greater than import) engender improvements in the exchange rate between a concern and its trading partners. It is this sequence of events that was reflected in the GMM estimates of the relationship between current account balances and the exchange rate in the selected African countries.

6.1 Conclusion

The selected countries in Sub Saharan Africa should endeavor to boost their productive capacity and ensure that their products are competitive in the international market if they are to encounter improvements in their exchange rate. This, in turn, will put these countries in a better position when they are repaying their debt obligations to their external creditors as they would have earned more foreign reserves from the growth in exports. This is affirmed by the result of this study which discovered that there was positive relationship between current account balances and the exchange rate in this group of countries in Sub Saharan Africa.

Also, these countries should be cautious when contracting external debts as this study discovered that when these debts rose by 9.46%, exports exceeded imports by a unit. These statistics insinuated that external debts were very fundamental in jump-starting growth in these economies. The growth in external debts should be in double digits for the selected countries to actualize favorable current account balances. The inference drawn from these statistics is that there are infrastructural decay and relatively lower receipts from exports in the sample countries. Ideally, external debts should be put to judicious use, especially on the development of critical infrastructures that will ensure that manufacturers operate at full capacity and

exports are promoted. There is also the need to strengthen institutions that ensure proper monitoring of the appropriation of external debts in the recipient countries.

6.2 Limitation of the Study

The study was faced with the challenge of omitted observations in some of the selected African countries.

References

- Aigbokan, Ben (1991). The Naira Exchange Rate Depreciation and Domestic Inflation. *The India Journal of Economics*, Vol. LXXI, Part IV, No. 283.
- Arellano, M. and Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and Application to Employment Equations. *The Review of Economic Studies*.
- Dahlberg, M. and Johansson, E. (2010). An Examination of the Dynamic Behavior of Local Governments using GMM bootstrapping Methods. *Journal of Applied Econometrics*, 15 (4): 401-416.
- David, U. and Olohitare O. (2013). Exchange Rate Misalignment and Balance of Payment Adjustments in Nigeria. *European Scientific Journal*, Volume 9 (13).
- Fratzscher M, and Sarno, L. (2010). Asset Prices, Exchange Rates and the Current Account, *SSRN Electronic Journal* 54 (5): 643-658.
- Greene, W. (2008). *Econometric Analysis*, 6th Edition, New Jersey, Pearson-Prentice Hall.
- James M., Kennedy, N. (2018). External Debt Servicing and Current Account Balance in Kenya. *International Journal of Development and Sustainability*, Volume 7(5): 1688-1710.
- Mike, Obadan (2012). *Foreign Exchange Market and the Balance of Payments: Elements, Policies and the Nigerian Experience*. Goldmark Press Limited, Benin City, Nigeria.
- Oyakhilome, Ibhagul (2018). External Debt and Current Account Adjustments: The Role of Trade Openness, *Cogent Economics and Finance* (2018), 16: 1446247.
- Rehman, R. and Rehman, A. (2010). Causal Relationship between Macroeconomic Variable and Exchange Rate, *International Research Journal of Finance and Economics*, 46: 58-62.
- Taoufik Bouraoui, 2019, External Debt, Current Account Balance and Exchange Rate in Emerging Countries. *Economics Bulletin*, Access Econ, Volume 39 (4): 2333-2342.
- World bank (2020), World Bank Indicator Database.

Table 1. Arellano-Bond Serial Correlation Test

Test order	m-Statistic	rho	SE(rho)	Prob.
		-		
		200681670549		
		057240000000		
AR(1)	NA	0	NA	NA
		-		
		312565849186790349214055		
AR(2)	-0.395478	111880000000	136640000000	0.6925

Source: Author's Computation.

Table 2. GMM Regression based on Equation 8 (with Specific Effects)
Dependent Variable: CURRENT_ACCOUNT_BALANCE

E

Sample (adjusted): 2002 2019

Periods included: 18

Cross-sections included: 12

Total panel (unbalanced) observations: 174

2SLS instrument weighting matrix

Instrument specification: C CURRENT_ACCOUNT_BALANCE(-1)
EXTERNAL_DEBT(-1) EXCHANGE_RATE(-1)
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXTERNAL_DEBT	-0.354898	0.247008	-1.436786	0.1526
EXCHANGE_RATE	-23017018	1.03E+08	-0.222443	0.8242
R-squared	0.017795	Mean dependent var		-9.27E+09
Adjusted R-squared	0.012085	S.D. dependent var		1.23E+11
S.E. of regression	1.22E+11	Sum squared resid		2.56E+24
Durbin-Watson stat	2.165293	J-statistic		0.087897
Instrument rank	4	Prob (J-statistic)		0.957003

Table 3. GMM Regression after Transformation (Equation 9)

Dependent Variable: CURRENT_ACCOUNT_BALANCE

Method: Panel Generalized Method of Moments

Transformation: First Differences

Sample (adjusted): 2003 - 2019

Periods included: 17

Cross-sections included: 12

Total panel (unbalanced) observations: 162

White period instrument weighting matrix

White period standard errors & covariance (d.f. corrected)

Instrument specification: @DYN(CURRENT_ACCOUNT_BALANCE,-2)

EXTERNAL_DEBT(-1) EXCHANGE_RATE(-1)

Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CURRENT_ACCOUNT_BALANCE(-1)	-0.115795	0.000433	-267.6729	0.0000
EXTERNAL_DEBT	0.094557	0.000477	198.1833	0.0000
EXCHANGE_RATE	6.02E+08	9505460.	63.32898	0.0000

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	-68180214	S.D. dependent var	1.79E+11
S.E. of regression	1.71E+11	Sum squared resid	4.64E+24
J-statistic	9.900433	Instrument rank	12
Prob(J-statistic)	0.358606		

The impact of monetary policy on long-run share price reversals on the Johannesburg Securities Exchange

Rollins NG Ayaya

Runxin Lin

Department of Business Finance
University of Witwatersrand, South Africa

Onesmus Ayaya

School of Accountancy, University of Limpopo
South Africa

Keywords: Share, price, reversal, monetary, policy, portfolio

Abstract

Purpose: The study expands on the phenomenon of long-run reversal in the financial markets using Johannesburg Stock Exchange (JSE) data. This study aimed to determine whether the monetary policy changes implemented by the South African Reserve Bank influence long-run reversals in the JSE.

Context: Long-run reversals have occurred in various global financial markets in the US, Europe, Asia, and South Africa. Long-run reversals occur when firms with poor past performance rebound and produce superior returns to firms with good historical past performance. South Africa has a monetary policy of inflation targeting. It tends to increase interest rates whenever the change in the consumer price index falls above the upper limit of the range of 3–6%.

Methods: The regressions of the Fama-French three factors model and the Fama-MacBeth model were used to estimate the relationship between the excess return of different portfolio returns and the Fama-French three factors. Furthermore, we split our sample under expansive and restrictive monetary conditions. We ran the regression of the Fama-MacBeth model again to see whether the monetary conditions influence the long-run reversal.

Results: The sample results over the near 15-year sample period show that firms with poor past performance failed to outperform those with past solid performance. In addition, monetary policy changes did not lead to long-run reversals among poor performing firms. The gap is closed under restrictive monetary conditions.

Practical value: The study recommends that one could do a detailed examination of the relationship between firm characteristics and long-run reversals under various monetary conditions. Monetary conditions are worth watching for when constituting a portfolio because they create arbitrage opportunities for astute investors.

Introduction

There has been significant research on long-run stock reversals in the US and European equity markets. There is wide-ranging evidence pointing to the tendency for equity instruments to perform well in the previous six to twelve months in the subsequent six to twelve months. Garcia-Feijoo and Jensen (2014) examined reversals during two monetary environments, namely the expansionary monetary environment and the restrictive monetary environment. Monetary environments are critical to determining liquidity-related issues. Garcia-Feijoo and Jensen (2014) did an extensive study on the effect of long-run reversals for firms in the USA. They extended the research of Fama and French (1996) by 17 years to determine if reversals are still prominent in the US and the reason behind their occurrence. Dyl et al. (2019) showed that investors overreact to non-information-based price movements and underreact to public statements comprising company-specific information.

On the contrary, Blackburn and Cakici (2017) did a similar study focused primarily on developed nations within the North American, European, and Asian regions. Zaremba (2016) examined long-run reversals in 74 countries, including South Africa, but did not do extensive research on the Johannesburg Stock Exchange (JSE) index. Numerous studies investigated the relationship and effects that overreaction has on share prices. South African scholars, such as Page and Way (1992), Hsieh and Hodnett (2011), Muller

(1999), and more recently, Britten et al. (2016), examined the overreaction theory in a South African context. They all concluded that reversals tend to occur because of overreaction. Different classes of shares (in the Chinese settings) with varying classes of clientele have been shown to have other monthly share price reversals. Institutional ownership strengthens momentum in B shares (Chui et al., 2021).

Context

South Africa has a different monetary framework than the US. These framework differences could yield different results compared to the previous US study by Garcia-Feijoo and Jensen (2014). Nominal interest is heavily dependent on the inflation rate because one needs to add both the real interest and inflation to calculate nominal interest. South Africa's monetary policy framework differences can also potentially affect the study and explain why South Africa's empirical findings are different from that of the USA. According to the South African Reserve Bank, the monetary authorities use inflation targeting to achieve their monetary policy objectives instead of other frameworks such as nominal income targeting, exchange rate targeting and nominal income targeting. The South African Reserve Bank has been using inflation targeting as a monetary policy framework since 2000. The US Federal Reserve, on the other hand, uses different tools. The US Federal Reserve's monetary policy promotes maximum employment, stable prices, and moderate long-term interest rates. The South Africa Reserve Bank pursues an inflation targeting policy that promotes stable prices. South Africa has experienced expansions and contractions of the interest rates, which can affect equity investment decisions, and ultimately, share price movements. This paper explores the effect of monetary policy changes on the reversals of loser and winner stocks in the long run.

Problem statement

There have also been studies on the phenomenon in South African markets (Britten et al., 2016; Page & Way, 1992). However, none has considered monetary conditions. Long-run stock reversals are the tendency of firms with poor share performance to eventually outperform companies with good share performance over the past five years. Research on reversals has the limitation of not examining other effects of reversals, such as the conditional monetary effects, which this paper aims to delimit. We consider the need to factor in various monetary conditions (restrictive and expansionary) alongside different firm characteristics to examine the reason behind their reversals. Restrictive monetary policy deals with reserve bank mechanisms to slow economic growth through restricted liquidity. Firm features include firm size (measured by market capitalisation), book-to-market equity (BEME) ratio, and firms with high and low beta stocks. Most liquid and large companies were noted to have significant share price reversals (Rif & Utz, 2021). The following question is worth asking: Are the considerable share price reversals associated with monetary policy conditions? US monetary tightening is a single global factor that explains the variation of risky asset prices worldwide (Miranda-Agrippino & Rey, 2020). Therefore, to what extent does monetary conditions in South Africa explain the variations of share prices on the JSE?

The aim of the study

The research aimed to determine if monetary policies affect long-run reversals in South Africa. The findings would help equity investors understand the JSE market better and interface with the monetary policy regime. It would also help finance professionals to take advantage of the potential arbitrage opportunities at hand if the long-run reversals are a phenomenon in the JSE. This article explores the transmission of monetary policy through monetary conditions (within financial intermediation) and prices, an area that has not been sufficiently covered using South African data.

Literature survey

Past scholars noticed the long-run reversal effects over the past few decades in various equity markets worldwide. The literature offers multiple explanations for the observed pricing trends following price movements. The reasons fall within the liquidity, overreaction, and underreaction postulates. There have been intensive studies focused primarily on US markets, and more recently, Asian, and European markets. Key authors include De Bondt and Thaler (1985), Fama and French (1996), Garcia-Feijoo and Jensen (2014) and Britten et al. (2016). One of the main reasons behind the reversals is overreaction (De Bondt & Thaler, 1985) in which equity investors attach significant importance to current information. However, according to Garcia-Feijoo and Jensen (2014, p. 4), one of the explanations behind these long-run reversal patterns is

rational, economic investor behaviour. Garcia-Feijoo and Jensen (2014, p. 4) argue that “stock return expectations are affected by time variation in the funding conditions for investors and firms”. Garcia-Feijoo and Jensen (2014) primarily investigated the relationship between monetary conditions and long-term reversals in stock prices for winner and loser stocks in the US markets. In South Africa, Britten et al. (2016) examined the overreaction hypothesis in which equity investors overweigh current events and under weigh historical information. The alternative explanations to the share price reversals are discussed in this section.

Overreaction theory

De Bondt and Thaler (1985, 1987) are leading, critical authors who examined overreaction in equity markets. They used equally weighted monthly return data from the New York Stock Exchange (NYSE) between 1926 and 1982. They concluded that shares with a prolonged period of poor performance in US markets somehow outperformed winners by an average of 31,9% over the next five years. They stated that this was due to overreaction. Investors tend to become overly pessimistic about stocks that perform poorly and excessively optimistic about stocks that exhibit superior performance. South African researchers Page and Way (1992) looked at the stock market reaction from a South African perspective and found that stock markets show overreaction. They believed that overreaction behaviour is due to investors paying too much attention to recent dramatic news. In Page and Way’s (1992) study, the prior ‘losers’ portfolios on average outperformed the ‘winners’ by about 20% over the three years after portfolio formation. Their results were consistent with the overreaction hypothesis, which predicts that traders tend to overreact to unexpected and dramatic news events, whether it is good or bad news. Page and Way (1992) believed that the findings suggested a substantial weak form of inefficiency in the South African stock market over the long-term horizon.

Muller (1999) also examined overreactions in South Africa and acknowledged that the JSE is no exception to weak-form inefficiencies. They concluded that investor overreaction in the JSE was evident. The loser portfolios of the study yielded higher excess market returns, while the winner portfolios yielded lower excess market returns with an increased holding period. This raises the following question: Does the information used by the investors include liquidity information?

Hsieh and Hodnett’s (2011) study extended Page and Way’s (1992) research in the JSE markets. Their empirical results agreed that overreaction of stock prices was present. However, the overreaction hypothesis contradicted the efficient market hypothesis in South Africa. Weak form efficient market hypothesis states that investors cannot consistently outperform the market using historical price patterns (De Bondt & Thaler, 1985). It is believed that investor overreaction systematically causes market prices to overshoot (De Bondt & Thaler, 1985). The reversals of share prices should thus be predictable to provide arbitrage investment opportunities, hence the argument by Hsieh and Hodnett (2011) that the overreaction hypothesis directly contradicts the efficient market hypothesis. The period covered by the De Bondt and Thaler’s (1985) study relates to the period affected by economic sanctions against the apartheid regime.

Blackburn and Cakici (2017) examined overreaction in 23 developed countries, including North America, Europe, Japan, and Asia. Despite Japan being geographically located in Asia, it was categorised because of its heavy market-capitalisation presence. The European countries consisted of Germany, the UK, Portugal, and Austria; the Asian countries included Singapore, Hong Kong, New Zealand, and Australia. In an equally weighted portfolio, the long-run reversals were present and statistically significant for North America, Japan, and Asia yet insignificant for Europe. The strategy longing winners and shorting losers in the long-term would yield a statistically significant average monthly return on -80 basis points over the sample period in North America. This suggested that the reversal phenomenon is due to making a loss from longing the winner portfolio. Japan and Asia yielded similar results. We submit that the use of monthly return data should have been affected by monetary conditions, which we look at next. The studies reviewed did not consider different forms of shares and their clientele classes.

Monetary conditions

Bjørnland and Leitemo (2009) reported a considerable simultaneous interaction between the interest rates and shocks to share prices in the US. Garcia-Feijoo and Jensen (2014) supported this by registering returns for expansive and restrictive monetary environments from 1963 to 2010. They looked at the returns to a portfolio of stocks in the long position (loser quintile) and stocks of the short position (winner quintile).

This portfolio was referenced as 'loser minus winner' (LMW). They also reported on monetary and reserve aggregates across the two aggregates.

A restrictive monetary condition exists whenever the reserve bank slows economic growth through reduced liquidity. The reserve bank lowers the amount of money and credit banks can lend by making loans, credit cards, and mortgages more expensive. Reduced liquidity should make inventors sell their portfolio holding to access cashflows. Share prices could then decline on the strength of oversupply. An expansive monetary condition is the direct opposite. It aims to increase aggregate demand and economic growth in the economy. The reserve bank cut interest rates or increase the money supply to boost economic activity. Ayaya (2002) contended that real economic growth is Granger caused by the domestic credit to the private sectors, which is affected by the monetary policy.

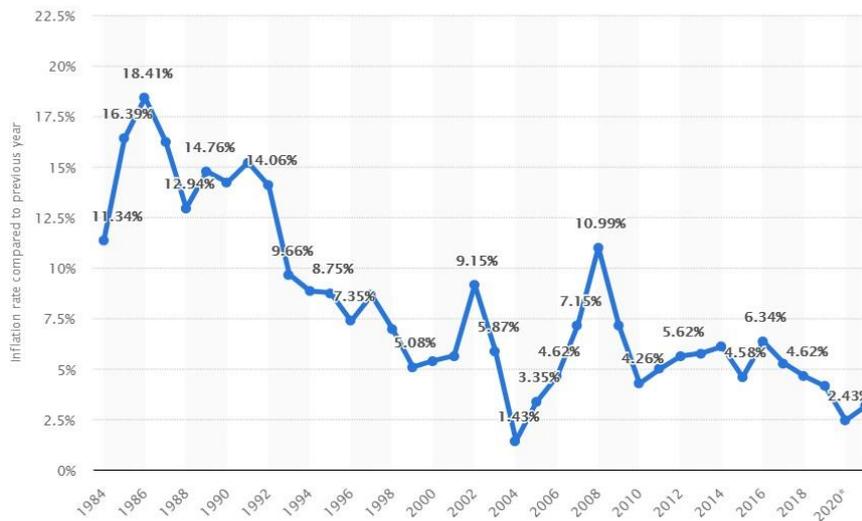
South Africa's monetary history

South Africa and the US have different economies, and therefore, these differences in monetary policy frameworks may affect the results of this study to show different results to Garcia-Feijoo and Jensen (2014). Monetary policy frameworks generally depend on the following three things: (i) structural differences (ii) varying degrees of indexation, and (iii) institutional arrangements and analytical constraints (Fry et al., 2000). Structural differences are a significant factor because they involve the structure of a country's financial sector, debt levels, and fiscal discipline, which differs between countries.

In the duration (1963–2010) of Garcia-Feijoo and Jensen's (2014) study, the monetary policy tools varied from maintaining fixed exchange rates post World War II to money supply targeting in the 1970s. According to the US Federal Reserve (2020) website, when the US Federal Reserve maintained a fixed exchange rate, they offered to buy or sell a unit of domestic currency for a set amount of foreign currency. A country that maintains a fixed exchange rate has the same inflation as other countries that do not. Therefore, countries with volatile or high inflation prefer to link their monetary policy, using the fixed exchange rate, to an economically robust country like the US or Germany. In the 1970s, monetary supply targeting was used. The technique used by the US Federal Reserve expands the money supply at a pre-specified and fixed rate over time. This method is used to limit the chances of inflation over time. The US experienced heavy inflation in the 1970s, and thus, incorporated this technique (US Federal Reserve, 2020).

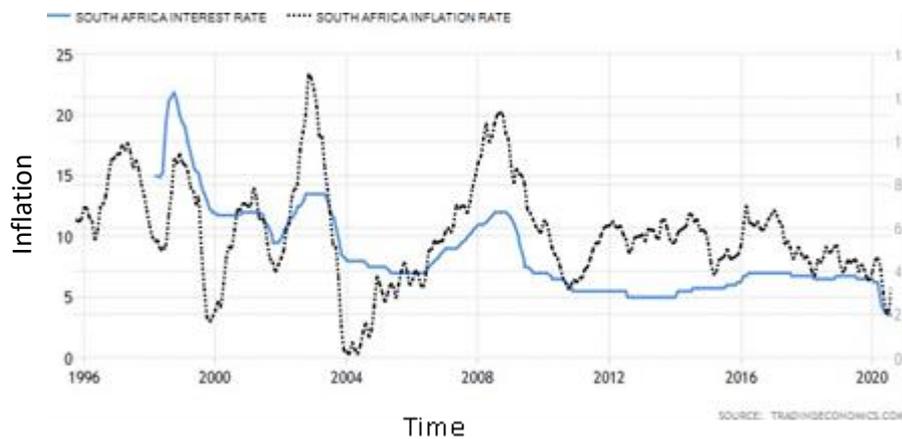
South Africa has been using inflation targeting as their monetary policy framework for the 21st century. Inflation targeting is a central banking strategy of setting an inflation rate goal and adjusting the monetary policy to achieve that goal. The objective of inflation targeting is maintaining price stability and supporting economic growth and stability. It has been proven by Statista (2020; Figure 1) that South Africa's inflation has experienced severe fluctuations, proving the existence of inflation targeting shown by the range of 1,43% to 10,99% between the years 2000 and 2020. Figure 2 highlights the correlation between interest rates and inflation. As inflation increases, interest rates tend to move in the same direction, proving the positive relationship between the two variables between 2000 and 2020. South Africa's inflation has proven to be a lot more volatile than that of the US. The US has been attempting to target its inflation levels at 2%.

Figure 1: South Africa's interest rate from 1984–2020



Source: Statista

Figure 2: Comparison in the relationship between South Africa's interest rate and inflation from 1996–2020



Source: Trade Economics (2020)

Firm characteristics, monetary conditions, and long-run reversals

The long-run reversal of share prices in the US also experienced effects by firm characteristics (Garcia-Feijoo & Jensen, 2014). Firm features included firm size (measured by market capitalisation), various BEME ratios, and firm betas. Garcia-Feijoo and Jensen's (2014, p. 16) research found that the monetary environment is expected to have a more "prominent influence on firms that have limited access to capital and firms that are heavily reliant on external sources of capital".

The reversal phenomenon was more definite for small firms compared to big firms. Firm size and BEME can both be viewed as a proxy for the firm's access to capital (Garcia-Feijoo & Jensen, 2014). Bekaert and Hodrick (1992) characterise the expected elements in excess rates of returns on major equity and foreign exchange markets by employing lagged excess returns, dividend yields, and forward premiums. Fama and French (1992) suggested that firms with relatively high BEME are more frequently financially distressed than firms with relatively low BEME. They found that high-BEME firms, also known as value firms, tend to have a more significant earnings uncertainty, higher leverage, and a greater tendency to reduce their dividend. Fama and French (1992) supported this theory by reporting that BEME is a proxy for risk and the higher the BEME, the riskier the firm. Financially distressed firms face more significant problems when attempting to secure financing. Thus, there is more reason to expect a more major reversal for firms with high BEME ratios. Garcia-Feijoo and Jensen's (2014) findings showed that reversals are conditional on the monetary

environment. They learnt that losers only reversed when monetary conditions are expansive. Meanwhile, winner reversals are commonly isolated within restrictive environments. Secondly, the reversal of loser stocks was found to be driven by the price movements of small-capitalisation stocks (small firms), high-BEME stocks (high-value firms), and stocks with high systematic risk. They found that a significant loser reversal is mainly identified when the monetary environment is expansive. Like the loser reversal (above), winner reversals are limited to stocks with small- market-cap, growth features, and high systematic risk.

The anomalies on the securities exchange

Anjum (2020) provided results of three market anomalies (day-of-the-week effect, weekend effect and monthly) using data from the Pakistan and Karachi Stock Exchanges. The research results showed that December and March mean it returns high in Karachi Stock Exchange and Pakistan Stock Exchange, respectively. The month of January is also known to significantly affect share prices on other securities exchanges. However, researchers have yet to determine why January drives superior returns.

Reversals are also seen to be frequently and significantly affected in January. De Bondt and Thaler (1987) and Grinblatt and Moskowitz (2004) reported that long-run reversals for losers are more concentrated in January. The January anomaly has been attributed to tax bases in the relevant jurisdiction. The end-of-year tax-based trading decisions may be responsible for the reversal pattern exhibited by losers. George and Hwang (2007) confirmed this theory and concluded that loser stocks' long-run reversal is exclusive to January. These systematic trends in the securities market contradict the efficient market postulates given that market returns can be predicted from known trends and not publicly available information. Arendas et al. (2021) showed that there are significant January effects on the security prices in the markets of Eastern Europe.

Momentum theory

The momentum effect refers to the inclination of equity securities that perform well in the previous half-year to a year to perform well in the subsequent half-year to a year (Chui et al., 2021). The momentum phenomenon refers to when security prices are experiencing accelerated changes and are expected to continue these changes in the future. It was found that the investor behavioural biases that cause short-term momentum are the same that cause long-term reversals (Hong & Stein, 1999). However, George and Hwang (2004) found that the anomalies are separate and concluded that the two return patterns are distinct phenomena and are encouraged by different investor behaviours. Chui et al. (2021) contended that these trends are in harmony with a situation where momentum is caused by informed investors who underreact to information signals and that short-term reversals denote premia to incorporate the demands of those who demand short-term liquidity. Predicting future returns from past returns can be attributed to clientele groups with different investment objectives; for instance, pension funds could contribute to momentum effects.

George and Hwang (2004) proposed two investor behavioural biases, namely anchoring and reference points, as explanations for price momentum. These authors, however, found that these behavioural biases do not explain long-run price reversals. However, according to Page et al. (2013), there is evidence of both a short-term momentum effect and the beginnings of a longer-term reversal. Page et al. (2013) reported that price momentum is present in the JSE. The authors investigated short- and medium-term momentum strategies in the JSE from January 1995 to December 2010. Page et al. (2013) reported a significant momentum effect on the JSE over the sample period, yet the magnitude of profits declined in the latter half of their sample. There is evidence of both a short-term momentum effect and the beginnings of a longer-term reversal, proving a relationship between the two. We postulate that the phenomenon observed could be associated with institutional constraints unique to the JSE. For instance, the foreign exchange controls and liquidity situation could make investors operate within different clientele groupings.

Description of overall research design

The overall study design was motivated by Garcia-Feijoo and Jensen (2014) who linked the existence and stringency of long-term reversals patterns to monetary conditions. Specifically, it is essential to test whether there is a long-run share price reversals pattern in South Africa and determine whether this reversal pattern is influenced by a firm's access to financing and the monetary environment in South Africa. The

study used quantitative methods to explore share price reversals while factoring in monetary policy changes. The study adapted Garcia-Feijoo and Jensen's (2014) US study to a South African context to establish whether their findings are universally acceptable. The researchers are positivists and believe that knowledge can be generated from reality and data independent of the research. Market players act on publicly available information that influences share prices.

Data and methods

Sampling and data collection

Daily data for securities listed on JSE was obtained from the Bloomberg terminal for the period January 2000 to December 2019. The period is long enough to identify loser and winner stock and to subsequently build the test portfolios. The daily data from the terminal included closing share price, price to earnings ratio, and the market capitalisation of shares. There were 458 firms in our sample.

The South African Reserve Bank obtained the 91-day treasury-bill return rate and used it to proxy the risk-free rate. Since the 91-day treasury bill was reported as an annualised return, it was geometrically divided into daily returns. The J203T was obtained from Bloomberg and used to represent the benchmark market return.

