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**CBER 8th International Conference on Globalisation, Entrepreneurship and Emerging Economies (ICGEEE), 8-9 December 2023**

Hosted by the
*Centre for Business & Economic Research (CBER), UK*
*In association with*
*Journal of Business and Retail Management Research (JBRMR)*
*Centre for the Study of Organised Crime (CSOC)*

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# Evidence on the role of institutions in economic growth: A panel data study of developing countries

**Hamaad Yousuf**
**Muhammad Ali Bhatti**
Forman Christian College (A Chartered University), Pakistan

**Muhammad Akbar Awan**
International Islamic University Islamabad, Pakistan

**Keywords**
Gross Domestic Product (GDP), International Development Association (IDA), Generalized Method of Moments (GMM), International Bank Reconstruction and Development (IBRD), World Development Indicator (WDI), International Country Risk Guide (ICRG).

**Abstract**
*The paper examines the role of various types of institutions on economic growth through capital formation and technological progress. The Solow residual is taken as a proxy of technological progress. The study uses panel data from twenty-one developing countries from the International Development Association. The sample period extends from 1990 to 2013. The institutions are categorized as economic, financial, political, and social institutions. The Solow growth model is the basic reference point of this study. The GMM panel estimation technique is applied due to the problem of endogeneity. The relationship between GDP per labor and institutions is explored through technology and stock of capital per labor. The results of this study show a significantly positive relationship between economic growth and economic, political, social, and financial institutions. Moreover, based on empirical results this study concludes that to achieve economic growth in developing countries, the government should strengthen its institutions and control the corruption, ethnic tension, injustice, terrorism, and intolerance in the society. The governments of developing countries should strengthen the financial and economic institutions to enhance growth via increasing investment in the country.*

## Introduction

Institutions play an important role in influencing the macroeconomic performance of the country. The development, functioning, and formation of institutions vary from country to country. This institutional variation causes variation in the economic growth of the countries by marking some countries rich and others poor. Moreover, it is seen that developing countries with weak institutions fail to promote property rights and productive investment. Furthermore, the reason for low investment in developing countries is manipulation and uncertainty in the judiciary, bribery, tax evasion, corruption, presence of inefficient institutions and the lack of property rights. The critics are of the view that institutions influence economic growth through transaction cost, incentive structure and property rights (North and Thomas 1973). In addition, variables like justice, law enforcement and tax administration are among the other variables of institutions that affect economic growth. The elite class has unlimited political and economic power and only they can benefit from the productive opportunities and quality of education.

## Literature Review

Vinayagathasan (2013) studied the impact of inflation on economic growth by taking the balanced panel data. The study employed dynamic panel estimation and a fixed effect model. It was found that inflation and economic growth are significantly and negatively related. The study found a non-linear relationship between economic growth and inflation. Moreover, inflation harms economic growth when it is more than 5.43%.

Javed et.al, (2013) empirically analyzed the impact of government expenditure and inflation on economic growth by taking the time series data. The study suggests that reduction in taxes and

misallocation of resources will improve economic growth. The study of Arjomand, Emami and Salimi (2016) found that inflation and labor productivity have a positive effect on economic growth. Budget deficit increases inflation, liquidity and government debt to state banks. This study suggests that the government can sell its bonds to meet its budget deficit. Goher et. al, (2012) empirically analyzed the impact of budget deficit on economic growth. The study found that budget deficit is negatively related to economic growth. The study suggests that the country should use its underutilized resources. Moreover, the government should reduce the excessive printing of paper money. Furthermore, the government should impose indirect and direct taxes to generate the revenue.

Adak (2015) studied the impact of innovation and technological progress on economic growth. The study found that technology and economic growth are positively related to each other. While the error correction results show negative long-run relationship. The study suggests that introduction of new machines; equipment's and technology tools will increase the output, which leads to the increase in economic growth. Ciftci, Ispir, Yetkiner (2015) analyze theoretically and empirically the impact of financial development on economic growth. The study found that the stock market and credit market development have positive long-run effect on economic growth. This study suggests that financial funds should be used for productive purposes rather than unproductive. The government policies should be structured in such a way that it boosts the credit market. Moreover, there should be legal and institutional improvement to strengthen the investor and creditor rights.

Abu-Bader and Abu-Qarn (2008) examines the impact of financial development on economic growth. This study suggests that limiting the government participation in financial system and improving the investment in human resource will improve the economic growth. Teng et.al, (2006) studied the impact of financial development on economic growth. This study found that long-run relationship exists between financial development and economic growth. This study suggests that China should improve its financial system with liberalized interest rate and sound financial intermediation. Hondroyiannis, Lolos and Papapetrou (2005) discuss the empirical impact of banking and stock market on economic. The study found that both the banking and stock market have long-run relationship with economic growth. This study suggests that financial intermediaries should offer funds to highly productive and less established firms.

Guidotti (1995) studied the empirical impact of financial institution on economic growth. This study suggests that well-functional financial structure leads to the better economic growth. The study further suggests that improvement of domestic financial market will boost the investment and saving rate. Paik et.al, (2017) wrote about the impact of ethnic tension on economic growth. This study suggests that the government should provide equal rights and public goods to the minorities. Moreover, the minorities should be given full privileges to participate in the politics. Arin et.al, (2017) studied the impact of ethnic fractionalization on economic growth. The study was found that ethnic tension and economic growth has negative relationship. This study suggests that the government should control the ethnic heterogeneity and rent-seeking behavior of the different ethnic groups, which will help in increasing the economic growth.

Leandro et.al, (2016) wrote a paper on the impact of cultural diversity on economic growth. Cultural diversity is represented by polarization and fractionalization index. The study found that both the polarization and fractionalization have positive and significant relationship with economic growth. This study suggests that diverse range of customs, ethics, societal norms and new ideas can foster technology innovation.

Ager and Bruckner (2013) studied the impact of cultural diversity on economic growth. The study found that polarization is negatively related to economic growth. This study suggests that immigration increases the polarization and negatively affects the economic growth. The study further suggests that the developed countries should tighten its immigration policies to boost economic growth. Radu (2015) empirically analyzed the impact of political stability on economic growth. The study suggests that the government should increase the education level, welfare of its residents, reduce poverty and assure job creation.

Li and Liu (2005) examined the impact of foreign direct investment on economic growth. The study found that problem of endogeneity does not exist between foreign direct investment and economic growth. study suggests that government should promote foreign direct investment and human capital, in order to improve the economic growth.

Agostino, Dunne and Pieroni (2016) empirically analyzed the impact of corruption and government. The study concluded that corruption reduces the collection of taxes. Moreover, the corrupt politicians collect bribes from spending on major project like civil engineering developments and purchase of weapons. Economic growth can be enhanced by controlling the corruption and reducing the military expenditure. Asadullah (2014) investigated the impact of military expenditure in the presence of external and internal threats on economic growth. It was found that military expenditure is negatively related to economic growth. The study suggests that military spending should be reduced to encourage economic growth.

Ugwuegbe et.al, (2013) empirically analyzed the impact of capital formation on economic growth. The data was gathered from state bank of Nigeria. This study suggests that the government should emphasis on capital accumulation, which will increase the economic growth of Nigeria. Xiaoqing (2005) investigated the impact of investment on physical and health capital on economic growth. This study suggests that investment in physical and human capital leads to the economic growth. Beck and Murphy (1994) studied the impact of physical capital, human capital on economic growth. They found the positive relationship between physical capital and economic growth. Nejat and Sanli (1999) discussed the impact of physical and human capital on economic growth and found the positive relationship between physical capital and economic growth. The study concluded that investing in both physical and human capital together is more fruitful for economic growth as compared to investing separately.

Beck and Murphy (1994) did analysis on the impact of physical capital, human capital and economic growth. They found the positive and significant relationship between physical capital and economic growth.

**Research Objectives**

The objective of this study is to explore the relationship between institutions and economic growth empirically and theoretically for developing countries. There are many studies which have analyzed the impact of institutions on economic growth. Some studies have divided the institutions into explicit categories, but none of them have taken political, economic, social, and financial institutions all together and there is no single study that has focused on IDA countries. Hence, it may be a useful contribution to test the effect of different types of institutions upon economic growth in IDA countries.

Objectives of the study are specified as follows:

- To quantify the effect of political institutions upon economic growth in developing countries.
- To quantify the effect of financial institutions upon economic growth in developing countries.
- To quantify the effect of economic institutions upon economic growth in developing countries.
- To quantify the effect of social institutions on economic growth in developing countries.

**Hypothesis**

The following hypothesis is considered for testing based on econometric inference.

- Political institutions significantly affect GDP per labor through stock of capital and technological progress in the selected IDA countries.
- Economic institutions significantly affect GDP per labor through stock of capital and technological progress in the selected IDA countries.
- Financial institutions significantly affect GDP per labor through stock of capital and technological progress in the selected IDA countries.
- Social institutions significantly affect GDP per labor through stock of capital and technological progress in the selected IDA countries.

**Research Methodology**

This section consists of detailed discussion of a theoretical framework constructed on the basis of the Solow growth model.

## Theoretical Framework

Following the neo-classical production structure, the aggregate production function is given as:

$$Y = A.f(K, L) \quad (1)$$

Where Y, A, K and L represents the output, technology, capital and labor respectively. Technology is appearing in this function multiplicatively. Assuming constant return to scale, the intensive form of this production function becomes more insightful.

Dividing the entire equation by labor 'L' we get,

$$\left(\frac{Y}{L}\right) = A.f\left(\frac{K}{L}\right) \quad (2)$$

It implies that output per worker depends only on capital stock per worker (capital stock labor ratio), given the state of technology. Further, assuming Cobb-Douglass production function, we get the equation 7 below

$$\left(\frac{Y}{L}\right) = A.\left(\frac{K}{L}\right)^{\beta} \quad (7)$$

Taking log of the equation 7, we get equation 8 below:

$$ln\left(\frac{Y}{L}\right) = lnA + \beta\ ln\left(\frac{K}{L}\right) \quad (8)$$

When $lnYL$ is regressed upon $ln\left(\frac{K}{L}\right)$, we get a constant $\alpha$ and residual $\mu$. The sum of constant $\alpha$ and $\mu$ is used to represent technology (A). It is to be noted that $\frac{dY}{dA}$ =1, if we differentiated the equation 8 w.r.t $\frac{dY}{dA}$. In chain rule we will incorporate the $\frac{dY}{dA}$ =1 value.

$$A = \alpha + \mu \quad (9)$$

Econometric model of equation (8) production function is:

$$ln\left(\frac{Y}{L}\right) = \alpha + \beta ln\left(\frac{K}{L}\right) + \mu \quad (10)$$

Rather than looking at the impact of institutions on economic growth directly this study looks at how do the institutions affect capital stock per labor and technology. Then by using the chain rule, the impact of institutions on economic growth is determined. For this purpose, the following two functions are estimate

$$A = f(E.Ins, F.Ins, P.Ins, S.Ins) \quad (11)$$

$$\left(\frac{K}{L}\right) = f(E.Ins, F.Ins, P.Ins, S.Ins) \quad (12)$$

Using the chain rule, the impact of institutions on economic growth is calculated as follow:

$$\frac{dY}{dI_i} = \left(\frac{dY}{dK} \cdot \frac{dK}{dI_i}\right) + \left(\frac{dY}{dA} \cdot \frac{dA}{dI_i}\right) \quad (13)$$

Where $I_i$ denotes each of the four institutions under consideration in this study.

**Description of Variables**

The international country risk guide consists of 22 variables, divided into three categories i.e. economic, financial and political variables. Each of these 22 components are assigned a numerical value which is its risk points where higher points indicate low risk and low points indicate high risk. The ICRG has combined social variables with the political variables. The social variables are separated in this paper and separate index of social institutions is constructed. The international country risk guide (created by the editor of international report in 1980) was made to forecast political, economic, social and financial risks. It provides data for 27 countries on annual basis and 140 countries on monthly basis. The ICRG data is used by banks, investors, multinational importers, corporations, foreign exchange, exporters, shipping concerns, traders and etc.

## Overview of Data

| Variable | Notation | Description | Sources |
|---|---|---|---|
| **GDP per worker** | $GDP/L$ | **Total output of the country divided by total number of labor US $ (2010)** | **World Development Indicator (ID (WDI-2016)** |
| **Capital per worker** | $K/L$ | **Stock of Capital US$ with base year (2010) divided by total labor force** | **Penn World table 9.0** |
| **Economic Institution** | $EINS$ | **1. GDP per Head.<br>2. Real GDP Growth.<br>3. Annual Inflation Rate.<br>4. Budget Balance as a Percentage of GDP.<br>5. Current Account as a Percentage.** | **International Country Risk Guide (ICRG)** |
| **Financial Institutions** | $FINS$ | **1. Foreign Debt as a Percentage of GDP.<br>2. Foreign Debt Services as a Percentage of Exports of goods and services.<br>3. Current Account as a Percentage of Exports of Goods and Services.<br>4. Net International Liquidity as Month of Import.<br>5. Exchange Rate Stability.** | **International Country Risk Guide (ICRG)** |
| **Political Institutions** | $PINS$ | **1. Government Stability.<br>2. Investment Profile.<br>3. Internal Conflict.<br>4. External Conflict.<br>5. Corruption.<br>6. Military in Politics<br>7. Law and order.<br>8. Democratic Accountability<br>9. Bureaucracy Quality** | **International Country Risk Guide (ICRG)** |
| **Social Institutions** | $SINS$ | **1. Ethnic Tension<br>2.Religious Tension<br>3.Socioeconomic variable** | **International Country Risk Guide (ICRG)** |

**Principal Component Analysis**

Principal component analysis is a statistical technique used to identify a few uncorrelated variables, called principal components, from a large data set. Thus, it helps in eliminating the problem of multicollinearity among the variables. This technique is mostly used to identify strong patterns and emphasize the variation in the data set. It is a commonly used tool for analyzing exploratory data in industries, social science, and market research. Minimal time and effort are used in reducing confusing and complex data sets to a useful and simplified information set.

**Endogeneity Problem and its Solution**

The problem of simultaneity or bi-directional causality is defined as the correlation between the independent variable and the error term of the model. The independent variable, which is correlated with the error term, is called the endogenous variable. In the presence of endogeneity, the OLS estimators will be biased and inconsistent. An instrumental variable approach is used to address the problem of endogeneity. In instrumental variable approach, variables are introduced in such a way that it nullifies the relationship between the endogenous variable and error term. In the measures used in this paper, bi-directional causality exists among economic growth, capital stock per labor and political institution: capital stock per labor, economic and social institution: technology and financial institution.

**Generalized Method of Moments (GMM)**

In ordinary least square method, we assume that there is no relationship between explanatory variable and the error term. If there is a relationship between explanatory variable and error term, it means there is a problem of endogeneity. In that case OLS estimator will be biased and inconsistent. Hasen (1982) developed the GMM technique in order to cope up with the problem of endogeneity.

## Results and Discussion

| Marginal Effects | |
|---|---|
| **Variable** | |
| $\frac{\partial y}{\partial S}$ | 0.001989 |
| $\frac{\partial y}{\partial P}$ | 0.023135 |
| $\frac{\partial y}{\partial E}$ | 0.035022 |
| $\frac{\partial y}{\partial F}$ | 0.069355 |

**Table 1.1 Marginal effects of institutions on GDP per labor are as follow:**
***Source: Author's Estimation***

The above table shows the indirectand positive relationship between GDP per labor, social institutio economic institution, political institution, and financial institution. Chand et.al, (2012) wrote a bout the impact of social institutions on economic growth and found that presence of corruption in these institut will reduce economic growth of the country. Eicher et al. (2009) also found that political institutions and economic growth have a positive relationship. Glaser et al. (2004) who empirically analyzed the impact c economic institutions on economic growth. They found that developing countries grow at a faster rate under dictatorship as dictators follow command economics which encourages investment through secure property rights, unhindered trade activities, and easy access to credit. King and Levin (1993) studied the impact of financial development on economic growth and found that a well -structured and efficient financial institution increases the investment of the country.

**Summary**

The purpose of this study was to capture the impact of political, economic, social and financial institutions on economic growth. The theoretical framework was constructed on the basis of Solow growth model. The panel data of 21 developing countries were used from 1990 to 2013. Methodology of the paper revolves around the panel causality test that detected the bi-directional causality among different variables. Due to the problem of endogeneity, a generalized method of moments was used. The relationship between GDP per labor and institutions were captured through capital and technology by using the Solow residuals.

Three different models were estimated to calculate the marginal effect. The International Country Risk guide, Penn world table 9.0 and world development indicator (WDI) were the sources used. Furthermore, GMM was applied using the dependent variables: Solow residuals, log GDP per labor and factor productivity for the estimation of marginal effects. The highest marginal effect can be seen in the financial and economic institutions. In developing countries, the elite class has unlimited power and only few people can benefit from the quality of education and the weak structure of the society was due to fragile bureaucracy.

The improvement in the information services regarding commercial banks and risk diversification will help in increase in economic growth of the country. There should be legal and institutional improvement to strengthen the investor and creditor. Moreover, the government should avoid involvement in commercial institution decisions. The financial intermediaries should offer funds to highly productive and less establish firms. Furthermore, the study suggests that improvement of domestic financial market will boost the investment and saving rate.

**Policy Recommendation**

The paper recommends that in order to achieve economic growth in developing countries the government of these countries should strengthen its institutions. There should be investment in technology, human and physical capital. The government should control the ethnic and religious tensions, corruption, injustice and intolerance in the society. The government should be politically stable, in order to promote foreign direct investment. Moreover, if the financial institutions are stable the country will have more investment, which will lead to the increase in economic growth. The investment in infrastructure promotes use of modern technologies, which will increase the productive activities.

Economic institutions play a significant role in increasing the economic growth of the country. It was found in the previous studies that increase in investment, reduction in trade barriers, reduction in taxes and miss allocation of resources will improve the economic growth. Hence, the government should impose indirect and direct taxes to generate the revenue, introduce new machinery, equipment and technology tools which will increase the output.

According to the empirical results of this study, financial institutions contribute more in economic growth as compared to other institutions. Therefore, it is suggested that improvement in the information services regarding commercial banks and risk diversification will help in stable economic growth. The government policies should be structured in such a way that it boosts the credit market. Moreover, there should be legal and institutional improvement to strengthen the investor and creditor rights. Furthermore, the financial intermediaries should offer funds to highly productive and less established firms. The government expenditure and trade play a major role in the amplification of economic growth. The well-operational financial structure leads to better economic growth.

A social institution is also one of the main pillars of institutions and it plays a key role in the development of society. It was seen in the different studies that the government should provide equal rights and public goods to the minorities; the minorities should be given full privileges to participate in politics. The government should control the ethnic heterogeneity and rent-seeking behavior of the different ethnic groups, which will help in increasing economic growth. Moreover, education increases the knowledge and skill of labor, which leads to an increase in labor productivity and finally economic growth. Furthermore, primary education should also be given equal importance, as primary education prepares for higher education.

The government should make policies for the production of goods and services on domestic level, in order to manage both external and government level debt. The sectorial imbalance should be avoided because it damages industrial and agriculture production. The foreign direct investment and economic growth have significantly positive relationship in many studies. So, the governments should promote foreign direct investment and human capital. It is seen that the corrupt politicians collect bribes from spending on major project like civil engineering developments and purchase of weapons. Economic growth can be enhanced by controlling the corruption. The financial institutions and decision makers should set their goals keeping in mind the political instability, while making the policy. Moreover, the government should avoid giving rent seeking opportunities to bureaucrats, and instead involve the bureaucrats in

investment activities. Furthermore, the government should enlarge the economy and increase competitiveness

The countries should emphasize capital accumulation, which will increase economic growth. Many studies concluded that investing in both physical and human capital together is more fruitful for economic growth as compared to investing separately. As mentioned in OECD (2007) the contribution of capital and investment in software lead to an increase in economic growth. Moreover, the investment in imported machinery increases economic growth since it possesses the latest technology and is cost and time efficient.

**Limitation and Future Research**

In this paper, the GMM estimation technique is used to find the impact of political institutions, financial institutions, economic institution, social institution and physical capital (control variable) on economic growth. This study includes the group of twenty-one developing countries taken from the International Development Association (IDA). This study can further be extended using the ASIAN and SAARC countries. Moreover, the econometric model and theoretical framework should be established to further highlight economic growth. Due to less availability of data, 21 IDA countries are included in the analysis of the research. The data of other countries can also be used to do more comprehensive research in this area.

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# An examination of reverse logistics best practices in the fast-moving consumer goods industries

**Mpho Sharon Makgedi Makaleng**
Department of Marketing, Supply Chain and Sports Management
Tshwane University of Technology, South Africa

**Keywords**
Reverse logistics (RL); best practices; fast-moving consumer goods (FMCG); retail sector; South Africa (SA); firm competitiveness

**Abstract**
*The Coronavirus pandemic has led to consumers being progressively demanding, with changing needs owing to increased product variety and globalisation, as well as cheaper substitutes for products from foreign markets. The fast-moving consumer goods industry is able to provide for such a demand, as it is one of the biggest industries globally. However, this industry has also been affected by reverse logistics, which has led to the industry in search of reverse logistics best practices to mitigate reverse logistics challenges. The main objective of this study was to examine reverse logistics best practices in the fast-moving consumer goods industry. This was achieved by employing a positivist research philosophy, and furthermore by employing the explanatory and descriptive research design. This study was quantitative in nature which promoted the use of a non-probability purposive method to further collect data through survey-monkey using online platforms. The study achieved an 80% response rate from the FMCG retail industry, where the descriptive results from the Statistical Package for the Social Sciences, version 27 revealed that RL best practices are moderately implemented.*

## Introduction

The coronavirus (Covid-19) pandemic has led to consumers being progressively demanding, with changing needs owing to increased product variety and globalisation, as well as cheaper substitutes for products from foreign markets. On average 8% of total sales stem from retailers' reverse logistics (RL), and at the same time, tighter regulation and Omni-channel retail make RL more complex. The increasing number of regulations encouraging the recycling of packaging materials and containers has led to the fast-moving consumer goods (FMCG) retail industry implementing RL (Bowersox, Closs, Cooper & Bowersox (2020). This leads to the FMCG industry seeking RL best practices that can be employed to enhance RL and achieve firm competitiveness.

RL of FMCG in the retail industry can be defined as the backward flow of goods by returning damaged goods, unused goods, or defective goods from customers (distributors, retailers, end-users) to manufacturers for substitution, reuse, repackaging, recycling, remanufacturing, repair, resell, disposal, and incineration. According to Kussing and Pienaar (2016), there are three general stages in that RL can occur in the supply chain:

(i) Manufacturing: RL due to production scrap, failed quality controls, and surplus raw materials.

(ii) From the distributor: these include RL due to inventory adjustments, commercial returns, redistribution of products, and product recalls.

(iii) From the customer: these include the RL of services, goods that have reached the end of use, and warranty returns.

In between the process of manufacturing and distribution RL best practices occurs. RL best practices are the mutual RL standards practiced in different industries and in this case, the FMCG. Omwenga, Ngacho and Muya (2019) posit that the ability of a firm to implement and handle RL best practices has rapidly become an important logistical process in nearly all industries of the economy. The RL best practices are implemented by industries through RL partners (Prakash & Barua, 2016); and will differ from industry to industry, and from country to country. Waqas, Dong, Ahmad, Zhu and Nadeem (2018) opine that

different practices have been recognised and established by different countries to encourage RL best practices. Furthermore, Mangla, Govindan and Luthra (2016) explain that the implementation of the RL best practices has received major attention among developed countries; and further highlight that a more thorough study is required in developing countries to receive the required benefits. However, Badenhorst (2016:10), mentions that "it is not practical to implement all best practices at once". Consequently, it is essential to prioritise the RL best practices for gradual implementation (Prakash & Barua, 2015:559).

**Literature review**

Firms have started developing and utilising RL best practices to harness the benefits of effective RL implementation (Makaleng, 2017). Since RL best practices permit firms to benefit from added cost-saving prospects by recovering the costs of product materials and reusing them at a later stage (Arrieta, 2015). Moreover, implementing RL best practices can also allow firms to create clear RL policies. This is because inadequate policies are a key limitation in developing countries when compared to developed countries (Waqas *et al.,* 2018).

There are several reasons why firms decide to refrain from or implement RL best practices (Waqas *et al.,* 2018). These reasons include but are not limited to increasing environmental concerns for society and rigid environmental regulations (Jindal & Sangwan, 2015), increasing customer satisfaction and service levels (Prakash & Barua, 2016). Some of the RL best practices which firms can prioritise in terms of implementation are establishing centralised return centres, establishing a gatekeeping function, and collaborating and sharing information with other FMCG retailers and supply chain partners. Moreover, using returns software, state-of-the-art technology, and RL information management systems, outsourcing reverse logistics to third parties.

Makaleng (2017); Waqas *et al.* (2018); and Omwenga *et al.* (2019) all discussed and examined the importance of RL best practices, the benefits of implementing the RL best practices in a firm, and its implementation. As mentioned previously, some of the benefits mentioned by the authors include, increasing customer satisfaction, cost savings, and service levels, amongst others.

Previous research did not necessarily focus on RL, and RL best practices in the FMCG sector. Mvubu's (2015:133) investigated green supply chain management challenges in the South African fast-moving consumer goods industry: a case of Unilever. The study indicated that "FMCG companies are the link between suppliers and customers and are therefore in a position to play an essential role in driving green SC initiatives in the total SC. Thus, in order to establish a database of greening practices, firms including those in the local FMCG sector should be encouraged to participate in similar studies on a specific basis". Agigi, Niemann & Kotzé (2016) examined the Supply chain design approaches for supply chain resilience: A qualitative study of South African fast-moving consumer goods grocery manufacturers. The results in Agigi *et al.* (2016:11) explained that "multi-sourcing and strategic stock are two of the main redundant design strategies used by San FMCG grocery manufacturers. The strategies allow firms to maintain continuity of operations. The firms currently follow a mixed distribution model allowing them the flexibility of having numerous facilities in case one of the facilities is affected by a disruption".

Meyer, Niemann, Van Pletzen, & Smit (2019:8) studied Environmental initiatives: A study of dyadic buyer and supplier relationships in the South African Fast-Moving Consumer Goods industry. The study further indicates in their findings that "in SAs FMCG sector, buyer organisations now include environmental initiatives as a key requirement in their supplier selection criteria, while buyer and supplier relationships are built on high standards of trust and quality". In their study, Meyer *et al.* (2019) further suggest that quantitative research could be used in future studies since it will encourage participants to be more open when disclosing negative experiences.

Finally, a study conducted by Botha, Creaven and Mandy (2020) conducted research on, conveniently healthy: The impact of health endorsements on brand trust, brand loyalty, and brand equity in Fast Moving Consumer Goods convenience versus shopping goods. The next sub-section will discuss the problem statement.

**Problem statement**

A review of the literature showed that there's a dearth of studies conducted on RL best practices, especially in the FMCG industry, hence the gap which resulted in this study being conducted. Hence the

current study sought to examine reverse logistics best practices in the fast-moving consumer goods industries. Therefore, the current study's RL best practices include: (i) the establishment of centralised return centres (Myerson, 2015; Saikiah, McRoberts & Thakur, 2016); (ii) the establishment of a gatekeeping function (Shukla, 2015; Kussing & Pienaar, 2016; Saikiah *et al.,* 2016; and Makaleng, 2017); (iii) collaborating and sharing information with other FMCG retailers and supply chain partners (Prakash & Barua, 2015; Morgan, Richey & Autry, 2016; and De Villiers Nieman & Niemann, 2022); (iv) utilising return software, state-of-the-art technology, and RL information management systems (Robinson, 2015; Samarasinhe & Wang, 2019; and Saikiah *et al.,* 2016); and (vi) outsourcing RL to third parties (Badenhorst & Van Zyl, 2015; Prakash & Barua, 2016; Badenhorst, 2016; Robinson, 2016; Samson, 2018; and Gu, Wang, Dai, Wei & Chiang, 2019). These RL best practices were found to be appropriate for the accomplishment of firm competitiveness in the FMCG retail industry.

**Research Objectives**

**Methodological objectives**

Following the problem statement, the study aimed to address the following methodological **objectives:**

$MO_1$ to review the literature on RL best practices implemented in the FMCG retail industry.

$MO_2$ to propose the most appropriate research design and methodology for this study.

$MO_3$ to gather and analyse primary data on RL best practices implemented in the FMCG retail industry.

Primary objectives

The primary objective of this study was to examine the RL best practices in the FMCG retail industry in Pretoria, South Africa (SA). To achieve this objective, the study had the following sub-objective:

**Secondary objective**

The secondary objective of this study was to:

$SO_1$ identify RL best practices implemented by the FMCG retail industry.

**Research design and methodology**

A research methodology encompasses the research philosophy, research design, research approach, sampling design, and data collection analysis methods (Quinlan, Babin, Carr, Griffin & Zikmund, 2019). A positivist research philosophy worldview was followed in this study because of the following reasons as mentioned by Govender (2018:359); "assumes an objective world"; "searches for facts"; "generalises results"; "uses scientific methods" and "not interested in meaning, but only proven facts". Moreover, the study employed descriptive and explanatory research. The descriptive research design aided the researcher to describe the FMCG retailers' profile and identify the level of implementation of RL best practices in the FMCG retail industry. The outbreak of the Covid-19 pandemic led to the researcher's use of a quantitative research approach since it ensured the safety of both the respondents and the researcher. A quantitative approach assisted in addressing the research aims, the research problem, and objectives. According to Quinlan *et al.* (2019:129), a quantitative research approach "addresses the research objectives through empirical assessments involving numerical measurements and analysis approaches". Using a quantitative approach enabled the researcher to address the research problem through the quantitative results on the implementation of RL best practices in the FMCG retail industry that can better assist managers, supervisors, workers, and consumers in Pretoria to gain firm competitiveness through enhancing customer satisfaction.

**Sampling design**

The population for this study included FMCG retailers and consumers in Pretoria. This consisted of retail stores, such as Woolworths, pick n Pay stores, Checkers, Spar, and Boxer stores because they are some of the biggest retailers involved in the reversal of FMCG. This population was inclusive of logistics managers/customer care managers, retail store managers, supervisors, third-party RL service providers, and shoppers or consumers of the FMCG. Any shoppers/ customers above the age of 18 in Pretoria, SA, formed part of the targeted population in this study.

A non-probability purposive sampling method was employed to enrol the respondents since the researcher had a specific purpose in mind which was to examine the RL best practices for FMCG retailers in Pretoria. Additionally, the purposive sampling method was employed because the sampling population

was to be selected on purpose. The researcher recruited the FMCG retailers through the retailer's database and sent out personal emails with the link to the required personnel who deals with RL. A link was further provided to consumers through social media platforms, such as emails and LinkedIn. The retailers and consumers addressed issues relating to the research objectives and questions and further provided information-rich cases. It proved difficult to track the number of logistics managers/customer care managers, retail store managers, supervisors, third-party RL service providers, and shoppers in Pretoria because of Covid-19. However, since the researcher used purposive sampling, a large number of completed questionnaires were obtained and all the targeted respondents in Pretoria, SA, had some degree of chance to be included in the sample of data collection.