The discount rate of South Africa was used to identify the monetary environment, which was also obtained from the South Africa Reserve Bank. The repurchase rate in South Africa was used as a proxy of the discount rate. The reason for using the discount rate as the indicator of policy stringency is based on the findings of Bernanke and Blinder (1988) that several studies model the influence of monetary policy on financial market participants through the impact on bank lending rate or the availability of money. Discount rates define returns on cash savings, and investors in shares are bound to expect returns on risky portfolios to exceed interest rates on savings.

The construction of SMB and HML portfolios

Fama and French (1996) found evidence suggesting that the three-factor model captures the economic essence of losers and winners. Furthermore, they contended that losers load more heavily on the small minus big (SMB) and high minus low (HML) portfolios. Based on this finding, it is important to test whether South Africa has the same phenomenon. The following are the details of the process of building SMB and HML portfolios:

$$SMB = \frac{\left[\left(\frac{S}{M} + \frac{S}{H} \right) - \left(\frac{B}{L} + \frac{B}{M} + \frac{B}{H} \right) \right]}{3}$$

$$HML = \frac{\left[\left(\frac{S}{H} + \frac{B}{H} \right) - \left(\frac{S}{L} + \frac{B}{L} \right) \right]}{2}$$

Firstly, all the shares were divided into two groups (big and small size) by comparing each share to the median. If the market value of shares was more significant than the median, they were placed into the big size group. If the market value of shares was smaller than the median, they were put into the small size group. The reason for choosing the median instead of the mean is that the market value of the JSE Top 40 takes up a large percentage of market capitalisation (over 90%) in the total market value of the sample. Therefore, there were two groups for the shares' market value for each period, big and small. Furthermore, all the shares were separately divided into three groups (high, medium, and low) according to their price-earnings ratio (P/E) ratios. For each period, all the shares' P/E ratios were compared within each group, then further divided into the following three groups: High P/E (top 30%) group, medium P/E (middle hierarchy from 30%–70%) group, and low P/E (bottom 30%) group. The holding period for both portfolios was from the year 't' to year 't+1', and all shares were divided into these six groups: B/L, B/M, B/H, S/L, S/M, S/H, which are the groups based on their prior market value and P/E ratio during the lookback period from year t-1 to year t. The equal-weighted return rate of these six groups was calculated in each trading month and strung together to form the portfolio returns from 2005 to 2019 (totalling 169 months, which is the same as the following LMW portfolios).

The total amount of monthly returns used in the sample was 77 402, and this was calculated by multiplying the 169-month sample period by 458 firms. **Table 1** shows the available numbers of each group. The evolution of the R1 invested in different equity securities' portfolios is depicted in Figure 3. Figure 4

depicts the evolution of the R1 invested in J203T (market benchmark), 91-days bills (risk-free) and market risk premium.

Table 1: Available numbers for each group

B/H	B/M	B/L	S/H	S/M	S/L
4678	4464	3880	2542	2924	5839

Figure 3: The evolution of the R1 invested in HML, LMW, SMB, market risk premium portfolios under restrictive and expansive monetary conditions

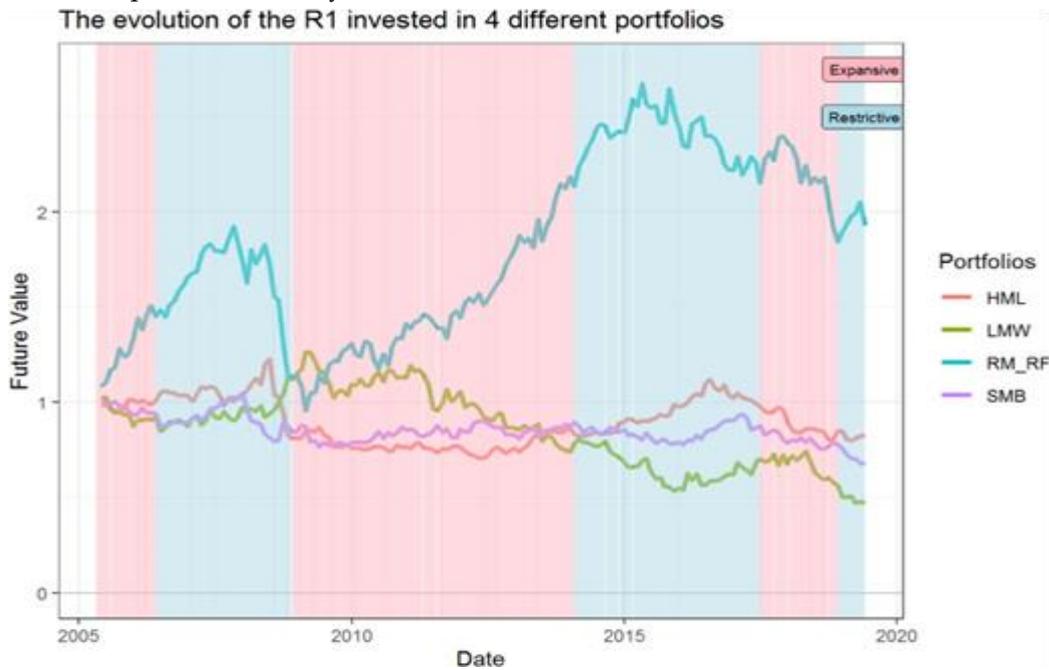


Figure 4: The evolution of the R1 invested in J203T (market benchmark), 91-days bills (risk-free) and market risk premium.



Meaning and delimiting winning and losing portfolio

The report started by looking at sample shares from a specified date and defining this date as the portfolio-formation date ($t = 0$). The cumulative excess returns for the prior 60 months to the last 13 months (the portfolio-formation period) will then be presented. The selection of the portfolio-formation period is in line with the findings reported in Fama and French (1996). They determined that the most significant long-term reversal exists when the formation period is based on share returns from month -60 through month -13 relative to the evaluation period, a five-year lookback period, except for a one-year skip period. This allowed us to separate the influence of short-term price momentum from the long-run reversal effect. For example, the lookback period of the first performance interval starts from 2000 to 2003 (four years). The holding period was the whole year of 2005, and the data of 2004 were excluded to avoid the potential influence of short-term price momentum. The cumulative excess returns were ranked from low to high.

Firms in the top 20% were assigned to the winner portfolio, and the firms in the bottom 20% were given to the loser portfolio, which is consistent with Garcia-Feijoo and Jensen (2014). After defining all the loser and winner groups from 2005 to 2019 (total 169 months), the next step was to calculate the return rate of the LMW portfolio. The grouping of each holding period was based on the previous performance through a four-year formation period. The equal-weighted monthly return was quickly figured out by simply using the losers' portfolio minus the winners' portfolio. Finally, they were strung together to form the LMW portfolio's monthly returns from 2005 to 2019 (169 months).

Meaning of the monetary condition

The repurchase rate was used as the proxy of the discount rate in South Africa. The changes in discount rates were viewed as the shifts in the South African broad monetary policy. For the periods when the discount rate increased, we argued that this period is restrictive where the general approach is constraining. For the periods where the discount rate decreased, we assumed that this period is expansive, and that the broad policy is unrestrictive. We defined the monetary environment as restrictive if the discount rate signalled constraining conditions where the discount rate was increasing. Furthermore, we classified an expansive environment when the discount rate was decreasing. For example, conditions are expansive when the discount rate is decreasing from month $t-1$ to month t . There was a sharp shift before and after the financial crisis in 2008. Furthermore, monetary conditions were considered maintained for these months in which the discount rate was unchanged.

Figure 5: The movement of repo rate in South African from 2005 to 2019 (14 years) and the restrictive and expansive monetary conditions during this period



The exploration of the analytical framework

Fama-French three-factor with January Dummy model

The Fama and French three-factor model was used because Fama and French (1996) found evidence suggesting that the three-factor model captures the economic essence of losers and winners. Specifically,

they contended that losers behave similarly to small, distressed shares, and thus, losers load more heavily on the SMB and HML factors. In addition, scholars “produced evidence indicating that the LMW premium is strongly influenced by returns in January” (Garcia-Feijoo & Jensen, 2014, p. 12). In Fama and French’s (1996) three-factor regression model, the SMB and HML risk factors were constructed by forming portfolios that are rebalanced monthly.

The portfolios were built based on the past cumulative excess returns, and then an investigation of the relation between reversal returns and the Fama-French three factors can occur. This was done while considering the January effect. The influence of January has been proved in many studies (Anjum, 2020). Consequently, it was viable to see whether it is relevant in the context of South Africa. The following equation was used to determine the January effect:

$$R_i - R_f = a_i + b_i (R_m - R_f) + s_i \text{SMB} + h_i \text{HML} + j_i (\text{January Dummy}) + e_i$$

Where $R_m - R_f$ = the excess return on a broad market portfolio.

SMB = the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks

HML = the difference between the return on a portfolio of high-carrying amount-to-market equities and the return on a portfolio of low-carrying amount-to-market equities

b_i , s_i , and h_i = the slopes in the regression model

Fama-MacBeth model

In this cross-sectional study section, the Fama-MacBeth model was used to test the relation between the return of loser (and winner) portfolios and the reversal returns. Furthermore, the findings were separated into the different monetary conditions and excluded or included the January influence, as mentioned above. This empirical study was divided into two steps based on the Fama-MacBeth regression method. Firstly, the cross-sectional regression was used to obtain the alphas and betas at each time ‘t’, and then we calculated the time-series average of these three coefficients. Here, the factor is the dummy variable of winner’s and loser’s portfolios. In the traditional cross-sectional regression, the above processes were done at once. However, in the Fama-MacBeth method, the time-series average of corresponding coefficients represents the coefficient estimate. Secondly, the one-sample t-test model was used on each coefficient (alpha, loser’s, and winner’s beta) to test whether the true mean of each coefficient was statistically significantly different to zero:

$$R_{it} = \beta_0 + \beta_1 t_{Loser} + \beta_2 t_{Winner} + e_i$$

Results of analysis and discussion

The evidence of reversals

First, before examining the monetary policy effects of share reversals, it is imperative to determine whether reversals were present in the JSE over the 14-year sample period. Table 2 reports the equally weighted average returns for past performance in quintiles. Similarly, to Garcia-Feijoo and Jensen (2014), firms were allocated into quintiles (five groups) based on continuously compounded returns during the portfolio-formation period. The methodology states that the lowest past performance quintile was denoted as the loser portfolio, while the highest past performance quintile was marked as the winner portfolio.

Following Garcia-Feijoo and Jensen (2014) and Fama and French (1996), the portfolio return was measured from the month ‘t’. This month was determined to be 12 months after the -60 to -13 formation period. This was done to separate the momentum effect from the effect of long-run reversals. An additional reason for the -60 to -13 formation period is one of our primary objectives, namely, to determine whether monetary conditions explain the long-run reversal phenomenon.

Table 2 shows the mean monthly returns regression results of portfolios from May 2005 to May 2019. The losers failed, as it can be seen in Table 2, to outperform the winners’ portfolio by 34 basis points. This means that firms with historically good performance have consistently been producing superior returns to firms with historic lousy performance. This observation contrasts the findings of Page and Way (1992) and Britten et al. (2016), who acknowledged the presence of long-run reversals. The finding shows the influence of institutional investors. These outcomes could be due to differences in time frames and external political and economic influences. In addition, Page and Way (1992) used a different metric to determine long-run reversals. The authors used a three-year formation period for their regressions, resulting in a 20% outperformance of LMW portfolios. Britten et al. (2016) used a different time horizon: Their examined period

ranged from 1 January 1998 to 30 June 2013, whereas the time horizon of this study ranged from 2005 to 2019. This suggests that the differences in results could be due to differences in the periods examined.

Table 2: Mean monthly returns and regression results for past performance portfolios in the JSE: May 2005 to May 2019

Reversal Portfolio						
	Loser	P2	P3	P4	Winner	LMW
Panel A. Mean Monthly Return for Past-Performance Portfolios						
Mean return	-0.10	0.35	0.21	0.34	0.24	-0.34
t-statistic	-0.28	1.16	0.68	1.13	0.72	-1.01
Panel B. Regression Results for Explaining Past-Performance Portfolio Returns						
a	-1.17***	-0.54***	-0.72***	-0.61***	-0.76***	-1.05***
b	0.87***	0.86***	0.86***	0.82***	0.94***	-0.05
s	0.90***	0.56***	0.59***	0.58***	0.52***	0.39***
h	-0.08	-0.06	-0.12*	-0.05	-0.01	-0.04
j	2.08**	-0.76	-0.23	0.29	0.05	2.06
t(a)	-4.06	-2.97	-3.45	-3.10	-3.68	-3.09
t(b)	11.73	18.35	16.07	16.07	17.77	-0.64
t(s)	8.22	7.96	7.38	7.70	6.67	3.51
t(h)	-0.80	-0.91	-1.81	-0.88	-0.19	-0.41
t(j)	2.08	-1.20	-0.32	0.42	0.08	1.74
R ²	0.46	0.67	0.60	0.61	0.66	0.10

Note: Panel A shows equally weighted average monthly returns (in %) for portfolios. They are divided into quintiles based on past performance. Following Fama and French (1996), portfolios are formed based on returns between months -60 and -13 relative to measurement month t . Panel B reports regressions of monthly excess returns for past performance portfolios on the Fama-French three factors. The three factors and dummy variable (January) is calculated as follows:

$$R_i - R_f = a_i + b_i(R_m - R_f) + s_iSMB + h_iHML + j_i(\text{January Dummy}) + e_i$$

The final column presents results for the LMW in the JSE.

***Significant at the 1% level

**Significant at the 5% level

Garcia-Feijoo and Jensen's (2014) US study acknowledged the presence of long-run reversals. Their study saw the losers outperforming their winner counterparts by 90 basis points between 1963 and 2010. As stated in the literature review, their study was a 17-year extension of Fama, and French's (1996) study and their results corresponded well. Fama and French (1996) discovered a 74-basis point gap between the losers and winners.

In Panel B in Table 2, it is worth noting that the coefficients of the market risk premium and SMB factor are all positive and are statistically significant at the 1% level. This means that the market risk premium and SMB factor positively influence excess return based on their different quintiles. The HML factor coefficient is negative and is way smaller than the above two factor exposures. The HML factor has a slightly negative influence on the excess return, and this influence is statistically insignificant. Based on these findings, we can argue that the SMB and market risk premium factor could capture the excess return in the different quintiles. According to Fama and French (1996), the three-factor model captures the economic essence of losers and winners, and these factors are the market risk premium ($R_m - R_f$), SMB and HML. The authors claimed that losers behave similarly to small, distressed stocks; therefore, losers carry more weight on the SMB and HML factors of the three-factor equation.

In addition, De Bondt and Thaler (1987) and Grinblatt and Moskowitz (2004) found that January returns strongly influence the LMW premium; hence, we investigated the relationship between reversal returns and Fama and French's (1996) three factors with January effects in mind. To determine the impact of January on the loser, winner and LMW portfolios, January was later factored out of the equation to determine if January has a significant, overweight effect on the regression results. As shown in Panel B in Table 2, the coefficient of the January dummy factor is only statistically significant at 5% in the excess return of the loser portfolio, and this coefficient is positive. In other words, the January effect has a strong influence on the loser portfolio. The relationship between the January effect and the excess return of the loser portfolio is positive. This finding is

also confirmed by De Bondt and Thaler (1987) and Grinblatt and Moskowitz (2004), which is explained in detail in Table 3. The adjusted R-square is relatively high in our regression model, with an average of 0.6, excluding the regression on the LMW portfolio. In other words, the regression model that we used fitted well.

The January effects

January has a history of producing superior returns in securities. As stated in the literature review, De Bondt and Thaler (1987) and Grinblatt and Moskowitz (2004) reported that long-run reversals hold significant weight in results in January. George and Hwang (2007) further confirmed this theory by stating that long-run reversals of loser stocks are significantly exclusive to January. Muller (1999) acknowledged the presence of overreaction in South Africa to a point where he needed to factor out January from his empirical research to determine the effect of the month on long-run reversals. The empirical results, shown in Table 3 opposes previous findings and exhibits a consistent presence of loser reversals. In Table 3, Panel A, where the whole year, including January, is included, and Panel B, where January is factored out of the equation, shows whether January did indeed have a significant effect on the outcomes

Table 3: Long-run reversals and January returns in the ISE

	β_0	Loser	Winner
Panel A. Full sample			
Coefficient	-0.3412	-0.4027*	-0.0587
t-statistic	-1.1899	-1.4680	-0.3083
Panel B. January Excluded			
Coefficient	-0.2752	-0.5865**	-0.0741
t-statistic	-0.9653	-2.0989	-0.3707

Note: The table shows the results of monthly Fama-MacBeth (1973) regressions of the form:

$$R_{it} = \beta_0 + \beta_1 L_{it} + \beta_2 W_{it} + e_{it}$$

The R_{it} is the return to stock i in month t . Loser (winner) is a dummy variable that takes the value of 1 if stock i is in the lowest (highest) quintile based on their continuously compounded returns from month -60 through the month -13. At the top of Table 3, loser and winner mean the corresponding coefficient estimates, calculated by the time-series average, in %. The portfolio-formation period of our samples is from May 2005 through May 2019 (169 months).

**Significant at the 5% level

*Significant at the 10% level

In Table 3, Panel A shows that the loser reversals failed to rebound with a 40,27-basis point drop in returns. Panel B shows that the losers experienced a further reduction of 58,65 basis points, excluding January. This 18,33-basis points difference confirmed our findings in Table 2, showing that the January effect has a substantial significant influence on the loser portfolio. Garcia-Feijoo and Jensen's (2014) January effect results were consistent with De Bondt and Thaler's (1987) and George and Hwang's (2007) theories. Their results confirmed a strong existence of long-run reversals over their 571-month sample period. The returns for losers generally rebounded by 59 basis points but dropped remarkably to 15 basis points after factoring out January, while winner reversals experienced a 31-basis point drop. As shown in the last column in Table 3, the winner portfolio also failed to yield a reversal with negative coefficients of -5,87 basis points and -7,41 basis points. However, these results were also shown to be statistically insignificant. Based on those findings, this finding is the same as in Table 2 in which we found that the mean monthly return of the LMW portfolio is -0,34%, which means that the winner portfolio keeps performing better than the loser portfolio. In other words, the long-run reversal of loser and winner does not exist in South Africa, while the January effect does affect the loser portfolio return.

The monetary environment and long-run reversal

Table 4: LMW returns, under expansive and restrictive monetary environments

	Expansive (n=92)	Restrictive (n=77)	T-statistical
LMW portfolio return	-0.6252%	-0.0080%	0.9003

Note: Table 4 displays average monthly returns for the LMW portfolio in expansive and restrictive monetary periods. Following Fama and French (1996), loser and winner portfolios were determined based on continuously compounded returns between months ranging between -60 and -13, relative to the portfolio-formation month t . The sample portfolio-formation period is from May 2005 to May 2019 (169 months).

We ran the two-sample t-test to examine whether the mean of the LMW was significantly different under both monetary conditions. Table 4 shows the LMW returns during both the expansive period and restrictive monetary environments. It can be seen that the loser reversals were not as evident, with the mean monthly return of the LMW portfolio showing a -62,52 basis point balance during the expansive period and a -0,70 basis point during the restrictive period. This slight increase in the latter period may suggest that a reduction of liquidity and money supply encourages individuals to invest more in loser portfolios, which gradually increases their share returns. Figure 6 supports Table 4’s findings of a constant underperformance with the loser line of monthly returns consistently falling below the winner line for the most part, except at the beginning of the financial crisis where the South African Reserve Bank implemented an expansive monetary policy that boosted the loser portfolio over that duration. Furthermore, the LMW portfolio line exhibited a spike at the beginning of the 2008 global financial crisis but then started to experience a decline.

The LMW returns discovered by Garcia-Feijoo and Jensen (2014) were at 1,85% during the expansive period. However, during the restrictive period, it was less than half the size at 0,48%. Based on those findings, they argued that monetary conditions strongly influence the long-run reversals. In other words, there was a solid long-run reversal in share prices when the conditions were expansive in the US markets during their 571-sample month period. On the contrary, when the economic environment was restrictive, the mean reversal findings were significantly diminished.

Figure 6: The evolution of the R1 invested in loser, winner and LMW portfolios



Table 5 builds on Table 3 by looking at the effects of the monetary environment on the long-run reversals of the JSE listed firms. Table 3 only determined whether reversals were present over the sample period, but Table 5 shows how the results differ when taking South Africa’s monetary environment into account. The empirical study separated the Fama-MacBeth regression results into the two types of monetary environments, namely expansive and restrictive.

Table 5: Long-run reversals under both monetary environments in the JSE

	Expansive Conditions			Restrictive Conditions		
	β_0	Loser	Winner	β_0	Loser	Winner
Panel A. Full Sample						
Coefficient	0.3688	-0.7248**	-0.0996	-1.1896***	-0.0179	-0.0099
t-statistic	1.0804	-2.0308	-0.4017	-2.5667	-0.0423	-0.0335
Panel B. January Excluded						
Coefficient	0.4700	-1.0722***	-0.2140	-1.1568***	-0.0121	0.0915
t-statistic	1.3614	-3.0911	-0.8266	-2.5704	-0.0272	0.2935

Note: The table shows the results of monthly Fama-MacBeth (1973) regressions. The formula is presented as follows: $R_{it} = \beta_0 + \beta_1 t + \beta_2 \text{Loser}_i + \beta_3 \text{Winner}_i + e_{it}$

Where R_{it} is the monthly stock return i in month t , and loser (winner) is a dummy variable that takes the value of 1 if the stock is in the lowest or highest quintile based on continuously compounded returns over months ranging between -60 and -13. The monetary environment is determined based on monetary policy variables, in which the repo rate of South Africa was used as the indicator. Loser and winner represent the corresponding (time-series average) coefficient estimates in the table in %. The sample portfolio-formation period is from May 2005 to May 2019 (169 months).

***Significant at the 1% level

**Significant at the 5% level

Table 5 shows that when classifying reversals under the two monetary environments, the losers perform significantly worse under expansive conditions than restrictive conditions. Under expansive monetary conditions, the losers exhibited a 72,48-basis point drop in mean monthly returns but interestingly improved to a -1,79 basis point change under restrictive conditions. The loser results in expansive conditions were significant at the 5% level. This is counterintuitive to Garcia-Feijoo and Jensen's (2014) US study who showed that losers significantly outperform winners under expansive conditions. Garcia-Feijoo and Jensen's (2014) study opposed these findings with an observed positive 1,51% loser reversal when the monetary environment was expansive but a drop in mean monthly returns to 0,18% when the monetary environment was restrictive.

In Table 5, Panel B excludes January to determine the difference in results when the power of the January effect is taken out of account. Under expansive conditions, the loser shares failed to experience reversals with a 107,22 basis points drop at a 1% significance level. They performed worse when January was factored out. This supports theories by De Bondt and Thaler (1987) that January has a more positive effect on January returns. During the restrictive conditions, the losers did improve significantly to a -1,21 basis point level. The winners still managed to produce better mean monthly returns during both monetary environments. The winners did experience poor performance during the expansive conditions but still managed to perform better than their loser counterparts. During the restrictive monetary conditions, the sample winners managed to generate positive returns at 9,15 basis points. In comparison, Garcia-Feijoo and Jensen (2014) found that winners' change in a mean monthly reversal in the US was negligible with a -0,37% reversal during the expansive conditions and a -0,30% mean monthly reversal during restrictive conditions. Excluding January in their study did show a significant drop in loser reversals from a 1,51% loser reversal in expansive conditions to 0,76% in the same environment. This confirms De Bondt and Thaler's (1987) and Grinblatt and Moskowitz's (2004) theory that long-run reversals for losers are more concentrated in January.

Conclusion

This research looked at the relationship between South Africa's monetary policy and the reversal returns of JSE listed firms. Long-run stock reversals are when firms with poor share performance over the long run (five years) eventually outperform companies with good share performance. The research aimed to determine whether differing monetary policy environments (expansive and restrictive) influence the reversals of the JSE listed firms in South Africa. An expansive monetary policy occurs when the South African Reserve Bank aims to stimulate economic growth by lowering short-term interest rates and expand the country's money supply. On the contrary, restrictive monetary policy occurs when the South African Reserve Bank aims to combat inflation by raising short-term interest rates and limit the money supply of South Africa. These two monetary environments had positive consequential effects in Garcia-Feijoo and Jensen's (2014) US study where reversals did occur in the US markets and did exhibit significant changes in results among loser and winner portfolios. The losers in the US did outperform winners, especially during expansive conditions, but their outperformance was more limited during restrictive conditions. The South African adopted study failed to find loser firms beating winners in both expansive and restrictive monetary conditions, with losers continuously underperforming winners in the long run but closing the gap during restrictive conditions. This was counterintuitive to our hypothesis based on Garcia-Feijoo and Jensen's (2014) monetary findings and Page and Way's (1992) and Bitten et al.'s (2016) acknowledgement of reversal occurrence in South Africa. January positively affected the loser portfolio, where the losers did not perform as severely when January was included in the analysis. Once January was excluded, the losers performed a lot worse in comparison.

Limitations and recommendations

The limitation of the empirical research was that many firms did not have all the required data to do a complete sample analysis. The data was suggested to be converted daily; however, it was difficult to restructure the approach because of time constraints. It is acknowledged and understood that 42 250 data points are significantly more than 169 data points and may have brought more conclusive results. However, the daily time-series data of market risk premium did yield a similar curve to our monthly time series. The holding period of the LMW portfolio was one year, which was inspired by Garcia-Feijoo and Jensen (2014). However, the results did not find long-run reversal patterns in the sample. Therefore, it is probable that this kind of reversal will show up if one expands the holding period. It is recommended that a more in-depth analysis of firm-specific factor effects in South Africa could help develop research in the field of monetary policy and price reversals. We also recommend that future research considers the tax and clientele effects on share price reversal.

The authors' substantive contribution(s) to the current conference article are in the table below.

Author name	Conceptualisation and design	Literature review	Data collection	Data analysis and interpretation	Manuscript writing	Critical revision of the manuscript	Obtaining funding	Overall responsibility
Rollins NG Ayaya	X	X	X	X	X			X
Runxin Lin	X	X	X	X				
Onesmus Ayaya		X			X	X	X	

References

- Anjum, S. (2020). Impact of market anomalies on the stock exchange: A comparative study of KSE and PSX. *Future Business Journal*, 6(1), 1-11.
- Arendas, P., Chovancova, B., Kotlebova, J., & Koren, M. (2021). January anomalies on CEE stock markets. *Investment Management and Financial Innovations*, 18(4), 120-130.
- Ayaya, O. (2002). Financial liberalisation, savings and investments: Evidence from a cointegration examination (Part 1). *South African Association of Accountants Biennial International Conference Proceedings, June 26-28, 2002, Port Elizabeth* (pp. 385-401).
- Bekaert, G., & Hodrick, R. J. (1992). Characterizing predictable components in excess returns on equity and foreign exchange markets. *The Journal of Finance*, 47(2), 467-509.
- Bernanke, B. S., & Blinder, A. S. (1988). *Credit, money, and aggregate demand* (No. w2534). National Bureau of Economic Research.
- Britten, J., Auret, C., & Page, D. (2016). Investigating the interaction between long-term reversal and value on the JSE. *Studies in Economics and Econometrics*, 40(2), 1-24
- Bjørnland, H. C., & Leitemo, K. (2009). Identifying the interdependence between US monetary policy and the stock market. *Journal of Monetary Economics*, 56(2), 275-282.
- Blackburn, D. W., & Cakici, N. (2017). Overreaction and the cross-section of returns: International evidence. *Journal of Empirical Finance*, 42, 1-14. <https://doi.org/10.1016/j.jempfin.2017.02.001>
- Chui, A. C., Subrahmanyam, A., & Titman, S. (2021). *Momentum, reversals, and investor clientele* (No. w29453). National Bureau of Economic Research.
- De Bondt, W. F., & Thaler, R. H. (1985). Does the stock market overreact? *The Journal of Finance*, 40(3), 793-805.
- De Bondt, W. F., & Thaler, R. H. (1987). Further evidence on investor overreaction and stock market seasonality. *The Journal of Finance*, 42(3), 557-581.
- Dyl, E. A., Yuksel, H. Z., & Zaynutdinova, G. R. (2019). Price reversals and price continuations following large price movements. *Journal of Business Research*, 95, 1-12.
- Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *Journal of political economy*, 81(3), 607-636.
- Fama, E. & French, K. (1992). The cross-section of expected stock returns. *Journal of Finance*, 47(2), 427-465.
- Fama, E. F., & French, K. R. (1996). Multifactor explanations of asset pricing anomalies. *The Journal of Finance*, 51(1), 55-84.
- Fry, M., Julius, D., Mahadev, L., Roger, S., & Gabriel, S. (2000). Key issues in the choice of the monetary policy framework. In L. Mahadeva & G. Sterne (Eds.), *Monetary Policy Frameworks in a Global Context*. Routledge.

- Garcia-Feijoo, L., & Jensen, G. R. (2014). The monetary environment and long-run reversals in stock returns. *Journal of Financial Research*, 37(1), 3–26.
- George, T. J., & Hwang, C. Y. (2004). The 52-week high and momentum investing. *The Journal of Finance*, 59(5), 2145–2176.
- George, T. J., & Hwang, C. Y. (2007). Long-term return reversals: Overreaction or taxes? *The Journal of Finance*, 62(6), 2865–2896.
- Grinblatt, M., & Moskowitz, T. J. (2004). Predicting stock price movements from past returns: The role of consistency and tax-loss selling. *Journal of Financial Economics*, 71(3), 541–579.
- Hsieh, H. H., & Hodnett, K. (2011). Tests of the overreaction hypothesis and the timing of mean reversals on the JSE Securities Exchange (JSE): The case of South Africa. *Journal of Applied Finance & Banking*, 1(1), 107–130.
- Hong, H., & Stein, J. (1999). A unified theory of underreaction, momentum trading and overreaction in asset markets. *Journal of Finance*, 54, 2143–2184.
- Miranda-Agrippino, S., & Rey, H. (2020). US monetary policy and the global financial cycle. *The Review of Economic Studies*, 87(6), 2754–2776
- Muller, C. (1999). Investor overreaction on the Johannesburg Stock Exchange. *Investment Analysts Journal*, 28(49), 5–17. <https://doi.org/10.1080/10293523.1999.11082392>
- Page, D., Britten, J., & Auret, C. J. (2013). Momentum and liquidity on the Johannesburg Stock Exchange. *International Journal of Economics and Finance Studies*, 5(1), 56–73.
- Page, M. J., & Way, C. V. (1992). Stock market over-reaction: The South African evidence. *Investment Analysts Journal*, 21(36), 35–49. <https://doi.org/10.1080/10293523.1992.11082314>
- Rif, A., & Utz, S. (2021). Short-term stock price reversals after extreme downward price movements. *The Quarterly Review of Economics and Finance*, 81, 123–133.
- Statista (2020, August 27). South African inflation rate from 1984 to 2021. <http://statista.com/statistics/370515/inflation-rate-in-south-africa/>
- Trade Economics (2020, August 27). South Africa interest rate. <http://tradingeconomics.com/south-africa/interest-rate#:~:text=In%20the%20long-term%2C%20the.according%20to%20our%20econometric%20models>
- US Federal Reserve (2020, August 15). Historical approaches to monetary policy. <http://federalreserve.gov/monetarypolicy/historical-approaches-to-monetary-policy.htm>
- Zaremba, A. (2016). Has the long-term reversal reversed? Evidence from country equity indices. *Romanian Journal of Economic Forecasting*, 19(1), 88–103.

Impacts of big data on accounting

Siriyama Kanthi Herath

Destiny Woods

School of Business, Clark Atlanta University, USA

Keywords

Accounting, Big Data, Data Analytics, Real-time and dynamic information

Abstract

Big data and data analytics are currently the buzzwords in both academia and industry to become data driven. Big data has been the trending topic in the accounting industry also. Big data and data analytics will have an important impact on accounting and accountants. Big data will improve the quality of accounting information and the accounting profession will continue to provide real-time and dynamic information to assist in decision-making. The purpose of this research is to investigate the impact of big data and big data analytics in accounting. Data analytics is one of the most recent developments in the accounting context. This study is qualitative in nature and adopted a literature review methodology to gain a better understanding of the study area. This literature review seeks to provide a description and evaluation of the impact of big data analytics on accounting. This research found that big data presents great opportunities for decision making in accounting and risks analysis, which indicated that companies could improve their performance, measure performance, manage risks and allow effective real-time decision-making with data analytics. This research revealed that accountants can create more value in a world of big data analytics and encourages accountants to get started with big data to find answers to risks in business operations as well as understand financial performance. It shows that relying on big data analytics will open new possibilities for accountants. This study contributes to the research literature in the area of big data analytics on accounting. The limitations of this study are that it utilizes few recent peer reviewed articles in the general accounting practice, therefore not exhaustive in describing how big data and big data analytics impacts accounting.

1 The Introduction

Big data and data analytics are currently the buzzwords in both academia and industry to become data driven. Big data has been the trending topic in the accounting industry also. Big data and data analytics will have an important impact on accounting and accountants. Big data will improve the quality of accounting information and the accounting profession will continue to provide real-time and dynamic information to assist in decision-making.

The purpose of this research is to investigate the impact of big data and big data analytics in accounting. Data analytics is one of the most recent developments in the accounting context. The focus of this research is to addresses various questions of how accounting has been impacted by big data and big data analytics. The basic question is how big data and data analytics affect accounting. We have recognized several more questions. What are the opportunities brought by big data in accounting? What are the risks of using big data and big data analytics in accounting? In addition, how can accountants exploit big data in decision-making? The paper discusses the big data sources in accounting, impact of big data analytics in accounting, and how big data analytics can be used in decision making in accounting. The motivation for this study is that the use of big data and data analytics in accounting is in its infancy stage and many accountants are unaware of how big data can transform their roles.

This paper is structured as follows: Section 2 reviews the literature on data analytics in accounting. It discusses how accountants can exploit big data and big data analytics effectively in their roles. Section 3 discusses the research methodology. Section 4 discusses research findings. Section 5 summarizes the research. The final section provides the imitations of this research and directions for future research.

2) Literature review

2.1 Big data and data analytics

In 2013 the Oxford English Dictionary introduced the term “Big Data” as “data of a very large size, typically to the extent that its manipulation and management present significant logistical challenges; (also) the branch of computing involving such data”. This definition covers only part of the big data story. Big data refers to enormous amounts of data that is propelled by growth of computer technologies, emergence of new sources of data and growth in infrastructures for information technology (Cockcroft and Russell, 2018).

Big data, however, does not only refer to large volumes of data, since industries and businesses like the banks have been using large amounts of data in the past (Jia, 2020). Big data refers to datasets that are not only big, but also high in variety and velocity, which makes them difficult to handle using traditional tools and techniques (Elgendy and Elragal, 2014, p.214). Big data uses sophisticated techniques for handling complexity of large data. Big data includes a complex, which is produced at higher speed and can be characterized as large volumes of data that flows with a high velocity, and a wide variety of data. The latter includes both structured, semi -structured and unstructured which can include types of data such as text, numbers, images and videos among others.

According to Cockcroft and Russell (2018), big data is primarily enabled by advancement of computing power such as cloud computing and storage, a feature that allows ease in capturing, storing, sharing and processing of data despite its size or complexity. As a result of the large quantities of data involved, various models, programs and technologies are used to extract knowledge in real-time. Big data analytics involves making big data usable through making sense of its analysis, thus, allowing decision makers to gain insights from it (Cockcroft and Russell, 2018). With computer analytics, software and visualization tools complex and big data can be made more user friendly, thus enabling business leaders to become less reliant on technical experts in the process of running queries (Ibrahim et al., 2021).

Additionally, big data analytics data linked to cloud computing applications are stored in large databases and costs of using data in decision-making have become cheaper. Bhimani and Willcocks (2014) point out that big data analytics is the application of computer technology to see large amounts of data through visualization software which helps one to clearly see patterns, trends, exceptions and outliers. The utilization of effective data analytic tools makes it possible to have new insights about data. Besides, data analytics makes it easier for businesses to analyze and use real-time data in making decisions.

2.2 Research questions

Utilizing big data and big data analytics, accounting professionals have been shifting from the traditional methods of data capturing, analysis and storage to large volumes of data that is technology generated and analyzed (Ibrahim et al., 2021). For instance, a common trend in accounting where professionals are turning their attention to social media as a source of big data (Arnaboldi et al., 2017). However, the use of big data, data analytics and social media for accounting is still in its infancy.

Research to date confirms that there are doubts about the reliability of the large and complex data gathered, the methods of processing it, risks of using it, how it fits in organizations, associated risk of business reputation, and the value of the information that if generated (Jia, 2020; O'Leary, 2018; Bhimani and Willcocks, 2014). Despite these challenges, available anecdotal evidence and sample case studies reveal that big data and big data analytics have already changed accounting, accounting practice and profession, as well as the accountability in companies. Hence, it seems justifiable to investigate the way in which accounting practices have been impacted by big data and big data analytics. The basic question is “How has big data and analytics impacted accounting”? This can be answered through asking what its opportunities in accounting arena. What are the risks of using big data and big data analytics in accounting? In addition, how can accountants exploit big data? This study seeks to identify the inherent impacts of big data and data analytics in corporate reporting.

3) Research methodology

This study is qualitative in nature and adopted a literature review methodology to gain a better understanding of the study area. This literature review seeks to provide a description and evaluation of the impact of big data analytics on accounting. The availability of big data and analytics in accounting has been reflected in the significant incorporation of big data in businesses. The businesses, particularly in the

U.S. and Europe, including Amazon and Google have constructed new infrastructures that support big data and enable big data analytics (Bhimani & Willcocks, 2014). Despite the businesses incorporating big data in accounting, the academic research on the effects of big data and accounting is minimal and does not reflect consistent updates with the development of technology.

The actual use of big data and big data analytics in accounting is still in its infancy stage as its use is fragmented, where early state of art research in terms of theoretical foundations is reflected (Ibrahim et al., 2021). The main reason may be the lack of researchers with knowledge to access big data or the experts need to learn big data analytics. Besides, big data is not static and there has been a rise in production of useful reviews, on its application, which remains unknown to many (Gulin et al., 2019). Most literature available on big data in accounting is fragmented where they use specific theoretical approaches such as opportunities, challenges, reporting, influences accounting information, and are in the early stages (Jia, 2020; O'Leary, 2018; Gulin et al., 2019; Bhimani and Willcocks, 2014). Therefore, there is a need to consolidate the available information for ease in understanding the effects of big data on accounting. A literature review provides the most appropriate method of converging the fragmented information for ease in review and applications in accounting within the big data realm. This study involves reviewing the recent literature on big data analytics applications in accounting. The literature explores how big data and data analytics affects the field. Peer reviewed articles generated from advanced search across the databases are used.

4) Findings/results

4.1 Big data analytics and decision making in accounting

This research found that big data presents great opportunities for decision making in accounting and risks analysis, which indicated that companies could improve their performance, measure performance, manage risks and allow effective real-time decision-making with data analytics. This research revealed that accountants can create more value in a world of big data analytics and encourages accountants to get started with big data to find answers to risks in business operations as well as understand financial performance.

Accounting requires the accountants to deliver tasks strategically within a certain period. The traditional transaction record-to-report accounting methods, however, limit the visibility of data, and make it difficult to complete the tasks periodically. Real-time access to the accounting data can create efficient and error free accounting reports and can save time and money. Using big data for analyzing reports can create real-time data driven decisions. Big data enables accountants to proactively identify issues with real-time access to the data so that accounting businesses can base their decision-making more on hard evidence and facts, rather than emphasizing on guesswork and assumptions about customers, employees, and vendors (Ace Cloud Hosting Editor, 2020).

The major goal of collecting and analyzing big data from a variety of sources is to get an opportunity for insights which could be used in making real-time decisions (Al-Htaybat and von Alberti-Alhtaybat, 2017; Bhimani and Willcocks, 2014; Cockcroft and Russell, 2018). Therefore, rather than depending on the financial reports that are generated after a period of time such as on a monthly basis, the availability of minute-to-minute data from various sources, including unstructured data from websites and mobile devices provide credible data for decision making (Bhimani Willcocks, 2014). Accountants can now utilize data analytics and data visualization techniques to analyze financial data. Data analytics and visualization of quality data lead to valuable decisions that are relevant to identification of financial risks and their sources (O'Leary, 2018; Arnaboldi et al., 2017)

New capabilities in big data enable the accountants to improve decision-making across organizations, for instance gaining new insights on the business sales including costing (Jia, 2020). Besides, the accurate and easily understandable data from data analytics accountants can provide greater assurance over business financial statements (Cockcroft and Russell, 2018). Moreover, big data analytics is essential in the improvement of decision quality required in the management of financial resources and evaluation of business functions based on predictive analysis (Nasrizar, 2014).

In practice, big data analytics provide opportunities for accountants to improve the quality of their accounting services in information governance also (Gulin et al., 2019). The extensive use of personal information obtained from various customer interactive sources requires that the organizations should have monitoring and compliance guidelines that would ensure security and privacy of sensitive information available in big data applications.

4.2 Importance of big data analytics in accounting

Big data include unstructured video, images, audio, and textual files often derived from sensors and social media. In accounting, big data allows real-time processing of data, which could mean that companies will be able to develop accurate financial performance, effectively measure performance, and reliably prepare budgets (Bhimani and Willcocks, 2014). Besides, big data helps improve the quality of accounting data through facilitating accuracy, completeness and making it available for use in decision making in real-time (Cockcroft and Russell, 2018). Moreover, with historical accounting data experts are able to predict the future of the business accurately utilizing data analytics. However, data has always been one of the main limitations of accounting in assessing risks and budgeting. Perhaps, big data and big data analytics are more likely to be understood despite the instant flow of data.

4.3 Big data characteristics (challenges)

Many organizations are now interested in managing and analyzing data utilizing big data. Big data is often linked with complexity and speed. Big data is affecting accounting in every aspect from data itself to its collection and processing, reporting and data-driven decision-making. It is important to understand the content and characteristics of big data. Several big data analytics definitions are shown in Table 1. Big data characteristics can be explained through common words that point to its remarkable potential. The defining characteristics of big data is their volume, variety, and velocity but researchers use the famous 'five V's' framework. As shown in Figure 1, two additional dimensions *veracity* and *variability* are added in the 'five V's' framework.

The 'five V's' of big data from the basic features of big data, and they include volume, velocity, variety, veracity and value. Volume is the base of big data and refers to the amount of data that is produced by big data technologies or sources, which is enormous (Nasrizar, 2014). Velocity defines the speed of production, access or collection and analysis of big data. An important feature of big data is that it is produced, collected and analyzed in real-time. In most cases velocity is more important compared to volume as it allows timely decision making in business, since even a limited volume of data available in real-time can lead to better results than a large volume of data which takes long to capture and analyze (Nasrizar, 2014). Value refers to the importance and use of big data in positively affecting organizational operations. Useful business insights that add value to decision making can be made from big data analytics (Jia, 2020). Variety involves the diverse data types that make big data, and which are collected from various sources. Types of data can include structured, semi structured and unstructured data (Ibrahim et al., 2021). Veracity is the validity of big data or its credibility, where the possibility of collecting data from various sources possibly makes the valuable data to be of good quality.

Author(s) and date	Definition
Opresnik and Taisch (2015)	Big data typically refers to the following types of data: (1) traditional enterprise data, (2) machine-generated/sensor data (e.g. weblogs, smart meters, manufacturing sensors, equipment logs), and (3) social data
Constantiou and Kallinikos (2015)	Big data often represents miscellaneous records of the whereabouts of large and shifting online crowds. It is frequently agnostic, in the sense of being produced for generic purposes or purposes different from those sought by big data crunching. It is based on varying formats and modes of communication (e.g. text, image, and sound), raising severe problems of semiotic translation and meaning compatibility. Big data is commonly deployed to refer to large data volumes generated and made available on the Internet and the current digital media ecosystems
Akter et al. (2016a)	Big data is defined in terms of five 'Vs:' volume, velocity, variety, veracity, and value. 'Volume' refers to the quantities of big data, which are increasing exponentially. 'Velocity' is the speed of data collection, processing and analyzing in the real time. 'Variety' refers to the different types of data collected in big data environments. 'Veracity' represents the reliability of data sources. Finally, 'value' represents the transactional, strategic, and informational benefits of big data
Abbasi et al. (2016)	Big data differs from 'regular' data along four dimensions, or '4 Vs'— volume, velocity, variety, and veracity

Table 1: Definitions of big data analytics
Adopted from (Mikalef et al., 2018, p.554)

Ramadan (2017) discussed the challenges induced by big data in terms of the ‘five Vs’. As shown in Figure 1, the “five Vs” or the challenges are defined as the issues related volume, velocity, variety, veracity and value. The first three characteristics can be viewed as raw properties of the data from various sources such as transactions, records, tables and files. These sources provide a continuous and ever-increasing quantity of data at greater speed, and they come in various forms (structured and unstructured) and different formats (video, image and text) (Ramadan, 2017). The veracity and value characteristics can directly affect the quality of the analysis. It is important to manage the first three Vs to ensure the reliability and timeliness of the analysis for decision-making purposes (Ramadan, 2017). Accountants must control and manage these challenges in order to make effective and efficient data-driven decisions with big data.

4.4 Analytic types

Literature discusses a variety of data analytics techniques. Because of Big Data technologies, companies can leverage any computational technique that generates information from data to make huge datasets useful for decision making (Warren et al., 2015, p. 398). To analyze big data and to get its value in decision making four types of approaches or data analytics have been suggested in the literature. These include descriptive analytics, diagnostic analytics, predictive analytics, and prescriptive analytics (Arnaboldi et al., 2017) as shown in Figure 2, and accountants can use them to analyze big data and make data-driven decisions.

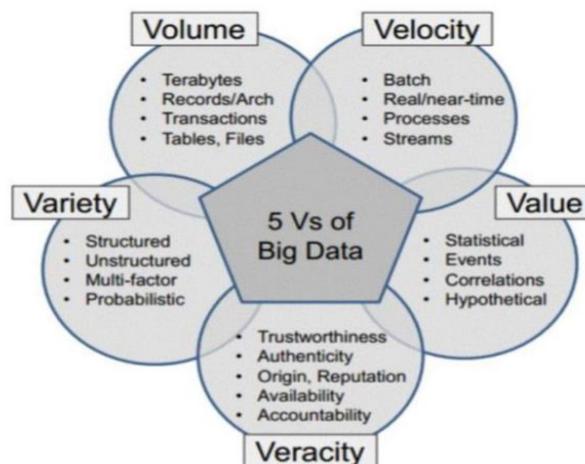


Figure 1.0 Big data challenges (Ramadan, 2017, p.2)

Descriptive analytics is the utilization of techniques of uncovering the pattern that is inherent in big data. It involves simplifying and summarizing the large volume of data in order to get more insights to the historic trend. Accountants can utilize various data analytics tools to get a better understanding on “what happened” and prepare informative reports. Diagnostic analytics is data analysis that is able to give the reason behind the pattern or trend in data for getting details to the cause of the problem or issue. Accountants can utilize various data analytics tools to provide an in-depth insight into a particular problem or issue by focusing on past data and performances to determine “why something happened.”

Predictive analytics is a data analysis technique that is concerned in predicting what will happen in the future through the utilization of historical and current data. Accountants can utilize the information gathered from descriptive and diagnostic analytics to predict future trends and outcomes, and to determine “what is likely to happen.” Predictive analytics allows accountants and analysts to better understand customer needs and provide personalized services. These analytics provide new ways of creating value for the business. Prescriptive analytics is a technique of data analysis that explores various possible actions and points on the best cause of action depending on the results of analysis from a given data set. Accountants can utilize prescriptive analytics to focus on “what actions to take” that can mitigate a problem or achieve a desired target.

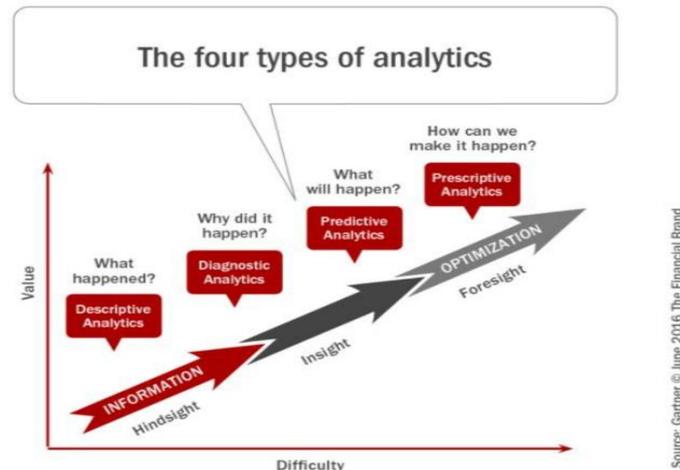


Figure 2: Analytics Types

Source: (Adopted from Marous, Financial Brand,

<https://thefinancialbrand.com/59805/banking-data-predictive-advanced-analytics/>)

4.5. Emerging issues of big data

Although the rapidly changing and sophisticated techniques provide broad applications, there are some issues associated with big data. One problem is storage and sorting of colossal amounts of data. Organizations have server limits cannot store the exponentially increasing data. Huge servers are very expensive and is not a cost-effective solution. One solution, however, is to use a distributed file server. Another problem is processing data with complex structures. Data analytics can help an organization to become an insight driven organization with informed decision-making. Many organizations cannot apply Big Data techniques simply because the entities cannot overcome a limiting factor, such as lack of data (quantity), irrelevance or data from questionable sources (quality), or insufficient expertise in extracting information (accessibility) (Warren et al., 2015, p.404).

If businesses want to include big data in their accounting records, they must identify the suitable data if available at hand or decide to outsource the analysis. Failure to properly perform this process could diminish the quality of the accounting records and underlying confidence in the financial results (Warren et al., 2015, p.404).

The trend of big data analytics in accounting facilitated by growth in computing power, ability to capture data and utilize various types of data from diverse sources presents opportunities for accountants to gain new insights, manage risks and predict future outcomes. Understanding the implications of big data in decision making in accounting provides valuable evidence that can help businesses in exploiting big data. Besides, presenting the opportunities of decision making that are enabled by big data analytics in accounting encourages businesses and accountants to get started with big data to find answers to questions about their operations as well as understand their current financial performance.

5) Discussions and conclusions

The trend of big data analytics in accounting facilitated by growth in computing power, ability to capture data and utilize various types of data from diverse sources presents opportunities for accountants to gain new insights, manage risks and predict future outcomes. Understanding the implications of big data in decision making in accounting provides valuable evidence that can help businesses in exploiting big data. Besides, presenting the opportunities of decision making that are enabled by big data analytics in accounting encourages businesses and accountants to get started with big data to find answers to questions about their operations as well as understand their current financial performance. Big data analytics can be utilized in a variety of areas of accounting including financial and managerial accounting. Financial accounting in the USA is mainly concerned with preparing financial statements following the generally accepted accounting principles (GAAP). In general, big data analytics can provide extremely important qualitative information to stockholders. Managerial accounting provides information generated from financial accounting records to help managers to pursuit their duties. One significant task for

management accountants is to create systems that align organizational goals with the behaviors of management and employees (Warren et al., 2015, p.400). For accountants to use big data in their analyses, they must understand, transform, and analyze the data and share the information with the stakeholders. Big data can play a vital role in accounting.

The paper provided a review of available evidence on the impact of the big data analytics on accounting. The purpose of the paper was to describe the impact of decision making using big data and big data analytics. The study found that big data analytics provides great opportunities to accounting operations by enhancing understanding of accounting operations, forecasting, predicting business operation outcomes, improvements of accounting ethics, automation of accounting and facilitates real-time risk analysis and decisions making which improves the efficiency of organizations (Bhimani and Willcocks, 2014; Cockcroft and Russell, 2018; Nasrizar, 2014; Jia, 2020; Arnaboldi et al., 2017 and Ibrahim et al., 2021 and O'Leary, 2018).

This study also established that the big data analytics improves the value of decisions made in accounting. Accountants can utilize it to uncover trends or patterns of a specific data in their roles, summarize different data sources, understand the reason for data trend, and test the various strategies based on historic data to predict the impact of an accounting decision (Nasrizar, 2014; O'Leary, 2018; Ibrahim, Elamer and Ezat, 2021; Jia, 2020 and Bhimani and Willcocks, 2014). Going through the advantages offered by big data analytics, you may be able to discern how crucial it has become for businesses. It offers solutions to every business problem that may arise. The different types of big data analytics enable businesses to process and make use of the stack of raw data they collect on a daily basis.

This paper shows that relying on big data analytics will open new possibilities for accountants although there are some challenges and limitations of big data. This study contributes to the research literature in the area of big data analytics on accounting.

6) Limitations and direction for future research

The major limitation of the current study is that it utilizes few recent peer reviewed articles in the general accounting practice, therefore not exhaustive in describing how big data and big data analytics impacts accounting. This means that the selected articles cannot be used as a representative sample; hence, the less information was gathered to describe the impacts of big data analytics in accounting. Though the research provided relevant information on the role of big data analytics in accounting, its findings lack specificity on how different accounting functions such as cost control, prevention of error and fraud, and preparing accounting reports and tax returns. Therefore, future research should consider providing a review of literature on the impact of data analytics on specific accounting functions while utilizing a large number of peer-reviewed articles. Future researchers can use other research methodologies such as surveys and case studies to gain empirical evidence of the impact of big data on accounting.

References

- Al-Htaybat, K. and von Alberti-Alhtaybat, L. (2017) "Big Data and corporate reporting: impacts and paradoxes", *Accounting, Auditing & Accountability Journal*, Vol. 30 No. 4, pp. 850-873.
- Arnaboldi, M., Busco, C., & Cuganesan, S. (2017) Accounting, accountability, social media and big data: revolution or hype? *Accounting, Auditing & Accountability Journal*, Vol. 30 No. 4, pp.762-776.
- Bhimani, A., & Willcocks, L. (2014) Digitisation, 'Big Data' and the transformation of accounting Information'. *Accounting and Business Research*, Vol. 44 No.4, pp.469-490.
- Big Data Arrives at the Oxford English Dictionary* (2013)
Available at: <https://whatsthebigdata.com/2013/06/15/big-data-arrives-at-the-oxford-english-dictionary/> (Accessed 24 November 2021).
- Cockcroft, S., & Russell, M. (2018) Big data opportunities for accounting and finance practice and research. *Australian Accounting Review*, Vol. 28, No. 3 pp.323-333.
- Elgendy, N. and Elragal, A., (2014) *Big data analytics: a literature review paper*, Computer Science, © Springer International Publishing pp. 214-227. Available at: <https://www.researchgate.net/publication/264555968>, (Accessed 24 November 2021)
- Gulin, D., Hladika, M., and Valenta, I. (2019) Digitalization and the Challenges for the Accounting Profession. In *Proceedings of the ENTRENOVA-ENTerprise REsearch InNOVAtion Conference (Online)*, Vol. 5, No. 1, pp. 428-437.
- Ibrahim, A., Elamer, A. A., and Ezat, A. N. (2021) The Convergence of Big Data and Accounting: Innovative Research Opportunities. *Technological Forecasting & Social Change*
- Jia, Z. (2020) The Impact of the Arrival of the Big Data Era on Accounting Work. In *IOP Conference Series: Materials Science and Engineering* (Vol. 768, No. 5, p. 052092). IOP Publishing.