The total population for this study was not known and therefore the scholar-practitioner determined the sample size of 520 respondents which comprised 500 FMCG consumers and 20 respondents from the FMCG retail employees was sufficient. This is because Gay, Mills and Airasian (2009), opine that where a population size (N)= 5000 or more, the population size is irrelevant, and therefore a sample size of 400 will suffice. Therefore, as per Gay *et al.* (2009), the sample size of 520 was sufficient.

**Data collection and analysis**

Data collection was done through two closed-ended questionnaires. The questionnaires were converted into SurveyMonkey web-based research platform questionnaires and one questionnaire was used to collect data from the FMCG consumers while the other questionnaire was used by retailers because it is less expensive. The questionnaire consisted of a nominal scale based on the demographic information of the respondents, as well as multi-term measures on the RL best practices, and these measures were anchored on a five-point Likert ordinal scale.

The questionnaire items were adapted from previous questions from other researchers and literature in this field to also ensure validity. The link to the participants was distributed through email, LinkedIn, and WhatsApp social media platforms. This allowed the researcher to gather data from a large group of FMCG customers and retailers while ensuring the safety of both the researcher and respondents given Covid-19.

The Statistical Package for the Social Sciences (SPSS) version 27 was employed to perform descriptive analysis on demographic information and RL best practices. The reliability test was also performed in SPSS version 27. Furthermore, the study conducted the confirmatory factor analysis (CFA), which confirmed already existing and tested questionnaire items, adopted and adapted from previous studies. Furthermore, frequency tables, diagrams, and charts were used to discuss the results (Bryman Bell, Hirschsohn, Dos Santos, Du Toit, Masenge, Van Aardt & Wagner, 2017).

**Data quality control**

The researcher received ethical clearance to conduct the study (ethical clearance reference number: H21-BES-LOG-050) and conducted the study in an ethical manner. Also, a Cronbach's alpha coefficient test performed in SPSS version 27 was used to test reliability. To ensure the validity of the research questionnaire, the researcher conducted a pilot test to test the data collection instrument which measured face and content validity.

**Results and findings**

Out of the 520 (500 for the customer survey and 20 for the retailers' survey) initial targeted sample size, a total of 418 questionnaires (402 for the customer survey and 16 for the retailer's survey) were completed in full, thus yielding an 80.38% response rate. Mugenda and Mugenda (2003), opine that a 70% and above response rate is very good. Thus, based on this statement, the 80.38% response rate obtained in this current study is very good.

The current study sought to examine the RL best practices in the fast-moving consumer goods industries, which also meant identifying the RL best practices implemented by the FMCG retail industry. The RL best practices are some of the most essential practices that firms follow towards achieving success of their firms. As stated previously in the literature review Jindal and Sangwan (2015) pointed out that RL best practices have been receiving increased attention in developing countries due to pressure from rigid environmental regulations, increasing environmental concerns of society, and the need to enjoy cost

reduction benefits. The next sub-section discusses the results of the demographic information of the customers.

**Demographic information on customers**

The study sought to gain insight into the surveyed customers' characteristics. Lakshmi, Niharika and Lahari (2017), explain that one of the major factors in purchasing behaviour is gender. As shown in Figure 1 below, female respondents were more than male respondents, and this could be because generally, females do more shopping than males.

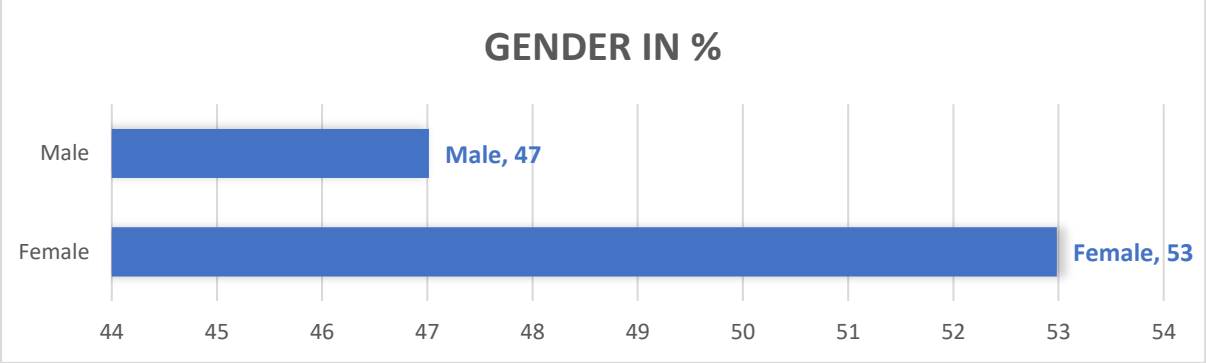


**Figure 1: Gender**

According to the results in Figure 1, more than half of the surveyed respondents (53%) in this study were female and 47% were male. This is because females find pleasure and satisfaction when shopping (Greeshma, 2016). From these respondents, the majority of the respondents were between the ages of 18 and 30 years, which represents 47% of the respondents. This is mostly composed of youth. This is followed by respondents aged between 31 to 40 years (39%), while the remaining 14% was represented by respondents aged between 41 and 65 years. The reason for the decline in percentage for the older generation could be because of Covid-19, e-retailing, and also because the youth could be buying for the older generation.

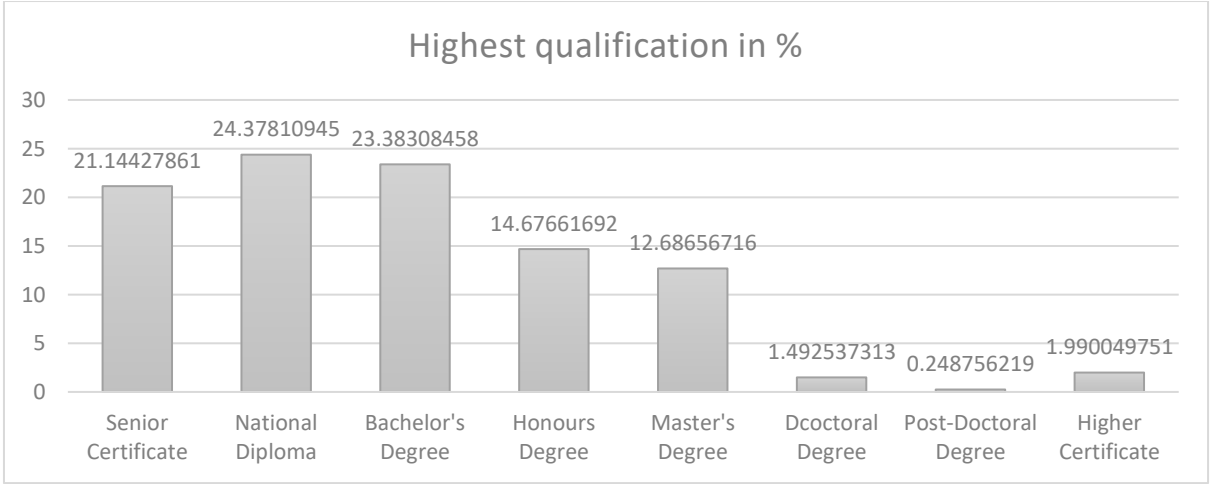


**Figure 2: Highest qualification**

As can be seen from the above results, a majority of the surveyed respondents in this current study had post-matric qualifications. As depicted in Figure 2 above, 24.39% of the surveyed customers held National Diplomas, followed by 23.38% with bachelor's degrees, 21.1% of the respondents had a senior certificate, and 14.68% of the respondents held an honours degree. Only 12.69% of the respondents held a master's degree, with only 1.50% of the respondents having a doctoral degree, and 0.25% holding a post-doctoral

qualification. Therefore, the remaining 1.99% belonged to the category *other*. Respondents in this category indicated that they had a higher certificate, and or advanced diploma.

Other descriptive questions were undertaken to understand the buying frequency of customers in this study and their understanding of RL. The results are illustrated in Figure 3 below. According to Figure 3, the majority of the respondents, which represented 48.51%, bought FMCG on a weekly basis from either Pick n Pay, Woolworths, Checkers, Spar, Boxer, and Makro, amongst others. This could be because the majority of the respondents, 47%+, were the youth who could be buying fresh produce because they are more health conscious. This is followed by 23.89% of the respondents buying on a monthly basis, and 21.44% of the respondents buying twice a month.

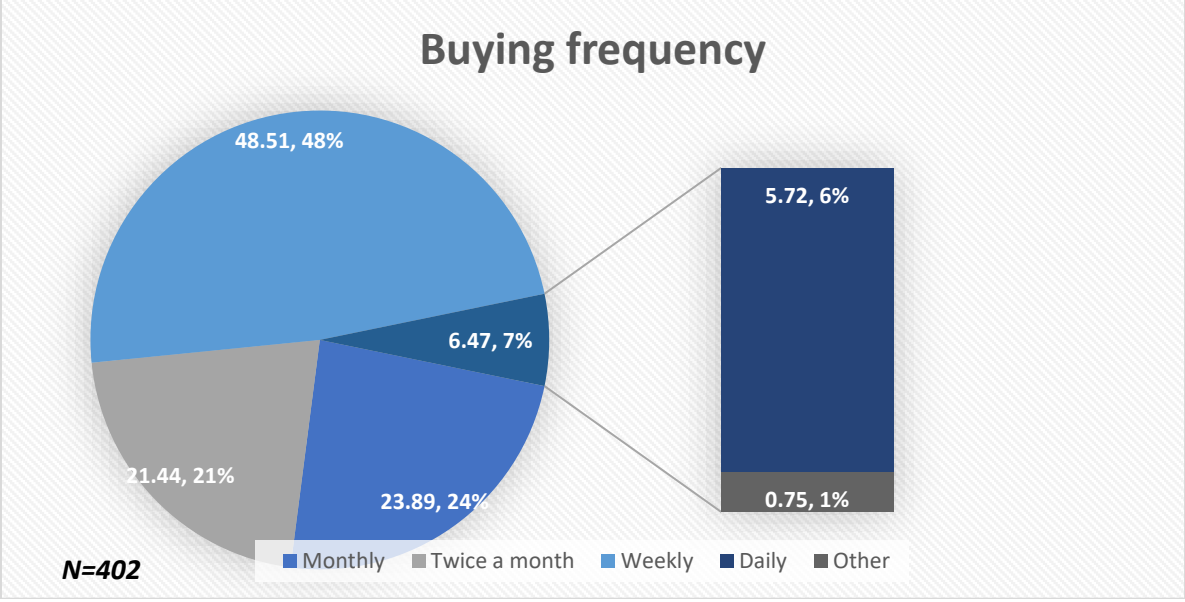


**Figure 3: Buying Frequency**

Moreover, the results reveal that 5.72% of the respondents bought FMCG on a daily basis, and 0.75% bought it once in a while, thrice a month, and once in six months (categorised under other). These results enabled the researcher to understand the profile of the respondents. The next section discusses the demographic information on retailers.

**Demographic information on retailers**

The demographic information was an important tool in assisting the researcher to establish background information to further conceptualise and gain an understanding of the respondents' characteristics. The demographic results included gender, the highest level of education, job title, and work experience. Frequency tables were used to determine the demographic profile of the surveyed respondents from the retail firms. These are summarised in Table 1 below. The findings in Table 1 indicate that the FMCG retail industry in Pretoria is male dominated (62.50%), while the females only constituted 37.50%. These findings indicate that women still lag behind men in logistics-related managerial jobs in the retail industry. The results are consistent with those of Meyer, Niemann, Mackenzie and Lombaard (2017) in whose study females constituted 33.33% of the large grocery retailers in SA. These results are concerning because the majority of the population in SA are women.

The findings in Table 1 further indicate that all the surveyed respondents in the study have formal qualifications. Moreover, the results also reveal that the majority of respondents (50%) have a National Diploma, while 37.50% of the respondents have a Bachelor's, Honours, and or master's degree. A total of 12.50% of the respondents indicated that they have a Senior Certificate. The high levels of qualifications among the retail staff meant that the surveyed respondents were qualified to answer the highly technical

questions on RL asked in this study's survey. Although the surveyed respondents had a post-matric qualification, this does not indicate whether a respondent's schooling is in line with SC or logistics. The significance of SC or logistics education and education, in general, should not be disregarded because it can contribute to the success of retailers.

**Table 1: Demographic characteristics of the retail respondents**

| Variable | Category | Frequency | Percentage (%) | Cumulative % |
|---|---|---|---|---|
| ***Gender*** | Female | 6 | 37.50 | 37.50 |
| | Male | 10 | 62.50 | **100** |
| | **Total** | **16** | **100** | |
| ***Highest level of qualification*** | Senior Certificate | 2 | 12.50 | 12.50 |
| | National Diploma | 8 | 50.00 | 62.50 |
| | Bachelor's Degree | 2 | 12.50 | 75 |
| | Honours Degree | 2 | 12.50 | 87.50 |
| | Master's Degree | 2 | 12.50 | **100** |
| | **Total** | **16** | **100** | |
| ***Job title*** | Store manager | 3 | 18.75 | 18.75 |
| | Logistics/Customer care manager | 2 | 12.50 | 31.25 |
| | Supervisor | 2 | 12.50 | 43.75 |
| | Procurement manager | 3 | 18.75 | 62.5 |
| | Third-party RL personnel | 1 | 6.25 | 68.75 |
| | Other | 5 | 31.25 | **100** |
| | **Total** | **16** | **100** | |
| ***Experience in current position*** | 2 to 5 years | 3 | 18.75 | 18.75 |
| | 6 to 15 years | 8 | 50.00 | 68.75 |
| | 16 to 21 years | 2 | 12.50 | 81.25 |
| | 22 or more years | 3 | 18.75 | **100** |
| | **Total** | **16** | **100** | |

The current study also sought to gain further insight into the job positions held by the respondents, and the results indicate that the majority of the respondents were store managers and procurement managers (18.75%), 12.5% were either logistics or customer care managers in retail firms, 12.5% of the respondents were supervisors of their retail firms, and only 6.25% of them were third-party RL personnel. The results further showed that the remaining 31.25% worked in the human resource department as administrative clerks and finance clerks. However, the results clearly indicate that 68.75% of the respondents were the targeted respondents and the researcher could assume that these respondents are able to understand SC, logistics, and RL.

These respondents further indicated the experience they had in their respective current position, and this was shown in Table 1. The majority of the respondents (50%) indicated that they had been in their respective job positions for six to 15 years. This was followed by 18.75% of the respondents who indicated that they had two to five years of experience in their positions, and another 18.75% who had been in their respective position for more than 22 years. A minority (12.50%) of respondents indicated that they had been in their job positions for 16 to 21 years. This revealed that the majority of the respondents had more than six years of work experience in their current positions and were more informed about RL's best practices implementation in their firms. This will further be discussed and tabulated in the next section.

**RL best practices**

This section will be discussing the results tabulated in Table 2 from the survey questions on the level of implementation of the RL best practices by FMCG retail firms in Pretoria, SA.

**Table 1**

**Table 2**

**Table 3**

**Table 4**

**Table 5**

**Table 6 Table 2: Reverse logistics best practices**

| | Percentage | Mean | Std.Dev |
|---|---|---|---|
| **Centralised return centres for returned products** | | | |
| Not implemented | 6.3 | 3.19 | 0.911 |
| Less implemented | 12.5 | | |
| Moderately implemented | 37.5 | | |
| Highly implemented | 43.8 | | |
| Total | 100 | | |
| **Gatekeeping function that deals with returned products** | | | |
| Less implemented | 18.8 | 3.38 | 0.957 |
| Moderately implemented | 37.5 | | |
| Highly implemented | 31.3 | | |
| Extremely implemented | 12.5 | | |
| Total | 100 | | |
| **Collaboration with other FMCG retailers when transporting product waste to their final destination** | | | |
| Not implemented | 6.3 | 3.13 | 1.147 |
| Less implemented | 25 | | |
| Moderately implemented | 31.3 | | |
| Highly implemented | 25 | | |
| Extremely implemented | 12.5 | | |
| Total | 100 | | |
| **Collaboration with consumers for effective recycling of used up products** | | | |
| Not implemented | 6.3 | 2.81 | 1.047 |
| Less implemented | 37.5 | | |
| Moderately implemented | 31.3 | | |
| Highly implemented | 18.8 | | |
| Extremely implemented | 6.3 | | |
| Total | 100 | | |
| **Collaboration with suppliers for effective remanufacturing of our products that have reached their end of shelf life** | | | |
| Not implemented | 6.3 | 3.50 | 1.155 |
| Less implemented | 18.8 | | |
| Moderately implemented | 6.3 | | |
| Highly implemented | 56.3 | | |
| Extremely implemented | 12.5 | | |
| Total | 100 | | |
| **Information sharing on products that have reached their end of life with our supply chain partners, to ensure responsibility towards the environment from everyone** | | | |
| Less implemented | 12.5 | 3.69 | 0.946 |
| Moderately implemented | 25 | | |

| | | | |
|---|---|---|---|
| Highly implemented | 43.8 | | |
| Extremely implemented | 18.8 | | |
| Total | 100 | | |
| **The use of advanced technologies and systems such as returns software, state-of-the-art technology, and RL information management systems, to enable the effective implementation of RL practices in the supply chain** | | | |
| Not implemented | 6.3 | 3.44 | 0.892 |
| Less implemented | 6.3 | | |
| Moderately implemented | 25 | | |
| Highly implemented | 62.5 | | |
| Total | 100 | | |
| **The use of third parties to effectively manage RL activities** | | | |
| Not implemented | 6.3 | 3.50 | 0.966 |
| Moderately implemented | 43.8 | | |
| Highly implemented | 37.5 | | |
| Extremely implemented | 12.5 | | |
| Total | 100 | | |
| **Mean: 3.33**<br>**Std.Dev: 0.645** | | | |

As shown by the overall mean (M=3.33) presented in Table 2 above, a majority of the respondents in this study indicated that RL best practices are moderately implemented in their respective FMCG retail firms. It is also evident from Table 2 that 43.8% of the respondents indicated that they highly implement centralised returns centres for returned products. Centralised returns centres have become a common solution for providing centralised sorting and return disposition services for firms (Saikiah *et al.,* 2016:9). More so, 37.5% of the respondents revealed that their FMCG retail firms moderately implement a gatekeeping function that deals with returned products. Retail firms should highly implement the gatekeeping function because it "reduces the cost of products being returned to an inappropriate destination" (Kussing & Pienaar, 2016:501). Furthermore, 31.3% of the surveyed retail managers stated that their FMCG retail firms moderately implement collaboration with other FMCG retailers when transporting product waste to their final destination.

The results in the above table also show that the surveyed FMCG retailers collaborate less with their customers for the effective recycling of used products. Moreover, 56.3% of the respondents stated that their retail firms highly implement collaboration with suppliers for effective remanufacturing of their retail stores' products once they have reached their end of shelf life. Also, 43.8% of the respondents stated that their FMCG retail firms highly implement information sharing with their SC partners. Information sharing in RL is important because it enables firms to collaborate effectively and efficiently with their supply chain partners in ways that generate RL-related value advantages, which will in turn improve the sustainable competitiveness and performance of the firm and its entire supply chain.

The results in Table 2 further indicate that advanced technology is highly implemented in most of the surveyed FMCG retail firms (62.5%). The respondents also said they believe that their FMCG retail firms have advanced in the use of technology systems, such as returns software, state-of-the-art technology, and RL information management systems are employed to allow the effective implementation of RL practices. This is good because excellent technological and information systems can help track and trace returned products and are useful when implementing standard RL activities (Samarasinhe & Wang, 2019).

Lastly, 43.8% of the respondents indicated that the use of third parties to effectively manage RL activities is less implemented in their FMCG retail firms. Highly implementing the use of 3PL RL service providers can enable FMCG retail firms to focus on their core business functions and enhance the use of advanced technology in a cost-efficient manner. This can also lead to inventory management improvement,

increased visibility, cost reduction, and risk management enhancement, which also leads to greater controls over inspecting, testing, recovering, and disposing of returned products, ultimately improving the firm's competitiveness of these retail firms (Robinson, 2016).

**Reliability**

The reliability of the scale results is presented in this section. The tests were conducted to measure if the results are consistent and whether the concepts that should be related are indeed related. According to Taherdoost (2016), reliability is the extent to which the measurement of a phenomenon provides stable and consistent results. This is further supported by Pietersen and Maree (2020) who postulate that reliability is the extent to which a measuring instrument is consistent and repeatable. Field (2013) opines that Cronbach's alpha and composite reliability are commonly employed to measure the scale's reliability. The required cut-off value of both Cronbach's alpha and composite reliability is 0.8 and above (Bryman *et al.,* 2017). However, Malhotra, Nunan and Birks (2017) suggest that 0.7 is acceptable, and 0.6 is sometimes also acceptable. The results suggested that Cronbach's alpha ranged from 0.820 to 0.931, signifying an overall good level of internal consistency. More so, these Cronbach's alpha results are supported by composite reliability coefficients which extended from 0.821 to 0.929. Based on both Cronbach's alpha and the composite reliability, the constructs involved in this study are considered reliable.

**Implications**

Upon completion of this research, this study indubitably contributed significantly to the theory development of future studies. The contributions of this study are as follows; (i) The study provided insight into previous research on RL best practices and the FMCG industry in SA. (ii) The study identified the RL best practices through a literature review for successful RL implementation that can lead a firm towards achieving the firm's competitiveness. (iii) The field of RL is dynamic and there is a dearth of research dealing with RL in the FMCG sector in SA, therefore, this study will play an essential role in the field by providing new insights and contributing to the body of knowledge. (iv) Many individuals can make a living through RL by recycling and selling recycled products from waste delivery. (v) It will also lead to an effective RL management system which will lead to the achievement of many goals, such as meeting the environmental protocols, increasing customer satisfaction, the decrease of operational costs, and the cumulative value of the brand.

This current study will therefore unquestionably assist the FMCG retail industry, managers, and practitioners in the successful implementation of RL best practices – by enabling the FMCG retail managers in identifying the RL best practices which they need towards achieving the firm's competitiveness.

As mentioned previously, there is a dearth of literature on RL best practices in the FMCG retail industry. Undeniably, this current study contributes significantly to the literature for future studies. This study has thus created the theoretical groundwork for future studies in this country and globally. Thus, this study recommends the implementation and improvement of RL best practices in the FMCG retailers' industry to achieve the firm's competitiveness. However, they face RL challenges in effectively implementing RL best practices toward achieving the firm's competitiveness.

A critical part of this research was to recognise and highlight the RL best practices to the FMCG retail industry, managers, and 3PL service providers. Through the findings in this study, the FMCG managers can scan the FMCG retailers' environment by conducting a swot analysis that can best assist them in knowing their strengths, weaknesses, opportunities available (such as 4IR) as well as threats (such as Covid-19). Moreover, the managers should, conduct a risk assessment and manage it by implementing the RL best practices. Also, the FMCG retail managers can plan, prioritise & implement and improve RL best practices to achieve a competitive advantage. Finally, they should monitor, evaluate & improve for RL best practices implementation success.

**Recommendations**

The recommendations of this study are expected to advise the FMCG retail firms of ways to improve their RL performance to achieve firm competitiveness. This was only plausible after the completion of this study. Following the results of this study, it is recommended that the FMCG retail industry increase customer awareness of RL best practices implemented by retail firms, and train and educate employees on

RL and RL best practices. Also, they should enhance RL best practices to improve RL implementation success and enforce formal policies. It is thus recommended that FMCG retailers globally enforce formal policies through harnessing RL practices to achieve these benefits that lead to the firm's competitiveness.

**Limitations and future research**

As prior stated, RL has been studied all over the world by many researchers; nevertheless, there's a dearth of literature on RL best practices in the FMCG retail industry in Pretoria, SA. Therefore, it proved difficult but not impossible for the researcher to find relevant literature. Thus, this current study undeniably contributes to both the FMCG retailers and the development of theory. The RL best practices can be used for RL implementation and improvement in other sectors globally. However, like any other study, this study is not without limitations. This study was conducted in Pretoria, SA, and could not cover SA as a whole due to time constraints. Hence, future studies may be carried out in other countries, provinces, and sectors. Similarly, further research can be conducted to improve the measurement of RL best practices.

This study employed a quantitative research method due to the 2020 outbreak of the Covid-19 pandemic, therefore the study only collected data through an online survey to ensure the safety of both the researcher and the respondents. That also became more challenging in July 2021 when the Protection of Personal Information (POPI) Act was implemented. Thus, future studies can consider using other research designs and methods of collecting data such as a qualitative research method and or a mixed method to get more insights on RL best practices that can lead to the firm's competitiveness to compare the results. Moreover, since this study only focused on RL best practices. Future research can also investigate other variables that can lead to the firm's competitiveness. Future studies can also increase the sample size when assessing the influence of RL best practices in the FMCG retail industry.

**Conclusions**

The FMCG retail sector has been prone to a lot of RL due to recalls and to a large extent waste management. The importance of implementing RL best practices and improving them has been highlighted in this study, as well as the benefits of implementation which will lead to the achievement of the goals set and ultimately the firm's competitiveness. Thus, this study significantly to the literature for future studies. The primary objective, which was examining RL best practices in the FMCG industry was achieved and was the key contribution. Moreover, the achievement of the secondary objective made it possible to achieve the primary objective of the study. The study also discussed the findings that revealed that RL best practices are moderately implemented. The contributions from this study were also discussed. Also, the recommendations to the FMCG retail sector, implications, limitations, as well as future research for scholars was made. The study likewise encourages future researchers to investigate RL best practices in other countries, provinces, and sectors. Additionally, future researchers can employ alternative research designs and methods, such as qualitative and mixed methods, as well as the use of probability methods. This study will have positive implications for the FMCG retail sector and theory.

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# Multiple linear regression analysis for determining factors affecting the actual adoption of enterprise application architecture for supply chain management

**Kingston Xerxes Theophilus Lamola**
University of Limpopo, South Africa

**Keywords**
Actual adoption; enterprise application architecture; external dynamics exasperations; internal dynamics exasperations; supply chain management; medium enterprises.

***Abstract***

***Background:*** *In this study, Multiple Linear Regression (MLR) is cast-off a statistical technique accustomed to propositions on determining the nexus between internal dynamic exasperations (IDEs) and external dynamic exasperations (EDEs), denoted as the independent variables ($X_s$), as well as perceived attitudes signified as the predictor variable for actual adoption (AA) of enterprise application architecture (EAA), presented as the dependent variable (Y).*

***Objective:*** *The objective of this paper was to ascertain the alternative hypotheses that IDEs, EDEs, and perceived attitudes (PAs) affect the AA of EAA for supply chain management (SCM) within small and medium enterprises (SMEs).*

***Design/Methodology:*** *The study used quantitative analysis chronicled in statistical package social science (SPSS) version 25 that encompassed diagnostic tests through Cronbach's Alpha for reliability, and Double-Exponent Distribution for data validity. Data analysis is concerted through the model summary, graphical expression of MLR, regression analysis (algebra expression), along with Beta weight.*

***Results/Findings:*** *A stratified-random sampling of 310 data sets were used as SMEs' owners and managers. The results were obtained from the main analysis of multiple regression that produced a model equation (Y) that determined the estimations of AA of EAA with 5xs; 19.49x6; 17.84x6; 18.23x6; 16.12x6; and 9.82x6; and response variable (Y); 25.8 x6: wherein Ɛi is residual error.*

***Practical implications and conclusions:*** *This exertion contributes to existing knowledge on AA of EAA for SCM by providing three main separable functions of multilinear regression (MLR). First, it broadens the understanding of the strength of relationships between $X_s$, PV and Y. Second, its expositions which predictors in the model are statistically significant and which are not. Third, it projects a confidence interval for each predicted regression coefficient.*

## Introduction

MLR is performed for determining the level of connexions amongst IDEs, EDEs, and PAs having cost-effect relations for the AA of EAA. When SMEs are underdeveloped, they endure great hardships and exacerbate IDEs, EDEs and PAs towards SCM activities. Subsequently, they have marginal expertise in the Forth Industrial Revolution (4IR). Nevertheless, all the above variables have major disadvantages for 4IR, to list a few; exposure to cyber security risks, major industry disruptions and ethical concerns Firican (2020). Superfluously, as the supply chain (SC) pressures increase, it will probably be difficult for SMEs to adsorb three institutional isomorphic pressures on governance, customers, and suppliers expectations as dominant competitive pressures. It has usually been assumed that the AA of EAA is anticipated as models for easing the daily routines between internal and external stakeholders Zachman (2008); Tupper (2011) and Yang, Avgeriou, Liang & Eliasson (2017). Strategies to heighten AA of EAA might involve distributor automation, electronic data interchange and product code, data architecture, enterprise application integration, and online analytic algorithms, business strategy challenges, as affirmed by Gillin (2020a), and Behara (2022). The objective of the study is to ascertain the alternative hypotheses that IDEs, EDEs, and PAs affect the AA of EAA for SCM within SMEs. The hypotheses were described consequently as...

- $H_{a1}$ = *"There is a correlation between IDEs (OPIs, ERs, ISCs and EATs) (independent variables and predictor variable) and PAs towards the AA of EAA for SCM in SMEs" (Indirect relationship).*
- $H_{a2}$ = *"There is a correlation between EDEs and PAs towards the AA of EAA for SCM in SMEs" (Indirect relationship).*
- $H_{a3}$ = *"There is a correlation between PAs and the AA of EAA for SCM in SMEs'' (Direct relationship).*

Ortiz (2022) deliberates challenges and benefits of developing EAA. In his discussion, the benefits include easing business processes, marginalising costs, greater control of information, and encouraging collaboration and information exchange. Conversely, the challenges include **scaling the business and changing environment, maximizing returns on investments, security, and control, user-friendly interface, engaging and training staff, storing large amounts of data, time and cost, upgrading legacy software**, maintenance, in addition to **third-party system integration**. Nevertheless, this is the most inclusive description of dynamics that influence the AA of EAA, this study encompasses three variables: *First* - IDEs that include OPIs, ERIs, ISCs, and EATs. *Second* - EDEs, which include detailed elements such as: (a) complex legal and regulatory constraints, external financing, low technological capacity, relative advantage, traceability, compatibility of computer systems, and customizability of EAA to enterprise over and above external users. ***Third* - PAs that includes alternative user-base solutions, technological aversion, and resistance to change.**

However, these aspects are believed to be prompting IDEs, and EDs as revealed in several studies, to list a few, Suhadak and Mawardi (2017); Sherman (2018) and *Hawks (2019). Subsequently, t*he statistical technique uses several explanatory variables to predict the outcome of a response variable. IDEs, EDs and PAs, are important components in the 4IR since they play a key role towards the AA of EAA. EAA has common myths anticipated with 4IR, perceived as a dynamic problems on exorbitant project to execute on application systems' multiplexes, not solving customer engagement, lack of understanding and expensive software applications in contrast to the economies of scale. On contrary, the benefits are the exact contrasting reflection of the myth stated in the previous sentence. The study attempts to aid SMEs in aligning internal operations with corporate strategy, tracking strategy implementation, and governing enterprise transformation.

## *Literature Review*

### *Theoretical review: Systems Theory Approach (STA)*

In the history of information technology (IT), the STA system has been thought of as a key factor in Health Sciences (Heylighen and Joslyn, 1992; Teenboom, 2018). Bertalanffy developed the theory via lectures in 1937 and then via publications in 1946 (Wilkinson, 2022). Okunbajo (2022) exemplifies dual version of the STA: *First:* Closed systems developed by Norbert Wiener and Ross Ashby in the modern version referred to as cybernetics. *Second:* Open system theory, proposed in the 1940s by biologist Ludwig von Bertalanaffy, who used the term general system theory to describe the main ideas and distinguish it from closed system thinking. Further, Rosh Ashby extended the theory to General Systems Theory (GST) in 1968.

In the context of this study, GST is defined as an extension of STA based on the assumption that complex systems share common organising principles that can be discovered and modelled mathematically (Proctor, 2015). STA is considered an interdisciplinary study of the non-figurative enterprise of phenomena independent of their nature, type, spatial or temporal scale (Heylighen and Joslyn, 1992). In simple terms, STA investigates both pros and cons of the AA of EAA, which are common to all complex enterprises with their different models for describing suitable algorithms. Gordon (2022) illuminates the key **components for successful AA of EAA which includes inputs, transformational process, outputs, feedback mechanism, and the environment.** Reflecting on the hypotheses posed at the beginning of this study, it is now possible to state that IDEs, EDs, and PAs play a significant role in the AA of EAA for SCM in SMEs.

### *Assumptions on AA of EAA model built-up*

In the preceding studies, assumptions on TOGAF and EAA frameworks on the AA of EAA were established. On the same breath, for the AA of EAA, the process of model specification and parameter estimation was carried-out and sustained by three model descriptions. *First:* Zachman (2008) upholds that

whether industries apply existing operations or build primitive models on the ontological, single-variable intersections between the interrogatives and the transformations or simply build ad-hoc, multi-variable, composite models made up of components of several primitive models. Likewise, in this study, the IDFs, EDFs, and predictor variables ($PV_s$) were used to test the response variable. *Second:* Tupper (2011) holds the interpretation that '*The Open Group Architectural Framework*' (TOGAF), and Architecture development method (ADM) has a genetic resemblance to the traditional waterfall-software development model.

The model is encompassed of phases such as planning, analysis, design, development, testing, and deployment, organised in sequential order. The EAA model of MLR is expressively not the same as those of AA of EAA in several key features, so is in different SMEs as per choice and preference. *Third:* The effectiveness of the EAA model has been exemplified in a report by Yang et al (2017), which includes four assumptions: *(a) Managerial assumptions* focused on project scope, quality, schedule, budget, resources, and risk. *(b) Organisational assumptions* built on artefacts defined by visible structures and processes; values that are grounded on espoused justifications that include strategies, goals, and philosophers. *(c) Technical assumptions* signifying any restriction on EAA choice regarding the design, implementation, or deployment of the solution. *(d) Technical assumptions* in many cases may be associated with certain principles defined in the enterprise architecture that restrict the types of platforms, programming languages, and decisions to buy or build part of the solution. Therefore, $X_s$, and $PV_s$ could be major factors, if not the only ones, causing assumptions on the AA of EAA.

**Systematic literature review (SLR)**

Peričić and Tanveer (2019) implies SLR roles that examine and organise all relevant empirical evidence to provide a complete interpretation of research results. This study adopted a systematic literature review through a well-conceptualised literature review, which included summary table in line with authors, variables (IDEs, PAs, and AA of EAA), titles, aim\objectives, findings\results, and conclusions. SLR was synthesised using the same technique comprehensive for the AA of EAA, using multiple $X_s$. Furtheremore, some benefits of pursuing SLR include explicit and reliable methodology, precise outcomes, and comprehensive and exhaustive reproducible output.

In some instances, SMEs might face dynamic forces such as occupation generation, economic expansion, cumulative manufacturing output, enlightening the employees' expertise, intensification in exports, and advancing SMEs' SCM capability (Thompson, 2022). Therefore, being able to hypotheses the $X_s$, $PV_s$, and response variables more precisely to explore EAA, and identify hidden elements integrated with the algorithms. In addition, to structuring a successful EAA as per SMEs' specific needs and the type of internal and external integration that includes customer relationship management, customer service management, demand management, order fulfilment, manufacturing flow management, supplier relationship management, product development, and returns management (Badenhorst-Weiss, Cook, Heckroodt, Howell and Strydom, 2016).

Thriving, for a balanced EAA, the primary layers of web architecture such as the presentation layer, data service layer, business logic layer, and data access lay are significant (Bestaieva, 2021). Thriving, for a balanced EAA, the primary layers of web architecture such as the presentation, data service, business logic, and data access are insignificant (Bestaieva, 2021). An application architecture describes the patterns and algorithms used to design and build an application. In some instances, the web architecture provides SMEs with a roadmap and best practices to follow when building EAA for a well-structured configuration. Software design patterns could help SMEs to build a productive EAA. EAA in many instances may be associated with certain dynamics that influence application performance that might include application complexity, design, testing, butterfly effect, infrastructure and components for application service, network connectivity, the dynamic IT environment over and above virtualisation and cloud computing.

**Conceptual Literature Review**

In this study, a conceptual framework is described as a visual exemplification of the relationship between IDEs, EDEs, and PAs, which are grouped based on enterprise characteristics with the advantage of an existing literature review from prevailing studies and theories. Figure 1 illustrates multiple variables; $X_s$ as; IDEs and EDEs, $PV_s$ as PAs; and the response variables as AA of EAA. On completion of IDFs, EDFs, and PAs, the process of model description and constraint estimation is executed.

However, approach is in developing a model with known limitations such as (a) Isolation of the conceptual hypotheses from emerging literature review, compelling the researchers to restructure the model. (b) By stipulation a research hypothesis had more than one concept, the individual concepts had to be isolated and addressed. (c) Avoiding factual concepts as they might have several meanings that might derail the respondents as indicated in Annexure A - Summary table: IDEs, EDEs, PAs, and AA of EAA.

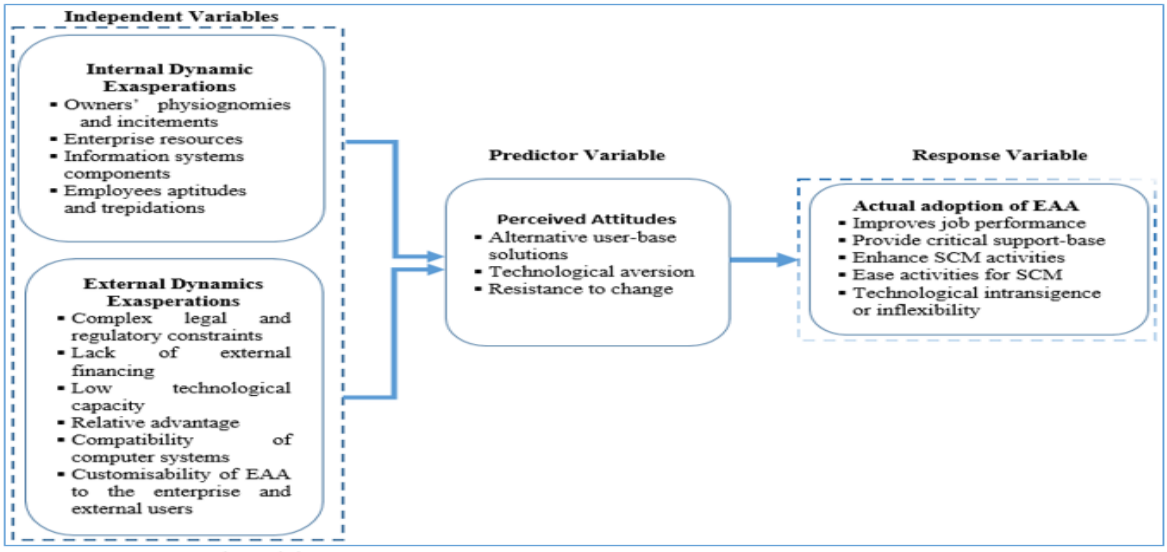


**Figure 1:** Conceptual Model
*Source: Author Conceptualisation, 2023*

### *Internal Dynamic* Exasperations (IDES)

Much of the literature on IDEs deals with the myths of enterprise development, which includes operational and administrative procedures, Risk perceptions, attitudes, and behavioral intentions, innovation, financing and employee risks (Van de Watering, 2022; **Alsaqal, Ahmed &Abdullah, 2021;** Glückstad, 2022).

Little investigation on specific IDEs is explored in the AA of EAA, and it is not clear what factors constitute to the AA of EAA for SCM in SMEs. For the reason of these thoughtful technological advancements, IDEs are characterised by the subjective nature of SCM activities, emerging from miscellaneous factors. In certain circumstances, these nominalised forms can become extensive and complex with the following being discussed.

***Owner's physiognomies and incitements (OPIs)*** - Traditionally, OPIs have subscribed to the belief that '*phrenology*' concentrated on the shape of the skull and made subsequent assumptions associated with the mental power; which fashioned various personality traits (Nguyen, 2010). Further, Desai (2022) defines OPIs as the association of certain personality traits transferred to physical traits that influence enterprise performance. The controversy about OPIs as scientific evidence for IDEs has exploded unchanged for over a century. As a result, the descriptions of OPIs in mid-19th-century realist fiction as a reflection of the period's norms and world views, on traditional belief, distorted belief, an implicit rejection of realism's epistemological basis, and self-perception as a possible projection of feelings towards the AA of EAA (Marits, 2003). One major speculative phenomena that has subjugated SMEs for many years' concerns the AA of EAA of which little is done to bridge the gap between well-established and developing enterprises.

***Enterprise resources inducements (ERIs)*** – Almost every paper inscribed on ERP components included a sub-division relating to manufacturing and production, finance and accounting, human resources, sales, and marketing (Quirk, 2018; Nursidiq, 2022; Hayes, 2022). In the perspective and standpoint of this study, the ERIs specifically focused on resources linked with the AA of EAA on the following: financial resources for acquisition of competent labour, mainframe, and hardware and software systems, and architect experts. Although the exclusion of other components may not reduce the effect on the AA of EAA, algorithms are executed with caution and bearing in mind the effectuation theory. Unless SMEs consider the enterprise architect particularly the choice of technology and usage, solution architecture strategy, infrastructure strategy, inter-program collaboration, and implementation strategy, the AA of EAA will not be attained.

An inference of this is the affirmation that ERIs need SMEs' economic power to be associated with SCM activities for a successful AA of EAA within SMEs.

***Information systems components (ISCs)*** – ISCs is a expressions frequently used in the literature, but to date, there are no clear definitions attars to this. However, in the context of this study, ISCs is delineated as a composition of integrated sub-connected inputs that work together to produce meaningful results across the enterprise that includes order fulfilment, manufacturing flow and management, supplier relationship management and customer relationship management, and reverse logistics. ISCs operate effectively with the use of both internet and website connectivity that makes SCM more fashionable and flexible, within the enterprise and in the outside world (Zwass, 2022; Pham et al., 2022). In their study, Feuer and Lee (1988) acknowledge the psychomotor abilities that cover the interrelationship between the cognitive processes and sensorimotor cues that prime human responses when learning, acquiring, and retaining information based on environmental conditions. If the deliberation moved presumptuously, a better understanding of ISCs needs would lead to the restoration and/or AA of EAA.

***Employees' appetites and trepidations (EATs)*** – EATs play a critical role within the concept of AA of EAA. Herr (2009) mollifies the paradoxes of human nature that drive high enactment within enterprises on emotional health, employees' interactions and work collaborations for increased productivity grounded on boost for emotional wellbeing. Helper (2022) postulates physiognomy on two aspects. *First* – Physiognomy as servitude based on submissive behaviour. *Second* - In a business context, many suffer financial and enterprise development difficulties based on geographic location for channel distribution, market unaccessibility, lack of collateral, racial primacy amongst others. Quirk (2018) ratifies the importance of ERIs in line with, financial management, business intelligence, customer relationship management, human resources, and SC management. This narrates the setting out and development of SMEs' viewpoint and approaches in addition to the algorithms used in assembling or developing EAA for SCM.

***External Dynamic*** **Exasperations** ***(EDES)***

Recent developments in 4IR have heightened the need for SMEs to adopt the best possible technology to manage SCM activities with agility. On the other standpoint, EDEs are synthesised using counter dynamics that are detailed for AA of EAA such as the existence of 3D technology, computer calculation speed/power, the ability of computers to create truly 'random' numbers, engine efficiency, internet connectivity, wireless charging and automation (Bush, 2016). Duggal (2022) postulates that organisations with enormous data analytics use analytic techniques to examine data to explore hidden patterns, correlations, market trends and consumer preferences. In this regard, this study makes several notable contributions to identifying external dynamics that might affect the enterprise. In this respect, this study makes several notable contributions to identifying EDEs that might affect the enterprise and acting to either leverage potential opportunities or mitigate potential threats. So far, six constructs have been identified as being potentially imperative in juxtaposition with EDEs: *First,* complex legal and regulatory constraints that are technically and extensively subjected to modifications (Mendoza, Dekker & Wielhouwer, 2016). *Second,* external financing which is regulated by financial institutions on three broad risk categories prior to financing SMEs that includes market risk, performance risk and specific risk (Schutte, Niemann & Kotzé, 2019). *Third,* low-technological capacity power-driven unclear indulgent of the difference between compliance investments and cleaner technologies (Pooe & Mhelembe, 2014). *Fourth*, relative advantage has a huge impact on the adoption of new technology for SCM, subsequent to SMEs that intent the AA of EAA could gain competitive advantage based on superior transparency and improved security (Mthimkhulu & Jokonya, 2022). *(e) Firth,* traceability, and compatibility of computer systems include the network concept, which vary widely in their nature and operation, depending on the particular role players involved, that includes their relationships within the SCM activities and processes, notwithstanding the level and scope at which they operate, and the wider context (Chinomona, 2013). *Six*, customizability of hardware and software system for a successful EAA adoption that covers both internal and external users (Widowati, Sutrisno & Tjahjana, 2022).

**Perceived Attitudes (PAS)**

PAs are deliberated as a learned tendency to evaluate situations, processes, and conditions in a certain approach, which includes three components (Cherry, 2021). (i) The cognitive component entails thoughts

and beliefs about the subject phenomena. (ii) The affective element is determined by how the other indicators or elements provoke individual feelings. (iii) Behavioural component is based on how attitude affects someone's behaviour. More information on PAs would help to establish a better level of accuracy on this matter. While deciding on the best knowledge-based software, the SMEs ought to consider the following, universal or customised-knowledge software, line of authorities to authorise content accessibility, customisation for content, and reporting (Short, 2022). It has a linkage between the organisational motivations, courses of action, capabilities, value streams, and resources (Jeffs, 2022). The PAs has several practical applications. In general, it points to norms, beliefs, and fear of the unknown, unless they introduce the subject phenomena, constant monitoring, and sufficient time to learn through.

**Enterprise Application Architecture**

In the antiquity of information systems, IDEs, EDEs and PAs have been thought of as key influences in the AA of EAA. EAA can be delineated as a structural map that illustrates the workflow assembled from different functional departments with ease-of-use of different applications that interact with each other to fulfil the enterprise goals (Ferguson, 2020b). It encompasses core types such as entities (business model classes that are persisted), aggregates interfaces, domain services, specifications, custom exceptions, guard clauses, domain events, and handlers.

However, Fauteaux (2022) and Gillin (2022b) explicate major challenges with this kind of EAA includes (a) Efficiently specifying materials which include the use of data from customer relationship management for an Architect Expects to digitise algorithms for SCM activities. (b) Maintaining changing technologies, which is linked with distributor automation by enhancing the responsiveness of SMEs' SC. (c) Providing solutions for affordable SCM solutions that characterised by economies of scale, cstoms and fiscal solutions. (d) Navigating the IDEs and EDEs that includes; globalisation regulations, integrated information systems, and customer service. (e) Coping with architect costs for assembling architect diagram, and complexity in functionality with respect to monolithic or service-oriented approach (g) **Performance and scalability in line with e**lements of web application architecture that might also be applied to distribute some processing to user endpoints. In agreement Jeffs (2022) writes that SMEs could automate data analysis, providing inferences for deviations and delays for continuous improvement.

Amidst all this, the EAA requires diverse input requirements, organisational boundary divisions, and tool boundary divisions, volatility of requirements, traceability, and integration with change and configuration management systems.

**Research Methodology**

A quantitative approach was employed to reveal the association between variables. A stratified random sampling best known as proportional random sampling used selected and divided both SMEs' owners and managers into homogenous groups. This was based on common traits such as managerial competencies and experience, discipline, curiosity, creativity, experimentation and risk taking. Four municipalities were considered as study areas: Blouberg (Bochum), Molemole (Dendron), Polokwane (Pietersburg), and Lepelle-Nkumbi (Lebowakgomo) municipalities. From the study population, 310 SMEs owners and managers completed the sampling process and returned the questionnaire. Five items on the questionnaire measured the extent to which PAs bring an impact on the AA of EAA.

**Results**

**Stability diagnostic tests**

*Reliability - Cronbach's Alpha*

Table 2 presents the results on Cronbach's Alpha (α) for all $X_s$, $PV_s$ and response variable. The population is apprehended from a sample of 310 SME owners and managers. The correlation between OPIs, ERs, ISCs, EATs, EDEs, PAs and AA of EAA were tested. The rule of thumb is rated at .75 for basic research. Subsequently, the internal consistency achieved more than .85 as an accurate measure of scale indicating that of the variance in the scores is reliable variance.

**Table 2:** Cronbach's Alpha per variable

| ITEM-TOTAL STATISTICS | | | | |
|---|---|---|---|---|
| **Variables** | **Scale Mean if Item Deleted** | **Scale Variance if Item Deleted** | **Corrected ItemTotal Correlation** | **Cronbach's Alpha if Item Deleted** |
| Owners' physiognomies and incitements | 378.7647 | 1683.944 | .196 | .874 |
| Enterprise resources | 370.4971 | 1618.457 | .370 | .872 |
| Information systems components | 369.9382 | 1516.471 | .603 | .866 |
| Employees aptitudes and trepidations | 365.0529 | 1509.826 | .591 | .867 |
| External dynamic exasperations | 352.6500 | 1357.933 | .683 | .868 |
| Perceived attitudes | 365.5206 | 1459.413 | .557 | .870 |
| AA of EAA | 381.6029 | 1641.880 | .310 | .873 |

*Source: Author conceptualisation, 2023*

Consequently, .13% is error variance. The reliability of the subscale was as; thus, .874, .872, .866, .867, .868, .870 and .873. The α assumes the unidimensionality that all the items measured a single dimension.

*Double-Exponent Distribution on AA of EAA*

Figure 1, demonstrates the double-exponent distribution, regarded as a symmetric distribution. Amidst, other distributions such as; normal-random numbers, Cauchy-random numbers, and Weibull-distribution, the double-exponent distribution it has a sturdy peak, more swift degeneration, and with weightier tails.

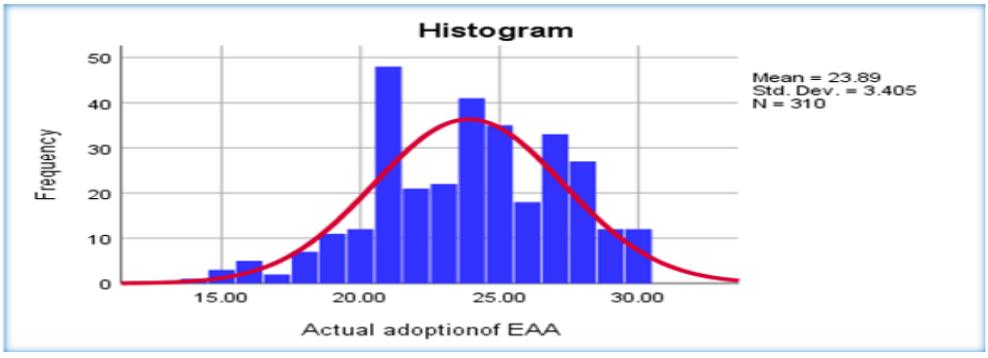


**Figure 2**: Double-exponent distribution on AA of EAA.
Symmetric distribution, where: N = 310, mean ≈ median @ 23.89, skewness = -.289; Kurtosis = -.344; σ = 3.405
*Source: Author Conceptualisation, 2023*

The mean is 23.89, N = 310, both mode and median serve the different proportion that produced an asymmetric distribution. The skewness and kurtosis are at -2.89 and -.344, chronologically. The distribution is skewed to the left and right away from the mean, mode and median with tails that vary (indicates asymmetry). Taken together, these results suggest that there is an association between $X_s$, $PV_s$ and Y. Therefore, in broad-spectrum, the data is reliable and valid to further analyse results for model summary, linear regression, regression Analysis (Algebra Expression), and Beta weight.

**Findings**

**Model Summary table 3**

Table 3 presents the model summary for $X_s$, PV and Y on the conception of direct and indirect relationships for the AA of EAA for SCM. For that reason, the model summary is appropriate for direct and indirect relationships with six positive slopes, and single negative slope amidst their accounts of the events form variables.

**Table 3**: Model Summary

| Model Summary | | | | | |
|---|---|---|---|---|---|
| | S | R-sq | R-sq (Adj) | R | |
| OPIs | 3.263 | 0.034 | 0.330 | 0.184 | |
| ERIs | 4.174 | 0.101 | 0.087 | 0.318 | |
| ISCs | 3.761 | 0.067 | 0.052 | 0.259 | |
| EATs | 6.211 | 0.120 | 0.110 | 0.346 | |
| EDEs | 5.571 | 0.057 | 0.042 | 0.239 | |
| PAs | 3.295 | 0.051 | 0.040 | 0.226 | |
| AA of EAA | 3.405 | 0.158 | 0.145 | 0.397 | |
| **Coefficients** | | | | | |
| Terms | Coef | SE Coef | T-Value | P-value | Regression Equations |
| Constant<br>OPIs | 19.486<br>.193 | 1.346<br>.058 | 14,477<br>3.328 | .001[b] | 19.49 + 0.19*x (Level of OPIs) |
| Constant<br>ERIs | 17.830<br>.259 | 1.047<br>.044 | 17.030<br>5.886 | .000[b] | 17.84 + 0.26*x (Level of ERIs) |
| Constant<br>ISCs | 18.235<br>.235 | 1.213<br>.050 | 15.032<br>4.700 | .000[b] | 18.23 + 0.24*x (I Level of ISCs) |
| Constant<br>EATs | 16.120<br>.190 | 1.214<br>.029 | 6.552<br>6.552 | .000[b] | 16.12 + 0.19*x (Level of EATs) |
| Constant<br>EDEs | 19.821<br>.146 | .962<br>.034 | 20.604<br>4.294 | .000[b] | 19.82 + 0.15*x (Level of EDEs) |
| Constant<br>PAs | 25.80<br>-.233 | .508<br>.057 | 50.787<br>-4.088 | .000[b] | 25.8 – 0.23*x (Level of PAs) |
| Constant<br>PRE_1 | 3.553E-15<br>1.000 | 3.147<br>.132 | 1.130<br>7.58 | .000[b] | 2.49E – 14 + 1*x (Level of AA: EAA) |

Source: Author Conceptualisation, 2023

***Dependent variables***

Given all parameters, the following results provide a predominant emphasis to the study. R-Squared ($R^2$ or the coefficient of determination) is a statistical measure in a regression model that determines the proportion of variance in the Y that could be explained by the $X_s$.

***First***: The R-squared ($R^2$) = 0.034, adjusted to 0.330 for OPIs indicating the best fit in the regression model. P (P-Value) < coefficient ($\alpha$); wherein the coefficient for the slope ($\beta_1$) < null hypothesis ($H_{01}$). Therefore: $H_{01}$ where; P < α, then $\beta_1$ (regression coefficients\slope) ≠ 0. Consequently; 19.486 > .001[b]. The slope (Δ) = 0.19*, indicating that there is a positive relationship between OPIs and AA of EAA (Y). This indicates that the dependent variable (Y) will increase with the same proportion of 0.19*, holding all other independent variable ($X_n$…) constant. The $H_{01}$ is rejected and support the $H_{a1}$ *(Alternative hypothesis)* that *"There is a positive relationship between IDEs: OPIs and PAs towards the AA of EAA for SCM in SMEs" (indirect relationship).*

***Second***: The $R^2$ = 0.101, adjusted to 0.087 for ERIs demonstrating the best fit in the regression model. P < $\alpha$; where; the coefficient for $\beta_2$ < $H_{02}$. Therefore: $H_{02}$ where; P < α, then $\beta_2 \neq 0$. Accordingly; 17.830 > .000[b]. The Δ = 0.26*, indicating that there is a positive relationship between ERIs and AA of EAA (Y). This indicates that Y will increase with the same proportion of 0.26*, holding all other $X_n$… constant. The $H_{02}$ is rejected and sustain the $H_{a2.}$ *"There is a positive relationship between IDEs: ERIs and PAs towards the AA of EAA for SCM in SMEs" (indirect relationship).*

***Third***: The $R^2$ = 0.067, adjusted to 0.052 for ISCs signifying the best fit in the regression model. P < $\alpha$; where; the coefficient for $\beta_3$ < $H_{03}$. Hence: $H_{03,}$ where; P < α, then $\beta_3 \neq 0$. As a result; 18.235 > .000[b]. The Δ = 0.24*, indicating that there is a positive relationship between ISCs and AA of EAA (Y). This indicates that Y will increase with the same percentage of 0.24*, holding all $X_n$… constant. The $H_{03}$ is rejected and withstand the $H_{a3.}$ = *"There is a positive relationship between ISCs: EATs and PAs towards the AA of EAA for SCM in SMEs" (indirect relationship).*

***Fourth***: The $R^2$ = 0.120, adjusted to 0.110 for EAT validating the best fit in the regression model. P < $\alpha$; where; the coefficient for $\beta_4$ < $H_{04}$. At that time: $H_{04}$ where; P < α, then $\beta_4 \neq 0$. Accordingly; 16.120 > .000[b]. The Δ = 0.19*, indicating that there is a positive relationship between EATs and AA of EAA (Y). This indicates that Y will increase with the same proportion of 0.19*, holding all other $X_n$… constant. The $H_{04}$ is rejected and withstand the $H_{a4.}$ *"There is a positive relationship between IDEs: EATs and PAs towards the AA of EAA for SCM in SMEs" (indirect relationship).*

***Fifth***: The $R^2$ = 0.057, adjusted to 0.042 for EDEs confirming the best fit in the regression model. P < $\alpha$; where; the coefficient for $\beta_5$ < $H_{05}$. Henceforth: $H_{04}$ where; P < α, then $\beta_5 \neq 0$. Accordingly; 19.821 < 1.000[b]. The Δ = 0.15*, indicating that there is a positive relationship between EDEs and AA of EAA (Y). This indicates that Y will increase with the same proportion of 0.15*, holding all other $X_n$… constant. The $H_{05}$ is

rejected and withstand the $H_{a5}$. *"There is a positive relationship between EDEs and PAs towards the AA of EAA for SCM in SMEs" (indirect relationship).*

***Sixth: Predictor Variable:*** The $R^2$ = 0.051, adjusted to 0.040 for PAs approving the best fit in the regression model. P < $\alpha$; Henceforward; the coefficient for $\beta_6 > H_{06}$. Therefore: $H_{06}$ where; P > α, then $\beta_6$ = 0. Accordingly; 25.80 > .000$^b$. The Δ = -0.23*, indicating that there is a negative relationship between PAs and AA of EAA (Y). This indicates that Y will decrease with the same proportion of -0.23*, holding all other $X_n$… constant. The $H_{06}$ is accepted and rejected the $H_{a6}$. *"There is a negative relationship between PAs towards the AA of EAA for SCM in SMEs" (indirect relationship).*

***Seventh: Response Variable:*** The $R^2$ = 0.158, adjusted to 0.145 for AA of EAA approving the best fit in the regression model. $H_{a7}$ = P < $\alpha$; where; the coefficient for $\beta_7 < H_{07}$. Henceforth: $H_{06}$ where; P > α, then $\beta_7$ = 0. Accordingly; 2.49E > .000$^b$. The Δ = 1*, indicating that there is a positive relationship between x, predictor variables and response variable. This indicates that Y will increase with the same proportion of 1*, holding all other $X_n$… constant. The $H_{07}$ is accepted and rejected the $H_{07}$. *"There is a positive relationship between IDEs, EDEs and PAs towards the AA of EAA for SCM in SMEs" (indirect relationship).*

Figure 3 illustrates graphical expression of MLR with $X_s$, RV, and Y. The applicability of PRE_1 originated as it established an automated positive slope on the AA of EAA as it is superficial in MLR.

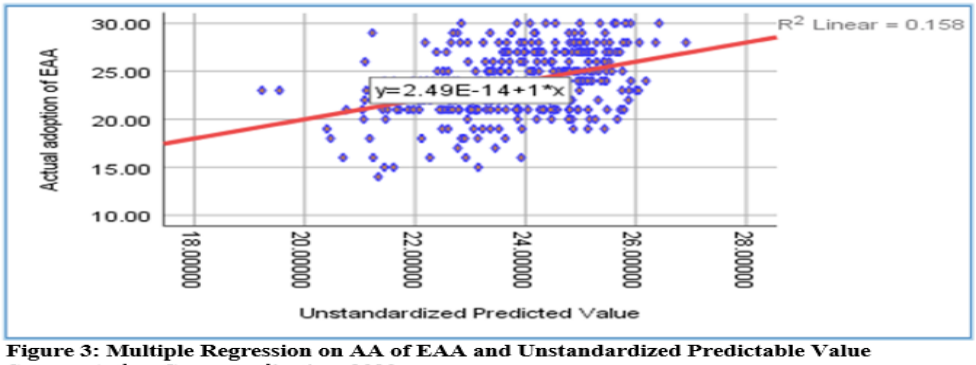


**Figure 3: Multiple Regression on AA of EAA and Unstandardized Predictable Value**
*Source: Author Conceptualisation, 2023*

Zach (2021) exemplify the assumptions whilst computing MLR. (a) *Linear relationships* - exist between IDEs, EDEs, PAs and AA of EAA. Thus, Y and $X_n$… (b) No multicellularity residuals are normally distributed, and $X_{ns}$ are not highly correlated (multivariate normality), and $X_{ns}$…are not highly correlated. (c) Observations are independent. (d) There is homoscedasticity indicating that the residuals have constant variance at every point in the linear model. (e) Multivariate normality entails the residuals of the model are normally distributed. The data described here appear to maintain the assumption that serves as pre-requisite to achieve the desired outcomes.

***Regression Analysis: Algebra Expression***

The test for additional group of variables on interest provided significant increase to the predictions of the output denoted as '' Y''. As it was determined that at least one of the regressors brings a significant change, it is important to consider the fact that an increase in error variables permits an increase in the regression sums of squares. MLR, where; PAs towards the AA of EAA determine Y. The model summary is expressed into algebra.

Where: $Yi = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_5 x_5 + \beta_6 x_6 + \varepsilon$ …… [Eqn_1]

At this point, Y is the dependent variable, and $X_1$,$X_n$ are denoted by *n* independent variables (x). Another major source of uncertainty is in the method used to calculate X: the weights, $x_1$, $x_2$, $x_n$, regression analysis ensures maximal prediction of the dependent variable from the set of x, calculated through by least squares estimation.