-
- Marous , J., *Predictive Analytics: Think Big, Start Small... Just Start Now!* The The Financial Brand Available at: <https://thefinancialbrand.com/59805/banking-data-predictive-advanced-analytics/> (Accessed 25 November 2021).
- Mikalef, P., Pappas, I.O., Krogstie, J. and Giannakos, M., (2018) Big data analytics capabilities: a systematic literature review and research agenda. *Journal of Information Systems and e-Business Management*, Vol. 3, pp. 547-578.
- Nasrizar, M. M. (2014) Big Data & Accounting Measurements. *Advances in Computer Science and Information Technology (ACSIT)*, Print ISSN: 2393-9907; Online ISSN: 2393-9915; Volume 2, Number 3; January-March 2015 pp. 295-305 © Krishi Sanskriti Publications Available at: <http://www.krishisanskriti.org/acsit.html>
- O'Leary, D. E. (2018) Big Data and Knowledge Management with Applications in Accounting and Auditing: The Case of Watson. *Available at SSRN 3203842*.
- Ramadan, R. (2017) "Big Data Tools-An Overview". *International Journal of Computer Science and Software Engineering*, pp. 1-5. Available at: <https://doi.org/10.15344/2456-4451/2017/125> (Accessed 25 November 2021).
- Warren, J. D., Moffit, K. C. and Byrnes, P., 2015. How Big data Will Change Accounting. *Accounting Horizons*, Vol. 29, No. 2, pp. 397-407. DOI: 10.2308/acch-51069 2015
-

Digital transformation, creativity & innovation during the Covid-19: An employee perspective

Stamatia Pitouli
Evangelia Fragouli
University of Dundee, UK

Keywords

Covid-19, Innovation, Creativity, Digital Transformation

Abstract

In the last few months Covid-19 has risen many issues regarding the policies applied in managing, motivating employees in order to be creative and nurture innovative ideas. Leaders and managers came across a great challenge and should find ways to promote the new reality to their employees to keep them interested in the activities they had to accomplish in the most successful way possible. Covid-19 forced everyone to go through a great transformation, adopt new habits, be engaged in the digital world in order to meet the needs of the new normal. In this research we will examine whether the practices used by managers to maintain creativity and innovation met their goal, while anxiety and insecurity overwhelmed all the parts involved. We will also try to explore the role technology played in promoting original ideas during that period as well as the barriers that had to be overcome and whether culture played any or no role at all in showing flexibility towards the new practices. In order to reach a conclusion, research will be conducted with the use of questionnaires and cross-examination of data collected by similar studies. This research will contain analysis of the data collected and a conclusion drawn defining and clarifying the questions set, examined from the employees' perspective.

1. Introduction

Theoretical Background

In the last few months, a worldwide disease has been spread, known as Covid-19 and led our lives to transform in many ways. Along with the transformation of our lives as individuals, companies also needed to transform in multiple ways in order to be able to survive during that crisis. The majority of companies were in a way forced to change their traditional way of operating and needed to adopt a more digital way and follow the digital trend that was spreading all over the world. Being able to transform, automatically means that you need to become more creative and innovative and adopt technologies and ways that best suit the company's philosophy. Every company, no matter what changes in the way of operating, needs to adjust those changes to the basic characteristics and philosophy, since those are the things that actually retain them in the market. Covid-19 could be considered an accelerator for creativity and innovation which led to digital transformation for many companies and was a one-way street in order to actually survive.

Due to Covid-19 many companies needed to readjust their whole operation system, in order to be able to face the crisis of the last year and confront the challenges that the lockdown brought across them. The pandemic and the different approaches taken by national governments to enact a lockdown has accelerated the volatility, uncertainty, complexity, and ambiguity (VUCA) across the social, economic, political, and technological environment (Saleh & Watson, 2017). Compassion must be had for business leaders, as no amount of forecasting or horizon scanning would have predicted such a catastrophic impact that has been witnessed in the past few months nor not what the future might unfold. However, many aspects of business decision-making have worryingly shifted (but these are exceptional times) during this period to becoming more short-term and purely operational (Cole, 2020). Some organizations examined their previously carefully constructed business continuity plans and immediately recognized the paucity of their efforts in the face of a genuine and significant global crisis (Wallace, 2020).

Along with the companies themselves, individuals as employees had to readjust to the new methods that needed to be followed in order to be able to maintain their position in the company they worked and find out ways to balance the new demands with their everyday life. Within days, in some cases, the place they were living and was the place that they turned to for relaxation and spending time with their families, became their workplace and needed to find ways in order to be able to split their time within the same space

between work and every other activity they used to do up to that time. Companies should find ways to support their employees and make them feel safe and supported, in order for them to be as efficient as they were within the facilities of the company. Through this research we will try to find out whether they were successful on their purpose and manage to maintain their productivity at the same levels and also try to figure out if employees agreed with the results of the same actions.

1.2. Research Question

How efficient were companies in adjusting to the needs the pandemic has risen and whether employees share the same view?

1.3 Aims and Objectives

Through this research we will examine whether the practices used by managers to overcome the difficulties and obstacles due to the pandemic met their goal, while anxiety and insecurity overwhelmed all the parts involved. We will also try to understand the role technology played and in what level in adjusting to the new challenges especially from the part of the employees during that period as well as the barriers that had to be overcome and whether culture and attitude played any or no role at all in showing flexibility towards the new practices.

2. Literature Review

2.1 Creativity and Innovation

It is often said that during a crisis opportunities arise as long as anyone would be adaptive, flexible, and insightful. Those qualities along with creativity and innovation are considered skills that would help see or even create opportunities at any time and mostly during a crisis if someone would have the courage to try their ideas. The particular universal crisis made current more than any other time the terms of VUCA. VUCA is an acronym – first used in 1987, drawing on the leadership theories of Warren Bennis and Burt Nanus – to describe or to reflect on the volatility, uncertainty, complexity and ambiguity of general conditions and situations. VUCA world shows the unpredictable nature of the world at stake like the situation of Covid-19 we are in right now. The deeper meaning of each element of VUCA serves to enhance the strategic significance of VUCA foresight and insight as well as the behavior of groups and individuals in organizations. It discusses systemic failures and behavioral failures, which are characteristic of organizational failure.

As Walton has written Design Thinking is a new approach to create breakthrough innovation and promote high-performance collaboration. It is quite different from analytical thinking and is a process for action. It is a method for discovering new opportunities and solving problems. It is generally understood that there are five key elements in design thinking: (1) defining the problem, (2) developing the options, (3) determining the direction, (4) selecting the best solution and (5) executing. While there are a variety of techniques and tools that can be used, the core process is somewhat universal. The majority of companies had to follow that procedure in order to be able to survive through the last year and deal with the difficulties that the pandemic brought in their way. In a very limited time, they had to define all the problems the pandemic rose regarding their functionality, start developing alternatives to proceed with, design a path that would be followed in order to meet their goals, selecting the best way to succeed and turn that plan into their everyday reality. Although digital transformation has become a goal to achieve for most companies in the last few years, most of them had to expedite most of the plans they had in progress and even change their strategy to be able to meet the new demands that rose up because of the pandemic. (2017)

The terms creativity and innovation are often used interchangeably (Man, 2001); however, there is a clear distinction between creativity and innovation, the former being the generation of ideas and the latter its implementation. In the era of globalization, digitalization and competition, creativity and innovation are considered to be key factors for survival, success, and excellence of organizations (Peter Cook, 1998). Creativity has always been considered to be the force that makes the world go round. People need to be creative in order to overcome difficulties and inconveniences to make everyday activities simpler and easier and most of all gain time. Companies and organizations need to be and remain creative in order to survive throughout the changes that take place every day in the business world.

Creativity is a critical skill for recognizing or creating opportunity in a dynamic environment. Creativity resulting in products, services, and processes is now more important than ever due to globalization and hyper competition (Hisrich, Ramadani 2017). There is no one idea of creativity that is appropriate for all activities. Creativity requires both cognitive and non-cognitive skills, inquisitiveness, intuition, and

determination. Creative solutions can be created or discovered immediately or over long periods of time. Creativity is not just a revolutionary changing product that comes from world-renowned innovators like Alexander Graham Bell, Thomas Edison, Albert Einstein, Sigmund Freud, or more recently James Dyson, Steve Jobs, or Mark Zuckerberg. Instead, it is the ability to consistently produce different, new valuable results (Trifan, Guica, Micu 2012).

Capturing an idea and put it in motion are the two things needed in order to support the concept creativity. Innovation is the production or implementation of an idea. According to psychologist Seema Hingorany having ideas but not acting on them might be imaginative but not creative. Generative research shows that everyone is able of being creative. The more diverse the training a person receives, the greater the potential for creative output is. The average adult among three to six alternatives for any given situation, while the average child reaches up to sixty ones. There are several ways for a company to trace any creative elements in each one of their employees and capitalize on it for the development of the company itself.

According to what Walton has written innovation occurs through cycles of divergent creative thinking, which brings about many potential alternatives followed by convergence to a selected solution. Divergence is breaking from the normal and familiar ways of doing things. It is focused on coming up with new ideas and solutions. It expands the number of potential solutions through the process of creativity. It is the most dynamic and social phase and underpins the creative process. Convergence is the achievement of some agreement regarding the benefits of a given idea and the value in pursuing that idea. It removes any nonviable options. It is an assessment in terms of the implementation issues. Unless the convergence stage is well managed, the most viable and innovative ideas may be lost. Creativity depends on a repeated cycle of divergence and convergence to first create a diversity of options and then determine the best ideas to implement. This process takes time and depends on the question or problem facing the organization. The creative process involves both logical and analytical thinking in the preparation, validation, and implementation stages. It calls for imagining, using intuition, conceptualizing, and synthesizing in the incubation and illumination stages. (R.D. Hisrich, V. Ramadani, *Effective Entrepreneurial Management*, Springer Texts in Business and Economics, Chapter3, p38,2017)

As Hisrich and Ramadani have written 'Creativity is a process that can lead to incremental improvements or breakthrough innovations. While breakthrough innovations such as penicillin, the computer, and the automobile are wonderful, most innovations make incremental improvements to existing product lines rather than bringing something radically new to market. Technological innovations such as voice and text messaging and the jet airplane occur more frequently than breakthrough innovations. Incremental innovation is the form of innovation that occurs most frequently and makes minor changes in the product or service' (2017). According to them creativity can range from low levels to relatively high levels. Lower-level creativity involves incremental modifications and adjustments of an existing idea or a combination of two or more previously unrelated ideas in a novel and useful way. Higher level creativity involves more breakthrough contributions. During the last year although there were breakthrough ideas that took place in many sectors, most companies were forced to lower levels of creativity in order to be able to handle the universal crisis of Covid-19. As Sam Walton has claimed creativity can range from low levels to relatively high levels. Lower-level creativity frequently involves incremental modifications and adjustments of an existing idea or a combination of two or more previously unrelated ideas in a novel and useful way. During the last year most, companies would say that have been moving in lower levels of creativity, since they needed to spend most of their energy in adjusting to the new reality that Covid-19 enforced to the whole world. (R.D. Hisrich, V. Ramadani, *Effective Entrepreneurial Management*, Springer Texts in Business and Economics, Chapter3, p38,2017)

2.2 Digital Transformation

Digital transformation can be defined as: "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies" (Vial, 2019). Digital Transformation is not a new concept, but it became more crucial than ever during the past year because of the pandemic Covid-19 which enforced everyone to find ways to avoid personal contact and get things done by keeping their distance to prevent the spreading of the virus. Apart from using the digital technology, for something to be considered digital transformation in a business, needs to make noteworthy change in its model with the use of that technology (Fitzgerald et al, 2014). According to G. Fletcher and M. Griffit in terms of digital transformation there are three key lessons

that can so far be detected in the pandemic period. There are many more things to learn regarding how data, information and technology were treated and arranged during the pandemic, along with many workforces' behavior and wellbeing related issues; organizations must improve their digital maturity; less digitally mature organizations are more fragile; and organizations with higher levels of digital maturity are generally more flexible. In their article 'Digital transformation during a lockdown' G. Fletcher and M. Griffit there is increasing evidence of how elastic and fluid business models are allowing businesses to continue (2020).

Covid-19 was the reason that many aspects of everyday life changed completely from the traditional way they occurred up to that point. A great example was that of distance education. Before the pandemic most countries were using only the traditional way to have lessons in the classroom where the tutor and students were interacting. When they were forced to have lessons in distance online learning became popular where the tutor and students needed to connect to a specific platform and work through their lesson digitally and remotely (Stauffer, 2020). According to UNESCO by March of 2020 1,38 billion students around the globe and of different levels of education were forced to remain in their houses because of the lockdown and were introduced to distant education (Li & Lalani, 2020). Children and parents needed to learn and adjust to a new way of learning since that was the only option they had until the pandemic was over and they would be able to have personal interaction again.

Another transformation that occurred during the pandemic was that of telecommuting and videoconferencing. According to data collected from the European Union (Eurostat, 2020) entering March 2020, 110 million people in the European Union were working from home, while in the United States the number was up to 54 million of telecommuters (Desilver, 2019). With telecommuting growing rapidly videoconferencing applications such as Apple's FaceTime, Cisco's Webex, Microsoft's Skype or Zoom, although being available for a long time (Zec and Matthes, 2018) met a sharp growth during the last year (Lev-Ram, 2020). According to a study that took place in 2017 by Gallup the percentage of American employees that were partially working from home was 43%, while during the pandemic that amount increased up to 90% (Bick et al, 2020). All that change made imperative the use of those application so that everyone could be informed on the spot about critical information regarding their work and be able to go through with everything. Along with the growing demanding of the internet use for work or education from home internet streaming has drastically risen, since people were forced to stay indoors during the lockdown and used the internet to gather information or for entertainment reasons (Bhargava et al., 2020).

Another breakthrough was the augmentation of e-payment and transactions. During the coronavirus and in making a great effort to reduce the spread of the virus many people of different ages and educational background started using the already available applications to make their transaction instead of paying in cash as they were used to until that point (Liébana-Cabanillas et al., 2018). According to Jones & Nikolaeva credit card payments replaced the traditional way of payment in Europe, mostly because banks decided to lower the ceiling of e-payments through credit card in smaller businesses and stores (2020). In other countries such as China of India there was an increase in payments by using applications supported for smartphones (Rooney, 2020), while more than 600 million of European and American citizens have been already using mobile payments (Fortune, 2019).

2.3 Companies' perspective

Most companies needed to adjust the way of operating and find new ways or expanding the existing ways in order to keep their operation moving, while employees needed to create new ways to be able to keep up with the changes that were taking place in the blink of an eye. A lot of people had a hard time since they were facing many new things that needed a lot of their effort to be handled. Many employees that were also parents needed to find ways to balance and combine the time they had to work from home while their children had to take their classes electronically. Apart from the practical things that needed to be taken care of, there were also other things that everyone had to handle. The anxiety that everyone felt about keeping their job, being able to work or study from home while not having an option to escape at any time because of the lockdown. Companies needed to find ways to support their employees not only towards the practical needs in order to be able to keep up with the work that needed to be done, but also psychologically since that was a new reality for both parts and in order to be able to keep up with one part, the other one needed to be taken care of too.

Along with creativity comes innovation. According to Baregheh et al attempting in 2009 to give a more accurate definition in innovation, offered the following one: "Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance,

compete and differentiate themselves successfully in their marketplace". In the last decade or more every organization tends to become more digital by finding new practices in order to digitalize their operations and procedures and meet the competition. In order to be able to meet that target they need to marry creativity with innovation and adjust their existing means to new procedures. The most important target of innovation is searching for effective approaches to improve the value chain for the organization and its stakeholders (Freeman, 2004; Harrison & Freeman, 2017). Innovation has become compulsory for organizational sustainability and has demonstrated its importance during the pandemic crisis of Covid-19 (Stoll, 2020).

All organizations and companies from the first day of the pandemic worked very hard in order to be able to find ways of keeping their work done, having in mind all the drastic measures governments all around the world had to enforce. They adjusted very quickly (in most cases) technologies that up to that point were used in a very limited way and expand them in order to be able to involve every employee to those practices in order to keep up with their work. An example that stands out in the telecommunication sector in Greece, is that of OTE Group of Companies, which was able to achieve within three days, almost 80% of their employees to work remotely in order to stay safe and protect themselves and their beloved ones, as the CEO of the company Mr Tsamaz has announced in his interview in "Kathimerini" on the 13th of March 2020 (online article Kathimerini, entered 22/6/2021 13:46). Out of the 16.000 employees 13.000 were able to work remotely within three days after the announcement of the first lockdown took place in Greece. OTE Group of Companies was able to expand practices that were used in a restricted way and among few employees up to then, so that a major part of the company would stay safe by working remotely and protect themselves while maintaining their job. By March 25th, approximately 2.3 billion people were forced to stay to their homes due to the lockdown. India accounted for 1.3 billion (Suri et al., 2020) leaving the rest 900 million in 35 other countries around the globe (Agence France-Press, 2020).

Digital Transformation does not only have to do with the improvement of the means already used by applying new and more advanced technologies which is generally known as digitalization. Digital Transformation reveals a fundamental reinvention of the way individuals, organizations, governments, and society are dealing with certain procedures (O'Halloran & Griffin, 2019). Digital Transformation is applied not only by advanced technologies, but also by mutual creation of shared goals (Porter & Kramer, 2011; Von Briel, Schneider, & Lowry, 2019) by converging strategies and creative ideas. Digital Transformation was the mean used in order to develop autonomous systems, social networks (Li & Bernoff, 2008), and AI-powered smart systems (e.g., smart homes, infrastructure, cities, and countries) (Rogers, 2016). These developments have enabled the creation of ambient intelligence and the paradigm of "smart everything" (Streitz, Charitos, Kaptein, & Bohlen, 2019). Digital Transformation was the reason that organizations were able to expand globally and create value chains with connectivity, agility, flexibility, and dynamic capabilities, all imperatives for sustainability of business enterprises in the age of urgency (De Smet & Gagnon, 2018). Digital Transformation has also enabled governments and nonprofit institutions to become smart digital entities with human and social e-services, citizen participation systems, 24/7 policing (Lee & Trimi, 2018). Digital Transformation has provided an impetus to the development of Convergence innovation.

Throughout the human evolution innovation can be found in every aspect of human life. Humans have always struggled to find new ways to improve the quality of life, from the hunting-gathering age to agrarian economy, industrial age, information age, and now knowledge economy (Lee, 2018). Every innovation initially brings a major shakeout as happened in automobiles, PC manufacturing, smartphones etc. The number of producers would first increase steadily, and then, as the value pool consolidates, it will drop rapidly (Bughin, Catlin, Hirt, & Willmott, 2018). According to Siebel, when the new change is being operationalized, a period of a more tranquil equilibrium would prevail only to be punctuated by new innovations that would be superior to previous ones used (2019). Every organization, no matter its size and purpose, has a chain of activities to create value added. The most important purpose of innovation is searching for effective approaches to improve the value chain for the organization and its stakeholders (Freeman, 2004; Harrison & Freeman, 2017).

All of the analysis done for the concept of creativity and innovation comes to meet the crisis the pandemic brought since March of 2020 and enforced organizations and companies to follow that path in order to be able to survive. The fact that people were scared and were in a way forbidden to go out in order to buy the things they needed for their everyday life, many supermarket and groceries chains were forced to work more intensively to create or improve their apps or e-shops, so that everyone could be able to make

their orders from the safety of their home. Online stores work hard in order to improve the procedure the visitors had to follow in order to submit their orders and found new ways to make easier the communication among their departments and the costumers themselves. Although during the previous years there was a variety of electronic applications that could help to the communication between parts, people preferred the meetings in person or through the telephone, while the use of application such as skype, viber, messenger, zoom etc were not so popular. During the past year many companies started using additional means to improve or even maintain the contact with their customers in the desirable level, while were enforced to use them for their internal communication because of the lockdown.

As mentioned before apart from working remotely, in order for every part of a company or organization to keep up with every new announcement, change or direction they had to be in continuous contact with each other to be informed. While in previous times an announcement could be done in person as everyone were available to the workplace, now that was a bit difficult. Having that concept in mind everyone started to share information more through e-mails, messages through various applications and of course teleconferencing so that they could stay in touch and have at some level the same feeling of being near their co-workers. This kind of contact arose new difficulties and questions among the parts using the new means considering the level of safety of that transmitting information through the use of those applications and of course that led to a new need for all companies and organizations; the need to improve their systems regarding the transmission of critical information and the measures they had to take in order to be able to keep their data safe. They needed to expand or even find new applications in order to protect themselves, their customers', and employees' data from exposure.

2.4 Employees' perspective

Apart from companies and organizations employees as individuals came across the same path dealing the pandemic crisis. Many decisions needed to be made on everyday things that never before seemed to be of such importance and difficulty as now, since nothing likewise had ever appeared before in our lives. Having to live your everyday life the way you used to, but at the same time needing to change many aspects of it was a very challenging thing for everyone. People needed to take care of their selves, their families at the same way they used to but adopt new approaches for the same activities they did up to that point and make sure it would have the same result on them because otherwise they might collapse. People needed to keep 'going' to work every day as they used to, but now their workplace would be their own home. They had to interact with the people they used to but only from distance and by using electronic means. They needed to take care their home in a more careful way than before, because now that was their home, their workplace, the place they could exercise and spent their whole day. In order to achieve that and make sure that it would not affect their mental status they should find ways to make that happen and experiment with many alternatives to find the one way that fitted most their ways and needs.

As far as everyday life is concerned people adopted new habits in order to make their daily routines easier. According to Brem et al six technologies grew through the pandemic and were widely used by a big part of people who needed to stay at home: distance education, e-gaming, videoconferencing, internet streaming, cashless payments, and e-commerce & home delivery (Technological Forecasting and Social Changes, p163,2021). People had to find ways to cope with the difficulties that arose with the coming of the lockdown due to the pandemic and since organizations and companies focused on developing those parameters on the way they operated, people became more familiar with each concept and started using them without hesitating or skepticism anymore. During a crisis, such as the pandemic of COVID-19, people come in a place and they are willing to deliberate over new practices, that would seem unacceptable if the case was not the one, they were going through. According to Brem et al "The control of individual movement and the replacement of humans by artificial intelligence and robots, which were hugely unpopular a few months ago are now increasingly considered attractive solutions".

Everyone in a blink of an eye had to adjust every aspect of their lives in their homes. As Boas Shamir and Ilan Salomon have written in their article "Work-at-Home and the Quality of Working Life" the domestic model of work is not something new and has not appeared in nowadays because of the pandemic. It was widely known and supported in preindustrial societies and coexisted with the factory system in nineteenth century Europe and the United States, while it is still very common in some Asian countries. Quoting Bythell's words at the end of his book "Outwork is rightly relegated to one of the darkest chapters of economic history, and now that it is virtually dead none should regret its passing" (1956, p. 254). Nevertheless, there are many different aspects among the variety of domestic work systems that are used

now and telecommuting, which need further advisement before they are adopted and any permanent arrangements could be reached (Academy of Management Review, 1985, Vol. 10, No.3, 455).

According to one widely accepted formulation (Hackman & Oldham, 1976), employees' productivity along with their satisfaction and attitudes, are strongly linked to certain psychological conditions: experienced meaningfulness of the work, experienced responsibility for outcomes of the work and knowledge of the actual results of the work activities, which in turn, are connected to certain core dimensions of the job: autonomy, feedback, task significance, skill variety, and task meaningfulness. The literature on work-at-home has created a sense that the autonomy of the worker is likely to be increased by switching from the regular place of work to working at home. Due to first thought and impressions the employees working from home are not so easy to be supervised and that could lead to more flexibility in the choice of working hours and work patterns. However, the actual repercussions of that switch on the level of employees' autonomy have shown that it may not change; it may even decrease, depending on several factors. For certain professional employees, including information technicians, who already enjoy a high degree of autonomy with respect to the choice of working hours and work patterns are not likely to be significantly affected by a transfer to the home. For others, who might be persons with childcare responsibilities, working from home might have more responsibilities and be more demanding, so it could offer less opportunities of autonomy than the workplace (Boas, Ilan, Academy of Management Review, 1985, Vol. 10, No.3, 456-457).

Following the new reality everyone should find ways to adjust the new demands to their own routine. People working from home had its benefits and disadvantages which affect different people in different ways. As described above everyone started working in a more autonomous way. Up to that point employees were used to work nearby their coworkers and supervisors and knew that if there was anything that they would need help with, there would always be someone available to ask for help, advice, or suggestions on how to deal with that particular matter. All of the sudden what was taken for granted changed and although through electronic means, help would seem to remain at the same levels, that was not the case at all situations. Because of the lack of physical presence no one could know what the other person was doing or whether they were available to help them, since they could not see them. In that way even if the employee needed any kind of help and tried calling his/her supervisor or coworker, sending a message through any kind of application, they could not be sure that the response would be an immediate one. Most of the times and because of the reason described before a lot of tasks were delayed and the employee him/herself had to keep a lot of tasks in abeyance and in that way spend more time afterwards to complete a lot of tasks at the same time in order to keep up with any deadlines that had been set. Accordingly, the feedback that needed to be given through the new means was something that everyone had to think twice since when communicating from a distance, the message that you want to send would be sent, but all the other aspects of the social contact couldn't be transferred (such as tone of voice, any physical explanatory gestures etc). As Boas and Ilan have mentioned in their article *Work-at-Home and the Quality of Working Life*, the nonverbal communication signals are in some cases very important for the transformation of the information needed to be said and telecommunication means lack of that kind of quality. They are considered such an important part of the feedback procedure, that the absence of them could be considered to lead to poorer feedback and of less quality that it would make a huge negative impact in their work (p.458). A lot of employees might have felt that way since it has been proven that in everyday communication and social contact many messages are interpreted through nonverbal language among the speakers and the lack of it can many times drive someone to the wrong conclusion.

Furthermore, following the results of the lockdown employees came across another problem they had to overcome, the social relation. While growing up the social groups created in anyone's life are closely bonded to the different aspects of our lives. For example, when being at school your schoolmates are the ones that you would be socialized more because you share the same interests and fears and spent a great amount of time together. The same thing happens in the work environment and the place of your schoolmates is being taken by your colleagues. Apart from helping you on the actual job you have to do, they become your social group because they are the ones that share the same problems with you and can understand any difficulties you might come across since they are in the same boat as you. Working from home arose a big obstacle on that matter, since suddenly people were not able to have the support, they might need from the group of people they knew would understand them the most. None could argue that your family and beloved ones would make anything to help you that there are aspects that only someone having the same

experiences could fully understand and would be able to help you in a suitable way. Social relations created at the workplace are also considered to be one of the most important parameters of job satisfaction (Albertson, 1978; Jahoda, 1979; Locke, 1976). As two experiments done by Olson (1981) have shown, telecommuting causes work socializing decrease, which could easily lead to job quality reduction.