Simplified:

- Yi = AA of EAA

- $\beta_0$ = Constant term/intercept in the model, $x_1$ & $x_2$ = 0
- $\beta_1$ = Are the regression coefficients signifying the change in y comparative to a one-unit change in $\mathbf{x_1}$ and $\mathbf{x_2}$, respectively
- $X_1$ = Owners' physiognomies and incitements (IDEs)
- $X_2$ = Enterprise resources inducements (IDEs)
- $X_3$ = Information system components (IDEs)
- $X_4$ = Employees aptitudes and trepidations (IDEs)
- $X_5$ = External dynamics exasperations (EDEs)
- $X_6$ = Perceived attitudes (PAs)
- $\varepsilon_i$ = Residual error

$$Y = 19.49x_1 + 17.84x_2 + 18.23x_3 + 16.12x_4 + 19.82x_5 + 25.80x_6 + 2.49Ex_6 + \varepsilon \quad \text{..... [Eqn\_2]}$$

Therefore, from the equation, the error on unstandardized coefficients for constant and PRE_1 is 3.147 and 0.132, chronologically.
Given the n observation
$(Y_1, \beta_1 x_1 + \ldots + \beta_5 x_5 + \varepsilon), \ldots, (Y_n, \beta_{n1} n x_1 + \ldots + \beta_{n5} x_{n5} + \varepsilon)$ ..... [Eqn_3]

**Beta weight**

A beta (β) weight is demarcated as a slope of a line in a regression equation, also referred to as a standardized regression coefficient. These is pragmatic as $X_s$, PV, and Y as the criterion, which are standardized and converted to z-scores. A β weight is equal the correlation coefficient (ρ) @ .3.553E-15 as a multiple predictor variable. In terms of the β weight (β = 3.553E-15, $p < .000$), it constituted the greatest contribution to the regression equation when applying ceteris-paribus (when holding all other predictors constant). The zero-order correlation (r = .398) is witnessed as the second largest in the model, and when squared, it indicated arithmetic value @ 15.84 on variance cognitive. The squared ($MLR^2$ = .158 ≈ √.158 = .39) illustrated that AA of EAA shared the second largest amount (158%) of variance with Y. The findings of the current study are consistent with those of Laura, Nathans, Oswald and Nimon (2012) who report that it is important that a single $X_n$ may be deemed the most important through one predictor. Another X may achieve prominence through another predictor variable(s). Due to IDEs and EDEs, it appears that AA of EAA alone is not the causative factor of SCM success.

**Recommendations**

This study endorses and countersigns that before presenting the Y, in a study such this one should be carried out on the assumption and assumption of MLR such as linear relationship, multicollinearity, independence, homoscedasticity and multivariate normality. However, more exploration and consideration on this topic needs to be undertaken before the association between $X_n$, PV, and Y. Prior to any formal analysis, it is highly recommended that future researchers consider a pilot study to authenticate the following: **sample size and selection, testing measurement instrument, data entry and analysis. Predominantly, to l**ook at data to see whether possible problems or questionable data points are detected. For safety, it is advisable to review and take into account free data science short courses, forecasting methods, distribution, random variables and regression analysis. In consequence, it is suggested that similar research studies that includes determining $X_1 + X_2 + \ldots X_n$ of the scores accumulated in MLR, which could be processed with outliers from large sample.

## Conclusion

Data administered through SPSS for both simple linear regressions, and MLR produced anticipated results denoted by Y, determined by three items: $X_n$, PV and Y. The MLR determined the influences and relationships amidst IDEs, EDFs, PAs, and AA of EAA. Therefore:

$Y = 19.49 + 0.19\ X\ 1 + 17.84 + 0.26\ X\ 2 + 18.23 + 0.24\ X\ 3 + 16.12 + 0.19\ X\ 4 + 19.82 + 0.15\ X\ 5 + 25.80 + [(-0.23)\ X\ 6 + 2.49E + (-14)\ ]\ X\ 7 + 1$

Y = 20.68 + 36.20 + 55.41 + 65.24 + 99.85 + 153.42 – 79.57

Y = 351.23

The degree model explaining the variance of Y was $R^2 = 0.158$. Reflecting on the coefficients, it can be assumed that the model predicts the Y very well. Examining the contributions of $X_n$… in the model, it is found that $X_n$… and PV made the greater influence with the value of ($\beta = 3.553$), followed by the scores received from OPIs, ERs, ISCs & EATs, and PAs, respectfully on the AA of EAA.

### Limitations and Direction for Future Research

Careful considerations are inevitable in unfolding the MLR assumptions and, such as linearity, normality, homoscedasticity, independence, and multicollinearity. In some instances, it is impossible to identify multiple outliers, as a result of predictor standards, except for those that are disregarded. In future investigations, it might be possible to use a different constructs in IDs, EDEs, as well as in PAs. This could include the possibility for exploring new complete measure for both independent and predictor variable.

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**Annexure A** - Summary table: IDEs, EDEs, PAs, and AA of EAA

| Authors | Vari-ables | Title | Aim\Objectives | Findings\Results | Conclusions |
|---|---|---|---|---|---|
| Suhadak & Mawardi, 2017 | IDEs | Analysis of the influence of external and internal environmental factors on business performance: a study on micro small and medium enterprises (MSMEs) of food and beverage. | ▪ This study aimed to analyze and explain the influence of external environmental factors on internal environmental factors, along with the influence of external and internal environmental factors on business performance. | ▪ The results of the analysis indicate that the internal environmental factors positively and significantly affect the business performance in MSMEs of Food and Beverage in BatuCity. | ▪ For owners or managers of Micro Small and Medium Enterprises (MSMEs), they need to increase the competence of entrepreneurship in order to be able to face competition. |
| Alsaqal, Ahmed & Abdullah, 2021 | OPIs | The role of strategic physiognomy to avoid the strategic drift. | ▪ Identify the availability of strategic dimensions of physiognomy in the study sample organizations.<br>▪ Identifying the level of availability of the dimensions of strategic drift in the study sample organizations.<br>▪ Identifying the impact of strategic physiognomy in avoiding strategic drift in the study sample organizations. | ▪ The banks of the research sample did not give the strategic physiognomy sufficient attention despite its great importance for organizations as it adopts most of the leading organizations of strategic physiognomy important activity that can respond to anticipate environmental changes and rapid response. | ▪ The study recommends the necessity of increasing the interest of organizational leaders in banks with the philosophy of strategic physiognomy and the adoption of it by banks Because of its effect on avoiding strategic drift, A |
| Zemmouchi-Ghomari, 2021 | ISCs | The basic concepts of information systems. | ▪ To describe information systems applications covering functional areas and focusing on the execution of business processes across the enterprise, including all management levels. | ▪ An information system can be defined as a set of interconnected components that gather, process, store and dispense information to support decision making and control in an organization. An IS can be seen as a socio-technical system. | ▪ A company has systems to support the different managerial levels: transaction processing systems, management information systems, decision support systems, and systems dedicated to business intelligence |
| Ertz, Rouzies & Sarigollu, 2022 | EATs | The impact of brand equity on employee attitudes. | ▪ Details the extent to which alignment between top and mid-level executives ' attitudes affects lower-ranking employees' attitudes | ▪ The psychology and behavioural literature could provide deeper insights into this mechanism. | ▪ Associations with brands should be made less salient for mid-level executives, part-time jobs, services settings, and long-tenured staff. |
| Glücksta, 2022 | PAs | Risk perceptions, attitudes, and behavioral intentions to spend on experiences in the post-Corona crisis: Data from Italy, Denmark, China, and Japan. | ▪ To provide comprehensive cross-cultural data on individuals' value priorities, risk perceptions, attitudes, and behavioral intentions to spend on experiences in the post-Corona crisis. | ▪ The dataset provides comprehensive cross-cultural data on individuals' value priorities, risk perceptions, attitudes, and behavioral intentions to spend on experiences in the post-Corona crisis | ▪ A comprehensive cross-sectional survey was developed in collaboration with several EE stakeholders (destination management office and cultural institution) as well as public health- and tourism experts. |
| Van de Watering, 2022 | AA of EAA | The role of enterprise architecture-driven dynamic capabilities and operational digital ambidexterity in driving business value under the COVID-19 shock. | ▪ Firms that have developed their EA-driven dynamic capabilities can handle and proactively address the exogenous COVID-19 shock and adjust accordingly. | ▪ An architecture governance model to promote transparency by adopting a common language amongst stakeholders and prioritizing the IT landscape planning process, considering the most critical business processes and the firm's dynamic capabilities. | ▪ Contemporary firms should strive for a dual digital approach to operational capabilities to bring the highest degree of business value. |

**Source:** Author Conceptualisation, 2023

# A Discussion of TikTok's Disregard of UK and US Child Data Policies

**Clifford Fisher**
**Lydia Barber**
**Olivia Hodge**
Purdue University, USA

**Keywords:**
COPPA Violations, Child Privacy Policies, Data Collection, TikTok Security, UK Data Protection

***Abstract***

*Children, being among the most vulnerable, require the most protection. While laws have been enacted to protect their physical well-being, many online companies have fallen short of ensuring proper usage of children's online data. The United Kingdom and the United States have taken an offensive stance on the matter by establishing their privacy policies aimed at protecting children online. The popular app TikTok has been flagged for security risks involving inadequate parental consent, unreasonable data collection, and data transference. This presentation will discuss US and UK child data privacy regulations and how companies can learn from TikTok's failure to comply. The first privacy concerns of TikTok surfaced in 2020, resulting in several nations discussing restrictions on the app and banning it as a whole. More recently, TikTok has been facing a multimillion-dollar lawsuit in the UK regarding the breach of data protection regulations for children. These are not the only allegations the parent company, ByteDance, has faced concerning safeguarding children and their data. TikTok's predecessor, Musical.ly, also owned by ByteDance, was sued in 2018 for violating the U.S. Children's Online Privacy Protection Act (COPPA). With more child users than ever, social media companies like TikTok are obligated to create a safe online environment.*

## Introduction

Today's children are growing up in a society dominated by technology. As a result, online services and applications have an added responsibility to regulate how data from children is collected and protected. The mass increase in children using technology and social media has coined a new term in the 21st century, the "iPad kids" (Leiby). A term that goes beyond "digital native," iPad kids describe the children who have direct access to digital media as young as two years old. Due to children's high level of vulnerability, the idea of increasing legal protections for children is nothing new. Laws such as prohibiting alcohol consumption, establishing a legal driving age, and preventing child abuse all have the goal of protecting children. With nearly one-third of children between the ages of 7 and 9 using social media, it is more important than ever for social media platforms and online services to comply with standards set by regulatory agencies and provide a secure experience for child users (Searing, 2021).

Online data collection has become a significant marketing tool used by companies. Collecting demographic and behavioral data allows companies to specifically target individuals in personalized ways (Froehlich, 2023). With nearly 91 percent of consumers more likely to purchase a product or service when ad targeting is used (Rouse, 2017), online data is rapidly becoming a currency in commerce (Evans, 2018). As this form of currency continues to develop, several problems have arisen with collecting demographic and personalized data of children under thirteen.

During the COVID-19 pandemic, children were forced to rely on technology, often provided by the schools, to complete their work remotely. As children used online services to assist in learning math, reading, and other lessons, it was later revealed that these online services were also collecting data from students and sending the data to third parties to be further analyzed without parents' consent (Harwell, 2022). These educational services shared the data with advertising companies like Google and Facebook to find ways of targeting children with personalized advertisements across platforms. For instance, the educational platform named "Schoology" was discovered to have a code within the app that would "extract

a unique identifier from the student's phone" to be later used to track the students across platforms (*Online Tools for Teaching & Learning*, n.d.).

As data becomes a sought-after resource for companies, concerns involving children's data online have surfaced from not only educational sites but popular social media companies as well (Harwell, 2022).

TikTok, a popular social media platform run by the Chinese company ByteDance Ltd., has become a significant point of interest to online privacy regulators. In May 2023, the social media company was fined £12.7 million by the United Kingdom's (UK) data protection agency, the Information Commissioner's Office (ICO). The original notice of intent was released in September 2022, accusing TikTok of violating the UK General Data Protection Regulation (UK GDPR). The breaches discussed included collecting data from child users without proper parental consent, collecting and misusing particular category data, and failing to provide clear and easy-to-understand data policy information. While TikTok was not found guilty of misusing special category data, they were found guilty of collecting child user data without proper consent, failure to provide a clear understanding of their privacy policy, and failure to ensure safe and lawful data processing for their UK users (*Ico fines tiktok £12.7 million for misusing children's Data*, 2023).

This is not the first time that ByteDance Ltd. has gotten into trouble with its social media platforms. In 2019, ByteDance Ltd.'s predecessor to TikTok, Muscial.ly, was also accused of mishandling the data of its child users. Musical.ly settled a $5.7 million fine from the Federal Trade Commission (FTC) for its non-compliance with online children's privacy laws in the US (Singer, 2022). The social media app was accused of failing to seek parental consent before collecting children's data, such as names, email addresses, and other personal information, while aware of the significant presence of child users on their platform. The 2019 lawsuit resulted in the most important monetary settlement in a case involving the violation of the US Children's Online Privacy Protection Act (COPPA) (Ritchie, J.N. & A., Jayanti, S.F.-T, et al., 2022).

In July 2020, more than a third of the total daily TikTok users in the US were reported as 14 or younger (Zhong, 2022). With such a large age demographic of underage users on the social media platform, there is an increasing sense of urgency for regulatory agencies to investigate TikTok's child data protection practices. Enhancing legal protections and implementing stringent regulatory standards are imperative to safeguard children's digital privacy.

## Part I. Data Privacy Laws in the UK and the US

### *UK Data Protection Policies*

The United Kingdom's data privacy laws are designed to build and expand off one another. The foundation of these data protection laws is the Data Protection Act of 2018 (DPA 2018). The DPA 2018 establishes grounds for the Privacy and Electronic Communications Regulations of 2003 (PECR), the UK General Data Protection Regulation (UK GDPR), and several other statutes, such as the Children's Code. The Data Protection Act of 2018 (DPA 2018) is the UK's primary data protection law. While initially put into effect by the European Union, the DPA 2018 has since been amended to best fit the UK's status outside the EU, creating a three-segmented system for UK citizen's data protection (*About this code*, *n.d.)*.

The first segment addresses the general processing system, highlighting the integration of the UK GDPR. The second segment discusses law enforcement data processing and the third regulates intelligence services processing. In addition to this segmented system, the DPA 2018 established the Information Commissioner's Office (ICO), defining its roles and function as the UK's data protection watchdog. Out of the three segments discussed, the first is most applicable in this context due to the UK GDPR's direct impact on company data policies (*About this code*, *n.d.)*.

The GDPR, first established by the European Union, became globally known as the gold standard for data protection. Due to Brexit in 2020, UK regulation was created to meet the same standards as the EU and maintain a sense of familiarity. To ensure that the free flow of personal data could continue from the EU to the UK, the EU performed an adequacy test on the UK GDPR and was deemed acceptable (*About this code*, *n.d.)*. The UK GDPR defines the responsibilities of data processors and data controllers. Data processors are those within a company or organization processing an individual's data. Controllers determine the purpose and means of personal data processing. The UK GDPR continues and establishes seven fundamental data protection principles for companies to abide by when processing consumer data: lawfulness, purpose limitation, data minimization, what is adequate and relevant, accuracy, storage limitation, integrity and confidentiality, and accountability (*About this code*, *n.d.*).

These principles represent the spirit of the legislation of the UK GDPR. Companies that comply with these principles are better set up for success in following ethical data protection practices. Any companies and organizations in or outside of the UK that offer goods and services to UK consumers are held to the UK GDPR principles and regulations (*About this code*, *n.d.)*.

The UK GDPR gives an explicit command for companies to take additional care in the collection of children's data. Recital 38 of the UK GDPR states, "Children merit specific protection about their data, as they may be less aware of the risks, consequences, and safeguards concerned and their rights about the processing of personal data. Such protection should, in particular, apply to the use of personal data of children for marketing or creating personality or user profiles and the collection of personal data about children when using services offered directly to a child…" (*About this code*, *n.d.)*.

In 1989, the UN Convention on the Rights of the Child defined children under the UK GDPR as anyone below the age of eighteen. "Childhood is separate from adulthood and lasts until 18; it is a special protected time, in which children must be allowed to grow, learn, play, develop and flourish with dignity" (UNICEF). Throughout the internet, children are constantly tracked and observed without their consent or their parent's knowledge. "By the time a child reaches 13, online advertising firms hold an average of 72 million data points about them" (Fowler, 2023). Information about children, such as their moods, the times they eat and sleep, and even the status of their relationships, are logged and recorded. The ICO describes this continual data logging as children being "datafied." The world is rapidly advancing in technology. Rather than hide children from the internet, the UK GDPR encourages children to access and learn how to navigate the internet with appropriate safeguards (*About this code*, *n.d.*).

In addition to the UK GDPR, the Children's Code was implemented as an additional safeguard. The Children's Code, established under section 125 of the DPA 2018, provides specific guidelines for companies to follow as well as practical methods of compliance. The applied standards of this statute always work to prioritize the best interests of the child. Companies under this statute's regulation include online service providers or any company or organization that processes consumer information through apps, programs, websites, games, or community environments (*Introduction to the Children's Code*, n.d.).

The Children's Code compels companies to maintain a risk-based approach in multiple facets. To start, the Children's Code requires that online service providers must undergo a Data Protection Impact Assessment (DPIA). DPIAs evaluate the data protection risks involved for children using the provided service to mitigate risks early on (*2. Data Protection Impact Assessments*, n.d.). Additionally, online service providers are to activate 'high privacy' settings as the default for their sites. This involves selecting 'off' for the default profiling and geolocation settings. Companies should not encourage children to use their sites to alter these settings to gain additional personal data or work around their data privacy protection. Any settings, parental controls, or online tools provided by the online service must be transparently stated. This code is not exclusive to children's content either. Due to the risk of a child accessing an app on an adult's phone without proper observation, the Children's Code applies to all online service providers (*Introduction to the Children's Code*, n.d.).

***US Data Protection Laws***

The United States adheres to a different regulation setup than the UK does. While the UK builds off the DPA 2018 for data protection within three different segments-- companies, intelligence agencies, and their government-- the United States focuses on protection from the government. The Privacy Act of 1974 is the central privacy policy the federal government follows, which is quite limited. The only regulation it provides is on how the federal government handles data from US citizens, not the way companies are to treat US consumer data. It is left to the states to implement data protection policies further.

While the US does have data protection laws in place for companies and institutions to follow, they are nowhere near as extensive as the UK's. The Federal Trade Commission Act of 1914 (FTC) is a federal statute that prevents businesses from exploiting their consumers via deception and misrepresentation. Other regulations imposed through the FTC Act, such as Gramm-Leach-Bliley, the Fair Credit Reporting Act (FCRA), the Health Insurance Portability and Accountability Act (HIPAA), and the Family Educational Rights and Privacy Act (FERPA), all cover significantly narrowed and limited areas of data protection. The sole exception in this field of legislation is the Children's Online Privacy Protection Act (COPPA) (Ritchie, J.N. & A., Jayanti, S.F.-T et al., 2022).

Acting similarly to the UK's Children's Code, COPPA builds off the FTCA and imposes regulation against unfair and deceptive practices with data collected from child users. This act defines child users as children aged thirteen years and under. COPPA applies broadly to operators of commercial websites and online services, including mobile apps that collect and maintain personal information. The FTC establishes a broad application of this Act, applying to "any service available over the internet, or that connects to the internet or a wide-area network" (Ritchie, J.N. & A., Jayanti, S.F.-T et al., 2022). The goal of COPPA is to place data collection controls back into the hands of parents and guardians. To comply with this, companies must be fully transparent with their data processing policies. Online service providers must provide full disclosure on their website to parents on what data is collected and the operator's use of their data. They must obtain parental consent for data collection. All this information should be easily accessible by parents and children in the operator's privacy policy (Ritchie, J.N. & A., Jayanti, S.F.-T et al., 2022).

In 2018, California legislation passed the California Consumer Privacy Act of 2018 (CCPA) along with the CCPA regulations acting as guidelines. This policy gives consumers more control over data collection, securing new privacy rights. The CCPA grants California consumers the right to know what information is being collected about them, the right to delete cached information, to opt out of the sale or distribution of personal information, and the right to non-discrimination for exercising these rights. Most recently, a 2020 amendment known as Proposition 24, the CPRA, introduced additional consumer rights to correct inaccurate information and limit the use of their personal information. Both are still under processing (*California Consumer Privacy Act (CCPA)*, 2023).

These privacy rights require businesses to be incredibly transparent, giving required notices to the consumer. California consumers are provided with a "notice at collection" at or before the time data collection occurs. A notice at collection lists the personal information the business has gathered from its consumers and the intended purpose for that data. If the business is in the market to sell its consumer data, consumers are given a "Do Not Sell or Share" link. By selecting this link, consumers can "opt out" of the business selling and sharing their data. The same goes for children. Businesses are not allowed to sell the personal information of a child unless given explicit permission by "Opt-In" settings being selected (*California Consumer Privacy Act (CCPA)*, 2023).

California sets a new standard for states in keeping companies focused on the consumer's best interests at heart. Not only does the policy give a clear explanation of how, what, and why data is being collected, but it also gives consumers a chance to opt out. Like the GDPR, California residents can know that this policy applies to them regardless of where they are (*California Consumer Privacy Act (CCPA)*, 2023). The CCPA is one of the first attempts to combat the gains a company receives from using consumer data. Several states have begun to follow suit.

**Part II. TikTok's Policies Regarding Data Collection**

TikTok provides separate privacy policies for UK users and US users. While similar in content, the privacy policy for UK users has many more specifics than the US policy to meet UK GDPR guidelines. For example, the UK privacy policy dedicates a section to discussing the importance of classifying "legitimate interests" for UK TikTok user data. This follows the ICO's requirement for online privacy policies to state their legitimate interests in processing users' data, being specific about the purpose and intended outcome of said processing. Because this is not a requirement under US data protection regulation, TikTok's Privacy Policy for their US users is much vaguer with its language.

Similar to the differences between the US and UK user policies, TikTok provides a separate privacy policy for its child users. TikTok states that the company "is committed to protecting children's privacy" (*About: TikTok - real short videos,* n.d.). The social media platform claims it collects minimal information from children when they register for an account, including their username, password, and birthday. However, in the very following sentence of the privacy policy, TikTok states that information from the child's device, such as IP address, web browser version, country-level location, video watches, time in the app, and general usage information, may be obtained (*About: TikTok - real short videos,* n.d.).

This is a significant wound in TikTok's legal skin that may fester over time. In addition to the unclear and somewhat manipulative wording, the children's privacy policy is also incredibly vague in describing how data from child users will be used, shared, and retained. For example, TikTok clearly states that data

will not be sold or shared with third parties but will share child user data with their corporate group and undefined "service providers" (*About: TikTok - real short videos,* n.d.).

In both the "Data Security" and "Retention and the Sharing Data" sections of the privacy policy, TikTok continues to use unspecific phrasing to define their purpose for data collection, such as: "provide and support our services," "as necessary for service providers/corporate group to support internal operations," "to fulfill the purpose for which the information was collected" (*About: TikTok - real short videos,* n.d.). Vague wording and a lack of transparency is a red flag for regulation enforcers like the ICO and goes against policies outlined in both the Children's Code and COPPA.

## Part III. TikTok's Violations of Data Policies

### *Violations of COPPA in the US*

TikTok has had multiple lawsuits related to child data collection over the past ten years. In 2019, the app Musical.ly, now known as TikTok, was under fire for violating COPPA under multiple counts. From 2014 to 2016, Muscial.ly failed to provide appropriate parental consent and controls (Ritchie, J.N. & A., Jayanti, S.F.-T et al., 2022). The proposed order of civil penalties for *United States of America v. Musical.ly* states, "The Complaint charges that Defendants violated the COPPA Rule and the FTC Act by failing to post a privacy policy on its online service providing clear, understandable, and complete notice of its information practices; failing to provide direct notice of its information practices to parents; failing to obtain verifiable parental consent before collecting, using, and disclosing personal information from children; failing to delete personal information at the request of parents; and retaining personal information longer than reasonably necessary to fulfill the purpose for which the information was collected." Musical.ly paid $5.7 million to settle FTC allegations and was ordered to delete all the stored personal information of these users unless otherwise directed by a parent or guardian (Ritchie, J.N. & A., Jayanti, S.F.-T, et al., 2022).

Musical.ly operators were aware of the number of children using the app, displaying a blatant disregard for COPPA. The FTC did not plan to let Musical.ly off the hook with only a fine, either. After acknowledging the order, Musical.ly was required to submit a compliance report a year later. The report holds similar criteria to DPIAs and Safe Harbor program applications, including, but not limited to, detailed descriptions of the activities of the business, showing the company is upholding the compliance of the order, copies of each new privacy policy notice posted on their website or service, copies of transparent statements describing data collection for obtaining parental consent and each type of data collected from children and the need for said data (Ritchie, J.N. & A., Jayanti, S.F.-T et al., 2022).

### *Violations of the UK GDPR and the Children's Code in the UK*

In May of 2023, TikTok was issued a £12.7 million fine by the ICO for violating the UK GDPR from May 2018 to July 2020. The violations addressed involved TikTok's failure to obtain parental consent for children's data, failure to ensure lawful and transparent data processing, and failure to "do enough" to verify the ages of their users. It was approximated in 2020 that over 1 million children under thirteen were using TikTok's platform, even with TikTok's age restrictions in place. Regarding TikTok's privacy policy, the social media platform failed to describe what user data was collected, used, and shared for in an easy-to-understand manner (*Ico fines tiktok £12.7 million for misusing children's Data*).

John Edwards, the ICO commissioner, shared his view on the severity of the situation, "As a consequence, an estimated one million children under the age of thirteen were inappropriately granted access to the platform, with TikTok collecting and using their data. That means that their data may have been used to track them and profile them, potentially delivering harmful, inappropriate content at their very next scroll" (*Ico fines TikTok £12.7 million for misusing children's Data*).

Outside of children's data protection regulations, TikTok has been served with multiple fines and class action lawsuits for violating consumer data protection laws. Ongoing instances involve the EU, the state of California, the state of Indiana, the state of Montana, and more (Singer, 2022). In addition to these lawsuits, TikTok's choice of data processing and vague terms has led multiple countries to outright ban the app on government-issued devices.

## Part IV. Recommendations for Compliance and Best Practices

### *Ensuring Compliance with the UK GDPR and Children's Code*

The Children's Code, while being an additional regulation, should be seen as a tool for companies to use rather than a hindrance. By strictly following the code and framing a company's software around its regulations, compliance with the GDPR is also improved, as many principles overlap.

For companies seeking to comply with the UK GDPR and the Children's Code, child safety and data protection should be at the forefront of product design. This may seem like an enormous task, but the Information Commissioner's Office assists companies to succeed by providing clear direction and multiple failsafe tools for companies to use. Section 123 of the Data Protection Act of 2018 requires the ICO to produce a code for companies and online service providers to abide by, as well as provide Data Protection Impact Assessments (*About this code*, *n.d.)*. Data Protection Impact Assessments (DPIAs) identify areas of high data risk within a project and assist in minimizing the risk (*2. Data Protection Impact Assessments*, n.d.).

Data processing is categorized as high risk if a data breach could endanger the health or safety of an individual. Data Processing Impact Assessments are legally required for all UK companies whose services are categorized as high-risk regarding data. In addition to high-risk data processing, the ICO requires DPIAs if a company or online service provider intends to use innovative technology, process biometric data, use profiling or special category data, process genetic data, match or combine data from other sources, collect data from a third-party source, or when targeting online services directly to children (*2. Data Protection Impact Assessments*, n.d.). Companies that do not fall under the high-risk category do not have to send their DPIAs to the ICO for review. To build up trust with parents and guardians of young consumers, the ICO recommends companies publish their DPIAs on their home web pages to show their prioritization of compliance with data collection regulations (*FAQs on the 15 standards of the children's code*, n.d.).

***The US COPPA Safe Harbor Program***

Like DPIAs, online service providers in the United States can use the COPPA Safe Harbor Program. This program allows companies and organizations to submit self-proposed regulatory guidelines that appeal to COPPA's standards to gain FTC approval. Companies that offer applications and are approved can work forward on developing their software quickly, knowing that the most critical standards have been met. Applications for this program must contain the online service provider's business model, a rundown of the tools used to collect and maintain consumer data, and an outline that aligns the proposed guidelines with corresponding COPPA rules (Ritchie, J.N. & A., Jayanti, S.F.-T, et al., 2023).

Once submitted, the protections provided by the self-proposed guidelines will be assessed and compared to the rules set forth by COPPA. The FTC approves applications that offer the same, or better, amount of protection for a consumer's data than COPPA does. The proposed guidelines must contain appropriate disciplines to be enacted for online service operators who are not compliant. This program provides companies with an opportunity to start an online service with a solid legal footing. The FTC further encourages companies to maintain the best interests of a child user at the heart of their design by allowing companies that pursue approval to be given safe harbor treatment for 180 days. A company within this Safe Harbor window has a reduced amount of liability regarding data collection policies. As the issues within a proposed policy are worked out, Safe Harbor acts as a buffer against penalties and fines from the FTC (Ritchie, J.N. & A., Jayanti, S.F.-T, et al., 2023).

If an online service provider is found to violate COPPA, all use of children's data must be stopped. Operators should review all aspects of data collection, storage, and use. Begin by analyzing privacy policies, methods of data collection, transparent communication with child and parent users, as well as data security. Seek consulting with an FTC-approved COPPA Safe Harbor Program organization such as the Children's Advertising Review Unit (CARU), the Entertainment Software Rating Board (ESRB), iKeepSafe, kidSAFE, Privacy Vaults Online, Inc., and TRUSTe. Penalties for violating COPPA may involve fines up to $50,120 per violation and are calculated based on the severity and frequency of the violations (Ritchie, J.N. & A., Jayanti, S.F.-T, et al., 2023).

**Part V. Discussion**

***The Need for Strengthened Data Protection in the US***

When establishing the United States FTC Act and COPPA, the Internet was nowhere near as prominent as it is in today's society. However, the UK has kept current, implementing policies as the internet has expanded and continued. Data protection is not merely a static concern but an ever-evolving challenge that

must adapt to the rapid advancements in digital technology. The ongoing evolution calls for a deeper analysis of the implications and potential trajectories of data protection laws, especially about safeguarding our most vulnerable citizens - children.

The patchwork of state-dependent data protection policies in the United States presents a fragmented landscape. To combat this, the US should adopt a unified and comprehensive policy approach at the state or federal level, similar to the UK's GDPR. As it stands, the US system, with its reliance on individual state policies, faces significant challenges in providing a coherent data protection strategy. In contrast, the UK's proactive stance not only strengthens protection for children's data but coordinates with the broader mandates of the GDPR, enhancing overall data governance.

Emulating the UK's data privacy model offers multiple benefits to the US. It would streamline state regulations, leaving a singular reference point for companies and consumers. This uniformity is especially pertinent given the cross-state nature of digital services. Current individual state legislation, such as California's Consumer Privacy Act (CCPA), though commendable, does not fully address the trans-state challenges of digital data flows. A federal standard, informed by the same components that make up UK regulation, would not only safeguard the rights of American citizens but also elevate the US's standing in global data protection.

***Insights into Research Limitations***

This paper acknowledges certain limitations reflective of the developing and evolving state of data protection legislation. The assessments of the UK's GDPR and Children's Code alongside the US's COPPA framework are bounded by the assumption that the principles and practices established in these legislations can be universally applied. However, cultural, social, and political differences between regions will necessitate distinct approaches to data protection. The UK model, while robust, may not be able to transfer to the US context without proper modifications. These assumptions are based solely on the interpretation of legislation aimed at safeguarding children's privacy. They do not take the broader societal or economic implications of these regulations into account. In light of these limitations, ongoing research and dialogue are necessary to evolve data privacy policies as technology advances and societal values change.