Following that assumption anyone could reach the conclusion that if employees working from home won't find another way to interact and start socializing, that need would remain unfulfilled which could by its turn lead to less satisfied and motivated employees, who would not care for job matters as much as the ones that would work from the original workplace (Hackman & Oldham, 1976). Additionally, the socialization is considered to be very important in order to transfer the organizational culture among the participants in a more unofficial way. The lack of that could create an environment that not all employees interpret the culture of the company they work, the goals and vision it has and eventually been unable to transfer that same message to the target group of clients (Hackman, 1976). In that way coworkers will not be able to bond with each other and in many cases will not find the support needed in order to be in a position of surviving within the company and have that feeling of loneliness and cut out of the rest of their work group.

Due to the reasons described above individuals needed to find ways to keep in touch with their coworkers in order to balance their work hours, their work relationships, and personal relationships within the new reality. As companies did, individuals started to contact with each other using a variety of electronic means and applications that gave them the chance to communicate with each other as they kept being nearby. More video calls were conducted, apart from the exchange of written messages and even group meetings through digital platform in order to catch up with their news personal or professional. For many people, that going to work was a way of escaping from the problems or pressure of their homes, that was their new way of escaping and socializing with everyone and offered them a kind of relief, knowing that there were others who shared the same thoughts, difficulties, and worries. Especially for people who had to take care others within their home, such as children or elderly parents, and was more difficult to find some time for themselves, that way was an escape of that routine and offered them relaxation and some moments of discussing with another individual different aspects of everyday life.

Apart from those aspects, telecommuting arose many obstacles to employees that were not familiar with this way of working and hence they came across many different and, in some cases, difficult choices in order to be able to meet the demands of their job and their personal lives. According to general opinion telecommuting can benefit both companies and employees since it is strongly connected to the amount of autonomy (Dambrin 2004; Wilson and Greenhill 2004), balancing work-life with personal life (Azarbouyeh and Naini 2014; Felstead et al. 2002; Raghuram and Wiesenfeld 2004; Sullivan and Lewis 2006) and an increasing in work performance (Fonner and Roloff, 2010). It is also thought to affect in a higher degree and have a more positive impact to the balance between personal and work life of people that have in higher extend family obligations (Golden 2006; Shockley and Allen 2007). Employees who have for example children at a young age, would seem to prefer working from home because it gave them the chance to be able to help their children if something needed or be able to pick up them from school during their brake, without having to interrupt their actual work. They would be able to better manage with the work needed to be done at home (such as cleaning, cooking etc) since they would not have to lose any time with public transportation that might not be on time or worry if they would be on time to go or pick up their children from an after-school activity. In that way they were able to gain time and spend it more "productively" in organizing their time towards their job and their family which would offer them more opportunities to be less anxious and perform in a better way to their job and meet their responsibilities in more creative and effective ways.

In contrast to the positive affect digital transformation, which brought telecommuting in our lives, has on employees, there are evidence to support the opposite and show that the results are no so encouraging regarding the lives of employees. A major concern has been risen towards the fact that working from home could increase stress among employees because strict margins can be put between home and workplace and that by itself could escalate disputes between work and family issues (Hardill and Green 2003; Mann and Holdsworth 2003; Russell et al. 2009; Standen et al. 1999; Sullivan 2012; Wheatley et al. 2008). As Mirchandani supports telecommuting can increase the levels of stress and anxiety on employees, since they need to find ways to combine and harmonize home and work activities (2000, p.159-182). Furthermore, people working from home would concern whether they would be noticed and appreciated for their work.

Meeting in person on a regular basis with supervisors and managers could lead to poor evaluation and even put additional boundaries on purchasing a promotion within the organization or company they work (Weinert, C., Maier, C., & Laumer, S., 2015, pp. 1407–1421). In addition to that people working from home combined with flexible hours offered from the employees could lead to employees spending actual more than their regular schedule, on work activities due to lack of concentration, privacy or other distractions within their home, in order to be able to meet any deadlines or productivity goals leading to more family conflicts, an unhappy family environment and lower effectiveness on job matters (Song, 2009, p.578–588). Following all the difficulties described so far, individuals needed to find ways to be able to separate their work and home time in order to remain as productive as possible regarding their work and also be able to remain committed to their family obligations, without leaving the work stress integrate with the time they would have on the after-work schedule activities and interests. Many of them adjusted a room in their home that was formed as an office, so that they would be able to separate themselves from the rest of the family and remain concentrate during the work hours, making the other members of the family understand that even though they were at the same place they should being considered absent, just like if they were to their workplace. When possible, many employees chose to work the night shift, in order to be able to enjoy the rest of their day with their family and make sure that they would not be distracted during their work hours, since everyone else would be asleep. In some cases, and in order to also avoid isolation, some employees would meet each other during their shifts and have a separate place to work as if they would meet at their original workplace.

Along with the adjustment that individuals needed to do regarding their work, they needed to adjust themselves to new habits, following the changes that occurred because of the pandemic. Working from home and saving time from not commuting from their place to their workplace they started using other means to complete everyday activities. One that became very popular was the engagement to online grocery shopping instead of going to the actual store and purchase the things they needed for their home. Due to fear of being affected from the coronavirus, of tiredness or even saving time a lot of people started regularly using the various applications available for online shopping giving them time to relax or spend time with other hobbies or activities. Many people that used to exercise on a regular basis and now they did not have the option due to the fact that gyms and sports centers were closed because of the lockdown, started using applications to keep up with their workout routines which was also the way for them to stress out and relax themselves and prevent exhaustion.

3. Methodology

In the proceeding section the methodology approach is described and also the procedures used for an explanatory analysis of the research. This research was an empirical one where a questionnaire was used which was composed of closed - ended type questions. After gathering the responses, a descriptive analysis took place. The creation of the questionnaire was based on the google application Google Forms. It was distributed with the use of electronic means such as social media (Facebook) and message exchange applications (Messenger, Viber).

First, a brief analysis of the sample is given, and an explanatory analysis of the data collected follows.

4.1 Population and Sample

The sample consisted of 100 respondents. Participants were employees of the Hellenic private sector, working in the telecommunication sector. The questionnaire was addressed to permanent and temporary employees as well as full and part-time employees. The sample was consisted of individuals of different work experience and education level and also of different positions of organizational hierarchy.

4.2 Analysis of Personal Data

The sample consisted of 35 male participants and 61 female participants and 4 described as other, which could be translated to 35%, 61% and 4% respectively. The education level of the correspondents was 16% of High School graduates, diploma or an equivalent, 32% Bachelor, 42% Master, 3% Doctorate and 7% other. 78% of the participants were employees, 8% held a managerial position, while 14% held another position and 86% held a full-time job while the rest 14% were working part-time. Company tenure, which described the time of years at the same company, ranged between 1 and 25 years.

4.3 Analysis and results

Organizational reactions and adjustments to stressful situations such as the covid crisis are not limited to just operational and technical changes but also include changes involving human cognition and emotions. The manner in which organizations react and change to adapt to such crises would depend largely on the people who run . Firms whose leaders encourage creativity and innovation are more likely to implement new technologies with success (Helfat and Martin 2015; Leonard-Barton and Deschamps 1988) cited in Bick et.al (2020).

Regarding the answers given through the questionnaire that was distributed, 89% of the participants answered that before the pandemic of Covid-19 was only working in the office, in contrast to 9% that had flexible working options and only 5% working from home. After the pandemic and at the question whether people would like to return to the office an amount of 36% answered that they wanted to go back, while the rest 64% would prefer working either from home or having a flexible option with 31% and 33% correspondingly. Accordingly, 41% of the participants admitted that they feel optimistic about working from home, 38% that it does not have any different impact on them, while 21% feels pessimistic about the concept. After the pandemic and as far as extra safety measures would be taken by the employers to ensure the health and safety of the employees, 39% supported that their employer would do so, 23% that they would do to some extent while the rest 38% supported that they would not really expect that to happen, to actually not at all (33% and 5% respectively).

Regarding productivity of the participants more than half, 56% respectively, have answered that they feel that they are equally productive at their tasks working either from home or in the office, while 27% feel that they are more productive when working in the office in contrast to 17% that feels that they are more productive when working from home. At the question how they would feel towards their employer, if they would ask them to return at the office full time 43% answered that it would not have any effect on them, 30% that it would affect their view slightly negative with a 2% saying that it would affect them very negative, while the rest 25% answered that it would have a positive or mostly positive effect on their opinion, with 14% and 11% correspondingly.

Regarding their return to the office 49% of the participants that they most looking forward to seeing their colleagues again, 23% being at the workplace environment, 11% having time away from home, 9% contacting with the public, 5% having financial security and 3% using their skills. On the other hand, 22% of the corresponds were least looking forward to wearing mask on their return to the office, 16% travelling to work, 15% using public transportation, 12% returning to the workplace environment, 10% missing their family or pets, 8% having time away from home and another 8% having contact with the public, another 6% experiencing social distancing, 3% seeing their colleagues again and a final 2% using their skills.

On their returning to work or seeking another role the most important thing according to the answers provided is salary with 28% and second comes career progression with 26%. 17% answered that training and development will be most important for them while 11% would expect flexible work hours. 8% will expect to have a shorter working week and another 6% will pay more attention on the commuting time. Only 3% will consider important working from home, while 1% would expect to be working part-time.

As far as the two biggest challenges that the participants are currently facing while working from home is concerned, they would be childcare and too many distractions at home with 33% each. For 32% of them was the general anxiety about the impact of the Coronavirus in their life, 30% found harder to communicate with their co-workers while 18% missed their physical workplace. Another 17% did not have access to the tools needed in order to be able to do their job and another 16% faced problems with their internet speed.

Regarding cyber security while working from home 31% had a moderate amount of concern, 29% did not concern at all, while 28% was slightly concerned and 11% were very concern about it. Last but not least 48% of the participants found it neither easy nor difficult to communicate with team members while working from home, while 36% found it easy despite the distance. 8% had no difficulties and found it very easy, while another 8% found it difficult to contact their team members.

Also, employee engagement is critical in difficult times and only leadership can do wonders through employee engagement via an effective communication plan. Deal, Stawiski, and Gentry (2010) cited in Bick et.al (2020), revealed that during the tough time, additional benefit packages and fair and comparable pay structures should be given to their employees to keep them engaged and motivated. To keep engagement high among employees, managers should provide effective feedback and direction to their subordinates from time to time.

5. Conclusion

5.1 Discussion

The main purpose of this paper was to find out whether the employees felt satisfied with the measures employers took during the pandemic and the lockdown that followed, in order for them to be able to continue working with the least possible losses on every level.

If we examine the answers that were gathered by the questionnaire distributed despite the difficulties that the participants had during their working from home, a large amount of them, even if they had never worked from home before that period, feel optimistic about working from home and would even consider either doing their job from distance either on a permanent basis or having a flexible option. The measures that were taken by the employers would be considered successful, if we consider the fact that most of the participants feel that their productivity remained the same when they had to work from home since they were able to get their job done even if they were not at their regular workplace but had the means and the support needed.

Despite the fact that the communication between colleagues was relatively easy and not too hard for most of the employees, personal contact is one of the most important things that would be considered by people and employers when people be asked to return at the office. Almost all of the participants are looking forward to meeting & working again in their workplace with their colleagues, showing that no matter how good and efficient communication can be through alternative means, the members of the team would always feel safer and closer to each other when they would be able to have personal contact and see each other on a regular basis.

Furthermore, and despite the fact that, that changes took place rapidly, unexpected and under very difficult circumstances considering the pandemic of Covid-19, a major amount of people felt relatively safe regarding cyber dangers while working from home with the equipment that was provided. This would be considered to be a great success for both parts since it shows that the employees were feeling safe and did not feel that their private life was in danger, while the employers offered the necessary means so that all the information and data needed to be processed was safe no matter where the person handling them was.

Moreover, while one of the great challenges people had to deal with was the impact the Coronavirus would have on their lives, a large amount of the participants believe that their employers would take extra safety measures in order to keep their employees safe and healthy, making returning to the office easier for those that are concerned regarding that matter. Despite the fact that a great amount of the answers we gathered reveals that wearing a mask during the work hours, is the thing that everyone is the least looking forward doing, most people are looking forward to return to their workplace and be reunited with their colleagues, while a noticeable amount is looking forward to having some time away from home and escape from that daily routine.

Another issue that would be worth mentioning is the fact that after the period of the lockdown and working from home, people returning to work or even seek for a new role or position, would chase to have a stable or even higher income and career progression, something that could be a result of the greater autonomy that came during working from home as mentioned and analyzed earlier in the paper. Many people are expecting and probably would find alternatives to be further trained and develop their skills in order to be able to have other opportunities within the same company or be able to find correspondence to other positions. This could be a new start for both parts in order to develop in different ways. Employees could create new opportunities on many levels for themselves, while companies could consider ways to benefit themselves through helping their employees develop themselves and earn more in many ways.

5.2 Limitations

One major limitation of the current study is the sample size. Because of the limited resources available, the sample size, could not be considered large or representative enough to generalize the findings. On the same basis, it seems that some characteristics appear in large proportion, like gender where 61% are women or 86% appear to be working full-time in contrast to 14% part-time, which could be a parameter that if given in other amount could affect our results in a very noticeable way. Accordingly, since the pandemic is not over yet, we could assume that it might be too soon to conduct any further research regarding the feeling people have towards their work since their answers might still been driven from the fear of the Coronavirus and impact it could have on their lives and the beloved ones.

Lastly, given the fact that research and answers provided relied on self-reports, the absence of inflation between relations cannot be guaranteed. In order to moderate such an effect two important things were applied; first, the respondents were guaranteed about the anonymity of their participation, and secondly,

they were assured that there were no right or wrong answers, in order for them to answer as honestly as possible.

5.2 Recommendations

Such subject of research could be a great opportunity for further empirical research including a broader sample and examining additional parameters, in order to be able to have a better understanding of the changes that occurred during the pandemic and the impact those changes had on a personal level as well as a universal one, when seen from a greater distance and when more parameters would be established.

References

- Azarbouyeh, A., & Naini, S. (2014). A study on the effect of teleworking on quality of work life. *Management Science Letters*, 4(6), 1063–1068
- Burke, R.J., & Westman, M. (2016) (Eds.), *Managing the work-home interface: A psychological perspective* (pp. 143–162).
- Bick, A., Blandin, A., & K. Mertens (2020), *Work from Home after the COVID-19 Outbreak*, 2020 Federal Reserve Bank of Dallas Research Department Working Papers, <https://doi.org/10.24149/wp2017r1>
- Bughin, J., Catlin, T., Hirt, M., and Willmott, P. (2018). Why digital strategies fail. *McKinsey Quarterly*, 25th January
- Bhargava, S., T. Charm, S. Pflumm, K. Robinson, US Consumer Sentiment During the Coronavirus Crisis, McKinsey March 2020, <https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/global-surveys-of-consumer-sentiment-during-the-coronavirus-crisis>, accessed 13/06/2021
- Bhargava, S., T. Charm, S. Pflumm, K. Robinson, US Consumer Sentiment During the
- Cole, B. (2020). 7 simple steps for good decision making during a crisis. *Forbes*. 14th April <https://www.forbes.com/sites/biancamillercole/2020/04/14/follow-these-7-steps-for-good-decision-making-in-a-crisis/>.
- Cook, P. 1998. The creativity advantage - is your organization the leader of the pack? *Industrial and Commercial Training*, 30, 179.
- Desilver, D (2021) 10 Facts About American Workers, Pew Research Center, 29 August 2019, <https://www.pewresearch.org/fact-tank/2019/08/29/facts-about-american-workers/>, accessed 20th May 2021
- Dambrin, C. (2004). How does telework influence the manager-employee relationship? *International Journal of Human Resources Development and Management*, 4(4), 358–374
- De Smet, A. and Gagnon, C. (2018). Organizing for the age of urgency. *McKinsey Quarterly*, 18th January
- D. O'Halloran, W. Griffin, Our shared digital future: Responsible digital transformation, World Economic Forum, February 6 (2019)
- EuroStat, Employment Statistics, 2020
https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Employment_statistics
- Felstead, A., Jewson, N., Phizacklea, A., & Walters, S. (2002). Opportunities to work at home in the context of work-life balance. *Human Resource Management Journal*, 12(1), 54–76
- Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2014). *Embracing digital technology: A new strategic imperative*. MIT Sloan Management Review, 55(2), 1–12.
- Fonner, K. L., & Roloff, M. E. (2010). Why teleworkers are more satisfied with their jobs than are office-based workers: When less contact is beneficial. *Journal of Applied Communication Research*, 38(4), 336–361
- Freeman, R. E. (2004). *The stakeholder approach revisited*.
http://www.ssoar.info/ssoar/bitstream/handle/document/34707/ssoar-zfwu-2004-3-freeman-The_stakeholder_approach_revisited.pdf, accessed 16th June 2021
- Golden, T. D. (2006). The role of relationships in understanding telecommuter satisfaction. *Journal of Organizational Behavior*, 27(3), 319–340.
- Jones, H, & Nikolaeva, M (2021). Contactless Payments Can Help Cut contagion: EU Banking Watchdog, Reuters 25 March 2020, <https://www.reuters.com/article/us-health-coronavirus-eu-banks/contactless-payments-can-help-cut-contagion-eu-banking-watchdog-idUSKBN21C1BL>, accessed 15th June 2021
- Harrison, J. S., & Freeman, R. E. (2017). Stakeholders, social responsibility, and performance: Empirical evidence and theoretical perspectives. *Academy of Management Journal*, 42(5). <https://doi.org/10.5465/256971>
- Hardill, I., & Green, A. (2003). Remote working: Altering the spatial contours of work and home in the new economy. *New Technology, Work and Employment*, 18(3), 212–222
- Hisrich, R.D V. Ramadani, (2017), *Effective Entrepreneurial Management, Springer Texts in Business and Economics*, CH 3, p.47, pdf form
- Li, C. J. Bernoff, (2008). *Groundswell: Winning in a world transformed by social technologies*, Harvard Business Press, Cambridge, MA (2008)

- Li, C., & Lalani, F (2021). The COVID-19 Pandemic Has Changed Education Forever 29 April 2020, <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>, accessed 13th May 2021
- Liébana-Cabanillas, F & V. Marinkovic, I.R. de Luna, Z. Kalinic, *Predicting the determinants of mobile payment acceptance: a hybrid SEM-neural network approach*, *Technol Forecast Soc Change*, 129 (2018), pp. 117-130
- Lee, S.M & S. Trimi, Innovation for creating a smart future, *Journal of Innovation and Knowledge* (2018), 10.1016/j.jik.2016.11.0001
- Lev-Ram, M. (2021) Here's Why Zoom was Zooming Even Before the Coronavirus Pandemic, 18th March 2020, <https://fortune.com/2020/03/18/zoom-is-zooming-despite-coronavirus/>, accessed 15th June 2021
- Mann, S., & Holdsworth, L. (2003). The psychological impact of teleworking: Stress, emotions, and health. *New Technology, Work and Employment*, 18(3), 196–211.
- Mirchandani, K. (2000). The best of both worlds” and “cutting my own throat”: Contradictory images of home-based work. *Qualitative Sociology*, 23(2), 159–182.
- M. Suri, S. Gupta, I. Kottasová, (2021). India, Population 1.3 billion, Orders 'complete' Coronavirus Lockdown, CNN 25th March 2020, <https://edition.cnn.com/2020/03/24/asia/india-lockdown-coronavirus-intl/index.html>, accessed 15th June 2021
- Zec, M.F. Matthes, Web-based software-support for collaborative morphological analysis in real-time, *Technol Forecast Soc Change*, 126 (2018), pp. 168-181 (online pdf)
- Streitz, N.A, D. Charitos, M. Kaptein, M. Bohlen, Grand challenges for ambient intelligence and implications for design contexts and smart societies, *Journal of Ambient Intelligence and Smart Environment*, 11 (1) (2019), pp. 87-107
- Online article Kathimerini, <https://www.kathimerini.gr/society/1068985/ex-apostaseos-ergasia-gia-13-000-yपाल्लोय-टोय-ओटे/>, accessed 22/6/2021 13:46
- Raghuram, S., & Wiesenfeld, B. (2004). Work–nonwork conflict and job stress among virtual workers. *Human Resource Management*, 43(2–3), 259–277
- Russell, H., O’Connell, J., & McGinnity, F. (2009). *The impact of flexible working arrangements on work–life conflict and work pressure in Ireland*. *Gender, Work and Organization*, 16(1), 73–97
- Rogers, D.I (2016) *The digital transformation playbook*, Columbia University Press, New York.
- Rooney, K (2020). Electronic Payments Look More Appealing As People Fear Cash Could Spread Coronavirus, CNBC 16 March 2020, <https://www.cnbc.com/2020/03/16/electronic-payments-look-more-appealing-as-coronavirus-spreads.html>, accessed 15th June 2021
- Saleh, A., & Watson, R. (2017). *Business excellence in a volatile, uncertain, complex, and ambiguous environment* (BEVUCA). *The TQM Journal*, 29(5), 705–724.
- Shockley, K., & Allen, T. (2007). When flexibility helps: Another look at the availability of flexible work arrangements and work–family conflict. *Journal of Vocational Behavior*, 71(3), 479–493
- Song, Y. (2009). *Unpaid work at home*. *Industrial Relations*, 48(4), p.578–588
- S.M. Lee, Innovation: From small “i” to large “I”, *International Journal of Quality Innovation*, 4 (2) (2018), 10.1186/s40887-018-0022-4
- Porter, M. M. Kramer, Creating shared value, *Harvard Business Review*, 89 (1) (2011), pp. 62-77
- Standen, P., Daniels, K., & Lamond, D. (1999). *The home as a workplace: Work–family interaction and psychological well-being in telework*. *Journal of Occupational Health Psychology*, 4(4), 368–381
- Stauffer, B (2021). What’s the Difference between Online Learning and Distance Learning? *Applied Educational Systems*, 2 April 2020, <https://www.aeseducation.com/blog/online-learning-vs-distance-learning>, accessed 13th May 2021
- Stoll, J. D. (2020). Crisis has jump-started America’s innovation engine: What took so long? *Wall Street Journal*, 10 April.
- Sullivan, C. (2012). Remote working and work–life balance. In N. P. Reilly, M. J. Sirgy, & C. A. Gorman (Eds.), *Work and quality of life* (pp. 275–290)
- Sullivan, C., & Lewis, S. (2006). Work at home and the work–family interface. In F. Jones, Siebel, T.M. (2019). *Digital transformation: Survive and thrive in an era of mass extinction*, Rosetta Books, New York
- Trifan E.L., Guica I.R., Micu C.A. (2012). Innovation Management and Technology Transfer within a Model of Innovation Center at the University Polytechnical of Bucharest *Journal for Problems of Management in the 21st Century*, (June-July 2012), pp. 74-85, ISSN 2029-6932, Scientific Methodical Center ‘Scientia Educologica’, Lithuania
- Von Briel, C. Schneider, P.B. Lowry, Absorbing knowledge from and with external partners: The role of social integration mechanism, *Decision Sciences*, 50 (1) (2019), pp. 7-45
- Vial, G (2019) Understanding digital transformation: A review and a research agenda *The Journal of Strategic Information Systems* (2019)

Van der Meulen, N., van Baalen, P., & van Heck, E. (2014). No place like home: The effect of telework gains on knowledge worker productivity. In *Academy of management proceedings* (Vol. 2014, No. 1). Briarcliff Manor, NY: Academy of Management.

Wallace, M. (2020). Digital Risks on why the best business continuity plans are usually the simplest. 15th May Insurance Business Magazine

<https://www.insurancebusinessmag.com/uk/news/technology/digital-risks-on-why-the-best-business-continuity-plans-are-usually-the-simplest-222533.aspx>.

Weinert, C., Maier, C., & Laumer, S. (2015) *Why are teleworkers stressed? An empirical analysis of the causes of telework-enabled stress*. In *Wirtschaftsinformatik* (pp. 1407–1421)

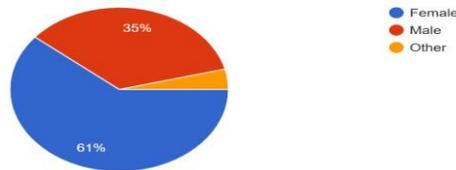
Wheatley, D., Hardill, I., & Green, A. (2008). Mobile work and challenges for public policy. In D. Hislop (Ed.), *Mobility and technology in the workplace* (pp. 227–239).

Wilson, M., & Greenhill, A. (2004). Gender and teleworking identities in the risk society: A research agenda. *New Technology, Work and Employment*, 19(3), 207–221.

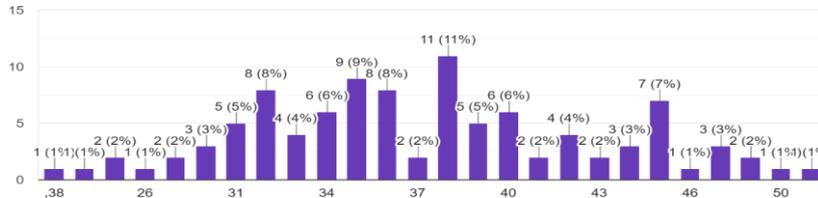
Appendix 1

Appendix 1 Charts

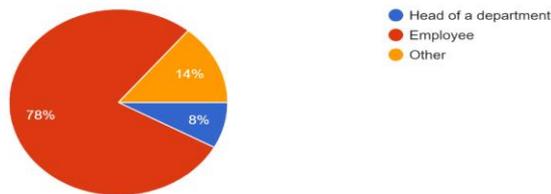
Gender
100 απαντήσεις



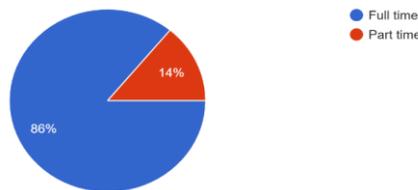
Age
100 απαντήσεις



Current job position
100 απαντήσεις

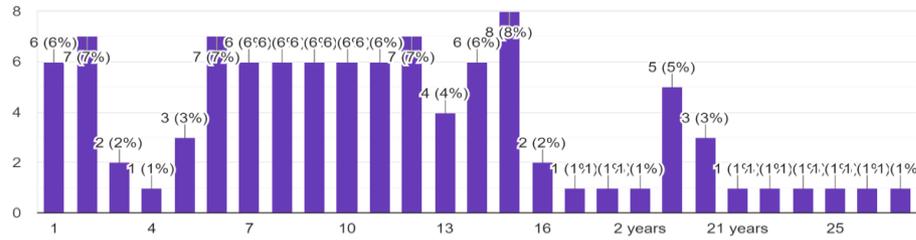


Type of employment
100 απαντήσεις



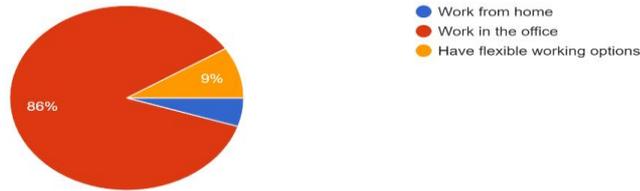
Years at the same job

100 απαντήσεις



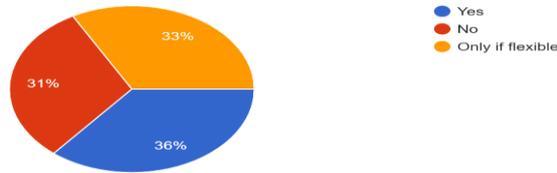
Before the Covid-19 crisis did you

100 απαντήσεις



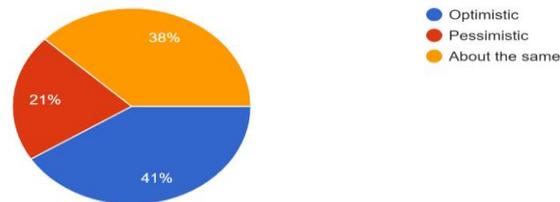
Do you want to return to working in an office?