**Conclusion**

The UK GDPR and Children's Code have set a standard that emphasizes the importance of child safety and data protection from the start of a product's design. Compliance with these regulations is not only a legal obligation but a fundamental aspect of ethical practice, which plays a crucial role in building user trust and establishing a foundation for the sustainable growth of digital services.

This paper advocates for a call to action for proactive engagement with data privacy legislation, particularly in the United States. While the US COPPA Safe Harbor Program provides a framework for companies to adhere to, there is a clear need for strengthened and unified data protection laws that reflect the digital landscape and anticipate future technological advancements. California has played a leading role in the US, signaling a path forward, suggesting that both state and federal levels could benefit from adopting the principles embodied in the UK's approach.

It is not enough to respond to privacy concerns as they arise; there must be a forward-thinking, proactive stance that anticipates the challenges and prepares for the complexities of a digital future. Policymakers, industry leaders, and stakeholders must consider the long-term implications of data privacy and work collaboratively toward comprehensive legislation that safeguards the rights and well-being of children online. By doing so, the digital world will not only be a space for innovation and growth but also a secure environment that fosters the potential of every user.

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# Enhancing quality assurance in higher education through strategic endowment fund management: case studies and best practices

**Nayer Fardows**
Forman Christian College (A Chartered University), Lahore, Pakistan

**Daud Nayer**
Strathclyde University Glasgow, UK

**Agnes Nayer**
Christian Educational Endowment Trust (CEET) Lahore, Pakistan

**Sarah Nayer Jaffar**
Coventry University, Coventry UK

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***Abstract***

*This research paper explores the pivotal role of strategic endowment fund management in elevating the quality assurance standards within higher education institutions. Quality assurance in higher education is of paramount importance, especially in a global context where educational excellence is a driving force for socioeconomic development. Endowment funds have emerged as a vital financial resource capable of shaping the quality landscape of educational institutions.*

*Drawing from an extensive analysis of case studies across diverse geographical regions and institutional types, this research identifies key strategies and best practices that have yielded tangible improvements in educational quality. It explores the innovative ways in which endowment funds are established, managed, and leveraged to address specific quality assurance challenges faced by higher education institutions. Furthermore, it examines the ethical considerations inherent in fund allocation and distribution, ensuring equitable access to resources for quality enhancement.*

*This research paper not only underscores the critical association between endowment fund management and higher education quality assurance, but also provides a repository of practical insights and best practices that can guide policymakers, educational leaders, and philanthropic organizations in their efforts to sustain and elevate the quality of higher education worldwide. As higher education institutions grapple with the challenges of the 21st century, strategic endowment fund management emerges as a powerful tool in ensuring that educational quality remains at the forefront.*

## Introduction

### *Background*

Institutions accumulate finances to guarantee that next students will have equivalent subsidies and educational prospects as present students (Baum & lee, 2019), where one such example is the endowment funds in higher education institutions as they offer a reliable and enduring source of financial resources (Phung, 2022). These funds usually consist of contributions, presents, and investments that are overseen to produce revenue, which can be utilized to finance different components of an institution's activities. Specifically, endowment funds can be utilized to provide financial assistance for many endeavors, including but not limited to scholarships, research grants, infrastructure enhancements, and faculty recruiting (Smith, 2022).

With the increased funds comes an increased concern on the part of institutions to be reassured on the quality of the spending of the funds (Seyfried and Pohlenz, 2018). This includes the surety whether the higher education institutes are operating efficiently and effectively, overall labelling the phenomenon as Quality assurance. The function of quality assurance in higher education is crucial in guaranteeing that educational institutions deliver a superior learning experience to students and that degrees and qualifications hold significance in the employment market (Matei & Matei, 2013). Moreover, the quality assurance in higher education is frequently contingent upon the caliber and proficiency of the teachers and

staff, where endowment money can be utilized to attract and maintain highly skilled instructors, researchers, and administrators, therefore improving the overall quality of the school.

***Problem Statement***

Even though, endowment funds play a crucial role in supporting institution's quality assurance by offering them a sustainable and dependable source of financial stability over the long term (ALJehani, 2023), many a times, institutions fail to strategically manage the funds in order to uplift the quality of education that is delivered, and end up not effectively utilizing the funds. This not only affects the institution's progress and achievements, but also affects the likelihood of students attaining their academic and professional objectives (Seyfried and Pohlenz, 2018). Moreover, at large this also impacts the institution's future chances of attaining funding from external bodies due to a poor history of mismanagement of endowment funds. Having said that, strategic administration of endowment funds is essential for guaranteeing the long-term financial viability of higher education institutions, where a well administered endowment can offer a consistent revenue stream that institutes can use towards several facets of their operations, such as academic programs, faculty advancement, and infrastructure.

***Research Aim and Objectives***

In view of this, this research study aims to explore the strategies for effective management of endowment funds which could enhance the quality assurance of the higher education institutes. To achieve this aim, the study has set the following objectives:

- To identify the strategic practices in endowment fund management that have been employed by institutions to support quality assurance in higher education.
- To understand the challenges and obstacles that higher education institutions typically face when managing endowment funds to enhance quality assurance.
- To provide recommendations that can be offered to higher education institutions seeking to improve quality assurance through strategic endowment fund management.

***Methodology***

This study builds on a case study descriptive in nature, which describes the strategic management of endowment funds in higher education institutes and how they can assure the quality of education. A total of six cases were studies which included higher education institutes from both, developed as well as developing world, to give a neutral context of the higher education institutes. Among the developed world context, Harvard University, Stanford University; and The University of Oxford were studied where through online repositories and resources, their strategic plan of fund allocation was studied. Within the developing world's context, Forman Christian College, Lahore; Edwardes College Peshawar; and Christian Educational Endowment Trust, Lahore, were studied through in-depth interviews with the higher administrative staff of the institutes. The paper seeks to share the knowledge gathered from these institutes, aiming to shed light on how to manage endowment funds most effectively for quality assurance.

**Strategic Management of Endowment Fund and Quality Assurance: Cases**

***Harvard University***

Harvard University, an American institution situated in Cambridge, Massachusetts, USA, is renowned worldwide for its extensive campus, research prowess, and substantial financial resources. It is considered one of the most reputable and esteemed educational establishments. The university maintained its place among the top two internationally, as per the U.S. NEWS rating of 2022. It also excelled in terms of its financial resources, with an endowment over 40 billion dollars in the fiscal year 2022. Since 1974, Harvard Management Company (HMC) has successfully managed university endowment money, resulting in the maintenance and expansion of campus infrastructure and amenities. This has eventually had a positive impact on the educational environment and student satisfaction.

In addition, HMC's strategic management of endowments is supplying the necessary financial resources for research initiatives and innovation. HMC has traditionally upheld a diverse investment strategy including a range of asset classes, including public stocks, fixed income, alternative investments, and real assets such as real estate and natural resources. Moreover, Harvard's endowment is a fund

designated for long-term investments, and the institution generally adopts a deliberate and cautious strategy when it comes to investing. This enables them to withstand short-term market volatility and concentrate on long-term expansion. Despite the strong holding, the institution has traditionally used a proactive investing strategy, aiming to surpass benchmark indexes rather than just mirroring them passively. This entails formulating investment judgments by doing thorough analysis.

Most of Harvard University's endowment is allocated to specific initiatives within different departments and is employed in accordance with the terms established by the donors. The main areas of finance largely provide money for the purpose of funding teaching staff salaries, financial aid and scholarships, alumni fellowships, assistance towards research projects, and funding towards student's activities. Overall, the institute is committed to maintaining the value of its endowments by carefully allocating a limited amount of funds each year and saving any excess for future growth and assistance, which guarantees the perpetual protection of the endowment money and assures equitable treatment throughout successive generations.

***Stanford University***

Stanford University, established in 1885 and situated in California, is among the top ten institutions worldwide in the domains of education, engineering, law, medicine, and business. The university's endowment, which comprises around 75% of the Merged Pool and other assets like real estate, reached a value of $36.5 billion on August 31, 2023, marking the end of its fiscal year (Stanford News, 2023). The management of the Stanford University endowment has effectively implemented a diversification strategy in its investment portfolio. It has also established precise and explicit long-term objectives and an investment policy statement for the university.

Furthermore, it has made investment choices while adhering to a long-term outlook. The management consistently modifies the investment portfolio to maintain the desired asset allocation, ensuring that the endowment remains aligned with its investment objectives. The institute additionally implements and adheres to a sustainable and prudent spending strategy that efficiently oversees the institution's operating budget while simultaneously preserving the purchasing power of the endowment.

Moreover, the university hires proficient investment managers who include ethical investing concepts into their administration of the endowment. This ensures that the investments align with the institution's values and goals. Stanford University's primary objective was to uphold openness in the financial performance of its endowment and communicate the outcomes to stakeholders, such as donors, to cultivate trust and confidence in the administration of the fund. In doing so, the institution has cultivated robust connections with donors and actively engaged them in the administration of the endowment, leading to a notable rise in support and generous donations.

***The University of Oxford, UK***

The University of Oxford, established in the 12th century, is a prestigious institution located in Oxford, England. Renowned for its rich history and academic excellence. Oxford is characterized by its unique collegiate system, with 39 self-governing colleges that offer a wide range of undergraduate and postgraduate programs across various disciplines, including humanities, sciences, social sciences, and more. The endowment fund of Oxford university has grown to over £6 billion in 2022 due to a mix of strong performance and investments from investors. Interestingly, the Oxford Endowment Fund has disbursed worth £1.4 billion and yielded a return of 224.8% since its establishment in 2009 (Endowment Management, 2023). Oxford has a collaborative approach.

Oxford has successfully leveraged endowment monies to improve the quality of academic programs and student outcomes in various ways. The institute provides financial resources to support scholarships and financial assistance initiatives, so enhancing the accessibility of education for students who may lack the means to finance it otherwise. This promotes student diversity and guarantees that academic opportunities are accessible to a wider spectrum of students. Funds at Oxford are kept providing financial assistance for research institutes, labs, and the acquisition of equipment, so enabling advanced research and fostering innovation that not only improves the caliber of academic programs but also offers students the chance to participate in research endeavors.

Endowment funds at Oxford are also utilized to establish novel academic programs, enhance current ones, and broaden services in regions with significant demand. This facilitates the adjustment of Oxford colleges to changing educational demands and enables them to maintain a competitive edge. Endowment monies are also utilized to augment library holdings and provide resources towards contemporary technological infrastructure.

This guarantees that students at Oxford are provided with current materials and digital technologies, hence enhancing the entire learning experience. In addition, Oxford fund initiatives facilitate students' practical learning experiences, internships, and cooperative education possibilities. These encounters bolster their practical aptitudes and equip them for the professional realm. Endowment monies are allocated towards the upkeep and enhancement of campus infrastructure, encompassing classrooms, labs, and communal areas.

***Forman Christian College (A Chartered University), Lahore Pakistan***

Forman Christian College (FCC), located in Lahore, Pakistan, is a renowned institution with a rich history dating back to 1864. Initially founded by Dr. Charles W. Forman, a Presbyterian missionary, the university has evolved into a center of academic excellence. FCC offers a diverse range of undergraduate and postgraduate programs, emphasizing a holistic education that blends academics, extracurricular activities, and character development. The campus is a blend of historic and modern architecture, reflecting its commitment to tradition and innovation. Known for liberal arts studies, fostering critical thinking and cultural awareness, FCC continues to shape the future leaders of Pakistan.

The University Endowments fund of Rupee 309 million comprises of extremely restricted contributions and attributed net growth. This endowment fund has been established in accordance with Higher Education Commission (HEC) mandatory requirement and in accordance with objective established by the Board of Governors/donors, where the profit of the endowment is primarily given in the form of scholarship to the deserving students. Forman examines the problems and limitations faced in managing endowment money while allocated to financial markets, and economic downturns that resulted in swings in the endowment's value. To tackle this difficulty, Forman has taken steps to diversify their investment portfolios, establish explicit investing objectives, and maintain a long-term outlook. Over time, inflation has gradually diminished the actual worth of endowment money. To address this issue, the University frequently aims to achieve a rate of return on investments that is above the inflation rate, thereby guaranteeing the preservation of the endowment's buying power.

The institute aims to remain updated on regulatory modifications and adjust their plans accordingly as tax legislation and rules pertaining to endowments are subject to change, which can have an influence on the administration and utilization of these funds. Moreover, the university intends to establish the optimal drawing rate for endowment funds to sustain their operational budgets while safeguarding the principle as achieving an optimal equilibrium long-term viability must be ensured. Also, Forman aims to frequently engage in growing the endowment fund and bring it to the level that in the next 10-15 years university may be able to decrease fees through investment returns.

***Edwardes College, Peshawar, Pakistan***

Edwardes College in Peshawar, Pakistan, stands as a symbol of educational heritage since its establishment in 1900. Named after Sir Herbert Benjamin Edwardes, a prominent British colonial officer, the college has a legacy of providing quality education. Edwardes offers a wide array of academic disciplines, emphasizing intellectual growth and character development. The campus boasts a blend of historic and modern architecture, creating a conducive environment for learning. With a commitment to nurturing well-rounded individuals, Edwardes College plays a crucial role in shaping the academic landscape of Peshawar and contributing to the nation's intellectual capital. Edwardes College established its functional endowment system in 2015 with a very less amount of less than three million, however, in 2029 reached to Rs 300 million. The institute proficiently conveyed their requirements and accomplishments to local donors, non-governmental organizations, foreign missionary donors and alumni, where the college management used its robust connections for expanding the endowment funds.

The college maintained consistent and effective governance of endowment for responsible stewardship for which the management fostered trust and confidence among contributors that created confidence

towards maintaining these resources in accordance with their set objective. Moreover, the college prepared set policies stipulating investment techniques and optimal approaches and got it approved by the Finance Committee, Executive Committee and Board of Governors. These policies clearly define the objectives, risk tolerance, and approaches for handling endowments inside the college. In addition, the college investment portfolio was made for mitigating risk and maximizing long-term gains by effectively navigating market swings and obtaining stable returns by maintaining a long-term investment strategy.

The college also prioritize donor interactions, focused fundraising efforts, and alumni involvement as strategies to expand its endowment assets. The management remained focused on implementing efficient risk management methodologies and financial planning to identify and address potential hazards. Effectively conveying the institution's fiscal well-being, endowment progress, and influence on donors and stakeholders that remained crucial for establishing confidence and obtaining backing.

***Christian Educational Endowment Trust, Lahore Pakistan***

The Christian Educational Endowment Trust (CEET) located in Lahore, Pakistan, plays a pivotal role in supporting Christian educational initiatives. Established to address the financial challenges faced by Christian educational institutions, CEET focuses on ensuring access to quality education for the Christian community. CEET established its endowment in 1969 and has reached Rs 70 million in 2023. By providing financial aid, scholarships, and resources, CEET aims to uplift and empower students, fostering academic excellence and personal growth. This trust contributes significantly to the sustainability of Christian educational institutions, promoting inclusivity and equal opportunities. Through its dedicated efforts, CEET stands as a beacon of support, enhancing the educational landscape for Christian students in Lahore and beyond.

CEET explores a variety of funding sources, including money from investments, government grants, private donations, corporate sponsorships, and international aid, where specifically it does not rely on a single source to minimize financial vulnerability. The institute has collaborated with other non-governmental organizations (NGOs), governmental agencies, and private sector entities. This partnership has led to shared resources, expertise, and increased visibility, attracting more funding opportunities. The trust has maintained transparent and accountable financial practices, regularly communicating its financial reports to donors, showing how funds are being utilized.

This transparency has built confidence and credibility, encouraging continued and increased support. Moreover, the institute developed and executed targeted fundraising campaigns that aligned with the organization's mission and resonated with potential donors. It also utilized online platforms, events, and social media to broaden the reach of fundraising efforts. The trust management developed relationships with individual donors who are passionate about the organization's cause, regularly engaged with them through personalized communication, updates, and events. Invested in professional grant writing to increase the success rate of securing grants, tailored proposals of funding organizations demonstrating a clear understanding of their goals and how the NGO aligns with them.

The institute clearly articulated the impact of the NGO's programs and projects by using data and success stories to show how contributions make a tangible difference knowing that donors are more likely to invest in organizations that can demonstrate positive outcomes. In addition, CEET has continued working with financial experts to explore responsible and sustainable investment options for the endowment, where a well-managed investment portfolio can generate returns that contribute to the long-term financial health of the organization. The trust engaged in advocacy efforts to raise awareness about the NGO's mission and the social issues it addresses to attract support from various stakeholders, including donors. The trust periodically evaluates the effectiveness of fundraising strategies and adjusts as needed. It always stayed informed about changing donor trends and remained adaptive in response to the evolving social and economic landscape.

**Recommendations to Higher Education Institutions to improve Quality Assurance through Strategic Endowment Fund Management**

The strategic administration of endowment funds in higher education is vital for guaranteeing the long-term financial stability of academic institutions. Financial stability is an essential aspect of quality assurance since it enables universities to sustain and enhance their educational programs. The endowment funds can

be utilized to provide financial assistance for many endeavors, including but not limited to scholarships, research grants, infrastructure enhancements, and faculty recruiting. Efficient distribution of these resources can improve the overall caliber of education offered by the school, whereas the effective administration of endowments may support the establishment of novel programs, research institutes, and academic initiatives that enhance the standard of education. From the discussion derived from various case studies, this study has identified several suggestions for strategic management of endowment funds for quality control.

***Comprehensive Strategy:***

To enhance quality assurance via strategic management of endowment funds, higher education institutions should establish a comprehensive investment strategy that clearly defines the institution's investment goals, risk tolerance, asset allocation, and spending policy.

***Diversifying the assets***

The research recommends that institutions should diversify their assets across different asset classes to mitigate risk and generate more consistent returns over a period. Consider a combination of stocks, bonds, unconventional investments, and tangible assets. It is imperative to prioritize long-term sustainability and refrain from short-term thinking and market-timing. The focus should be on protecting the true value of the endowment.

***Spending guidelines***

It is crucial to create clear spending rules that strike a balance between supporting the institution's operational budget and preserving the principle of the endowment. The institute should further contemplate integrating ethical concepts into the endowment management plan to synchronize investments with the institution's values and goal.

***Long-term viability***

Creating an endowment committee or board consisting of a diverse group of financial specialists, institutional stakeholders, and independent members to provide efficient governance and supervision. Regularly assess the performance of the investment portfolio and readjust it as needed to uphold the planned distribution of assets. Reassess the investment strategy of the institution in response to changing market circumstances and objectives. Identify and address several types of risks, such as market risk, inflation risk, and liquidity risk, to safeguard the value of the endowment and assure its long-term viability.

***Connections***

Cultivate robust connections with donors, include them in the administration of the endowment, and showcase the tangible effects of their donations on the institution's excellence and purpose. Create focused fundraising campaigns and alumni engagement activities to expand the endowment, enabling more financial backing for academic programs and improvements in quality.

***Collaborative approach***

Ensure openness in the administration of endowments by effectively communicating the financial performance, investment strategies, and outcomes of the fund to donors, stakeholders, and the public. Ensure that the administration of the endowment fund is in accordance with the strategic objectives of the institution and contributes to the fulfillment of its purpose. Reflect upon the ways in which endowment monies might improve academic programs and positively impact student achievements. Deliver instruction and training to staff, board members, contributors, and other stakeholders engaged in endowment administration to guarantee that all individuals are thoroughly knowledgeable about optimal methodologies and developing plans.

***Knowledge exchange***

Engage in partnerships with other institutions, investment experts, and consultants to acquire valuable knowledge, exchange information, and tap into specialized skills in managing endowments. Consistently evaluate the performance and efficacy of the endowment management plan. Adapt and modify as needed to match evolving conditions and objectives. Ensure the team is well-informed and adhere to the applicable tax rules, regulations, and reporting obligations that regulate the management of endowments.

***Caution***

Institutions and their investment committees are obligated to fulfill their fiduciary obligation by prioritizing the best interests of the endowment and its beneficiaries, who include donors, students, and the school itself. This entails making judicious investment choices and meticulously overseeing the endowment with the utmost caution. Establish unambiguous investment rules and standards to direct investment choices, and periodically assess them to ensure they continue to adhere to the institution's fiduciary obligations. Numerous endowment funds are accompanied by explicit donor limits and objectives. It is of utmost importance to show respect and reverence for the wishes of the donor, and any divergence from the donor's intentions must be approached with extreme caution and legal advice.

***Socially responsible***

Certain organizations give priority to ethical or socially responsible investment while managing their endowments. Striking a balance between ethical beliefs and financial responsibilities may be an intricate undertaking. Establish explicit criteria for ethical and socially responsible investment that are in accordance with the institution's core principles. Convey these instructions to anyone with an interest in the matter and strictly follow them while making investment choices.

***Transparency***

Remain knowledgeable about pertinent laws and regulations and guarantee that the management methods of endowment funds align with these stipulations. Having a legal advisor who specializes in nonprofit and higher education law might be quite beneficial in this situation. Transparent reporting to donors, governing boards, and the public is necessary for endowment funds. Stakeholders require access to comprehensive information about the performance and utilization of the endowment. Create a resilient system for documenting the performance and utilization of the endowment fund, and consistently and effectively convey this information to relevant parties. Transparency fosters confidence.

***Donations***

Establish unambiguous gift acceptance policies to provide guidance on the institution's procedures for accepting and handling gifts, particularly those designated for the endowment. Create gift acceptance regulations that clearly define the eligible assets, the specific circumstances for acceptance, and any accompanying limitations or restrictions. These policies serve to guarantee that donations are in accordance with the institution's mission and values. Institutions have an ethical and legal obligation to serve as responsible caretakers of endowment monies. The purpose of these monies is to enhance the institution's mission and ensure the provision of high-quality education. Consistently provide education to endowment managers, board members, and staff on their duties as custodians of endowment assets and highlight the institution's dedication to responsible administration.

## Conclusion

In conclusion, the study on multiple cases of higher education institutes and the strategic administration of endowment fund has proved to be a resultful study where practitioners and academics alike could take idea from these findings and build strategic plan for investing endowment funds and ensuring quality education. The study was descriptive in nature; however, future studies could build around explanatory methods and test the causal effect between management of endowment funds and quality assurance. Moreover, this study focused solely on successful cases of funds management, however future studies could take on board management perspectives from both ends i.e., successful, and non-successful cases and identify the differences in patterns for a strategic plan.

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# Improvement of Overall Equipment Effectiveness Through Planned Equipment Maintenance: A Case Study

**Asser Letsatsi Tau**
**Emmanuel Innocents Edoun**
**Charles Mbohwa**
**Anup Pradhan**
University of Johannesburg, South Africa

**Key words**
Availability, bottleneck, classifier, OEE and reliability

**Abstract**

*Maintenance of equipment in a manufacturing facility is of great importance to ensure availability, performance, and production of goods at the right quality level. Overall Equipment Effectiveness (OEE) is a good key performance indicator for monitoring and controlling the reliability of equipment within a production system. Classifier is one of the major equipment forming an integral part of a production line within a coal fly ash processing plant. The classifier had a capacity to produce 45 tons per hour of product, but its productivity had reduced to 33 tons per hour. Through bottleneck identification, it was noted that some of the components of the classifier had worn and tear, thus needs to be replaced. Planned maintenance of the classifier was carried out for a period of five days on shutdown. Data was collected over 31 days before the maintenance and 31 days after maintenance for availability, performance and quality of goods produced to quantify OEE before and after the maintenance. Although the classifier was producing less than its capacity, the goods produced were within the acceptable quality level, thus 100%. Post the maintenance, the production rate increased by 30.30%. The OEE improved by 21.76%, which ultimately improved the availability of products to customers. The Turn-Around-Time of trucks on the despatch line improved by 29.76%. A maintenance programme was recommended to have a system in place to be followed for maintainability of the equipment, thus, to have a sustained OEE.*

## Introduction

### *Background*

To stay competitive in an ever-changing technological improvement on equipment of a manufacturing plant, most manufacturers strive to enhance the performance of their equipment for the purpose of increasing and maintaining its reliability and of the overall industrial plant in general. These help in ensuring better efficiency of equipment that forms part of a system that makes up the industrial plant to produce products to supply customers.

Mechanical equipment tends to underperform due to common reasons such as aging, worn components, lack of maintenance or continuous operator error. O'Connor and Kleyner (2012) indicated that the following could be the reasons why engineering products fail: the product design might be inherently incapable, product being in some way overstressed such that the stress being applied exceeds the strength, failures might be caused by variation, failures can be caused by wear-out, mechanisms of time dependency and errors such as specifications that are incorrect, for example, coding in software coding, designs or by assembly that is faulty and maintenance that is incorrect or inadequate.

In a coal fly ash processing plant, like other industrial plants, equipment exist which require good level of attention to maintain the equipment in thier efficient, operable state. A classifier is one of the equipment that is found in a coal fly ash processing plant. The function of a classifier in such a plant is to separate raw feed coal fly ash into fine material and tailings (rejects) material. The fine fly ash is considered as product at a targeted fineness level meanwhile the tailings are considered unwanted material. When such equipment produces fewer quantity of product than its design capacity and it is not available, such process parameters denote that the equipment's reliability has deteriorated. It is also important to also account for other process parameters of the concerned manufacturing plant.

### *Problem statement*

The manufacturing plant experienced challenges with low production outputs of 33 tons per hour on average compared to the designed capacity of 45 tons an hour when using the classifier at the coal fly ash processing plant. This was further due to continuous unplanned downtime on the classifier, which affected the supply of product to market. The equipment's unavailability ultimately negatively affected the Overall Equipment Effectiveness as a measure of performance.

**Objectives**

***Overall objective***

The overall objective of the study was to improve the Overall Equipment Effectiveness (OEE) through equipment planned maintenance.

***Sub-objectives***

To identify the process bottleneck that led to the lower equipment performance.

To establish the current performance of equipment with respect to production output and OEE.

To conduct a planned maintenance on the equipment for the purpose of OEE performance improvement.

**Literature review**

Generally, the manufacturing industry is targeting production of goods of the right quality and quantity, and to deliver them at the right time to customers. To fulfil this, manufacturing plant should be operational efficiently and effectively. The manufacturers target to produce the goods at a profit, and this is achieved through the usage of a system of maintenance that is effective and assist with minimisation of downtime of machines because of stoppages that are unwarranted. Poor equipment performance, downtime and plant maintenance that is inefficient leads to reduction in profit, loss of opportunities in the market and production losses (Fore & Zuze, 2010). Fore & Zuze (2010) further indicated that low plant reliability and overtime cost can affect the manufacturing industry negatively based on its operational efficiency. Thus, an efficient and effective system for maintenance of equipment and plant in general is needed.Maintenance plays a vital role for the preservation of design life of an equipment and overall plant. The basic practices to improve equipment life through maintenance is conducted based on factors such as adjustments of loose belts, lubrication of parts and replacement of components that are faulty. Proper maintenance of equipment assists in equipment being capable to handle tolerances better, reduction in generation of scrap, improvement in the consistency and quality of product being produced (Jiménez et al., 2017). Thus, maintenance refers to the process of taking good housekeeping of machines and equipment for the purpose of achieving a maintained operable efficiency and useful life that is prolonged. Organisation takes necessary precautions during maintenance to replace, repair and maintain the components and equipment of the plant, which ultimately permits operation within limits that are satisfactory (Singh et al., 2020). Maintenance entails the routine and recurring process that is carried out to keep an equipment in its operating conditions that are normal to deliver expected performance (Tsang et al., 1999).

Improvement of performance of an equipment, operating procedures and processes of maintenances can be measured and analysed through implementation of Overall Equipment Maintenance (ATS International B.V, 2010).

OEE is a way in which monitoring and improvement of efficiency of manufacturing process can be carried out (Patel & Deshpande, 2016). It has been introduced in 1988 by Nakajima as a key performance indicator of Total Productive Maintenance (Ng Corrales et al., 2020). Since the development of this concept, it has been an accepted tool of management for measurement and evaluation of plant's floor productivity (Patel & Deshpande, 2016). OEE is the productivity ratio between real manufacturing and what could be manufactured ideally. Many companies use OEE as a critical tool, for example, when implementing lean manufacturing philosophies, or when implementing maintenance programs and for the purpose of monitoring actual equipment performance (Ng Corrales et al., 2020). Patel & Deshpande (2016) stated the metrics that measure OEE as availability, performance, and quality.

ATS International B.V (2010) and Hendri et al. (2019) defined and mathematically exprssed these factors of OEE as follows:

Availabilty refers to the percentage of time that are allocated to machine for a scheduled production in comparison to the amount of time that were actually spent in production. It is a factor that is calculated using the following equation:

Availability = $\frac{Operating\ time}{planned\ production\ time}$

Performance entails the comparison of the theoritical machine rate with the number of actual items produced on the machine during the operating time spent,calculated as follows:

Performance = $\frac{Total\ pieces}{Operating\ time \div Ideal\ run\ rate}$

Meanwhile, quality entails the percentage of items that passes the first inspection of quality post production and it is calculated as follows:

Quality = $\frac{Good\ pieces}{Total\ pieces}$

Thus, OEE take into account these factors and is caculated as expressed by the following equation defined by Vorne (2014) and Hendri et al. (2019):

OEE = Availability × Performance × Quality × 100

The initial OEE industry performance can be used as a benchmark for the purpose of comparing current OEE values of manufacturing system for the purpose of noting the need to improve, this is one of the quantitative performance metrics. OEE of 85% was suggested as an ideal value which is known as a world class value for measurement of components at availability rate of 90%, rate of performance of 95% and quality rate of quality rate of 99% (Cheh et al., 2016; Patel & Deshpande, 2016; Nakajima, 1988). Further research indicated that an OEE of greater than 50% is acceptable based on real performance rate, quality rate and availability of equipment. Typical manufacturing factors that affect OEE include breakdown (i.e., equipment failure), set-up and adjustment, idling and minor stoppages, reduction in speed, defects in quality and rework (Cheh et al., 2016).

ATS International B.V (2010) further indicated that some of the benefits that an enterprise can benefit from implemention of adequate system for tracking OEE include reduced downtime, reduced costs of repairs, maximised labour efficiencies, improved quality, maximsed productivity of personnel and increased capability of production.

## Methodology

### *Process bottleneck identification*

During the operation of the equipment (classifier), a high wear on the components, viz: rotor, vanes, buffer plates and seals were identified through visual inspection and resulted with low production rate of 33 tons per hour instead of a minimum of 40 tons per hour to a maximum of 45 tons per hour. This was further identified to be as a result of raw feed coal fly ash by-passing the system straight to the tailings side (rejects) of the classifier.

The results of actual production output, availability and quality were collected. OEE was calculted using the data which was initially collected over 31 days period thus indentifying that OEE was 51% instead of the targeted amount of ≥ 70%. The following formulars were used to calculate OEE:

OEE = (Availability × Performance × Quality) × 100
Where: Availability = (Operating time)/ (Planned production time)
Availability = (Actual equipment running time)/ (Planned production time)
Availability = (Actual equipment running time)/ (Planned production time)
Performance = (Actual equipment production run rate)/ (Ideal equipment run rate)
Quality = (Good pieces produced)/ (Total pieces produced)
Quality = (Good pieces produced Waste or rejects pieces)/ (Total pieces produced)

Data presented on Table 4 and Table 5 in the appendix was used to calculate availability and performance. The quality of goods produced was always 1 (or 100%), thus goods were always in specification. All these neccisitated the need for planned maintenance to improve the performance of the classifier.

***Planned classifer equipment maintenance***

Post the identification of the process bottleneck, a planned maintenance was conducted across the classification plant section of the coal fly ash processing plant. The maintenance entailed the replacment of the parts/components of the classifier that went through wear and tear.

Table 1 shows the components that were replaced and their function on the efficient operation of the classifier.

| **Component/Part** | **Function of the component on the classifier operation** |
|---|---|
| Shaft classifer | Drive shaft of the rotor, connecting the rotor to drive gearbox |
| Taper lock, fenner | Taper lock bush for fitting and securing coupling to shaft |
| Coupling | Coupling flanges for fitting tyre coupling connecting shaft and gearbox |
| Tyre, fenaflex | Coupling that connects the gearbox and separator shaft |
| Plate, buffer, O-seperator | Hard wear component for reducing wear from ash inside separator |
| Seal, O-seperator | Seal between the rotor and separator body |
| Rotor, O-seperator | Rotor is the rotating part of the separator that disperses the material |
| Vane, O-seperator | Assist with air flow though the separator to separate material particals |
| Element, coupling | Connection between motor and gearbox |
| Fan, centrifugal | Induces a draft through the separator to remove fine ash particles through to the cyclone |
| Impeller fan, axial (helicoidal) | Hard surfaced fan blades for inducing draft though separator |

Table 1: Classifier maintenance components

The maintenance was carried out over a five-day plant shutdown period. The following section explains in detail what has been achieved on each day of the maintenance, thus in order to improve the reliability of equipment.

**Five-day kaizen event planned equipment maintenance.**

***Day one***

The scope of the maintenance was discussed with everyone who was part of the project crew. Job hazard analysis was conducted for each activity that was executed. Log Out Tag Out Try Out (LOTOTO) safely procedure was followed. This was followed by isolating the classifier from the system by closing its raw coal fly ash feeding line, so it could be inspected while on a shutdown. The circulation fan was replaced as it contributed to the poor production output of the classifier system due to high wear and vibrations. Furthermore, the supporting structures and platforms were stripped to gain access for building scaffolds to remove the classifier cone.

***Day two***

The classifier was stripped to remove its internals to replace the critical parts that went through wear and tear. These involved removal of cones, rotor, buffer plates, vanes and seals and tiling inspection. Figure 1 shows some of these components during the striping of the classifier.

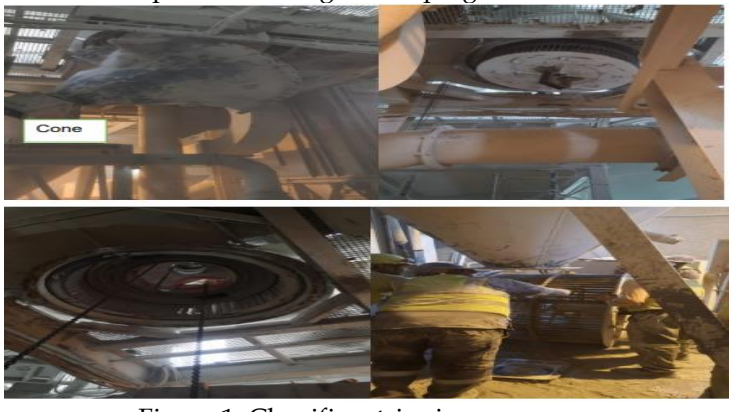


Figure 1: Classifier stripping

***Day three***

The installation of new vanes, rotors, seals, shaft, buffer plates and replacement of filter bags and assembling of the circulation fan were carried out. Figure 2 shows some of these assembling activities.


Figure 2: Classifier parts/components assembling.

***Day four***

Continuation of installation of the internal classifier components and tailings cone after some modifications were required for spare parts to fit. The separator was started, and the test ran without raw coal fly ash feed until satisfied with the running condition and no abnormalities were observed.

***Day five***

The classifier was run with raw coal fly ash feed, a blockage of the product cyclone was encountered due to a sealing cloth that came loose and blocked the outlet, causing the separator to trip, the cyclone was drained, and cloth membrane removed.

The classifier was restarted and feed opened, and material classified conformed to quality standards of product and increased production rate from 33 tons per hour to 43 tons per hour. Post the successfully planned maintenance, new data on the improved system was collected over 31 days. The after-maintenance key performance indicators on production output and OEE and Turn Around Time (TAT) (Gate in Gate Out and Yard in Gate Out) results were collected. The Gate in Gate Out (GIGO) and Yard in Gate Out (YIGO) data were collected using stopwatch and despatch software system using a truck for the time observations during the product despatch at the plant. The following formulas were used to calculate TAT:

TAT = (YIGO-GIGO)/2
Where: YIGO = Time truck gate out – Time truck gate in
GIGO = Time truck finish loading – Time truck arrival dispatch

**Results and discussion**

***Production output, OEE and TAT results before equipment maintenance***

Figure 3 graphically represents OEE as a function of time meanwhile Figure 4 indicates production rate as a function of time before classifier maintenance. The OEE and production rate before the equipment maintenance showed an inconsistent performance mainly because of the unavailability of the equipment due to unplanned downtimes. A peek OEE of 93% was achieved on day 12 when the production rate was 43.7 tons per hour. This is because downtimes were minimum and the total quantity produced during this day amounted to 1005.10 tons which further amounted to 31 number of trucks dispatched on average (refer to appendix, Table 4). Meanwhile, the lowest OEE of -6.00% was achieved during day 18 with production rate of 30.74 tons per hour as indicated on Figure 3, Figure 4, and Table 4 (appendix). This was further indicated by a total of downtime of 26 hours.

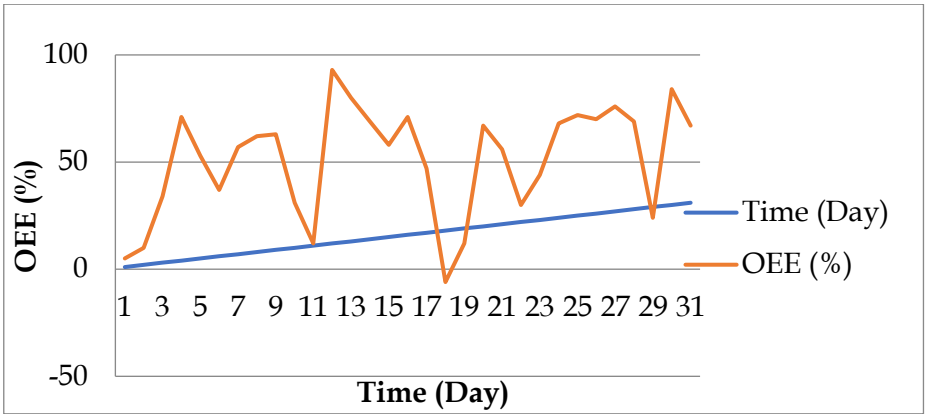


Figure 3: OEE versus time graph before classifier maintenance

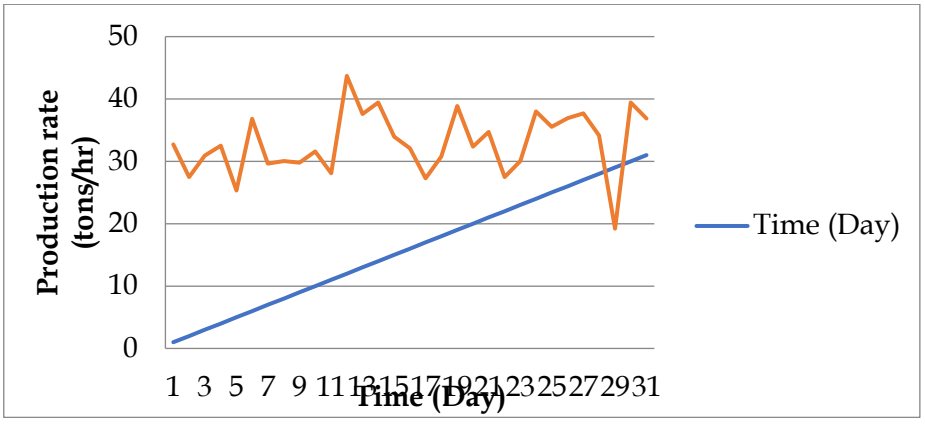


Figure 4: Production rate versus time before classifier maintenance

Figure 5 indicates the turnaround time of trucks before the maintenance being conducted. It can be noted that on day 12, the TAT was 106 minutes on average, meanwhile on day 18, the average TAT was 99 minutes as most trucks did arrive at plant due to assumed longer TAT.

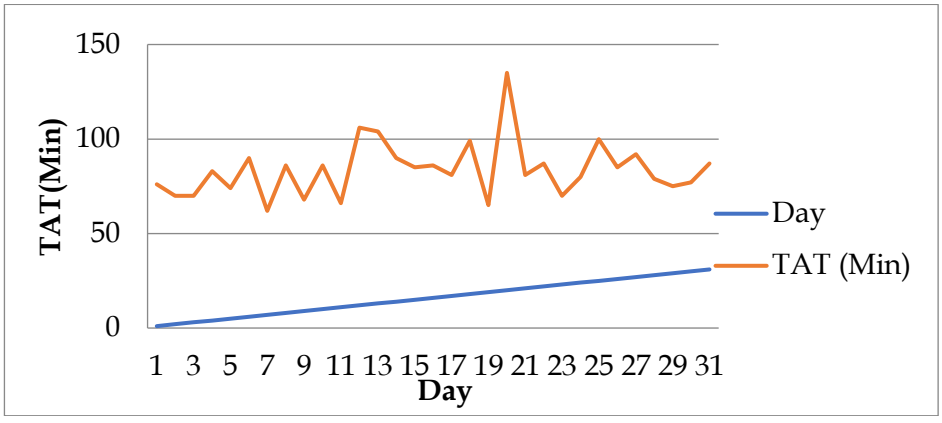


Figure 5: TAT before maintenance

This further cascaded into longer TAT of trucks while at the plant to load product for customers as the product output from the classifier directly affected daily product despatches.

***Production output and OEE results after equipment maintenance.***

Figure 6 indicates OEE as a function time after maintenance on classifier. It was noted that a maximum of 98% and a production rate of 44.20 tons per hour was achieved as indicated by Figure 7 on the same day. Furthermore, this indicated that TAT of trucks was improved to 53 minutes after maintenance as indicated by Figure 8.

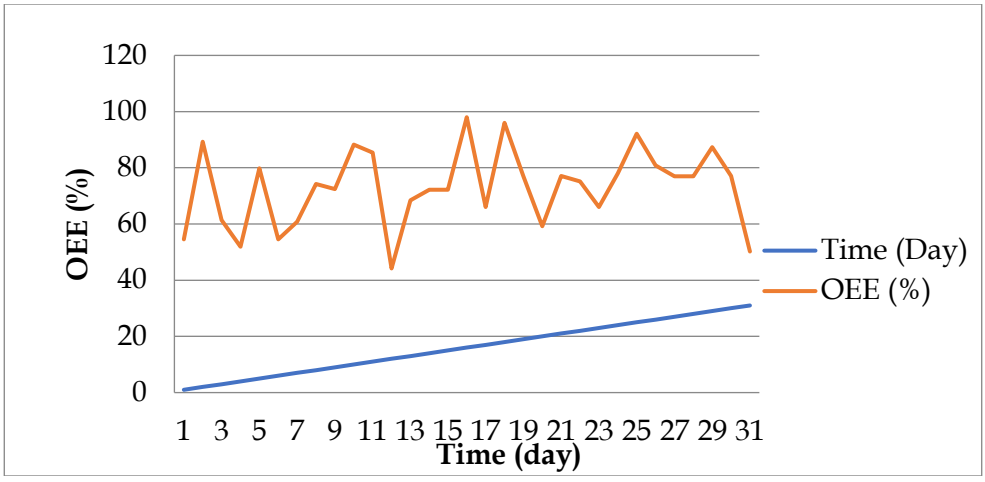


Figure 6: OEE versus time graph after classifier maintenance

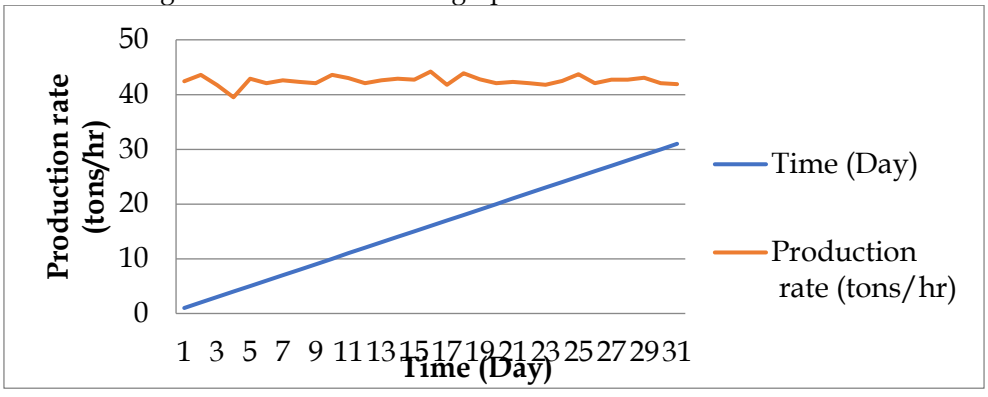


Figure 7: Production rate versus time after classifier after maintenance

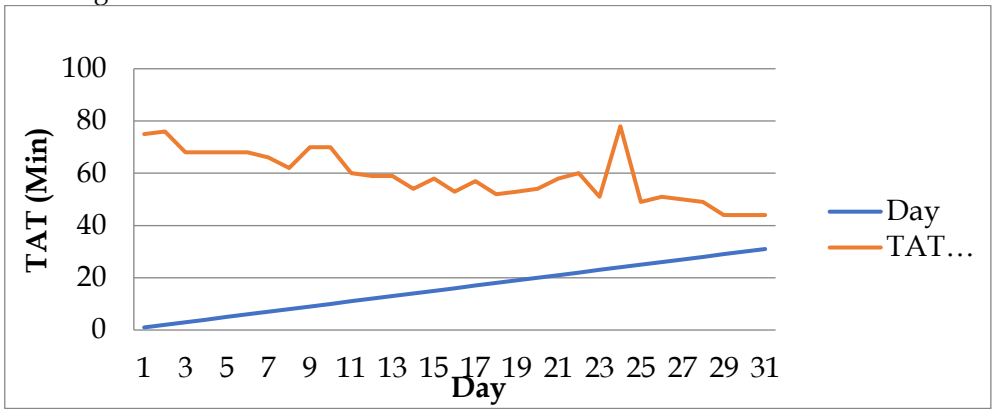


Figure 8: TAT after maintenance

Post the maintenance, the utilization of the equipment improved thus with production rate indicating consistent production output across the classifier, with average production of 42.51 tons/hr. The average

OEE also showed consistent performance improvement, 73.02% was achieved on average. Meanwhile the Turn Around Time has improved from 84 minutes to 59 minutes on average.

**Conclusion**

It was evident that maintenance improves the Overall Equipment Effectiveness when other systems or process variables remain constant at efficient levels as noted in the study. After the maintenance activities, the utilization of the equipment improved production rate by 30.30%. The OEE improved by 21.76%, that is, from 51.17% to 72.93%. This further cascaded to improved product availability and improved product supply to customers. The TAT of trucks at the factory improved along the despatch line, ensuring timeous delivery of products to customers On-Time-In-Full (OTIF). TAT improved by 29.76% post equipment maintenance.

**Recommendations**

Post the planned maintenance, based on the definition of reliability engineering as defined by Vincent (2010), the basic concepts and fundamentals of reliability as intensively stated by Hashmy (2012) and, Rausand and Hoyland (2004), the reasons why product fails as indicated by O'Connor and Kleyner (2012) together with the consequences associated with products failures as stated by Kapur and Pecht (2014) also based on the governing principles and concepts of repairable and non-repairable items further indicated by O'Connor and Kleyner (2012) together with Jackson (2012), a maintanence programme was implemented in order to maintain the classifer as it affects the relaibility of the coal fly ash processing plant. The programme entailed routine daily visual inspection before any shift begins on the system components. Also, weekly inspection of classifier internals to determine wear, external inspection of V-belts and drive system coupling, gearbox and motors and replacement of spare part where required, were part of the maintenance program initiated.

Autonomous maintenence training was given to the general plant maintenance patrollers in order to maintain and standardize the task as a preventitive plan to avoid any classifer breakdown which can cause downtimes.

In this way, this will further keep the equipment maintained. Thus, standardization of work on the maintenance program was made with the set standards assisted to reduce variations of the operation of the classifier. Correction of any errors that might arise can be avoided by being proactive in the case of no standards governing the classifier utilisation. Improvement on safe operation of the equipment and the coal fly ash processing plant as no unsafe operation of the classifier was operated as the general plant maintenance patrollers were trained on monitoring and control of the classifier. Standardization was followed as defined by Košturiak et al. (2010) on the key functional benefits of using standardization.

**Limitations and direction for future study**

The findings of the study were only applicable to the case study and thus cannot be concluded on generalisation. However, the findings can be used as a benchmark on deployment of planned equipment maintenance to improve overall equipment effectiveness in a manufacturing facility. Future studies should consider the use of other lean tools to investigate continuous improvement in manufacturing companies.

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## Appendix

| Day | Actual Production Rate (tons/hr) | OEE (%) | TAT YIGO+GIGO Hr: min:sec |
|---|---|---|---|
| 1 | 32.7 | 5 | 01:16:00 |
| 2 | 27.5 | 10 | 01:10:30 |
| 3 | 30.93 | 34 | 01:10:30 |
| 4 | 32.5 | 71 | 01:23:30 |
| 5 | 25.3 | 53 | 01:14:30 |
| 6 | 36.8 | 37 | 01:30:30 |
| 7 | 29.63 | 57 | 01:02:00 |
| 8 | 30.07 | 62 | 01:26:00 |
| 9 | 29.8 | 63 | 01:08:00 |
| 10 | 31.6 | 31 | 01:26:30 |
| 11 | 28.1 | 12 | 01:06:30 |
| 12 | 43.7 | 93 | 01:46:00 |
| 13 | 37.6 | 80 | 01:44:00 |
| 14 | 39.45 | 69 | 01:30:30 |
| 15 | 33.97 | 58 | 01:25:00 |
| 16 | 32.10 | 71 | 01:26:00 |
| 17 | 27.25 | 47 | 01:21:00 |
| 18 | 30.74 | -6 | 01:39:00 |
| 19 | 38.87 | 12 | 01:05:00 |
| 20 | 32.33 | 67 | 01:35:30 |
| 21 | 34.7 | 56 | 01:21:30 |
| 22 | 27.5 | 30 | 01:27:30 |
| 23 | 30.05 | 44 | 01:10:30 |
| 24 | 38.01 | 68 | 01:20:30 |
| 25 | 35.55 | 72 | 01:40:00 |
| 26 | 36.9 | 70 | 01:25:30 |
| 27 | 37.7 | 76 | 01:32:00 |
| 38 | 34.16 | 69 | 01:19:00 |
| 29 | 19.2 | 24 | 01:15:00 |
| 30 | 39.43 | 84 | 01:17:30 |
| 31 | 36.85 | 67 | 01:27:00 |

Table 2: Results before classifier maintenance

| Day | Actual Production Rate (tons/hr) | OEE (%) | TAT YIGO+GIGO Hr: min:sec |
|---|---|---|---|
| 1 | 42.40 | 54.52 | 01:15:00 |
| 2 | 43.60 | 89.24 | 01:16:00 |
| 3 | 41.70 | 61.38 | 01:08:30 |

| | | | |
|---|---|---|---|
| 4 | 39.50 | 51.92 | 01:08:00 |
| 5 | 42.90 | 79.80 | 01:08:30 |
| 6 | 42.10 | 54.52 | 01:08:00 |
| 7 | 42.60 | 60.8 | 01:06:00 |
| 8 | 42.30 | 74.26 | 01:02:30 |
| 9 | 42.10 | 72.38 | 01:10:30 |
| 10 | 43.60 | 88.27 | 01:10:00 |
| 11 | 43.00 | 85.44 | 01:00:00 |
| 12 | 42.10 | 44.18 | 00:59:00 |
| 13 | 42.60 | 68.40 | 00:59:00 |
| 14 | 42.90 | 72.20 | 00:54:00 |
| 15 | 42.70 | 72.20 | 00:58:00 |
| 16 | 44.20 | 98.00 | 00:53:30 |
| 17 | 41.80 | 66.03 | 00:57:00 |
| 18 | 43.90 | 96.04 | 00:52:00 |
| 19 | 42.80 | 76.95 | 00:53:00 |
| 20 | 42.10 | 59.22 | 00:54:30 |
| 21 | 42.30 | 77.08 | 00:58:30 |
| 22 | 42.10 | 75.20 | 01:00:00 |
| 23 | 41.80 | 66.03 | 00:51:00 |
| 24 | 42.50 | 78.02 | 01:18:30 |
| 25 | 43.70 | 92.15 | 00:49:30 |
| 26 | 42.10 | 80.84 | 00:51:00 |
| 27 | 42.70 | 76.95 | 00:50:00 |
| 38 | 42.70 | 76.95 | 00:49:00 |
| 29 | 43.10 | 87.36 | 00:44:00 |
| 30 | 42.10 | 77.08 | 00:44:00 |
| 31 | 41.90 | 50.22 | 00:44:30 |

Table 3: Results after classifier maintenance

| | | | | Dispatches per hour | | | Unplanned downtime | | | | Equipment Idle Time | | | | Planned | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Total Produced in Avaialable hours | Total Despatches in available hours of production | Total Waste | Road transport | | Production Rate | Mant B/D | Maint Comp | Maint Leaks | Total | Balance & Setup | Product silo full | Raw Ash supplier | Total | Maintenance | Available Production | Standard Production | Total downtime | Equipment Actual Running | Availability | Performance | Quality | OEE |
| | Quantity producced (Tons) | No. of trucks | Tons | Product Quantity Tons | Total number of trucks | Tons/Hr | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | % | % | % | % |
| 1 | 49.05 | 1.53 | 0 | 32.7 | 1.02 | 32.7 | 22 | 0 | 0 | 22 | 0.5 | 0 | 0 | 0.5 | 0 | 2 | 21.6 | 22.5 | 1.5 | 0.06 | 0.73 | 1.00 | 5 |
| 2 | 103.13 | 3.22 | 0 | 27.5 | 0.86 | 27.5 | 20.25 | 0 | 0 | 20.25 | 0 | 0 | 0 | 0 | 0 | 3.75 | 21.6 | 20.25 | 3.75 | 0.16 | 0.61 | 1.00 | 10 |
| 3 | 371.16 | 11.60 | 0 | 30.93 | 0.97 | 30.93 | 12 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 12 | 21.6 | 12 | 12 | 0.50 | 0.69 | 1.00 | 34 |
| 4 | 763.75 | 23.87 | 0 | 32.5 | 1.02 | 32.5 | 0 | 0 | 0.25 | 0.25 | 0.25 | 0 | 0 | 0.25 | 0 | 23.75 | 21.6 | 0.5 | 23.5 | 0.98 | 0.72 | 1.00 | 71 |
| 5 | 575.58 | 17.99 | 0 | 25.3 | 0.79 | 25.3 | 0 | 0.75 | 0 | 0.75 | 0.5 | 0 | 0 | 0.5 | 18.75 | 23.25 | 5.25 | 1.25 | 22.75 | 0.95 | 0.56 | 1.00 | 53 |
| 6 | 395.60 | 12.36 | 0 | 36.8 | 1.15 | 36.8 | 12 | 0.75 | 0 | 12.75 | 0.5 | 0 | 0 | 0.5 | 0 | 11.25 | 21.6 | 13.25 | 10.75 | 0.45 | 0.82 | 1.00 | 37 |
| 7 | 614.82 | 19.21 | 0 | 29.63 | 0.93 | 29.63 | 1 | 1.25 | 0 | 2.25 | 1 | 0 | 0 | 1 | 0 | 21.75 | 21.6 | 3.25 | 20.75 | 0.86 | 0.66 | 1.00 | 57 |
| 8 | 669.06 | 20.91 | 0 | 30.07 | 0.94 | 30.07 | 0.25 | 0 | 1 | 1.25 | 0.5 | 0 | 0 | 0.5 | 0 | 22.75 | 21.6 | 1.75 | 22.25 | 0.93 | 0.67 | 1.00 | 62 |
| 9 | 685.40 | 21.42 | 0 | 29.8 | 0.93 | 29.8 | 0.5 | 0 | 0 | 0.5 | 0.5 | 0 | 0 | 0.5 | 0 | 23.5 | 21.6 | 1 | 23 | 0.96 | 0.66 | 1.00 | 63 |
| 10 | 331.80 | 10.37 | 0 | 31.6 | 0.99 | 31.6 | 2.25 | 0.75 | 0 | 3 | 2 | 7 | 1.5 | 10.5 | 0 | 21 | 21.6 | 13.5 | 10.5 | 0.44 | 0.70 | 1.00 | 31 |
| 11 | 133.48 | 4.17 | 0 | 28.1 | 0.88 | 28.1 | 6.25 | 0 | 0.25 | 6.5 | 0.75 | 12 | 0 | 12.75 | 0 | 17.5 | 21.6 | 19.25 | 4.75 | 0.20 | 0.62 | 1.00 | 12 |
| 12 | 1005.10 | 31.41 | 0 | 43.7 | 1.37 | 43.7 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 23 | 21.6 | 1 | 23 | 0.96 | 0.97 | 1.00 | 93 |
| 13 | 864.80 | 27.03 | 0 | 37.6 | 1.18 | 37.6 | 0 | 0 | 0.75 | 0.75 | 0.25 | 0 | 0 | 0.25 | 0 | 23.25 | 21.6 | 1 | 23 | 0.96 | 0.84 | 1.00 | 80 |
| 14 | 749.55 | 23.42 | 0 | 39.45 | 1.23 | 39.45 | 0 | 1 | 0 | 1 | 0 | 0 | 4 | 4 | 0 | 23 | 21.6 | 5 | 19 | 0.79 | 0.88 | 1.00 | 69 |
| 15 | 628.45 | 19.64 | 0 | 33.97 | 1.06 | 33.97 | 0 | 3 | 0 | 3 | 1 | 1.5 | 0 | 2.5 | 0 | 21 | 21.6 | 5.5 | 18.5 | 0.77 | 0.75 | 1.00 | 58 |
| 16 | 770.40 | 24.08 | 0 | 32.1 | 1.00 | 32.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 21.6 | 0 | 24 | 1.00 | 0.71 | 1.00 | 71 |
| 17 | 510.94 | 15.97 | 0 | 27.25 | 0.85 | 27.25 | 5.25 | 0 | 0 | 5.25 | 0 | 0 | 0 | 0 | 0 | 18.75 | 21.6 | 5.25 | 18.75 | 0.78 | 0.61 | 1.00 | 47 |
| 18 | -61.48 | -1.92 | 0 | 30.74 | 0.96 | 30.74 | 1 | 2 | 0 | 3 | 2 | 0 | 21 | 23 | 0 | 21 | 21.6 | 26 | -2 | -0.08 | 0.68 | 1.00 | -6 |
| 19 | 126.33 | 3.95 | 0 | 38.87 | 1.21 | 38.87 | 1.25 | 0 | 0 | 1.25 | 0.5 | 0 | 19 | 19.5 | 0 | 22.75 | 21.6 | 20.75 | 3.25 | 0.14 | 0.86 | 1.00 | 12 |
| 20 | 719.34 | 22.48 | 0 | 32.33 | 1.01 | 32.33 | 1.5 | 0.25 | 0 | 1.75 | 0 | 0 | 0 | 0 | 0 | 22.25 | 21.6 | 1.75 | 22.25 | 0.93 | 0.72 | 1.00 | 67 |
| 21 | 607.25 | 18.98 | 0 | 34.7 | 1.08 | 34.7 | 0 | 1 | 0 | 1 | 2 | 0 | 3.5 | 5.5 | 0 | 23 | 21.6 | 6.5 | 17.5 | 0.73 | 0.77 | 1.00 | 56 |
| 22 | 323.13 | 10.10 | 0 | 27.5 | 0.86 | 27.5 | 1.5 | 1.5 | | 3 | 3 | | 6.25 | 9.25 | 0 | 21 | 21.6 | 12.25 | 11.75 | 0.49 | 0.61 | 1.00 | 30 |
| 23 | 473.29 | 14.79 | 0 | 30.05 | 0.94 | 30.05 | 1.75 | 3 | 0 | 4.75 | 2.5 | 0 | 1 | 3.5 | 0 | 19.25 | 21.6 | 8.25 | 15.75 | 0.66 | 0.67 | 1.00 | 44 |
| 24 | 731.69 | 22.87 | 0 | 38.01 | 1.19 | 38.01 | 1.25 | 0.5 | 0 | 1.75 | 2 | 0 | 1 | 3 | 0 | 22.25 | 21.6 | 4.75 | 19.25 | 0.80 | 0.84 | 1.00 | 68 |
| 25 | 773.21 | 24.16 | 0 | 35.55 | 1.11 | 35.55 | 0 | 1 | 0.5 | 1.5 | 0.75 | 0 | 0 | 0.75 | 0 | 22.5 | 21.6 | 2.25 | 21.75 | 0.91 | 0.79 | 1.00 | 72 |
| 26 | 756.45 | 23.64 | 0 | 36.9 | 1.15 | 36.9 | 0 | 0.5 | 0 | 0.5 | 1.5 | 0 | 1.5 | 3 | 0 | 23.5 | 21.6 | 3.5 | 20.5 | 0.85 | 0.82 | 1.00 | 70 |
| 27 | 819.98 | 25.62 | 0 | 37.7 | 1.18 | 37.7 | 2 | 0.25 | 0 | 2.25 | 0 | 0 | 0 | 0 | 0 | 21.75 | 21.6 | 2.25 | 21.75 | 0.91 | 0.84 | 1.00 | 76 |
| 28 | 742.98 | 23.22 | 0 | 34.16 | 1.07 | 34.16 | 1.25 | 1 | 0 | 2.25 | 0 | 0 | 0 | 0 | 0 | 21.75 | 21.6 | 2.25 | 21.75 | 0.91 | 0.76 | 1.00 | 69 |
| 29 | 264.00 | 8.25 | 0 | 19.2 | 0.60 | 19.2 | 0 | | 8.25 | 8.25 | 2 | | | 2 | 0 | 15.75 | 21.6 | 10.25 | 13.75 | 0.57 | 0.43 | 1.00 | 24 |
| 30 | 906.89 | 28.34 | 0 | 39.43 | 1.23 | 39.43 | | | | 0 | 1 | | | 1 | 0 | 24 | 21.6 | 1 | 23 | 0.96 | 0.88 | 1.00 | 84 |
| 31 | 727.79 | 22.74 | 0 | 36.85 | 1.15 | 36.85 | 0 | 2.75 | 0 | 2.75 | 1.5 | 0 | 0 | 1.5 | 0 | 21.25 | 21.6 | 4.25 | 19.75 | 0.82 | 0.82 | 1.00 | 67 |
| **Totals** | **17132.89** | **535.40** | **0** | **1020.99** | **31.91** | **32.94** | **94.25** | **21.25** | **11** | **126.50** | **26.50** | **20.50** | **58.75** | **105.75** | **18.75** | **617.50** | **653.25** | **232.25** | **511.75** | **0.69** | **0.73** | **1.00** | **51.17** |