100 απαντήσεις



Are you feeling more optimistic or pessimistic about working from home?

100 απαντήσεις



Will you expect your employer to take extra safety measures to ensure the health and safety of employees?

100 απαντήσεις



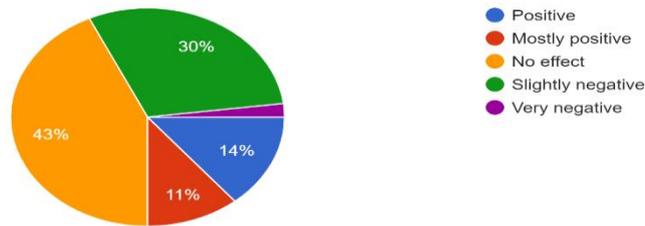
Where do you feel you are most productive?

100 απαντήσεις



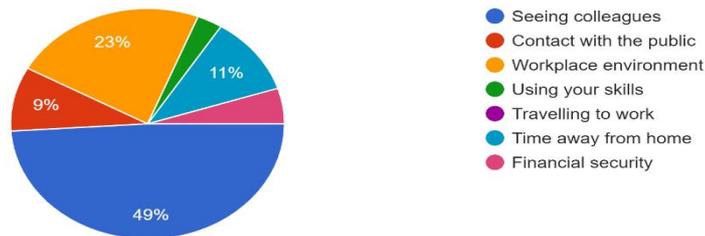
If your employer asks you to return to the office full time, how will this affect your view of them?

100 απαντήσεις



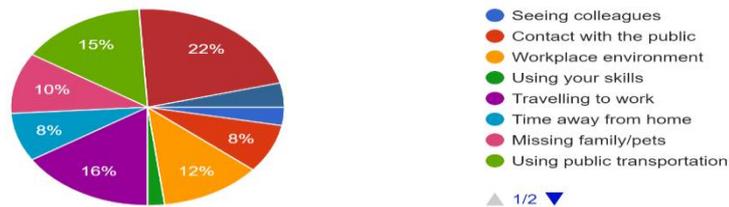
What are you most looking forward to when you return to your workplace?

100 απαντήσεις



What are you least looking forward to when you return to your workplace?

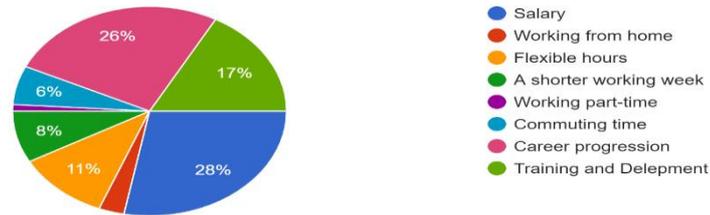
100 απαντήσεις



▲ 1/2 ▼

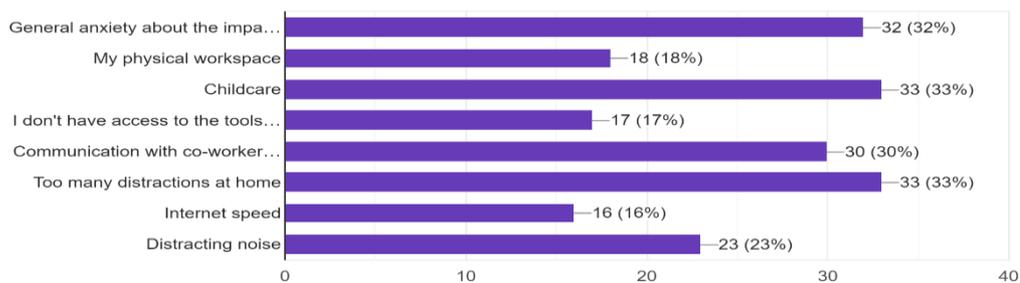
Which of the following will be important to you when returning to work/seeking a new role?

100 απαντήσεις



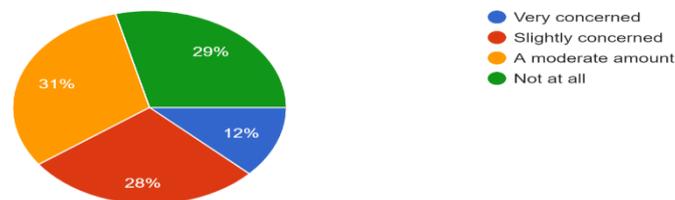
What are the TWO biggest challenges you are currently facing whilst working from home?

100 απαντήσεις



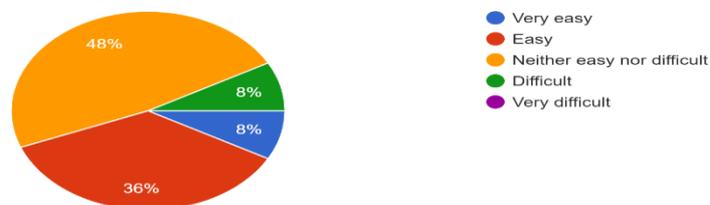
How concerned are you about cyber security when working remotely?

100 απαντήσεις



How easy are your communications with team members currently? I.e. transferring calls?

100 απαντήσεις



Equity provision equal-pay for work of equal-value implementation within South African State-Owned Enterprise (SOE)

Lesiba Langa
Seugnet Bronkhorst

University of Johannesburg, APK Campus, South Africa

Keywords

Employment Equity Act, Equal pay assessment, State-owned enterprise, Semi-structured interview, Reflexivity and Interpretative Phenomenological Analysis

Abstract

Purpose of the research: The purpose of the study is to determine how a state-owned enterprise in South Africa deploys equal pay for work of equal value. The research setting and environment where the investigation takes place are located in a state-owned enterprise (SOE) called ZYD.

Research methodology: An inductive research approach is used with qualitative research for primary data and for secondary numeric data. The research includes a population sample of eight participants who are involved in the primary research data collection. In addition, a company finance report is analysed for the secondary data collection. Equally, some qualitative primary research data are analysed quantitatively in order to make sense of the data (Saunders, Lewis & Thornhill, 2012:165).

Results/findings: The study confirms that implementing equal pay has a financial implication attached to it, insignificant as it is. Uncoordinated confirmations for promoting equal pay exist. Lack of a comprehensive approach to equal pay encompasses the majority concerns. The study shows how important it is for the organisation to have all essential pillars in place and in sync with one another, which lagged in this case. With the essential pillars in place and in sync, a robust pay equity system/model, which is supported by policy, will be leveraged and initiated as a business imperative, promoting open communication and empowerment about equal pay (Bradshaw, et al., 2017:3). Vignettes have been constructed and highlighted in order to bring alive the participants' voices within the researcher's interpretations of meaning.

Practical implications and Conclusions: South African researchers and researchers across the globe have shown little interest to explore the racial pay discrimination situation; they have constantly researched gender-based pay inequity instead. This should be reason enough to have future research studies focusing on pay equity irrespective of race, gender or disability.

Introduction

The purpose of the study is to determine how a state-owned enterprise in South Africa deploys equal pay for work of equal value. Equal pay for work of equal value received much attention in recent years due to the important implications for employees and challenges to employers. The promotion of gender equality and equal pay for work of equal value are currently high on the agenda of various countries (Adelekan & Bussin, 2018:3). Equal pay for work of equal value includes work that is the same, substantially the same and work with same value with other work (Bussin & Smit, 2015:28). Equal pay for work of equal value is the provision made within the Employment Equity Act 55 of 1998 in South Africa which was introduced in August 2014 (Ebrahim, 2016:5).

While the origins of equality provision resulted from gender discrimination in most businesses around the world (Bussin & Smit, 2015:28, Laubscher & Gilfillan, 2015:3), South Africa's context on unfair discrimination and exclusion of pay inequality are apparent among the various race groups. Statistics South Africa (2017:1) states that South Africa's economic climate is complex, as it is characterised by high unemployment ratios, the most unequal country in terms of distribution of country wealth, high skills challenges, low productivity levels, low economic growth, low inflation ranging from three to six percent, and high prices. Therefore, this situation necessitates a special need to have equality provision on pay. Blau and Kahn (2007:7), supported by Arulampalam, Booth and Bryan (2007:164) stress that without the provision of equal pay, the determination of remuneration is primarily based on supply and demand for work and labour.

Vartiainen (2001:19) argues that employers have too much uncontrollable power over salary determination. The determination of remuneration, which is based on supply and demand of labour, perpetuates low and unequal pay that is driven and fuelled by capitalist approaches that undervalue gender and race groups previously excluded from the mainstream economics (Adelekan & Bussin, 2018:3). As a result, unfair discrimination practices arise from employers as they attempt to decompose what part of pay inequity constitutes unfair discrimination. In addition, Biltagy (2014:18) stresses that while the labour market discrimination often responsible for the unexplained wage gap, the challenge might be on unobserved and unmeasured variables in worker and job aspects. Vartiainen (2001:19) further states that the decomposition is evident in the gender pay gap of Finland over the years where pay gap explanations have been made, using variables such as educational background and choice of low paying jobs.

According to Sandberg (2016:1) it is acknowledged that the equal pay for work of equal value provision has started in August 2014, and that the Labour Relations Act has prohibited unfair discrimination in remuneration practices prior to the dawn of democracy for South Africans in 1994. Notwithstanding the long period stated, the fact that pay inequality is still dominant in South Africa shows the reluctance to implement equal pay for work of equal value in favour of unequal pay for equal value of work (Blau & Kahn, 2007:7).

Literature review

The research environment is the ZYD company which is an energy-production business. The company has recently celebrated its 96th year of existence and it operates across South Africa. It has 48 500 employees comprising permanent and temporary employees who work in all nine provinces with its head-office in Sunninghill, Gauteng province. The skills within the company range from technical, engineering, procurement and sourcing, logistics, strategic planning, production, human resources, finance, information technology, horticulture, property and facility management. The large size of the organisation, the variety of the skills and many position profiles give rise to comparisons in terms of similar jobs, substantially similar jobs and jobs with comparable value as per the equal pay provision cited on the internal job evaluation of ZYD.

ZYD uses a job evaluation system to evaluate and grade all jobs that management requires, irrespective of whether these are permanent or temporary jobs. The job evaluation system is known as Tuned Assessment of Skills and Knowledge (TASK) as cited on its internal job evaluation.

The recruitment and selection policies of ZYD state that every employee and potential employee can apply for an advertised position, irrespective of colour, race, gender, disability, location of the job and where the candidate comes from as long as they meet the minimum requirements of the job description. A salary structure, which is aligned to the graded jobs, exists as per the job levels (TASK grades 04 to 18). The structure comprises a minimum and maximum of the scale per grade with six different salary zones between the minimum and the maximum, giving rise to discriminatory pay for work of equal value, whether it be fair or unfair.

The Concept of Equal Pay for Work of Equal Value

Almost five years after the equal pay provision has been in place companies still struggle with salary discrepancies, with allegations of unfair discriminatory practices based on gender, racial and/or disability (Rospabe, 2002:185). Rospabe (2002:185) regards the turning of the revolution of discrimination in South Africa as the period between 1993 and 1999 during which discrimination in labour participation has decreased, whereas wage and occupational discrimination have increased. What is required, according to Adelekan and Bussin (2018:3), is also a reduction in occupation and wage discrimination in order to allow a good representation of the South African workforce across all occupational jobs as well as of improved wages.

The meaning of 'work of equal value', as per Section 6(4) of the Employment Equity Act, states the following (Scheepers, 2014:16):

Work carried out by an employee is observed to be the same or identical or interchangeable to the work of another employee within the same employer.

Work carried out by an employee is observed to be substantially the same or sufficiently similar compared to that of another employee within the same employer, such that these jobs can be considered to be reasonably the same irrespective of whether identical or interchangeable.

Work carried out by an employee is observed to be of the same value as work of another employee within the same employer; however, doing a different job, as both jobs are evaluated and accorded the same value.

Purpose of Equal Pay for Work of Equal Value

Pay equity

Promoting equal opportunities and fair treatment.

Implementing affirmative action intended to redress the ills within the employment experienced by designated groups.

2. Eliminating unfair discrimination in the workplace
3. Addressing identified pay gaps
4. Annual employee remuneration report
5. Organisational report on pay differentials

The Pillars of Equal Pay

Countries have adopted equal pay differently and at different times. Through globalisation and digitalisation that disregard formal boundaries, people in different countries have started sharing information, including equal pay and pay discrimination information. Such international efforts include the League of Nations and the International Labour Organization. The latter was founded at the Paris Peace Conference held in 1919.

According to Watkins (2019:1068), the workforce has increased exponentially due to the workplace environment that is accommodative and cherishes and protects the rights of women. The U.S. Congress continues to use its law-development power to adopt equal pay legislation to the new employee landscape (Watkins, 2019:1051). The evolvement of equal pay according to Figart (2000:1) and Vartiainen (2001:19), with efforts to erase explicit pay discrimination are observed, yet it has reproduced new gender and equal pay unfair practices. Trade unions in South Africa, and internationally in 1919, seek to explore extreme and seemingly unattainable improvements to this piece of legislation, such that pay equity becomes a reality sooner than later (Dube, 2017:13).

The establishment of the ILO, through various equal pay conventions and declarations, intends that party members adopt and comply with, promote and protect this legislation (Tufarolo, 2016:321). The international conventions and declarations are important cornerstones of equal pay, as they seek to make companies comply, promote and protect the equal pay provision (Dube, 2017:14). Based on the lead of the Equal Pay Act, legislation in various countries has significantly improved and led to today's equal pay for work of equal value statutory framework (Watkins, 2019:1051).

When dealing with equal pay case claims, a possible remedy that can be awarded to the employer is to increase the applicant's remuneration to the level of the comparator; thus, achieving pay equity without reducing the comparator's remuneration (Oliphant, 2015:14). Such provision is included in the Canadian Human Rights Act of 1978, where it is provisioned expressively that the employer may not reduce the remuneration of a comparator in order to eliminate discrimination and achieve pay equity (Laubscher & Gilfillan, 2015:40).

The South African Constitution states that any international agreement that has been enacted into law by national legislation becomes law in South Africa unless it is inconsistent with the Constitution. It further states that when courts interpret any legislation, every court must prefer any reasonable interpretation of the legislation that is in consistent with international law on any alternative interpretation that is inconsistent with international law (Section 233).

Considering the above obligations and commitments, South Africa has signed to be a member of the ILO. Therefore, South Africa is obliged to align with agreements made internationally (Dube, 2017:17). It is evident that international law plays a significant role in South African courts, as South Africans are protected locally by international law. Where the law is approved internally and ratified locally or not ratified locally, there is no local legislation enacted to give effect to the member's obligations (Dube, 2017:17). It is this International Labour Organization Convention 100 on remuneration that South Africa has ratified on 30 March 2000.

The Constitution protects the rights and dignity of everyone in South Africa. Before 1994, the Labour Relations Act of South Africa, Section 2(1)(a) of Schedule 7 has prohibited unfair discrimination in remuneration practices. Individuals who have been aggrieved by discriminatory practices in the workplace should use this legislation to demand recourse. The Act stipulates that an unfair labour practice means any

unfair labour act or omission that arises between an employee on any arbitrary ground, including but not limited to race, gender, sex, ethnic or social origin, colour, sexual orientation, age or disability (Dube, 2017:18). Accordingly, individual rights have already existed and been protected by this piece of legislation (Laubscher & Gilfillan, 2015:2).

The Employment Equity Act 55 of 1998 has been enacted to give effect to the promotion of equality in the workplace where individuals with equal pay grievances who sought to challenge employer remuneration practices could use this piece of legislation in their claims. The purpose of this Act is to achieve equity in the workplace by promoting equal opportunities and fair treatment in employment through eliminating unfair discrimination and implementing affirmative action measures to redress the disadvantages in employment experienced by designated groups. In addition, this Act stipulates that no person may discriminate unfairly, directly or indirectly, against an employee in any employment policy or practice on a variety of grounds, among others, race, gender, disability and culture (Dube, 2017:18). Laubscher and Gilfillan (2015:2) assert that the enactment of the Employment Equity Act has resulted in the Labour Relations Act, Section 2(1)(a) of Schedule 7 being repealed, as its purpose is included in the Act itself.

The definition of equal pay, according to the legislative scope includes employment policy on remuneration, contractual terms and conditions, which employers and employees would use in dealing with claims at the courts (Dube, 2017:18). Equal pay for work of equal value was evidenced in the case of *Hayward versus Cammell Laird* where a claim was put forth and found to be successful in comparing a female cook with three joiners, two painters and an insulation engineer. In the past, women could only make claims for equal pay with a comparable male where work was similar or substantially similar. This case was the first to be adjudicated following the enactment of the Pay Equity Act Amendment Regulations, which came into effect from 1 January 1984. Therefore, it had far-reaching implications, broadening the equal pay context.

Variables Influencing Pay Equity/Inequity

1. Pay transparency

The employee making a claim would obtain information about the comparator remuneration from the comparator who can decline the request and the employee could then request the employer to provide the comparator's remuneration information. Pay transparency is an essential aspect to pay equity, and since employers strive to eliminate barriers to pay equity, they should remove this clause from the conditions of employment contract so that pay discussions for everyone are facilitated with ease (Khovera, 2012:47).

2. The power to negotiate pay

Causevic (2018:751) and Khovera (2012:47) are of the opinion that employers have a habit of using a previous salary slip to observe to gauge the increase level, project a ten percent attraction fee and that is the remuneration that is offered to the candidate employee. This is the reason why employers and employees negotiate on remuneration, and, in turn, it causes pay inequity, as various people differ in negotiating (Bosch, 2015:4). The interest level to negotiate also differs. People who are often excluded economically such as Africans, women and people living with disabilities strive to be included in the economy. Therefore, they display very low behaviours of demanding and aggressive traits in pay negotiations (Watkins, 2018:1078). Negotiating for pay should be disbanded, as it is the cause for pay inequity and have for the past period sustained the pay gap (Brown, 2017:489).

3. Reactions to pay equity/inequity

Difference in pay expectations by individuals plays a crucial role in the racial or gender-based wage gap (Khovera, 2012:27). Due to the social comparison individuals with similar attributes and opinions are relevant and influential to one another (Suls et al., 2002:159). Gender socialisation leads to a construction of a society where individuals are put in specific blocks or social roles, such that men and women receive positive reinforcement for behaving in ways that are regarded appropriate to their gender, as well as receive negative feedback when behaving like the opposite sex (Smith & Rogers, 2000:73). Based on how one is socialised, the same treatment is perceived to be fair by one gender or race and unequal by another (Ngo, Foley, Wong & Loi, 2003:227).

4. Approaches to pay equity/inequity

The approach to equal pay has, for over the longest period of time, been evolving and has shifted from the idea of similarity to the idea of similar worth, and from a woman-centeredness to an emphasis on the

significance of gender or race (Khovera, 2012:14). It is hoped that pay equity is regarded as good governance that needs to sustain the employee retention in organisations (Adelekan & Bussin, 2017:9).

5. Racial and gender inequality

The racial job segregation is the one most visible feature within the South African labour market. It manifests itself in a horizontal segregation between economic sectors and vertically between occupational categories, leaving African workers in less skilled and less remunerated activities (Rospabe, 2002:13). South African researchers and researchers across the globe have shown less interest in exploring racially based pay discrimination and have constantly researched gender-based pay inequity (Kray et al., 2001:942). Khovera (2012:47) and Barron (2003:635) attest that the behaviour in itself perpetuates the pay gap, as those excluded due to race are denied the opportunity for an increased perception on their monetary worth and bargaining power.

6. Pay structures and pay scale levels per job/position

Pay structure includes salary ranges, and each position title and level have a pay scale. Considering a supervisor position title, it will have a graded pay scale of task level 11 (T11) and the salary range will include a lower percentile (bottom range), a median percentile and an upper percentile (maximum) per month (Analytico, 2016). Inherently the pay structure is built with a range in order to allow the accommodation of various competency levels of incumbents aligned and supported by the market factors (Laubscher & Gilfillan, 2015:28). Based on the above, differentiation is allowed if in line with the Employment Equity Regulations (Oliphant, 2015:13).

7. Onus of proof

Onus of proof is insufficient and ineffective to drive the employer's non-compliance behaviour to equal pay as evidenced by continued pay gaps for groups who discriminated against (Blau & Khan, 2017:789). This follows continued research on and investigations into women's attributes that the universe uses to justify why they are paid less than men rather than researching why practitioners and line managers tasked with salary determination continue to make women remuneration offers that are less and lower than that of their male counterparts (Levy, 2015:1). The onus of proof has run its course and based on challenges of equal value and pay transparency, the employee side of onus to proof needs to be relaxed.

8. Equal pay implementation powers

In South Africa, the commissioners and courts, through the Employment Equity Act, are able to make individual judgments and awards towards equal pay claims made against employers (Levy, 2015:2). The adjudication and the award provided by the Labour Court when a complainant is successful with an unfair discrimination claim may include any appropriate order regarded as just and equitable as provided for in Section 50(2) of the Employment Equity Act (Dube, 2017:7). This includes payment for damages such as lost benefits that resulted from this discrimination levied to the employee by the employer. Payment for compensation with regard to employee infringement of dignity caused by this discrimination and an order directing the employer to take steps to prevent the same unfair discrimination from occurring in the future in respect to other employees (Laubscher & Gilfillan, 2015:40).

Application Complexities of Equal Pay

Employers are confronted by challenging and conflicting roles. They need to put plans together that progressively reduce the pay gap over time; however, at the same time they may be faced with an individual claim that disregards the efforts already made to the overall employer plans to redress and eliminate unfair practices. Court cases that are successful against the employer for the organisation to embrace equal pay provide limited relief to the applicants (Dube, 2017:7). The situation thus perpetuates the pay gap.

The Department of Labour inadequately deals with the overall company non-compliance to equal pay and expects the company to address the discrepancy over time on its own accord (Scheepers, 2014:20). If salaries revealed disproportionate levels, the Department is unable to enforce the discrepancy. It should be acknowledged that internal processes may have changed to accommodate the massive salary disparities that the organisation is scheduled to address, and instead be compromised by an individual claim. Guidelines for good practice are open for interpretation by various users and continue to show imperfect understanding as to what employers need to do (Levy, 2015:2). Instead of assisting them, these guidelines frustrate users, making them doubtful.

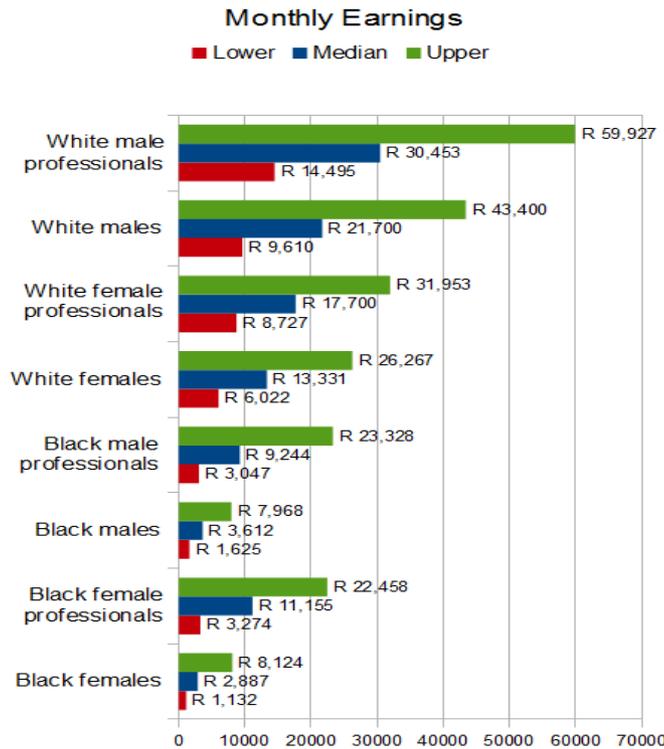
The traditional rationale of pay structures that are aligned with the market position is becoming irrelevant if professional users find it difficult to apply the rationale (Levy, 2015:2). It includes the use of related experiences and/or tenure, as applicants who have been in the particular position for longer, should be disregarded as a justifiable factor because a new entrant might be able to deliver the job accurately within a limited time (Padayachie, 2015:12).

In the absence of practical tools and guidelines to guide human resources practitioners, the pay gap will persist or take a different form (Levy, 2015:2). Challenges mentioned include the use of market-related salary offers; competent people making audible requests, thus negotiating for increased offers. Lack of consistent application when dealing with a high number of employees; using previous salaries to then make offers that are just fine but could have been better, should the previous salary be kept out; and the natural human discriminatory behaviour all make up the equal pay gap (Padayachie, 2015:14). It should be better for newly established companies that are without a pay history. Employers are advised to conduct a careful analysis of the differences that exist among all employees, including gender, with the intend to put corrective action plans together in order to avoid the risk of having disputes and an unhappy workforce which could later damage the company image (Laubscher & Gilfillan, 2015:54).

Persistence of the Pay Gap

The “us” and “them”, employees and employers, men and women, whites and non-whites, separation and categorisation are the root causes of discrimination (Johnson, 2017:13), as these lead to domestication of own members or fellow persons, thus reducing their output. In doing so, employees discriminated against and paid less will end up costing the company more than they produce or offer to the company (Johnson, 2017:13). “Us” and “them” practices reaffirm the self by rejecting, degrading and discrediting others that are unlike oneself. It is, therefore, important to understand that putting two things together, “them” and “us”, will benefit the country and the organisation if brought together by a purposefully driven culture (Johnson, 2017:13). The pay gap is, therefore, the result of “us” and “them” discrimination.

Figure 1: Monthly earnings per profession



Source: Adapted from Analytico, 2019

In order to substantiate the South African version of the pay gap, Statistics South Africa (2017:4) estimate in their report that men earn a median salary of R3 500 per month compared to R2 700 per month in

2015. This report shows that African and Coloured women earn a median of R2 500 and R 2 700 per month compared to Indian and white employees who earn a median of R6 000 and R10 000 respectively.

Figure 1 shows lower, median and upper percentiles for white male professionals and white males generally, white female professionals and white females generally, black males professionals and black males generally, and black female professionals and females generally. As equal pay provision permits that differentiation, Figure 1 is compressed due to employees being at the upper percentile, some at the median and others at the lower level.

In South Africa, factors that allow and justify the difference in pay (Oliphant, 2015:13) and thus regarded as fair include:

- The individual seniority or length of service
- Qualifications, abilities and competencies or the potential of doing the job
- Performance, quality or quantity of work performed
- If an employee is demoted without reducing his/her salary due to organisational restructuring or legitimate reasons
- Employees temporarily employed in a position
- The existence of a shortage of a relevant skill
- Any other relevant factor that is not unfairly discriminatory

It is, therefore, necessary to observe different salaries at appropriate percentiles as permissible by the South African law under the Employment Equity Regulations. The evidence, as indicated in the above figure, shows that salaries of white males are excessively higher than those of professional women and professional Africans, while unprofessional white males' salaries are higher than those of white female professionals, and white females, irrespective of professional level, outweigh the salaries of African men and African women. African male salaries almost match the salaries of African women.

The pay gap in modern America, as cited by Causevic (2018:741), was such that women received 59 cents for every dollar earned by men in 1960, 71 cents for every dollar man earned in 1990, 63 cents for African American women and 54 cents for Latinas in 1990. Further projections by Causevic (2018:741) are that, if the gap closed at the rate, it did between 1960 and 2015, then women would achieve pay equity by 2059, which is alarming. It confronts society with the unpleasant truth that pay equity is still just a slogan, far-fetched and unrealisable, even after 55 years of policy enactment.

The gender pay gap and pay inequity are unfortunately still a reality in South Africa (Boninelli, 2015:12). A collective effort by appropriate key stakeholders is required to turn this chronic situation around and achieve equal pay for all. Biltagy (2014:38) state that the Oaxaca-Blinder decomposition of gender wage gap demonstrated that the gap is due to discriminatory effects against women in the labour market.

Employers in various industries use salary scales that have a minimum and a maximum with a range of 56 percent between the two points. The minimum and maximum values of the scale have been benchmarked other external labour market positions and rates. The company's remuneration executive decides upon the minimum and maximum values per scale level, (Bosch, 2015:5). The range allows managers and remuneration advisors to position the employees' salary anywhere in between as deemed fit by their rationale, whether it is fair or unfair. According to Boninelli (2015:10) wage gaps are discovered at one or more levels of pay. Pay determination can be below the salary scale and is sometimes above the maximum of the scale. Observed, practised and experienced cultures, traditions and overt discrimination tend to create restrictive employment conditions for economic exclusion. Bussin and Nienaber (2015:13) are of the view that executives and board members rarely put this topic on the agenda, while sometimes too little attention and time are spent discussing equal pay and its negative implications.

Research Methodology

The research investigated the employer environment of a South African state-owned enterprise (SOE). For purposes of the research, the SOE were called ZYD so that the company name remains anonymous, as agreed to with the company.

Research Approach

The study has employed an inductive theory development approach in that participants' experiences and perceptions about equal pay were observed at grass roots level, followed by an identification of patterns from these observations, as well as the creation of tentative themes and theories which lead to theory development (Saunders et al., 2012:145). The employed inductive approach is a bottom-up process allowing

ideas, concepts and themes to emerge from the interview data (Doody & Noonan, 2013:29). This approach confirms the logic of generating untested conclusions.

Research Philosophy

The development of a new theory through the pursued research on equal pay were influenced by epistemological assumptions of the researcher with regard to human knowledge assumptions. The interpretivist research philosophy was appropriate to the research therefore, adopted to shape and deliver a methodology and strategy, as well as data collection and data analysis that fit together.

Research Paradigms

The findings were reflective of subjective experiences and perceptions gathered at the place of work with various interactions between individuals. In establishing how the employer ZYD has implemented equal pay, no one objective point of view about the truth was appropriate to provide a representative view about the world within enormities of people.

Research Methods

The research study involves an empirical investigation in response to research objectives and questions. Quantitative research question in ZYD and secondary data has been used (Saunders et al., 2012:183). It involved exploring employer's records regarding employees who have been involved in the income disparity exercise, which involved verified data to be analysed.

Regarding the qualitative research questions, a purposive homogenous sampling process of collecting data, were used to select participants. The rationale behind the choice was that the homogenous sample possessed requisite knowledge and experience on the researched topic (Parse, 2001:59). A semi-structured interview guide used to gather rich descriptions, ideas, reasons, explanations and experiences in the participants' own words held at the employer site. Interview questions, as indicated in Appendix A, were generated, and tested with two senior managers in the Organisational Development Department of ZYD. The senior managers were involved in and knowledgeable about phrasing questions, as they were responsible for the employer engagement surveys. The research questions were revised taking into account the senior managers' inputs before being used by the purposive homogenous sample.

Sample procedure and size

Purposive sampling or selective judgemental sampling was accepted as the alternative to random sampling research approach (Saunders et al., 2012:301). It was well suited for a research study that requires the rich, diverse and complex knowledge and experiences on sociological units of measure from insiders in order to gain an in-depth understanding of equal pay from them (Saunders et al., 2012:297).

Data collection

Numeric financial variables were the units of analysis appropriate to the numeric research questions (Saunders et al., 2012:166). The data collection process involved archival spreadsheets comprising secondary data that the employer had stored privately. Permission to access and use the data was obtained. Data was made available, retrieved, verified and analysed. The researcher self-administered the spreadsheet.

Data analysis

Working with and organising data, breaking it into manageable units, synthesising data in order to explore patterns, uncovering important information that relates to the research objective and questions.

Ethical considerations

Permission to access the premises of the state-owned enterprise ZYD and to use the data was granted. Anonymity and privacy of participants as well as of the employer and the information were upheld. Participation in the research was free and voluntary, and participants could withdraw at any time without any negative impact on them.

Ethical clearance was obtained from the employer and the University of Johannesburg before engaging in the research. Due to the sensitivity of the research topic the names of the participants and the transcripts had only been made available to the research team. In some instances, participants might have taken a stance to refuse to speak negatively about the employer. As total anonymity was impossible to achieve when using face-to-face interviews and telephone interviews, the data were stored and reported in a manner that the sources were unidentifiable, and where it was identifiable, only the research team had access to those sources.

Major Findings

Legislation alone cannot make equal pay for work of equal value work possible in South Africa. The labour courts can instruct employers to adjust individuals' pay in comparison to the comparator or company-wide salary adjustments if salary discrepancies are observed. However, the labour courts cannot take over the role of wage determination where employers fail to comply with non-conformance. This requires that the company display a business will to implement this provision (Hlongwane, 2007). The evidence, as observed in the gender-based pay gap, is proof that without the company will implement equal pay, the pay gap will persist.

Collective bargaining provides an approach that mitigates for equal pay, as benefits and salary increases are negotiated for every bargaining unit employee. This is in support of the equal pay, provided the base salary is the same. Employers and trade unions should make this aspect an agenda item and discuss it with an open mind, since organisations are continuously challenged with inadequate funding.

Using the thematic analysis found in the interpretative phenomenological analysis initially proved to be difficult. However, through the reiterations, interconnectedness and iterative nature of the analysis methods, an appropriate understanding prevailed, allowing adequate sense making, refinement and grounded interpretations of participants' voices.

The study confirms that implementing equal pay has a financial implication attached to it, insignificant as it is. Uncoordinated confirmations for promoting equal pay exist. Lack of a comprehensive approach to equal pay encompasses the majority concerns.

The relationship of the central themes identified in the equal pay study shows how important it is for the organisation to have all essential pillars in place and in sync with one another, which lagged in this case. With the essential pillars in place and in sync, a robust pay equity system/model, which is supported by policy, will be leveraged and initiated as a business imperative, promoting open communication and empowerment about equal pay (Bradshaw, et al., 2017:3).

Recommendations for Future Research

The results and comments of this research highlight the need for further areas of intervention. Further research in other employer environments should be undertaken to understand the intricacies involved in equal pay, and to make South Africa's labour market more inclusive and equitable. The various employer findings may then provide a platform for comparison, with the intention of adopting workable solutions. Studying the institutional context where pay is determined, policy developed and the implementation takes place was very important (Sandberg, 2016:46) as it was evidenced in this study. This is so as understanding the context shapes the future better (Sandberg, 2016:46). It is recommended that further research be conducted in future and in ZYD with improved economic stability, as this will likely produce different responses and findings. A different context in ZYD following the sharing of these research findings could provide different, suitable and usable findings. Future research studies should be conducted in other state-owned enterprises in order to provide findings for different context, as this study was limited to one state-owned enterprise.

South African researchers and researchers across the globe have shown little interest to explore the racial pay discrimination situation; they have constantly researched gender-based pay inequity instead. This should be reason enough to have future research studies focusing on pay equity irrespective of race, gender or disability.

The study was considerate that the topic researched was sensitive to employees, trade unions and the employer. In order to access a sample from every employee in the organisation, a quantitative data collection method such as a survey questionnaire could have been appropriate, and if the emphasis was to obtain an appropriate representation of the sample. Such a sample would also require more time to conduct the research. Disregarding the sensitivity would have led to disruptive responses detrimental to the employer, which would have been disapproved.

Acknowledgement was made that research rarely delivers unquestionable results and that total researcher objectivity was never possible, and that the adopted interpretive and pragmatist paradigms have diversity and subjectivity at the core, with no certainty or acceptable theory (Saunders et al., 2012:202,7)

Final Conclusions

It is essential for employers to have a robust system in place to analyse and provide pay information as required by various relevant stakeholders, primarily to empower managers. The results and findings of this

study can be used in guiding employers' efforts on pay strategies, which, in its totality, will focus on all pillars of equal pay.

The removal of racial and gender discrimination in South Africa involves the participation of employers, trade unions and the government through legislation. A coordinated effort is required to bring together all stakeholders to make pay equity a reality, acknowledging pay equality. Closing the pay gap is almost a lifelong action that requires unwavering commitment as environmental challenges escalate and constantly change in the workplace. Understanding the dynamics of equal pay is crucial for all stakeholders, of special relevance to practitioners and policy developers, as it will focus future deliberations for pay inequity (Bradshaw, 2017:3).

References

- Adelekan, A.M. & Bussin, M.H.R. 2018. Gender pay gap in salary bands among employees in the formal sector of South Africa. *SA Journal of Human Resource Management/SA*, 1-10. DOI:10.4102/sajhrm.v16io.1018
- Analytico. 2016. Available from: <http://www.analytico.com/>
- Arulampalam, W., Booth, A. & Bryan, M. 2007. Is there a glass ceiling over Europe? Exploring the gender pay gap across the wage's distribution. *Industrial and Labour Relations Review*, 60(2):163-186.
- Attride-Stirling, J. 2001. *Thematic networks: An analytic tool for qualitative research*. London: Sage.
- Bakari, Z.A. 2014. *Pay equality: Reassessing the gender pay gap, a comparable analysis of South Africa, India and Tanzania*. Unpublished master's dissertation. Cape Town: University of Cape Town. 1-70.
- Barron, L. 2003. Ask and you shall receive. Gender differences in negotiators' beliefs about requests for higher salary. *Human Relations*, 56:635-662.
- Barrick, G. 2018. The gender pay gap: Will the tide finally turn? *People Dynamics*, April-June 2018:37-38.
- Bell, E., Bryman, A. & Harley, B. 2018. *Business research methods*. 5th ed. New York: Oxford University Press.
- Blau, F.D. & Kahn, I.M. 2007. The gender pay gap: Have women gone as far as they can? *Academy of Management Perspectives*, 21(1):7-23.
- Blau, F.D. & Kahn, I.M. 2017. The gender wage gap: The extent, trends, and explanations. *Journal of Economic Literature*, 55(3):789-865.
- Boninelli, I. 2015. The Gender pay audit: Practical steps for multi-national and local companies. In A. Bosch (Ed.). *SABPP Women's Report 2015: Equal Pay for Equal Value*, 7-12. Parktown, South Africa: SABPP.
- Bosch, A. 2015. Reasons for the gender pay gap: What HR practitioners should know. In A. Bosch (Ed.). *SABPP Women's Report 2015: Equal Pay for Equal Value*, 3-6. Parktown, South Africa: SABPP.
- Bradshaw, C., Atkinson, S. & Doody, W. 2017. Employing a qualitative description approach in health care research. *Global Qualitative Nursing Research*, 4:1-8. DOI:10.1177/2333393617742282
- Brown, S.L. 2017. Negotiating around the Equal Pay Act: Use of the "factor other than sex" defense to escape liability. *Ohio State Law Journal*, 78(2):472-502.
- Bryman, A. & Bell, E. 2015. *Business research methods*. 4th ed. New York: Oxford University Press.
- Buhalis, D. 2001. Tourism in Greece: Strategic Analysis and Challenges. *Current Issues in Tourism*, 4(5):440-480.
- Bussin, M.H.R. & Nienaber, R. 2015. The gender pay gap: A boardroom perspective. In A. Bosch (Ed.). *SABPP Women's Report 2015: Equal Pay for Equal Value*, 13-17. Parktown, South Africa: SABPP.
- Bussin, M.H.R. & Smit, E. 2015. Understand equal pay for work of equal value. *Finance, Hot Button*, 28-29. Available from: <https://www.hrfuture.net>
- De Wet, R. 2018. Equal pay for work of equal value. *Labour Elite*, 1-84. August.
- Dube, T. 2017. *A critical analysis of the equal pay for equal work or work of equal value provision as it relates to the South African labour market*. Unpublished master's dissertation. Pietermaritzburg Campus: University of KwaZulu-Natal. 1-43.
- Ebrahim, S. 2016. Equal pay for work of equal value in terms of the employment equity Act 55 of 1998: Lessons from the International Labour Organization and the United Kingdom. *Potchefstroom Electronic Law Journal*, 2016(19):1-27. DOI:10.17159/17273781/2016/v19n0a1230
- Ebrahim, S. 2017. Equal pay in terms of the Employment Equity Act: The role of seniority, collective agreements and good industrial relations. Pioneer Foods (Pty) Ltd v Workers against Regression. *Potchefstroom Electronic Law Journal* 2017(20).1-18 ZALCCT14. DOI:10.17159/17273781/2017/v20i0a1524
- Figart, D.M. 2000. Equal pay for equal work: The role of a job evaluation in an evolving social norm. *Journal of Economic Issues*, XXIV(1):1-19.
- Freidenvall, L. & Dahlerup, D. 2009. Minority women's organisations and diverse claims for representation: Intersections of gender and ethnicity. ECPR General Conference in Potsdam, Germany, September: 10-12.
- Khoreva, V. 2012. Gender inequality, gender pay gap and pay inequality: Perceptions and reactions in Finnish society and workplaces. *Hanken School of Economics*, 247:1-150.
- Laubscher, T. & Gilfillan, N. 2015. *Equal pay for work of equal value. A South African perspective*:1-53. <https://www.saslaw.org.za> or <https://docplayer.net/31027450>
- Levy, A. 2015. Pay equality seminar: Pay equality to challenge SA bosses. Sage HR & Payroll. July:1-3. Available from: <https://www.iol.co.za/business-report/pay-equality-to-challenge-sa-bosses-1892305>

- Lombardo, E., Meier, P. & Verloo, M. 2009. Discursive dynamics in gender equality politics: What about feminist taboos? *European Journal of Women's Studies*, 17(20):105-123.
- Makhunga, B.M. 2015. *Equal pay for work of equal value: What are the implications and is it really new? Human resources matter*. Presentation at SARA Awards:1-25. Available from: <http://www.sara.co.za/sara/file%20storage/Documents/presentations/Equal%20Pay%204%20Work%20of%20Equal%20Value.pdf>
- Olipant, M.N. 2015. Code of good practice on equal pay. Remuneration for work of equal value. Government Gazette Notice 37873, 1-9. Available from: <http://www.gpwonline.co.za>
- Padayachie, K.M. 2015. *Education and the gender wage gap in South Africa*. Unpublished master's dissertation. Durban: University of KwaZulu-Natal. 1-59.
- Pienaar, H. 2015. The meaning of equal value in terms of pay. In A. Bosch (Ed.). *SABPP Women's Report 2015: Equal Pay for Equal Value*, 18-22. Parktown, South Africa: SABPP.
- Pregolato, M., Bussin, M.H.R. & Schlechter, A.F. 2017. Total rewards that retain: A study of demographic preferences. *South African Journal of Human Resource Management*, 15(a804):1-10. DOI:10.4102/sajhrm.v15.804
- Roberts, T. 2013. Understanding the research methodology of interpretive phenomenological analysis. *British Journal of Midwifery*, 21(3):215-218.
- Rospabe, S. 2002. How did labour market evolve after the end of apartheid? An analysis of the evolution of hiring, occupational and wage discrimination in South Africa between 1993 and 1999. *South African Journal of Economics*, 70(1):185-217.
- Sandberg, P. 2016. *The politics of gender pay equity: Policy mechanisms, institutionalised undervaluation, and non-decision making*. Published doctoral thesis. Helsinki, Finland: Hanken University:1-138.
- Scheepers, J. 2014. Equal pay for work of equal value: How do we get there? *The South African Labour Guide*, 1-20. Available from: <https://www.labourguide.co.za/equal-pay-for-work-of-equal-value>
- South Africa. 2018. Basic Conditions of Employment Act 7 of 2018. Pretoria: Government Printer.
- South Africa. 1996. Constitution of the Republic of South Africa. Pretoria: Government Printer.
- South Africa. 1998. Employment Equity Act 55 of 1998. Pretoria: Government Printer.
- South Africa. 1998. Employment Equity Act 55 of 1998 as amended. Code of good practice on equal pay/Remuneration for work of equal value. *Government Gazette*, 600(38837). Pretoria: Government Printer.
- South Africa. 2014. Employment Equity Regulations GN R595 in GG 37873 of 1 August 2014. EER.
- South Africa. Labour Relations Act 66 of 1995. Pretoria: Government Printer.
- South Africa. Department of Statistics. 2017. *I know the home, I understand*:1-238. Pretoria: Department of Statistics.constitu
- South African Human Rights Commission. 2016. Research brief on race and equality in South Africa 2013-2017. Available from <https://www.sahrc.org.za/home/21/files/RESEARCH%20BRIEF%20ON%20RACE%20AND%20EQUALITY%20IN%20SOUTH%20AFRICA%202013%20TO%202017.pdf>:1-23.
- Steyn, R. & Jackson, L. 2015. Gender-based discrimination in South Africa: A quantitative analysis of fairness of remuneration. *South African Journal of Economic and Management Sciences*, 18(2):190-205. DOI:10.17159/2222-3436/2015/v18n2a4
- Suls, J., Martin, R. & Wheeler, L. 2000. Social comparison: Why, with whom and with what effect? *Current Directions in Psychological Science*, 11(5):159-163.
- Sullivan-Bolyai, S., Bova, C. & Harper, D. 2005. Developing and refining interventions in persons with health disparities: The use of a qualitative description. *Nursing Outlook*, 53:127-133.
- Tshetlo, S. 2015. *Equal pay in South Africa: How does equal pay legislation work in South Africa?* Available from: <https://www.cliffedekkerhofmeyr.com/export/sites/cdh/en/practice-areas/downloads/Employment-Equal-Pay-Brochure.pdf>: 1-3.
- Tufarolo, M.A. 2016. You haven't come a long way, baby: The courts' inability to eliminate the gender wage gap fifty-two years after the passage of the Equal Pay Act. *Journal of Gender, Social Policy and the Law*, 24(2):305-337.
- Van Heerden, A. 2015. Pay equality to challenge SA bosses. *Business Report*. July:1-3 Available from: <https://www.iol.co.za/business-report/pay-equality-to-challenge-sa-bosses-1892305>.
- Watkins, T.A. 2019. The ghost of salary past: Why salary history inquiries perpetuate the gender pay gap and should be ousted as a factor other than sex. *Minnesota Law Review*, 103(2):1041-1088.

Assessing the efficacy of open distance learning in South Africa

Frans Khutso Kgobe

Institute of Public Affairs & Governance, South Africa

Mokoko Piet Sebola

University of South Africa, South Africa

Keywords

Access, Distance learning, Efficacy, Higher Education, Legislation

Abstract

The aim of this paper is to explore the effectiveness of open distance learning in South Africa. Most developing countries in the world are facing challenges of expanding access to higher education. These challenges are even more acute in places of limited resources and capacity to provide quality higher education for an ever-increasing population. For many countries in Africa, distance education seems to be the only option to play a role in widening participation to higher education problems. While recognising the necessity of distance education in widening access, it must also provide academically credible and quality education content that is effective and efficient. Given the emergence of Covid-19 most universities in South Africa are moving towards the distance education, which author(s) argue that effectiveness of this model is challenged. This paper is purely conceptual and adopts a desktop methodology and to underpin the argument the paper will further rely heavily on the perusal of the available literature to support the argument carried out. Thus, to realize the aim of this article, the author(s) benefited from Critical Discourse Analysis (CDA) of secondary data covering open distance learning. The article revealed that open distance learning is challenged by covid-19 and that it is not effective. Thus, assessments are done solemnly online which affect the effectiveness of distance education. The article recommends that all provisions and regulations guiding open distance learning needs to be revisited and amended as to make the education more effective even in difficult times.

Introduction

In the course of these years, universities have worked on a range of innovative technologies to provide the most effective service for distance learning students (Makoe, 2011). In addition to the world's needs for mass higher education and a larger array of students, the function of the online mentor is increasingly recognizable in university education (Chang, Shen, & Liu, 2014). Williams emphasizes the mentor's important role in the development of all types of informational communication (2002). The latest advancements in networking and immersive learning systems have a major impact on the interaction between the student and the business and the learning process. Brown (2002) argues, in order to cover certain e-learning settings in the modern education system, the different activities must be integrated.

E-tutor functions cannot be generalised on the basis of a special sense of e-learning (Metz and Bezuidenhout, 2018). In this study, the University of South Africa is the largest ODL institution in South Africa and the only university specializing in distant education in Southern Africa. The University has good rates for distant education (DE) compared with residential universities within the continent (Mashile, 2012). In this article we argue that due Covid 19 pandemic, the ODL learning model by Open Learning Distance Universities is challenged in similar way as the residential universities. Both are struggling to implement an ODL learning model. The question therefore raised in this article is: How can we improve the ODL learning model during the Covid 19 pandemic? In addressing this question, the paper covers the following aspects, namely the methodological approach, the relevance of digital learning, open distance learning and digital technologies in this context.

2. Methodological approach

No research may be conducted without the design of the research. For the execution of any study, research designs are essential. Kumar (2011) considers research designs a process strategy adopted by academics to address issues of research. In relation to Pandey and Pandey (2015), these are the frameworks used in the data collection and analysis procedures. Qualitative approaches typically produce rich and thorough data, providing ideas and thoughts to inform your study. MacDonald & Headlam (2014) suggests

that they are able to disclose people's feelings and how they think without giving the target audience the numbers that they are feeling or thinking. This study adopts a qualitative technique for research. Therefore, a qualitative design. Bryman (2020) shows that quality research is a compilation of social data that focuses on meaning and gives useful insights into the study populations' local views. They can contribute to rich cultural and contextual data (Mack, et al. 2005). In the qualitative investigation, the researcher relied around the terminology "cases and contexts" and cultural signification on the concept of interpretative or critical social science (Neuman, 2014). The logic of continuous practice while following a nonlinear research route is supported by a qualitative study (Neuman, 2014). The current literature has been evaluated and summarized carefully. This procedure involves the evaluation of journals, books, public laws, and Internet sources that have been evaluated by peers. The author also used a qualitative research technique to achieve the objectives of this article using secondary data. The paper so use information from published articles, reports, journals, books, and other materials that were publicly available.

3. Understanding Open Distance learning (ODL)

The notion of open distance education has consequently evolved to give consolation to busy students who are not part of the regular university structure (Towobola and Raimi, 2011). Makoe, (2015) said that open distance learning is meant for a student who is away from the teacher and who mostly uses media for learning. Open distance learning is further described by the Policy (DHET, 2014:2) as typically "involving making provision to support a wider range of student choices regarding access, curriculum, pacing, sequencing, learning modes and methods, assessments, and articulation" (Prinsloo, 2015:24). Open distance learning (ODL) is a flexible way of learning for individual and group delivery, which is conceptualized in educational literature (Towobola and Raimi, 2011). Open distance learning is provided to students who are not physically present in a specific geographical location and who could not fit into the traditional educational setting involving attending classroom sessions (Towobola and Raimi, 2011) for various reasons which are convenient for the student to choose that path for learning.

Universities' open distance learning is a real mechanism for accessing mass education possibilities for a significant part of the country's population. Towobola and Raimi (2011) therefore believe that open distance study is open for institutions wanting to implement a program of remote learning in line with worldwide best practices. ODL is a method that is meant to offer access to learning when the source of information and learners are separated by time, distance physically and geographically or a mix of both (Honeyman and Miller, 1993). The main goal of ODL institutions is according to Makoe (2015) to expand learning possibilities for individuals who have had no opportunity to study. More often these students are working and do not have time to attend classes on full time basis. Such students are the n capable of sharing their learning time with some of their commitment such as full-time employment.

4. The current state of Affairs of the open distance learning in South Africa`s Higher Education

The higher education system of South Africa has seen significant development, structurally (including important consolidations), and cultural alterations since the end of the apartheid era (Karodia, Shalkh & Soni, 2015; Ariail, 2015). Makoe (2015) believes that even universities located on campuses increasingly provide or explore open distance learning programmes. The latter occurs with Covid-19 as most higher education institutions have moved from campus education to e-learning. The globalization of higher education in South Africa has had a major influence on distance education (Ariail, 2015). Murphy (2020) indicated that there have been substantial changes in social interaction and organisation. The spread of COVID-19 coronavirus affected and brought about challenges in the higher education sector like it did in other education sectors. The world is full of unpredictability and therefore the South African institutions for higher learning (HEIs) were not spared from unanticipated events (Mashau and Nyawo, 2021).

Mashilo and Selelo (2021), opines that discourse, as opposed to merely the necessity to change towards a new age of education, applied to the impact of the COVID 19 epidemic on the quality of education in higher learning institutions in South Africa. In Dhawan's report (2020) the epidemic has highlighted the inadequacies of the university system in order to adapt digital technology instructors to the rapidly changing environment of education around the world (Dhawan, 2020). Rashid & Yadav (2020) argued that higher education institutions throughout the world were intense and popular in responding to an emergency pandemic, which reveals a rapid shift to the online learning system. In the meanwhile, Mashilo and Selelo (2021), are of the view that the pandemic exposed the flaws, inadequacies and value of digital culture in poor countries and rising countries during the pandemic period.

Not every student and lecturer have regular or secure Internet access. In many cases, internet connection may be limited to dial-up speed, or its internet may have a covered monthly usage that might reduce their ability to access or draw data. Sometimes, due of large families and commotion in the house, students are less comfortable to learn in the home environment (Jena, 2020). Furthermore, given a unique setting in which the students live, the problem of networking to online learning is a different experience for some (Toquero, 2020a). Distance students often feel alienated and lack confidence in studying. This is especially true for kids who encountered an online forum (Metz and Bezuidenhout, 2018). In supporting and giving students such a platform, e-tutors will be an important part of the support system.

5. Open Distance Learning And E-Learning

The reality that digital technology facilitates open-distance learning at institutions cannot be avoided. Without recognizing the importance of digital technology in this process, nobody can talk about open distance learning. Distance learning also involves a combination of technological and digital factors (Azorin, 2020). South African higher education institutions are somewhat equipped for this digital migration without being beyond the scope of the task. This is because certain privileged universities have finished their academic year effectively employing technological instruments and applications (Dawadi, Giri & Simkhanda, 2020). These include the universities of Pretoria, Cape Town, Johannesburg University and Wits University. Despite the problems encountered by higher education institutions, particularly disadvantaged universities, multimodal learning is practicable, since these universities have invested and increased their ICT infrastructure capacity and labour force (Daniel, 2020).