Table 4: Data collection before planned equipment maintenance.

| | | | | Dispatches per hour | | | Unplanned downtime | | | | Equipment Idle Time | | | | Planned | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Total Produced in Avaialable hours | Total Despatches in available hours of production | Total Waste | Road transport | | Production Rate | Mant B/D | Maint Comp | Maint Leaks | Total | Balance & Setup | Product silo full | Raw Ash supplier | Total | Maintenance | Available Production | Standard Production | Total downtime | Equipment Actual Running | Availability | Performance | Quality | OEE |
| | Quantity producced (Tons) | No. of trucks | Tons | Product Quantity Tons | Total number of trucks | Tons/Hr | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | Hrs | % | % | % | % |
| 1 | 593.60 | 18.55 | 0 | 42.4 | 1.33 | 42.4 | 1 | 5.5 | 0 | 6.5 | 3.5 | 0 | 0 | 3.5 | 0 | 17.5 | 21.6 | 10 | 14 | 0.58 | 0.94 | 1.00 | 54.96 |
| 2 | 959.20 | 29.98 | 0 | 43.6 | 1.36 | 43.6 | 0.5 | 0.5 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 23 | 21.6 | 2 | 22 | 0.92 | 0.97 | 1.00 | 88.81 |
| 3 | 656.78 | 20.52 | 0 | 41.7 | 1.30 | 41.7 | 4.5 | 3 | 0 | 7.5 | 0.75 | 0 | 0 | 0.75 | 0 | 16.5 | 21.6 | 8.25 | 15.75 | 0.66 | 0.93 | 1.00 | 60.81 |
| 4 | 562.88 | 17.59 | 0 | 39.5 | 1.23 | 39.5 | 2 | 4.75 | 0 | 6.75 | 3 | 0 | 0 | 3 | 0 | 17.25 | 21.6 | 9.75 | 14.25 | 0.59 | 0.88 | 1.00 | 52.12 |
| 5 | 868.73 | 27.15 | 0 | 42.9 | 1.34 | 42.9 | 1.75 | 0 | 0 | 1.75 | 2 | 0 | 0 | 2 | 0 | 22.25 | 21.6 | 3.75 | 20.25 | 0.84 | 0.95 | 1.00 | 80.44 |
| 6 | 589.40 | 18.42 | 0 | 42.1 | 1.32 | 42.1 | 5 | 1.25 | 3.75 | 10 | 0 | 0 | 0 | 0 | 0 | 14 | 21.6 | 10 | 14 | 0.58 | 0.94 | 1.00 | 54.57 |
| 7 | 649.65 | 20.30 | 0 | 42.6 | 1.33 | 42.6 | 1.25 | 7 | 0.5 | 8.75 | 0 | 0 | 0 | 0 | 0 | 15.25 | 21.6 | 8.75 | 15.25 | 0.64 | 0.95 | 1.00 | 60.15 |
| 8 | 803.70 | 25.12 | 0 | 42.3 | 1.32 | 42.3 | 0 | 3.5 | 0 | 3.5 | 1.5 | 0 | 0 | 1.5 | 0 | 20.5 | 21.6 | 5 | 19 | 0.79 | 0.94 | 1.00 | 74.42 |
| 9 | 778.85 | 24.34 | 0 | 42.1 | 1.32 | 42.1 | 2.25 | 0.75 | 0 | 3 | 2.5 | 0 | 0 | 2.5 | 0 | 21 | 21.6 | 5.5 | 18.5 | 0.77 | 0.94 | 1.00 | 72.12 |
| 10 | 948.30 | 29.63 | 0 | 43.6 | 1.36 | 43.6 | 0 | 1.75 | 0 | 1.75 | 0.5 | 0 | 0 | 0.5 | 0 | 22.25 | 21.6 | 2.25 | 21.75 | 0.91 | 0.97 | 1.00 | 87.81 |
| 11 | 913.75 | 28.55 | 0 | 43 | 1.34 | 43 | 1.5 | 0.75 | 0 | 2.25 | 0.5 | 0 | 0 | 0.5 | 0 | 21.75 | 21.6 | 2.75 | 21.25 | 0.89 | 0.96 | 1.00 | 84.61 |
| 12 | 473.63 | 14.80 | 0 | 42.1 | 1.32 | 42.1 | 7 | 3.75 | 0 | 10.75 | 2 | 0 | 0 | 2 | 0 | 13.25 | 21.6 | 12.75 | 11.25 | 0.47 | 0.94 | 1.00 | 43.85 |
| 13 | 734.85 | 22.96 | 0 | 42.6 | 1.33 | 42.6 | 0 | 4.75 | 0 | 4.75 | 2 | 0 | 0 | 2 | 0 | 19.25 | 21.6 | 6.75 | 17.25 | 0.72 | 0.95 | 1.00 | 68.04 |
| 14 | 782.93 | 24.47 | 0 | 42.9 | 1.34 | 42.9 | 1 | 4.75 | 0 | 5.75 | 0 | 0 | 0 | 0 | 6.5 | 18.25 | 17.5 | 5.75 | 18.25 | 0.76 | 0.95 | 1.00 | 72.49 |
| 15 | 779.28 | 24.35 | 0 | 42.7 | 1.33 | 42.7 | 0 | 5.75 | 0 | 5.75 | 0 | 0 | 0 | 0 | 0 | 18.25 | 21.6 | 5.75 | 18.25 | 0.76 | 0.95 | 1.00 | 72.16 |
| 16 | 1060.80 | 33.15 | 0 | 44.2 | 1.38 | 44.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 21.6 | 0 | 24 | 1.00 | 0.98 | 1.00 | 98.22 |
| 17 | 710.60 | 22.21 | 0 | 41.8 | 1.31 | 41.8 | 0 | 0 | 0 | 0 | 5 | 0 | 2 | 7 | 0 | 24 | 21.6 | 7 | 17 | 0.71 | 0.93 | 1.00 | 65.80 |
| 18 | 1031.65 | 32.24 | 0 | 43.9 | 1.37 | 43.9 | 0 | 0 | 0.5 | 0.5 | 0 | 0 | 0 | 0 | 0 | 23.5 | 21.6 | 0.5 | 23.5 | 0.98 | 0.98 | 1.00 | 95.52 |
| 19 | 834.60 | 26.08 | 0 | 42.8 | 1.34 | 42.8 | 4.5 | 0 | 0 | 4.5 | 0 | 0 | 0 | 0 | 0 | 19.5 | 21.6 | 4.5 | 19.5 | 0.81 | 0.95 | 1.00 | 77.28 |
| 20 | 631.50 | 19.73 | 0 | 42.1 | 1.32 | 42.1 | 5.5 | 0 | 0 | 5.5 | 2 | 0 | 1.5 | 3.5 | 2.5 | 18.5 | 21.5 | 9 | 15 | 0.63 | 0.94 | 1.00 | 58.47 |
| 21 | 835.43 | 26.11 | 0 | 42.3 | 1.32 | 42.3 | 1.75 | 0 | 0.5 | 2.25 | 2 | 0 | 0 | 2 | 0 | 21.75 | 21.6 | 4.25 | 19.75 | 0.82 | 0.94 | 1.00 | 77.35 |
| 22 | 810.43 | 25.33 | 0 | 42.1 | 1.32 | 42.1 | 3.25 | 0 | 1 | 4.25 | 0 | 0 | 0.5 | 0.5 | 0 | 19.75 | 21.6 | 4.75 | 19.25 | 0.80 | 0.94 | 1.00 | 75.04 |
| 23 | 710.60 | 22.21 | 0 | 41.8 | 1.31 | 41.8 | 3.25 | 2.75 | 0 | 6 | 1 | 0 | 0 | 1 | 0 | 18 | 21.6 | 7 | 17 | 0.71 | 0.93 | 1.00 | 65.80 |
| 24 | 850.00 | 26.56 | 0 | 42.5 | 1.33 | 42.5 | 2.5 | 0 | 0 | 2.5 | 1.5 | 0 | 0 | 1.5 | 0 | 21.5 | 21.6 | 4 | 20 | 0.83 | 0.94 | 1.00 | 78.70 |
| 25 | 994.18 | 31.07 | 0 | 43.7 | 1.37 | 43.7 | 1 | 0 | 0 | 1 | 0.25 | 0 | 0 | 0.25 | 0 | 23 | 21.6 | 1.25 | 22.75 | 0.95 | 0.97 | 1.00 | 92.05 |
| 26 | 873.58 | 27.30 | 0 | 42.1 | 1.32 | 42.1 | 0.5 | 0 | 1.75 | 2.25 | 1 | 0 | 0 | 1 | 0 | 21.75 | 21.6 | 3.25 | 20.75 | 0.86 | 0.94 | 1.00 | 80.89 |
| 27 | 832.65 | 26.02 | 0 | 42.7 | 1.33 | 42.7 | 3.5 | 0 | 0 | 3.5 | 1 | 0 | 0 | 1 | 0 | 20.5 | 21.6 | 4.5 | 19.5 | 0.81 | 0.95 | 1.00 | 77.10 |
| 28 | 832.65 | 26.02 | 0 | 42.7 | 1.33 | 42.7 | 0 | 2 | 0.5 | 2.5 | 2 | 0 | 0 | 2 | 0 | 21.5 | 21.6 | 4.5 | 19.5 | 0.81 | 0.95 | 1.00 | 77.10 |
| 29 | 937.43 | 29.29 | 0 | 43.1 | 1.35 | 43.1 | 0.5 | 0.75 | 0 | 1.25 | 0.5 | 0 | 0.5 | 1 | 0 | 22.75 | 21.6 | 2.25 | 21.75 | 0.91 | 0.96 | 1.00 | 86.80 |
| 30 | 831.48 | 25.98 | 0 | 42.1 | 1.32 | 42.1 | 1.5 | 2.75 | 0 | 4.25 | 0 | 0 | 0 | 0 | 0 | 19.75 | 21.6 | 4.25 | 19.75 | 0.82 | 0.94 | 1.00 | 76.99 |
| 31 | 544.70 | 17.02 | 0 | 41.9 | 1.31 | 41.9 | 6.5 | 2.5 | 0 | 9 | 2 | 0 | 0 | 2 | 0 | 15 | 21.6 | 11 | 13 | 0.54 | 0.93 | 1.00 | 50.44 |
| **Totals** | **24417.75** | **763.05** | **0** | **1317.9** | **41.18** | **42.51** | **62** | **58.5** | **8.5** | **129.00** | **37.50** | **0.00** | **4.5** | **42** | **9** | **615.00** | **665.40** | **171** | **573** | **0.77** | **0.94** | **1.00** | **72.93** |

*Table 5: Data collection after planned equipment maintenance.*

# Improvement of SME's Manufacturing and Supply Process Flow: A Case Study

**Asser Letsatsi Tau**
**Emmanuel Innocents Edoun**
**Charles Mbohwa**
**Anup Pradhan**
University of Johannesburg, South Africa

**Key words**
Flow control, LOGON system, SAP system and Simulation

***Abstract***

*Small Medium Enterprise (SME) within the manufacturing industry of South Africa needs to be nourished as they contribute significantly to economy. Evaluation of a SME manufacturing facility resulted with areas of improvement. The current manufacturing process was manually operated , for instance, from raw materials feeding into a mixing equipment to finished goods packaging, suppliers of raw materials being manually notified and customers placing orders on a manual ordering system. Proposal of a semi-automated manufacturing process was initiated as an improvement of the current traditional process by consideration of design principles and introduction of components such as flow control valves, stock level sensor/detector, conveyor belt, automated guided vehicle and SAP system and LOGON system. Integration of systems that adds to Enterprise Resource Planning were also recommended which can further improve the supply chain network. Simulation and modelling of the traditional manufacturing process and the proposed process of manufacturing that was improved were conducted by making use of Arena simulation software version 16.0. The outcome indicated an improvement potential of higher material input and material outputs at maintained processing efficiencies. It was concluded that the adoption of the proposed manufacturing process improvement can assist in improving the supply chain from raw material acquisition to product availability to customers.*

## Introduction

### *Background*

The industries of manufacturing and investors of businesses are consistently striving to find ways to optimise manufacturing methods for the purpose of lowering cost, energy and expand their capabilities. Traditional manufacturing entails the subtractive and methods of manufacturing that are long established, assurance of quality and implementation in the commercial space (Pereira, et al., 2019). The regions of manufacturing are categorised and defined by attributes such as complexity advantage, customization, and volume (Da Silveira, et al., 2001).

A complex supply chain hinders the performance of suppliers of raw materials to manufacturing facilities which ultimately affects manufacturer's production output, this subsequently leads to unavailability of finished goods at the right time to market.

Small Medium Enterprise (SME) companies in South Africa contributes about 20% of the total economic growth. The South African government has set naturing initiatives in place to assist in growing and maintaining businesses in the current alerts of electricity load-shedding.

The second and third industrial revolution aimed at continuous improvements in operational excellences in both manufacturing and service sectors which SMEs are still striving to meet in South Africa, to date. Most companies cannot afford to be left behind in the revolution due to the dynamic and competitive markets they operate in. Meanwhile, well established businesses are striving to meet the fourth industrial revolution pillars which include autonomous robot, simulation, system integration, industrial Internet of Things, cybersecurity, cloud computing, additive manufacturing, augmented reality and big data and analytics. SMEs are prone to be left behind for the adoption of the new revolution mainly due to their low capital investment potential.

Any means of potentially improving SMEs operations can assist with further improvement on sustainability of their businesses in the everchanging manufacturing sectors. The designs of smart factories offers productivity enhancement where manufacturers can offer finished goods at relatively competitive pricing due to lower cost potentials. Continuous improvement within existing factories is of great importance to help meet optimised operational excellence.

The new manufacturing processes that have transformed since 1800s resulted with continuous change in the industrial landscape. Changes in the technologies of the industrialization have driven the paradigm shifts of industrial revolutions. In most countries, industries represent key component of economy that carries out the materials and goods production, which can be highly mechanized and automatized. Thus, nowadays production in the manufacturing industries has reached the edge of new revolution and future factories have been painted (Mohamed, 2018).

However, before the current industry 4.0, there have been three revolutions which really revolutionized the industry with respect to water and steam power mechanization, mass production in assembly lines and the use of information technology to automate systems (Tay, et al., 2018). This is further outlined by Figure 1.

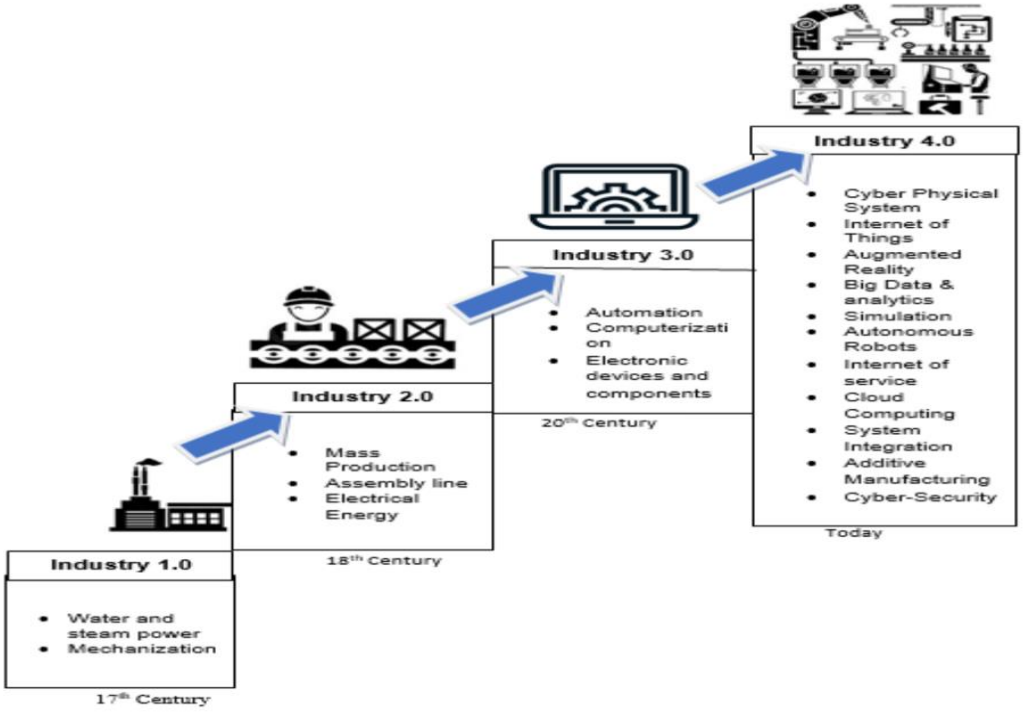


*Figure 9: Overview of industrial revolutions Source: (Tay, et al., 2018)*

Typically, most SMEs within the South African manufacturing sectors are still stuck on meeting the second industrial revolution. The lower business turnover affects their operational improvement opportunities.

There have been great improvement in the manufacturing sectors through moving towards smart manufacturing. Smart manufacturing entails the application of advanced information and digital technologies (Ghobakhloo, 2019) , together with the use of systems associated with Artificial Intelligence (AI) and cyber-physical systems (Zheng, et al., 2018), for the purpose of achievement of improved efficiency for production of goods with high quality and low cost (Haricha, et al., 2020). Traditional manufacturing has limitations to only a process or a process that is sequential for the conversion of raw materials to finished goods (Mittal, et al., 2019).

Meanwhile, smart manufacturing further includes the process improvement of manufacturing to a smart and fully connected manufacturing process on numerous technologies and solutions such as cyber-physical production systems (CPPS), Internet of Things (IoT), robotics/automation, big data analytics and

cloud computing (Thoben, et al., 2017). Deep learning as a subset of machine learning offers real time regulation/maintenance and optimization of production process through collection of data for entire stages on network of supply commencing from shop floor and chain of supply network then transform it into raw knowledge of data (O'Donovan, et al., 2015).

***Current manufacturing and supply process flow***

A powdered cementitious product manufacturing process plant is a semi-automated system with some of the process equipment requiring some adjustments or improvement to minimize man-machine interaction which is costly. At the discharge side of the raw materials storage silos, there is a flow control valve which is operated manually by pre-setting the amount of material to be discharged. Hopper 1 is also semi-automated in such a way that flow control valve must be manually regulated through raw material weight pre-sets.

This is then followed by a dry mixer which has a discharge valve that is manually operated to discharge the product in the temporary storage silo. The follow control valve on the discharge side of the product storage to the hopper 2 is also manually controlled. The product packer is also manually operated and packing one product at a time which takes longer. After the product is packed, customers' orders are delivered with clients being phone called to collect their orders. Figure 2 illustrates this manufacturing and supply process flow.

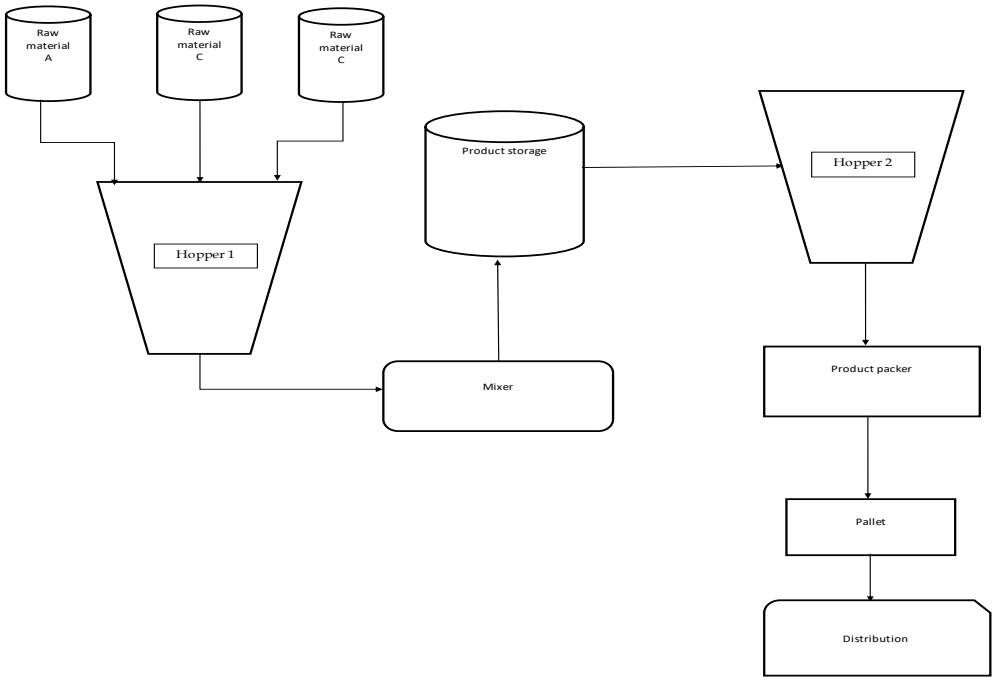


***Figure 10: Current traditional manufacturing process flow diagram***

As the markets remain competitive, the industry should be innovative through implementation of new facilities and systems of production as well as establish Key Performance Indicators (KPIs) thereof to run sustainable operations. Facility design concept in industry 4.0 considers the improvement on designs that are traditional and are required to be modular and flexible. Configuration must be adoptable to changes in real time without addition of costs, production delays and activities that are non-valued on production lines. Simulation combined with CORELAP algorithm offers generation of a design that results with reduction in time of production, reduction of non-value added activities and increase production efficiencies (Chakroun, et al., 2022). Simulation is an important tool for mimicking the behaviour of a real system thereby finding areas of improvement (Tau, et al., 2022).

***Problem statement***

Covid 19 pandemic in South Africa has resulted with numerous numbers of job losses across various industries such as mining, construction, building materials and petroleum. In order for the industries to recover and meet their financial targets, products in the market are expensive resulting with consumers being unable to afford. In addition, manufacturers are battling with increased raw materials costs, which makes their product selling prices to increase. Company X is a close corporation enterprise within the cementitious industry in Gauteng province, South Africa. It manufactures various product offering to different application within the building and construction industry.

Being a medium Entreprise, the manufacturer strives to improve production costs, improve quality, and lead time for the purpose of meeting customers' demand and productivity in their operations such that they can be able to compete in the marketplace. Having been established few years ago, continuous improvement is required in order to adjust their operations to a sustainable level, both financially and non-financially. Their work process is required to be improved in order to minimize waste, increase production output at minimal labour usage and ensure that the production operators and workers are not strained throughout their daily duties while at the workplace.

***Objectives***

The primary objective was to improve a manufacturing process flow of Small Medium Enterprise. The sub-objects were: (i) to incorporate of some of the smart factory designs features in order to improve the traditional manufacturing and supply process (ii) and to simulate the manufacturing process for the purpose of modelling the performance of the smart factory.

**Literature review**

High volume at low cost of production has been what traditional manufacturing industries are striving to achieve and this has been enabling an economic advantage for countries with low wage for optimization of their capability of manufacturing (Atzeni & Salmi, 2012). Traditional manufacturers are also characterised by batch mode of production instead of continuous mode. For instance, historically, pharmaceutical manufacturing industry has been using batch size operations where transformation of raw material into finished goods can take place at any point over time in a spatially separated unit operations. Manufacturing process is typically disjointed with intermediate checks of quality, accumulation of inventory and transport between two sites within the supply chain. Continuous manufacturing process conditions thereof are classically irrelevant with time at each spatial location and material transformation occurs as the material flow through a production line coupled with processing steps that are continuous (Ende & Mary, 2019).

The industrial facilities design layout impacts the workflow success greatly (Chakroun, et al., 2022). The origin of fourth industry date back in 2011 from a project in high-tech strategy of the German government which promoted the computerization of manufacturing. Overall, the fourth industrial revolution aims at productivity improvement and creation of fields within the industry which depends on acquisition and sharing of data and information within the supply chain (Keller, et al., 2014). Thus digital value chain is contributed by an increase in digitalization, automation and communication (Oesterreich & Teuteberg, 2016). Industry 4.0 stands for a production orientated CPPS integration within production facility, systems of warehousing and logistics. This system is an intelligent system that facilitates production which is flexible, modular and adaptable that assist with customer requirements. This further assist in decentralisation of production control (Varl, et al., 2021).

Facility design is key in the optimization of organisation's workplace, for example through determination of best layout of machines or other production support resources. This further assist with ease of material movement (Chakroun, et al., 2022). The adoption of industry 4.0 enables the manufacturing sectors to be digitalized with sensing devices that are built virtually in all the components, products, and equipment of manufacturing (Tay, et al., 2018).

Key component in industry 4.0 include smart factory designs for productivity improvement. Cloud computing also offers service-orientated network-based function that converts the manufacturing resources and capabilities to manufacturing service. Internet of things enable devices of manufacturing to exchange data between devices of manufacturers and their providers of service or even customers (Mabkhot, et al.,

2018). Internet of things further include the combination of sensors such as the RFID, embedded computers, Enterprise Resources Planning (ERP) and technologies for business intelligence. Sensors are really in the physical objects such as vehicle and heavy equipment (i.e. loaders, cranes etc), machines and robots (Mabkhot, et al., 2018)

Fourth industrial revolution is further associated with the intelligent networking of industrial products and processes which add to productivity improvement and potential growth of companies using advanced technologies for smart factories (Nagy, et al., 2018). The industry 4.0 requires human resources with unique qualities than the traditional industries (Heynitz & Bremicker, 2016). Table 1 shows traditional factory and smart factory comparison.

| Key | Traditional manufacturing | Smart manufacturing |
|---|---|---|
| Data | Not fully exploited, not total accessible | Real time data collection and visualization |
| Process and operations | Manual optimization | Automatically optimized, and full traceability |
| Downtime | unpredictable | Predictable |
| Maintenance | Preventive/Corrective | Preventive/Corrective/Predictive |
| Supply chain | Traditional | Smart and 100% transparency |
| Efficiency | Not fully exploited | Fully exploited |
| Product development | Time wasting and not flexible | Faster developed products even for complex products |
| Energy optimization | N/A | Yes |
| Quality | Manual inspection | Hight quality, less cost, automatic inspection |
| Flexibility | Not totally flexible | Totally flexible |
| Decision making | Poor data | Real time data, smart algorithm to prediction |

***Table 6: Traditional factory and smart factory comparison Source: (Haricha, et al., 2020)***

Smart factory involves shop floor decisions and insights integration with the whole chain of supply and the enterprise by utillization of interconnectivity Information Technology landscape. Fundamentally, this can change the processes of production and better enhance relationships with suppliers and clients. Smart factory can also connect to global network which can be off similar systems of production as the improved systems of industry 4.0 and even encourages the digital supply network (Deloitte, 2017).

A typical transformation of traditional supply network to digital supply can be described by Figure 2 which was adopted by Deloitte Company as part of their improved network.

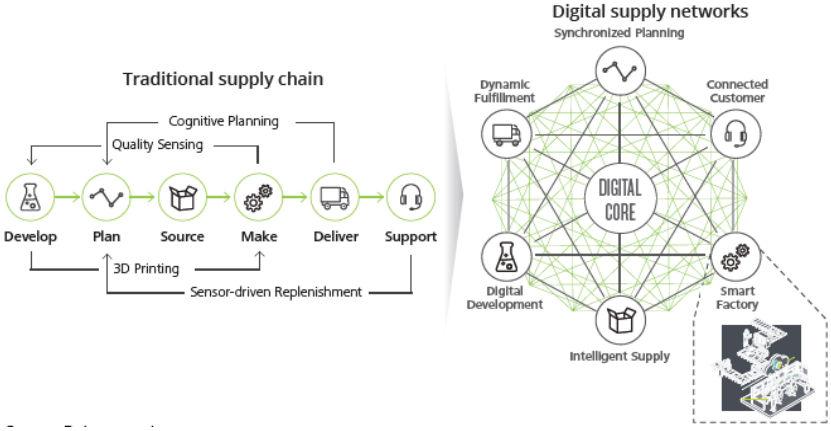


***Figure 11: A shift from traditional supply chain network to digital supply network Source: (Deloitte, 2017)***

The automation in the smart factory includes the full automation of a system of production, use of three-dimensional scanners, technologies for IoT and controls of machine. Smart factories help to lower customer lead times and reduces overall cots, improves the capacity of production, and reduces amounts

of defective products. Furthermore, the features of smart factory also include connectivity, optimization, transparency, proactivity, and agility which has a direct impact in improvement of a production process as outlined in Figure 4 (Deloitte, 2017).

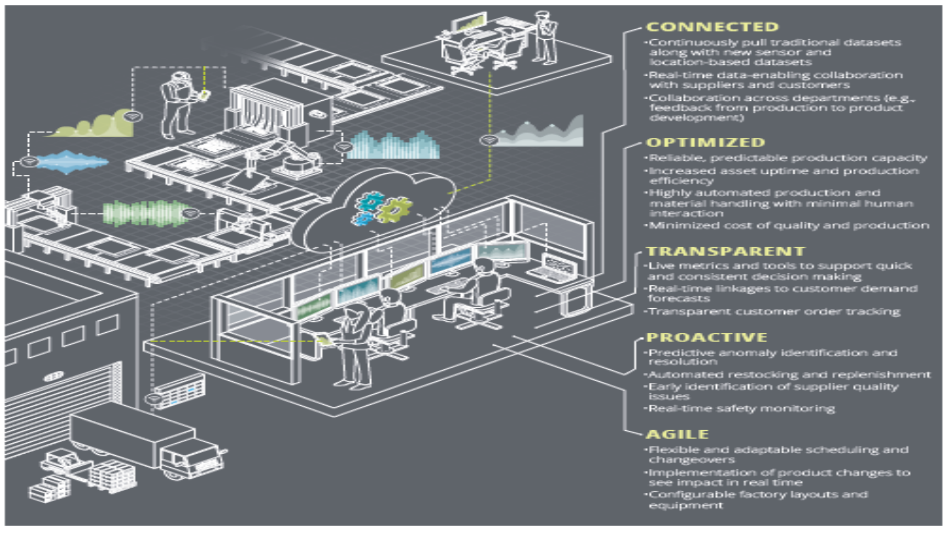


***Figure 12: Features of smart factory Source: (Deloitte, 2017)***

The design of smart factory is also guided by design principles. The concepts of a factory that is smart assist designers to build new or upgrade traditional factories to be smart. These design principles are based on the requirements of the scope of industry 4.0 and are described as follows (Mabkhot , et al., 2018):

***Modularity***

Refers to the capability of the components of the system to be separated, combined in a manner that is easy and quick with reconfiguration being on the basis of plug and play principles. For instance, modules can be added, reorganised or replaced on time in a line of production. Thus factory that is smart should consist of modularity that is high, permitting modules integration rapidly that can be offered by various suppliers, for the purpose of responding to the requirements that are changing from customers and to respond positively for the resolution of internal system that can malfunction.

***Interoperability***

Refers to the ability to exchange data amongst the components of the system which include products and also the ability for information sharing amongst production enterprise together with clients. The Cyber-Physical System (CPS) allows for connectivity over the IoT and Internet of Services (IoS). Enhancement of interoperability can be attained through mechanical, electrical and information communication that are standardized. A controller is another key enabler of interoperability in a smart factory which allows the integration between features such as OPC UA and the smart PLC which allows the connection between the PLC and information technology programs.