6. The Benefits of Open Distance Learning

It should be noted that the digital network enables learning from an open distance. Open-distance and digital/online learning are therefore synonymously utilized for this paper and are so employed to avoid misunderstanding. Therefore, both students and universities worldwide gain from online training. Since the breakout of COVID-19 the development of Online Learning has attracted attention. As such, at the universities and colleges such as in South Africa online learning and teaching has been extensively supported with enormous resources.

Online learning and education may be more beneficial and useful for students and facilitators repeatedly. Students can operate inside the structure themselves and the interaction of on-line learning and training may be divided into more modest, unstoppable bits of time with an opportunity to show up in the middle (Jena, 2020). Another advantage of online learning is that it enables students to study from any field of choice (Jacob, Abigeal & Lydia, 2020). It also allows universities not to be restricted to geographical limitations but to connect to a wider network of students. In addition, for future references, online discussions may be registered, documented, and shared (Jena, 2020). This allows pupils to access the instructional material at a time of consolation. Internet learning therefore provides students with time and place available for instruction. However, digital content-based knowledge acquisition produces computerized expertise, which is becoming necessary in modern society and working situations (Daniel, 2020).

Every student has a varied taste for studying in different styles. Some students are visual students, while some students want to study auditory. In addition, a few students bloom in the home, and other sub-studies are individual students who are distracted by big meetings (Gautam 2020). The online learning system may be personalized from several points of view with its range of options and assets (Toquero, 2021). It is the perfect way to create an optimal learning environment suited to each student's needs.

The online learning approach is best suited for everybody. This sophisticated transformation led to stunning improvements in access, testing and sharing of material (Jacob, Abigeal and Lydia, 2020). Office participants and housewives can take online instruction courses when appropriate (Jena, 2020). Depending on their accessibility and consolation, during weekend or at night many people prefer to learn. It guarantees access and fair opportunity for all, so that online transmissions provide students and facilitators with disabilities the chance or have difficulties in their availability that confines themselves to an eye-to-eye lesson (Daniel, 2020).

Gupta, (2017) highlights the effectiveness of open distance learning that it:

makes it simple to get a handle on the content and review it

It brings about improved scores on certifications, tests, or different kinds of assessment.

Higher number of students who accomplish pass or dominance level.

Improved capacity to learn and carry out the new cycles or information at the working environment.
Help in holding information for a long period

It can be deduced from the above that e-learning is the most effective form of educational instruction, especially considering the challenging COVID 19 facing the globe today. Indeed, when the pandemic ends, the academic fraternity would have learned a bit about e-learning opportunities in the educational environment.

7. Efforts Made by the Government and Institutions of Higher Learning During the Covid 19 Pandemic

This paper uses South Africa as a case of reference to examine the viability of open distance learning in the institutions. "A point worth mentioning is that higher education as a sector has embraced ICTs, which are seen not only as an impetus of change in traditional concepts of teaching and learning, but also as prime motivations behind the higher education change as the interplay of technological developments and socio-economic change, shape the processes of teaching and learning" (Mbatha and Naidoo, 2010: 65). Like in other countries, including Spain, Italy, China and Kenya, certain higher education institutions continue to experience migration to open-distance learning problems. The problem is to implement weak ICT infrastructure for open-distance study. The institutions did not absolutely or entirely fail to provide open distance learning because the university and the government tried to do open distance learning (Toquero, 2020).

The similar practise is used in South Africa by distributing computers and databases to students to access online learning through governments and institutions. The institutions have also been enhanced and invested in their online learning ICT infrastructure (Reimers & Schleicher, 2020). One conclusion is that online learning is feasible at institutions with few obstacles. "Unisa's open learning policy promotes open access to courses, flexibility in learning provision, flexibility in methods and criteria of assessing learning process and achievement, and lifelong learning as propagated by the Commonwealth of Learning" (Sonnekus, Louw, and Wilson, 2006; Mbatha, and Naidoo, 2010:64).

8. Conclusion

The interpretation of open distance learning shows the necessity for research in the future to assess how qualified students can participate in the online management system and contribute to low levels of engagement of e-tutors. In recognizing the importance of these tasks and the identification of the required teaching abilities, the performance of e-learning techniques is crucial. In general, ICT's may be substantially helped by the opportunities of remote education in instances when there are large numbers of non-approached instructors, inadequate service preparedness and few training centers or trainers.

References

- Ariail, D. L.(2016). Globalization of Higher Education in South Africa. *Georgia Journal of College Student Affairs*, 32(1).
<https://doi.org/10.20429/gcpa.2016.010107>
- Azorín, C. (2020). Beyond COVID-19 supernova. Is another education coming? *Journal of Professional Capital and Community*, 5(3): 381-390.
- Brown, C. (2002). Simple and effective – Teacher roles remain a powerful framework to embed ICT within the practice of teaching. In D. Willis, J. Price, & N. Davis (Eds), *Proceedings of SITE 2002 -Society for Information Technology and Teacher Education International Conference*, Nashville, TN.
- Bryman, A. (2012). *Social research methods*. Oxford: Oxford University Press.
- Chang, C., Shen, H., & Liu, E. Z.(2014). University faculties' perspectives on the roles of e-instructors and their online instruction practice. *International Review of Research in Open and Distance Learning*,
- Daniel, J.(2020). Education and the COVID-19 pandemic. *Prospects*, 49(1): 91-96.
- Dawadi, S., Giri, R. and Simkhada, P.(2020). Impact of COVID-19 on the Education Sector in Nepal-Challenges and Coping Strategies. Sage Submissions. Preprint.
- Department of Higher Education and Training. (2014). Policy for the provision of distance education in South African universities in the context of an integrated post-school system. Retrieved from
gov.za/documents/download.php?f=213796
- Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, 49(1), 5-22
- Gautam, P.(2020). Advantages And Disadvantages of Online Learning. <https://elearningindustry.com/advantages-and-disadvantages-online-learning>
- Gupta, S. (2017). 9 Benefits Of eLearning For Students.
- Honeyman, M. and Miller, G. (1993). Agriculture distance education: A valid alternative for higher education?". *Proceedings of the 20th Annual National Agricultural Education Research Meeting*: 67-73

- Jacob, O.N., Abigeal, I. and Lydia, A.E.(2020). Impact of COVID-19 on the higher institution's development in Nigeria. *Electronic Research Journal of Social Sciences and Humanities*, 2(2):126-135.
- Jena, P.K.(2020). Impact of pandemic COVID-19 on education in India. *International Journal of Current Research (IJCR)*, 12.
- Karodia, A. M., Shaikh, A., & Soni, D. (2015). The South African universities post-merger mess: Kumar, R. (2011). *Research methodology: A step-by-step guide for beginners*. London: Sage Publications Limited.
- MacDonald, S., & Headlam, N. (2014). *Research methods handbook: Introductory guide to research methods for social research*. United Kingdom: Centre for Local Economic Strategies.
- Mack, N., Woodsong, C., Macqueen, K.M., Guest, G.N., & Namey, E. (2005). *Qualitative Research Methods: A Data Collector's Field Guide*. *Family Health International*.
- Makoe, M. (2011). Academics going mobile: new roles for new technologies. *Progressio*, 33(2), 174-188.
- Makoe, M.(2015). A fit for Purpose Mission for Widening Access through Open distance learning. (Eds). In Letseka, M., Education in A Competitive and Globalizing World. Nova Publishers. New York
- Mashau, P. and Nyawo, J.C.(2021). The use of an online learning platform: a step towards e-learning. *South African Journal of Higher Education*, 35(2), pp.123-143.
- Mashile, O. (2012). Unisa tutor model. Report compiled for Senate Teaching and Learning Committee, March 2012. Pretoria: University of South Africa.
- Mashilo M.T., & Selelo, M.E. (2021). The impact of covid-19 on the quality of education in institution of higher learning: an exploratory study in the University of Limpopo *International Journal of Entrepreneurship*, 25(4): 01-10.
- Mbatha, B., and Naidoo, L.(2010). Bridging the transactional gap in Open distance Learning (ODL); The case of the University of South Africa (Unisa). *Inkanyiso Journal of human and Social Science*. 2(1):64-69
- Metz, N., and Bezuidenhout, A.(2018). An importance-competence analysis of the roles and competencies of e-tutors at an open distance learning institution. *Australasian Journal of Educational Technology*, 34(5): 27-43
- Michael, P A.M (2020). COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemporary Security Policy*
- Neuman, W.L. (2014). *Social research methods: Qualitative and Quantitative Approaches* (7th ed.). Harlow: Pearson Education Limited
- Pandey, P., & Pandey, M.(2015). *Research methodology: Tools and techniques*. Buzau: Bridge Center.
- Prinsloo, P.(2015). Participation in Open distance Learning. (Eds). In Letseka, M., Education in A Competitive and Globalizing World. Nova Publishers. New York. Pp 21-37
- Rashid, S., & Yadav, S.S. (2020). Impact of Covid-19 pandemic on higher education and research. *Indian Journal of Human Development*, 14(2): 340-343.
- Reimers, F.M. and Schleicher, A.(2020). A framework to guide an education response to the COVID-19 Pandemic of 2020. *OECD*.
- Toquero, C.M. (2020a). Challenges and Opportunities for Higher Education Amid the COVID-19 Pandemic: *The Philippine Context*. *Pedagogical Research*, 5(4).
- Toquero, C.M.(2020b). Emergency remote teaching amid COVID-19: The turning point. *Asian Journal of Distance Education*, 15(1):185-188.
- Toquero, C.M.(2021). Emergency remote education experiment amid COVID-19 pandemic. *IJERI: International Journal of Educational Research and Innovation*, (15): 162-176.
- Towobola, W. L and Raimi, L. (2011). Open distance learning (ODL): A catalyst for educational and entrepreneurship development in Nigeria. *Continental Journal of Education Research* 4 (3): 1 - 11.

The Business & Management Review

Information for author

Copyright Policies for Open Access conference proceedings

Centre for Business & Economic Research (CBER) is fully committed to transparency in regard to the issue of copyright and copyright ownership. Authors who submit papers to the **Business & Management Review** retain ownership of their original material. Although as part of the open access process authors permit other individuals, organisations, and institutions to access the said material. Whilst other parties may well access materials if they quote from them, they are expected to fully credit the author/authors. It is important to remember that the rights of authors are granted and apply only to articles for which you are named as the author or co-author. The author's rights include the following:

- The right to make copies of the article for your own personal use (including in the course of academic teaching and other scholarly endeavours)
- The right to reproduce and distribute copies of the article (including in electronic form) for personal use.
- The right to present the article at conferences and meeting and distribute copies at such gatherings.
- You have patent and trademark rights to any process or procedure described in the article that was formulated by the author/authors.
- The right to include the article in full or in part in a thesis or dissertation provided that this is not published commercially.
- The right to prepare other derivative works, to extend the article into book-length form, or to otherwise reuse portions or excerpts in other works, with full acknowledgement of its original publication in the journal.

Copyright Notice

Authors who submit papers that are submitted and accepted for publication in the **proceedings** agree to the following:

- Authors retain copyright and grant the journal right of first publication with the work simultaneously licensed under a [Creative Commons Attribution License version "CC BY 3.0"](#) (this allows others to share the work with an acknowledgement of the work's authorship and the place of first publication)
- Authors are perfectly entitled to enter into separate contract arrangements for on-exclusive distribution of the journal's published version of the work providing there is an acknowledgement of its initial place of publication.
- Once submitted and accepted papers can post-print provided, they are in the same format as it appeared in the proceedings, however, pre-prints are not permitted.
- Authors may use data contained in the article in other works that they create.
- Authors may reproduce the article, in whole or in part, in any printed book (including a thesis) of which the author, provided the original article is properly and fully attributed.
- Authors and any scholarly institution where they are employed may reproduce the article, in whole or in part, for the purpose of teaching students.

Open Access rights and Permissions for our Open Access

Articles can be distributed under the terms of the [Creative Commons Attribution \(CC-BY\)](#) license. Authors retain full ownership of the copyright for their article, but undertake to allow anyone to download, reuse, reprint and distribute the article. Authors are permitted to post the final, published PDF of their article on a website, institutional repository, or other free public server, immediately upon publication, provided, a link is included between the web page containing the article and the journal's website.

CALL FOR PAPERS

Journal of Business & Retail Management Research ISSN (Print) 1751-8202 ISSN (Online) 2056-6271

The JBRMR, a scholarly and refereed journal, provides an authoritative source of information for scholars, academicians, and professionals in the fields of business and retail management and is published two times a year. The journal promotes the advancement, understanding, and practice of business & retail management. It is peer reviewed and is the main research platform of Centre for Business & Economic Research (CBER). Scholars across borders are encouraged in advancing the frontiers of management education, particularly in the area of retail trade. Contributions should therefore be of interest to scholars, practitioners, and researchers in management in both developed and developing countries targeting a worldwide readership through both print and electronic medium.

Although broad in coverage, the following areas are indicative and nurture the interests of the Centre with a “retail” underpinning:

- International retailing and diversification
- Retail buying; Retail management and strategies.
- Online retailing; The future of retailing
- Multi-channel retailing; Demographics & Retail Business
- Consumer behaviour
- Innovation in retailing; Mall Management
- Customer Relationships Marketing (CRM)
- Business Policies, Strategies, and Performance
- Marketing and Business ethics
- Distribution strategies
- Service marketing; Brand Management
- Contemporary Marketing Thoughts
- International Business issues
- B2B and B2C marketing
- Social Media Marketing; Supply chain management
- Business security and privacy issues

Frequency:

Twice a year: April & October

Review process: Blind peer review**Indexing with** ProQuest, ROAD, Open J-Gate, Google Scholar, Crossref

Preference will be given to papers which are conceptually and analytically strong and have empirical relevance. All papers will be reviewed according to the Journal’s criterion. The Journal’s website is www.jbrmr.com. For further information, please write to Editor via info@cberuk.com

CALL FOR PAPERS

INTERNATIONAL JOURNAL OF BUSINESS & ECONOMIC DEVELOPMENT
(Print) ISSN 2051-848X (Online) ISSN 2051-8498

The International Journal of Business and Economic Development (IJBED) publishes original research papers relating to all aspects of contemporary economic ideas. The emphasis is on quantitative or analytical work, which is novel and relevant. The interaction between empirical work and economic policy is an important feature of the journal. Contributions should offer constructive ideas and analysis and highlight the lessons to be learned from the experiences of different nations, societies, and economies. The journal plans to provide a valuable appraisal of economic policies worldwide. Therefore, the analysis should be challenging and at the forefront of current thinking, however articles are to be presented in non-technical language to make them readily accessible to readers outside of the related disciplines.

Authors are invited to submit their original research papers within the broad scope of the journal. Although broad in coverage, the following areas are indicative and nurture the interests of the Centre with an “economic development” underpinning:

1. Economic development
2. Behavioural Economics
3. FDI, Free trade – theory and practice
4. Economic History
5. Globalisation, liberalisation, and development
6. Financial Institutions & Markets
7. Fiscal policy
8. Financial services
9. Industrial Organisations
10. International economics & trade
11. International finance
12. Macroeconomic parameters and growth
13. Microeconomics
14. Microfinance and development
15. Monetary policy
16. Public policy economics
17. Regional economics
18. Inclusive growth
19. Institutions, and economic development

Frequency:

Twice a year: May & November

Review process: Blind peer review

Indexing with ProQuest, DOAJ, Open J-Gate

Preference will be given to papers which are conceptually and analytically strong and have empirical relevance. All papers will be reviewed according to the Journal’s criterion. The Journal’s website is www.ijbed.org. For further information, please write to Editor via info@cberuk.com

CALL FOR PAPERS

International Journal of Higher Education Management (IJHEM)
(Print) ISSN 2054-984 (Online) ISSN 2054-9857

Aims and Objectives.

IJHEM is a peer reviewed journal and is a research publication platform for international scholars. Their research can be in any aspect of teaching & learning covering the interests of developed and emerging countries alike. The Journal seeks to reach a worldwide readership through print and electronic media. The main aims of the Journal are:

- Publish high quality and scholarly empirical based research papers, case studies, reviews in all aspect of teaching & learning, education management and leadership with theoretical underpinnings.
- Offer academics, practitioners, and researchers the possibility of having in depth knowledge and understanding of the nature of teaching and learning practices and.
- Create a forum for the advancement of education management research for the High Education sector.

Subject coverage

- Educational policy and Policy impacts on education
- Management of education and Relations between lecturers and students
- Psychology of education, Psychology of student and teacher/lecturer
- Quality of education and Improvement method
- Global education and Its challenges and opportunities
- E-teaching/E-learning, educational software, and multimedia for education
- Teacher education
- Distance education and Education quality
- Methodology of educational research, Adult, and continuing education
- Special education, Gender, diversity and difference, Vocational education
- Assessment processes and mechanisms
- Language Education, Listening and acoustics in education environment.
- Education History
- Innovative teaching and Learning methodologies; multi-virtual environment.
- Application of educational technology
- Education reforms and Practical teaching reforms

Frequency:

Twice a year: February & August

Review process: Blind peer review

Indexing with ProQuest, ROAD, Open J-Gate

Preference will be given to papers which are conceptually and analytically strong and have empirical relevance. All papers will be reviewed according to the Journal's criterion. The Journal's website is www.ijhem.com. For further information, please write to Editor at info@cberuk.com

Call For Papers

International Journal of Maritime Crime & Security (IJMCS)
(Print) ISSN 2631-3855; (Online) EISSN 2631-3863

The International Journal of Maritime Crime and Security (IJMCS) is a peer reviewed Journal and will be the first high-quality multi/interdisciplinary journal devoted to the newly identified field and academic discipline of maritime security and to the study of maritime crime. The latter has been neglected, as the scientific study of crime has remained essentially landlocked.

The main aim of the Journal is to fill the need for a high-quality multi/interdisciplinary maritime crime and security journal, providing a high-level forum for papers that draw together different strands and disciplines, which are not catered for sufficiently by existing literature.

Scope of the Journal

The seas and oceans cover 70 percent of the earth's surface, and 90 percent of world trade by volume travels by sea. Maritime crime is a growth area, both in terms of its profitability in a world where the volume of maritime trade is increasing year-by-year, but also a subject for professional and academic study. However, of all disciplines, the study of crime, criminology, has neither actively presented itself as relevant for, nor has it been paid attention to by maritime (security) studies, whereas their intersection makes total sense. The Journal addresses this new academic discipline.

The Journal will cover the following, broadly constructed and interpreted, disciplines as they relate to maritime security:

- Social, geographical, and political dimensions of maritime crime and security, to include Ocean governance and the law of the sea.
- Conventional defense and security, including the seas as a platform for the deployment of Weapons of Mass Destruction and a conduit for weapons proliferation.
- Marine insurance and maritime law
- Maritime crime and the organised criminal business model, including piracy and armed robbery at sea, smuggling of all kinds, people trafficking and illegal migration and stowaways.
- illegal, Unregulated and Unreported fishing
- Illegal dumping, pollution, and environmental damage
- Offshore energy exploitation, whether fossil fuels or renewable, and mineral exploitation
- Environmental security
- Resilience and Disaster Management
- Human security, human factors, and psychology
- IT and Cyber-Security
- Utilisation of Private Maritime Security Companies
- Security Risk assessment and management
- Port Facility Security Management

IJMCS will publish research papers that contain sufficient scholarly content to support the IJMCS's inter /multi-disciplinary objectives. All papers will be reviewed according to the Journal's criterion. The Journal's website is www.ijmcs.co.uk

Number of Issues: Twice a year (March & September)

Review process: Double blind

Time of review: 4-6 weeks

For further information, please write to Managing Editor via mw@ijmcs.co.uk or editor@ijmcs.co.uk

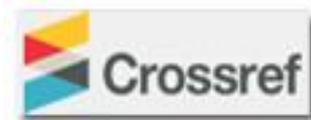
Centre for Business & Economic Research (CBER) Reviewers

Abraham Park, Pepperdine University, USA
Abasilim Angela Nneka, Wesley University of Science and Technology, Ondo, Nigeria
Anthony Wood, The University of the West Indies, Barbados
Ahmad Bello, Ahmad Bello University, Nigeria
A. O. Ayandibu, University of South Africa (Unisa), South Africa
Alan Morgan, Dublin Institute of Technology (DIT), Dublin, Ireland
Anna Ianoszka, University of Windsor Chrysler Hall, Windsor, Ontario, Canada
Archana Shrivastava, Birla Inst. of Management Technology, India
Arabinda Bhandari, Presidency University, Italgapura, Bangalore, India
Caren Ouma, United States International University_Africa, Kenya
Claudia Gomez, Kent State University
Chiloane-Tsoka Germinah, University of South Africa, South Africa
Darlington Richards, Morgan State University, USA
David Borker, Manhattanville College, New York, USA
David Alastair Lindsay Coldwell, University of the Witwatersrand, Johannesburg, South Africa
Debjani Banerjee, VIMSR, Mumbai, India
Eleni Aravopoulou, St Mary's University, UK
Eman Mohamed Abd-El-Salam, Arab Academy for Science and Technology and Maritime Transport, Egypt
Evangelia Fragouli, University of Dundee, UK
Fabrizio Pezzani, Bocconi University, Italy
Fon Sim, Ong, The University of Nottingham, Malaysia
Gagan Kukreja, Ahlia University, Kingdom of Bahrain
Gunnar Oskarsson, University of Iceland, Iceland
Gabriela Marinescu, University of Medicine and Pharmacy "Gr.T. Popa" Iasi, Romania
Hanaa Abdelaty Hasan Esmail, Jazan University, KSA
Hezekiah O. Falola, Covenant University, Nigeria
Imbarine Bujang, Universiti Teknologi MARA, Malaysia
Jennifer Bowerman, MacEwan University, Canada
John Davies, Victoria University of Wellington, New Zealand
Josiane Fahed-Sreih, Adnan Kassar School of Business, Lebanon
Jeff Ritter, Marketing Concentration Chair, Keiser University, USA
Justin Henley Beneke, University of Winchester, UK
JP Spencer, Cape Peninsula University of Technology, South Africa
Juan Carlos Botello, Universidad Popular Autónoma del Estado de Puebla, Mexico
Khaliquzzaman Khan, Dhofar University, Oman
K. M. Moorning, Medgar Evers College, New York, USA
Khaled Rouaski, High National School of Statistics and Applied Economics, Algeria
Keifi Karim, CERL, ISTECH Paris, France
Lela D. Pumphrey, British University in Egypt, Cairo, Egypt
LO, Olivine Wai Yu, Hong Kong Shue Yan University
Lobna Ali Al-Khalifa, National Authority for Qualifications & Quality Assurance of Education & Training (QQA), Bahrain
Manolis I. Skouloudakis, University of Macedonia, Greece
Małgorzata Magdalena Hybka, Poznań University of Economics and Business, Poland
Marvin O. Bates, Lewis University, USA
Merlin Stone, School of Management and Social Sciences, St Mary's University, UK
Monika Kriewald, Ostfalia University of Applied Sciences, Germany
Mohamed Branine, Dundee Business School, Abertay University, UK
Michael J. Harrison, Framingham State University, USA
Michael D. MacColl, Vancouver Island University, Canada
Michael Chattalas, Kean University, New York, USA
Mukherjee, Deepraj, Department of Economics, Kent State University, USA
Mudrajad Kuncoro, Gadjah Mada University, Indonesia
Müge Çetiner, İstanbul Kültür Üniversitesi
Mohammad Mahmoud Alzubi, Al-Madinah International University, Shah Alam, Malaysia
Mohammed Nuhu, Universiti of Utara Malaysia, Malaysia
Narentheren Kaliappen, Management Universiti Utara Malaysia, Malaysia
Noor Hasmini Hj Abd Ghani, Universiti Utara Malaysia, Malaysia
Noha Bendary, The British university in Egypt, faculty of BAEPS, Egypt
Oliver Menk, University of Salzburg Business School, Austria

Pellegrino Manfra, University New York, USA
Philippe Coffre, Léonard de Vinci Pôle Universitaire, Research Center, France
Robertson K. Tengeh, Cape Peninsula University of Technology, South Africa
Rachael English, De Montfort University, UK
Rajeev Sooreea, Dominican University of California, USA
Rahul Gupta Choudhury, IFIM Business School, Bangalore, India
Reham I. Elseidi, Ain Shams University, Cairo, Egypt
Ruth Marciniak, Glasgow Caledonian University, UK
Sampath Kumar, University of Wisconsin Green Bay, USA
Sally Ebrahim Elawady, Qassim university, Saudi Arabia
Slava Shavshukoff, Saint Petersburg State University
Sławomir Kotylak, Uniwersytet Zielonogórski / University of Zielona Góra, Poland
Stephen P. Magee, University of Texas at Austin
Shaymaa Farid Fawzy Ahmed, Arab Academy for Science, Technology and Maritime Transport, Egypt
Shivakanth Shetty, Sivakantha Setty Institute of Management
Srinivas Sampalli, Dalhousie University, Halifax, Canada
Surabhi Singh, G.L Bajaj Institute of Management & Research, India
Tanuja Sharma, Management Development Institute, Gurgaon, India
Tom A. Buckles, Azusa Pacific University, USA
Tinashe Chuchu, University of the Witwatersrand
Umopathy Ananthanarayanan, New York Institute of Technology, USA
Vidhu Gaur, Management Development Institute, Gurgaon, India
Warren Mathews, Belhaven University, USA
Wincenty Kulpa, University of Rzeszów, Poland
Yongmei Bentley, University of Bedfordshire, UK
Zaid Ahmad Ansari, Qassim University, Buraidah, Qassim, Saudi Arabia

The Business & Management Review

The Business & Management Review is approved for listing in
ProQuest and J-Gate of Refereed Publications



Archiving In



PORTICO

The Business & Management Review reserves the rights to add, amend, modify, or delete its rules, policies, and procedures affecting its relationship with contributors as deemed necessary by the administration. Any such amendment, modification, addition, or deletion shall not be Reconsidered a violation of the relationship between CBER and contributors.

THE BUSINESS & MANAGEMENT REVIEW

Volume 12 Number 2 December 2021

Name of the Contributors

Pipera, Maria	Evangelia Fragouli
Abdel Moniem M.K. Elsaid	Amanda Mphahlele
Antoine Trad	Malemela Angelina Mamabolo
Asmaa Sabry AbdAlaziz Salama	Amira Sayed Mohamed Gadelrab
Ghadeer Mohamed Badr EIDin	Farida Mohamed
Jean-Marie M. Mbuya	Ohio moje Iyemifokhae
Leena Ajit Kaushal	Luka de Wet
Lesiba Langa	Frans Khutso Kgobe
Mokoko Piet Sebola	Damir Kalpić
Nasser Mohammed Lasloom	Elena Grigorieva
Ohio moje Abubakar Iyemifokhae	Runxin Lin
Rollins NG Ayaya	Onesmus Ayaya
Seugnet Bronkhorst	Gabriel Kabanda
Siriyama Kanthi Herath	Destiny Woods
Stamatia Pitouli	

Centre for Business & Economic Research (CBER)

79 College Road, Harrow, Middlesex HA1 1BD, UK

Email: editor@cberuk.com; Web: www.cberuk.com