***Decentralization***

It involves the elements of the systems such as modules, materials and product, making self-decisions which are unsubordinated to a control unit. Real time autonomous decision making in exclusion of the violation of goals of organization. Embedded computers assist in autonomous CPS in order to interact with the environment through sensors and actuators.

***Visualisation***

Involves the creation of an artificial environment of factory with CPS and similarly to the actual environment and also being capable of monitoring ad stimulating the physical process. Transparency with respect to information in CPS and data sensor enables formation of sort of that environment. Thus a virtual system is used for the purpose of monitoring and control of specific physical aspects, convey data in order to update in real time its virtual model and also assist in designs, creativity and digital prototypes

implementation which are most the same as the ones that are real. Virtual system as well can be a very helpful method of training workforce, offering of guidance for the workforce through processes that are manual, diagnosis and prediction of faults together with team of maintenance guidance or fixing malfunctioning equipment. Combination of virtual and augmented reality together with mobile devices assist clients with more insight into the product designs and permission to track the process of manufacturing.

***Service orientation***

Integration of goods and services is achieved and sold as a package. Companies in the manufacturing sectors opt for processes outsourcing and concentrate on main processes. This encourages innovative ways of operations in the main improvements process, which ultimately other manufacturing facilities will sell their products to other industry. CM is the infrastructure that make use of internet as a means of service offers and sales. Meanwhile on the on the other side cloud computing plays a critical role in making sure that on-demand service provision is enabled.

***Real-time capability (responsiveness)***

This covers ability of the system to response to respond timeously on time such as the alterations in the requirements of the customer or changes in the production systems internally. Access to information and analysis in real time in order to respond to requirements of the clients are achieved. Detection of disturbances in the system should be on time and the system should be stabilized Responses to changes internally, monitoring and regulation should be instantly. Disturbances detection should be on time, and the system should have rapid recovery ability.

**Methodology**

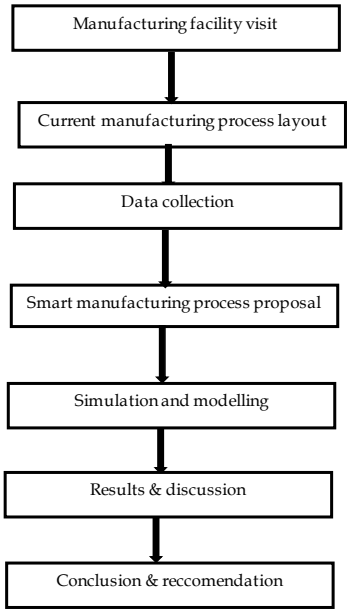


***Figure 13: Research methodology***

**Results and discussion**

***Improvement proposal of traditional manufacturing process to smart factory***

The traditional plant as described by Figure 2 can be improved through addition of other components in order to minimise manual handling, raw material monitoring systems and supplier notifications. The technical specifications which can be added for the improvement were:

***Flow control valves (FCV)***

The installation of flow control valve across all the equipment such as raw material silos, hopper 1 & 2 and ribbon blender discharge will assist in ensuring that the system is fully automated via system software,

and this allows accurate selection and extraction of raw materials at the right quantity. This will reduce man-machine interaction which is costly.

***Stock level sensor/detector***

The installation of stock level sensor assists in checking the level of stock in the system as managed on the floor at the warehouse, this will assist in ensuring that the customers make informed order quantities based on the current stock level, thus avoiding delays.

***Conveyor belt***

The conveyor belt assist in material handling which will improve for the ergonomics requirements as there will be less manual handling of the material by human. Also the conveyor belt will reach larger areas within the warehouse.

***Automated guided vehicle***

It will assist in material movement such as the material being packed at the correct shelves depending on the packing procedure being pre-set. These will ultimately result with reduction in cost of labour, reduces costs of utilities, increased work safety and also results with possible reduction of some of the product damages due less manual handling.

***SAP system and LOGON system***

These software assist in improving the order placement by the clients. Clients can be able to place orders online and monitor the status of their orders daily to check progress. Clients can also be able to trace their credit account limit facility available which will guide them when to make interim payment were required. Figure 6 depicts the improvement of the current traditional factory to smart factory.

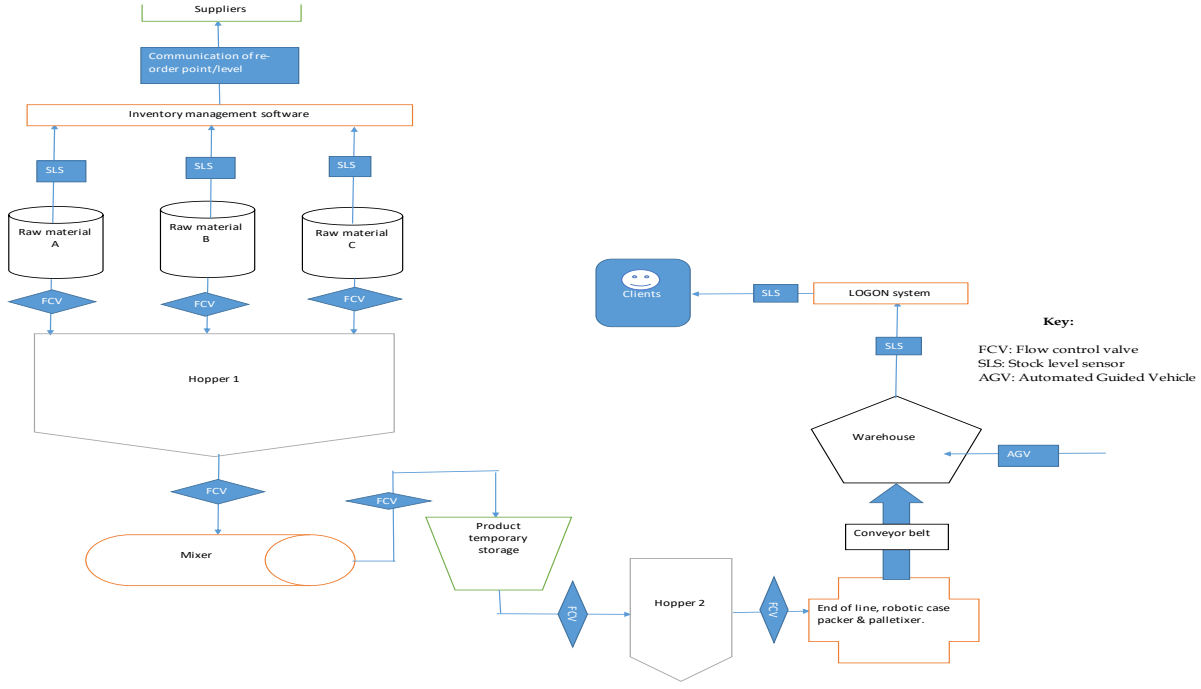


*Figure 14: Proposed fully/semi-automated system at company X*

**Modelling and simulation using Arena simulation software 16.0**

To suit the modelling exercise, some of the process steps in the factory layout were simplified in order to suite the software capability.

**Current traditional plant**

In the current traditional plant, raw material feed enters the system at a random average time interval of 13 minutes, then the material proceeds to the blending process in the ribbon blender at a uniformly

distributed time of a minimum of 8 minutes and maximum of 10 minutes. The blending process also is operated by an operator. After the material is being process in the blending process, it then proceeds to a packing process which is uniformly distributed at a minimum time interval of 5 minutes and maximum time of 7 minutes with the process also making use of packing operator. Now that the material is being packed in 25kg bags, it then proceed to a palletising process where it is triangularly distributed at a minimum of 1.033 minutes, median of 1.0833 and a maximum of 1.167 minutes. Thus, the palletizing process also make use of palletizing operator.

The palletized product then leaves the system.

Based on this information, simulation and modelling was conducted using Arena simulation software in order to quantify the amount of product that can be produced in a replication length of 8 hours (480 minutes) and number of replications of 1. Figure 7 shows the traditional plant layout in the Arena simulation software.

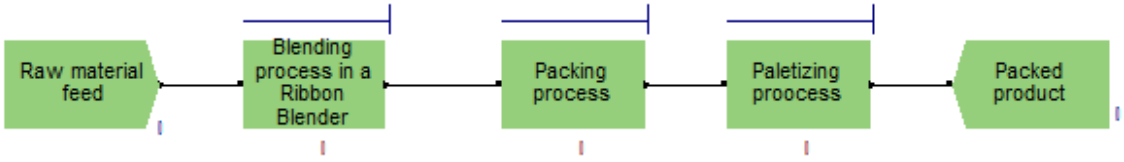


*Figure 15: Traditional plant layout simulation in arena 16.0*

**Improved traditional manufacturing process to smart factory.**

In the smart factory, raw material feed enters the system at a constant average time interval of 6 minutes, then the material proceeds to the blending process in the ribbon blender at a constant time interval of 4 minutes. After the material is being process in the blending process, it then proceeds to a packing process which include the palletizing process and it takes place at constant time interval of 2 minutes. Now that the material is being packed in 25kg bags leaves the system. All process step fully automated, only at packing process where there is only an Inspector who visually inspected the packed product.

Based on this information, simulation and modelling was conducted using Arena simulation software in order to quantify the amount of product that can be produced in a replication length of 8 hours (480 minutes) and number of replications of 1. Figure 8 shows the improved factory layout in the Arena simulation software.

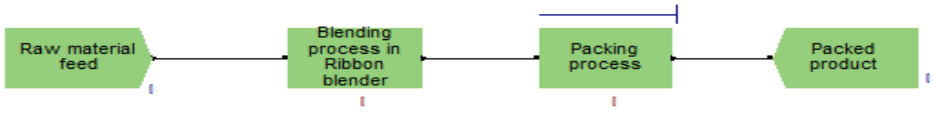


**Figure 16: Smart factory simulation using Area.**

Table 2 shows the comparison of modelling results on traditional system and improved system.

| KPI | Traditional factory | Smart factory |
|---|---|---|
| **Material input** | 34 | 81 |
| **Material output** | 33 | 80 |
| **% Process efficiency** $= \frac{Material\ input}{Material\ output} \times 100$ | $\frac{33}{34} \times 100 = 97$ | $\frac{80}{81} \times 100 = 97$ |

***Table 7: Plant performance comparison***

In the improved system, the number of packed products has improved from 33 to 80, an increment of 47 packed products due to the automated system. Though the efficiency is similar, the total output is improved.

**Key observations and areas of improvement**

- The manual operations of the valve results with lots of wastages where the materials leaks, which ultimately results with continuous financial loses. This was observed as one of the operators was opening the valves, then as the material flows from hopper 1 into ribbon blender. Despite partially opening the

valve, the material continued to spill from the discharge side of the hopper and also on the connection line between the mixer and the silo. This was due to the continued material flow pressure and welding of the leakages does not last.

- Also as the material become over fed into the mixer the whole batch size is lost as it is either has to be discarded or the whole product reworked by the experienced plant manager, however the product reworking waste time and also does not add any value as some times the rework is at higher cost of production.
- The measurement of raw material stock level in the storage silos is still being carried out in the old technique of using a rubber hummer, metallic sound indicating the area where there is no product. This is also not a good method of inventory management as sometimes it's not accurate, 30% of the time it gives wrong indication and the plant manager becomes under pressure to place orders with suppliers and sometimes suppliers need 48 hours order placement notification before the raw material is being delivered.

**Conclusions**

The design of a smart factory as per the requirements of Industry 4.0 can reduce some of the operational cost as the productivity of the factory is improved or optimized which then further improves the customer service. Smart factory design also reduces the man-machine intervention which can sometimes become a concern from the perspective of health and safety.

**Recommendations**

- The proposed system recommended the installation of flow control valves on each raw material storage silo for raw material A, B and C, hopper 1 discharge side, mixer discharge side, product temporary storage discharge side and hoper 2 discharge side. This should be operated via computer process control software which will adjust both pressure and mass flow rate of the respective material such that there is no wastage.
- The system will be automated and will have components working under the principle of Poka-Yoke in order to minimize potential errors affecting the manufacturing process lines.
- On each raw material storage silo, stock level sensor should be installed for better management of the inventory which with the stock figures being depicted on a computer screen or any form of application such as one from another company
- Also at the product packing line and palletizing, this process can also be carried by making use of a packer that is operated pneumatically and can pack the material on pallets at the targeted 60 bags on a pallet. This will maximize productivity and ensures good product availability to clients.
- Software or applications such as LOGON is recommended for order placement, this will also assist in material stock talking thus to avoid manual counting at the end of the month.
- If suppliers have access to this inventory management software, it will be easy for them to delivery raw material timeously and the adoption of JIT management philosophy will be applicable at Company X. This will also meet the concepts of E-commerce and E-procurement as compared to traditional procurement.
- Simulation and modelling is recommended to be ran based on the new process layout in order to quantify the productivity improvement as a function the number of 25kg bagged product being made. With the current system, the daily production is about 480 bags in 8 hour shift.
- Feedback from customers based on product performance as part of the quality functional deployment is also can rise important areas of improvement by incorporating the voice of the customer in everyday manufacturing activities.

**Limitations and direction for future study**

The findings of the study were only applicable to the case being studied. However, the deployment of lean manufacturing tools in similar case studies are encouraged to be evaluated for continuous improvement initiative for Small Medium Enterprises in order to best prepare them for industrial revolution.

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## Appendix

### A. Simulation results of a traditional factory

Traditional factory

Replications: 1 Time Units: Minutes

Key Performance Indicators

System

| | Average |
|---|---|
| Number Out | 33 |

Traditional factory

Replications: 1 Time Units: Minutes

Entity

Time

| | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| VA Time | | | | |
| Entity 1 | 16.1990 | (Insufficient) | 14.2793 | 17.5902 |
| NVA Time | | | | |
| Entity 1 | 0.00 | (Insufficient) | 0.00 | 0.00 |
| Wait Time | | | | |
| Entity 1 | 4.4685 | (Insufficient) | 0.00 | 17.8414 |
| Transfer Time | | | | |
| Entity 1 | 0.00 | (Insufficient) | 0.00 | 0.00 |
| Other Time | | | | |
| Entity 1 | 0.00 | (Insufficient) | 0.00 | 0.00 |
| Total Time | | | | |
| Entity 1 | 20.6675 | (Insufficient) | 14.2793 | 34.7823 |

Other

| | Value |
|---|---|
| Number In | |
| Entity 1 | 34.0000 |
| Number Out | |
| Entity 1 | 33.0000 |

| | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| WIP | | | | |
| Entity 1 | 1.4747 | (Insufficient) | 0.00 | 4.0000 |

Replications: 1 Time Units: Minutes

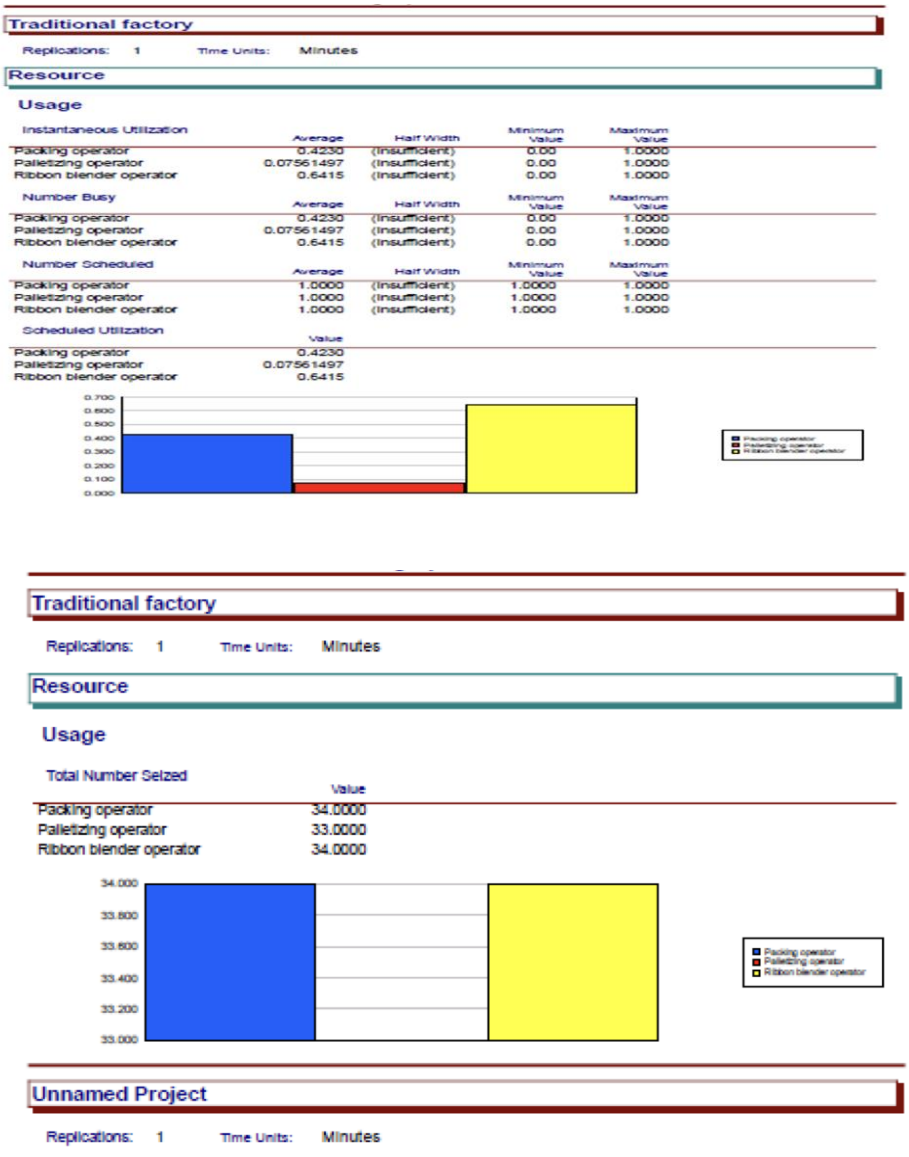
Queue

Time

| Waiting Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Blending process in a Ribbon Blender.Queue | 4.7230 | (Insufficient) | 0.00 | 17.8414 |
| Packing process.Queue | 0.00 | (Insufficient) | 0.00 | 0.00 |
| Palletizing process.Queue | 0.00 | (Insufficient) | 0.00 | 0.00 |

Other

| Number Waiting | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Blending process in a Ribbon Blender.Queue | 0.3345 | (Insufficient) | 0.00 | 2.0000 |
| Packing process.Queue | 0.00 | (Insufficient) | 0.00 | 0.00 |
| Palletizing process.Queue | 0.00 | (Insufficient) | 0.00 | 0.00 |



Traditional factory

Replications: 1 Time Units: Minutes

Resource

Usage

Instantaneous Utilization

| | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Packing operator | 0.4230 | (Insufficient) | 0.00 | 1.0000 |
| Palletizing operator | 0.07561497 | (Insufficient) | 0.00 | 1.0000 |
| Ribbon blender operator | 0.6415 | (Insufficient) | 0.00 | 1.0000 |

Number Busy

| | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Packing operator | 0.4230 | (Insufficient) | 0.00 | 1.0000 |
| Palletizing operator | 0.07561497 | (Insufficient) | 0.00 | 1.0000 |
| Ribbon blender operator | 0.6415 | (Insufficient) | 0.00 | 1.0000 |

Number Scheduled

| | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Packing operator | 1.0000 | (Insufficient) | 1.0000 | 1.0000 |
| Palletizing operator | 1.0000 | (Insufficient) | 1.0000 | 1.0000 |
| Ribbon blender operator | 1.0000 | (Insufficient) | 1.0000 | 1.0000 |

Scheduled Utilization

| | Value |
|---|---|
| Packing operator | 0.4230 |
| Palletizing operator | 0.07561497 |
| Ribbon blender operator | 0.6415 |






Traditional factory

Replications: 1 Time Units: Minutes

Resource

Usage

Total Number Seized

| | Value |
|---|---|
| Packing operator | 34.0000 |
| Palletizing operator | 33.0000 |
| Ribbon blender operator | 34.0000 |




Unnamed Project

Replications: 1 Time Units: Minutes

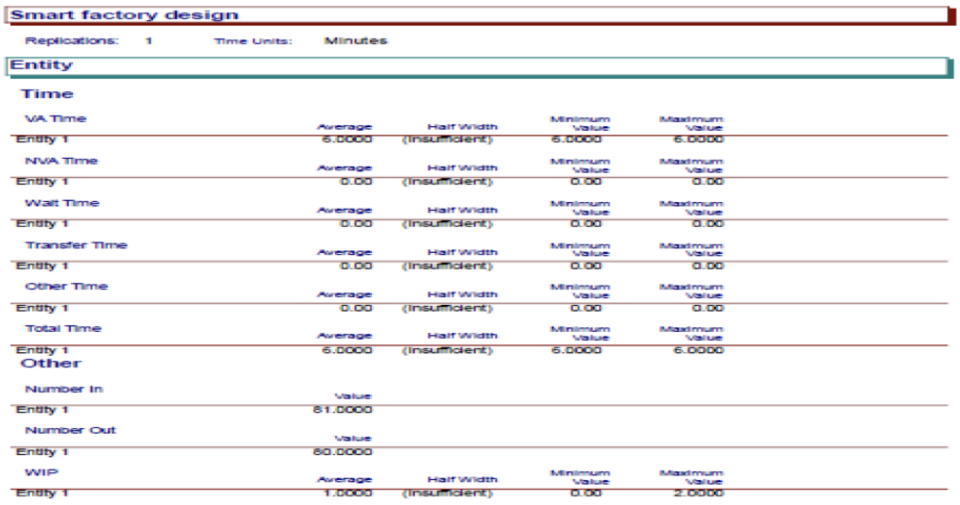
**A. Simulation results of a smart factory**

Smart factory design

Replications: 1 Time Units: Minutes

Key Performance Indicators

| System | Average |
|---|---|
| Number Out | 80 |



Smart factory design

Replications: 1 Time Units: Minutes

Entity

Time

| VA Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Entity 1 | 6.0000 | (Insufficient) | 6.0000 | 6.0000 |

| NVA Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Entity 1 | 0.00 | (Insufficient) | 0.00 | 0.00 |

| Wait Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Entity 1 | 0.00 | (Insufficient) | 0.00 | 0.00 |

| Transfer Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Entity 1 | 0.00 | (Insufficient) | 0.00 | 0.00 |

| Other Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Entity 1 | 0.00 | (Insufficient) | 0.00 | 0.00 |

| Total Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Entity 1 | 6.0000 | (Insufficient) | 6.0000 | 6.0000 |

Other

| Number In | Value |
|---|---|
| Entity 1 | 61.0000 |

| Number Out | Value |
|---|---|
| Entity 1 | 60.0000 |

| WIP | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Entity 1 | 1.0000 | (Insufficient) | 0.00 | 2.0000 |

## Smart factory design

Replications: 1 Time Units: Minutes

### Queue

#### Time

| Waiting Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Packing process.Queue | 0.00 | (Insufficient) | 0.00 | 0.00 |

#### Other

| Number Waiting | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Packing process.Queue | 0.00 | (Insufficient) | 0.00 | 0.00 |

### Resource

#### Usage

| Instantaneous Utilization | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Packing Inspector | 0.3333 | (Insufficient) | 0.00 | 1.0000 |

| Number Busy | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Packing Inspector | 0.3333 | (Insufficient) | 0.00 | 1.0000 |

| Number Scheduled | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Packing Inspector | 1.0000 | (Insufficient) | 1.0000 | 1.0000 |

| Scheduled Utilization | Value |
|---|---|
| Packing Inspector | 0.3333 |

| Total Number Seized | Value |
|---|---|
| Packing Inspector | 60.0000 |

## Traditional factory

Replications: 1 Time Units: Minutes

# Moderating role of Transformational Leadership on workplace mindfulness and employee wellbeing

**Vidhu Gaur**
MDI Gurgaon, India

**Keywords**
Employee wellbeing, Workplace mindfulness, Transformational Leadership

**Abstract**

*In recent years, the importance of organizational justice and transformation leadership has increased manifolds in organizations. The relevance of these practices in organizations has drawn the interest among researchers to explore more in this domain. Keeping this in view, the current study has examined the impact of workplace mindfulness on employee wellbeing by analyzing the impact of organizational justice as a mediator between them. In addition to this, the present research also analyzed the role of transformational leadership as a moderator between the relationship of Workplace mindfulness and wellbeing. Software like AMOS and SPPS were used to analyze the data was collected from 383 faculty members associated with prestigious universities of India. This is evident from the results of the study that there is a significant relation between employee wellbeing and Workplace mindfulness The results shows that organizational justice not only has a significant influence on employee wellbeing but also plays a vital role as a mediator between the relationship of Workplace mindfulness and its wellbeing. The study also confirms that this relationship is significantly moderated by transformational leadership. The relevance and uniqueness of these results will give future directions to the managers, employees, policy makers and employers to get a meaningful insight of the dimensions related to employee wellbeing, organizational justice, Workplace mindfulness and leadership.*

## Introduction

According to the Future Workplace 2021 HR Sentiment poll, 68% of senior HR leaders (including 40% of CHROs) prioritize employee well-being and mental health (Rudolph, 2021). It's no surprise that this is a top focus for HR directors, given that the corporate well-being industry in the United States is already valued at $20.4 billion and is expected to increase to $87.4 billion by 2026 (Forbes 2021) . From 2019 to the present, it has been disheartening for human life in almost all domains, and it can be said for the personal or professional sphere. This devastating pandemic has left no space untouched. Human were busy in their success, competition, an accomplishment it has almost shaken the entire humankind not only in their personal life, but they are work-life too. Many life lessons have been derived from these troublesome years, one of which is mental well-being. It has also given researchers many areas of scope to stop and ponder the high competition, stress, rat race, and burnout will lead to success? This is where our study tries to intervene and make a pathway to analyse the situation disabled occurring at the workplace.

At least this time, the credit was with covid -19, where we researchers also got the space to understand the between the lines pressure, the chaos created, and a gate away to it with the concept of Workplace Mindfulness. Hanh, T. N. (2011) described mindfulness as a pearl of true wisdom that can transform an individual life with small attention towards your little happiness, which can only radiate once life but will transcend the life of others and society at large.

It is a measure that combines daily wisdom. The connections of mindfulness at workplaces come from understanding the complexities of the working sphere as the employees spend the maximum time at their respective workplaces and are exposed to stress 24 X 7. Here comes the magical concept of looking invert and finding the solutions to the complication that is mindfulness.

Various researchers have tried to study the concept in the different domains as with well-being (Page & Vella-Brodrick 2009) with stress (Bishop et. al., 2004) with work (Glomb et. al.,2011) with wellbeing ( Rybak, 2013), with Organizational Justice ( Reb, 2019), with leadership (Baron, 2018). And finally with workplace productivity (Kersemaekers, et. al.,2018).

## Literature Review and Hypothesis

### *Employee Wellbeing and Workplace Mindfulness*

Page & Vella-Brodrick (2009) shed light on the understanding that well-being has three major subsets: psychological well-being, subjective well-being, and workplace well-being, where workplace well-being is derivative of the mental, emotional, and physical wellbeing. A lot of the previous literature has talked about the importance of workplace wellbeing as a significant contributor to productivity (Hamar et. al., 2015). Adams, J. M. (2019) illustrated that employee wellbeing is now considered an agenda of national importance. The workplace environment can have both positive and negative implications on physical, mental, and social well-being.

However, it can't be achieved in isolation, and thus considerable previous literature has unveiled the association between employee wellbeing and workplace mindfulness (Walsh & Arnold 2020). The author advocated not only abought the bright, however dark associations among the variables**.** Slutsky, et. al., (2019) and Mellor et. al., (2016) discussed the significance of mindfulness training in enhancing the wellbeing of employees at workplace in two different research context. A highlight on workplace interventions with online and offline work has also been shown ( Aikens, et. al., 2014). Thus, it postulates us to frame our first hypothesis as

***H1: There is a significant association between employee wellbeing and workplace mindfulness.***

### *Transformational leadership as Moderation in the relationship between Workplace Mindfulness and Employee Wellbeing*

The research tries to invade the possibility of understanding the moderating role of transformation leadership in reactions to workplace mindfulness and employee wellbeing; ( Qian, S., Yuan, Q., Lim, V. K., Niu, W., & Liu, Z.,2020). However, it is evident that there is a potent intervention of these variables and is heavily disposing of each other in behavioral context. Kroon, B., van Woerkom, M., &Menting, C. (2017) has identified the substitute of transformation leadership in an organizational context.

Not all employees are advantageous to have these leaders for them, and it is mindfulness. Pinck, A. S., &Sonnentag, S. (2018) also, in his contribution, emphasize the leader mindfulness transcending into the positive and negative well-being of employee and transformation leadership acting as a tool to it. Xu, X., Jiang, L., Hong, P. Y., & Roche, M. (2021). Discussed upon the cognitive appraisal theory with support the role of transformational leadership and mindfulness of leader in balancing the determinant of the workplace as job stress, job satisfaction, psychological wellbeing. These studies, as mentioned earlier, supported us in the formation of our fourth hypothesis as

***H2: Transformational leadership positively moderation the relationship between workplace mindfulness and employee wellbeing***

## Methodology

### *Participants*

The population studies for this research were a faculty fraternity of five reputed Indian universities with comprehensive coverage of all North, South, East-West, and Central geographical regions of the country. The study is conducted with reference to measuring the role and impact of mindfulness and wellbeing in higher education institutions. Faculty fraternity as the high intellectual capital thus becomes an intelligent target to analyze the impact and effectiveness of these psychological and behavioral concepts. Research has used a convenient sampling technique to the study as its Cost-effective and opportune, and competent. (Jager et al., 2017) The study was investigated in the monsoon term that is July, August, and September.

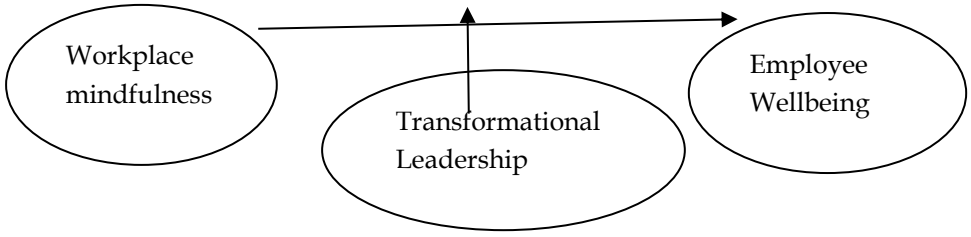
Further to add the research exploration was done with the distribution of the questionnaire to 510 faculties across the target sample. The spread of the faculties is wide from engineering, Management, Food-Technology, Biotechnology, Pharmacy, Fashion, Vocational education. The data received was not unusable. After eliminating incomplete and inaccurate data, a sample of 383 respondents was considerable and, therefore, utilized for further investigation.

Hence, the response rate was 39.9% which is considered positive. The dispersion of the demographic variables of the research comprises age, gender, department, educational background. The sample consists of different age groups as a bracket of 24 years to 60 plus with description as 24 % respondent belong the

age bracket 24-34 yr, 36 % belongs to the age bracket of 35-45, 28 % in the frame of 45-55 and 12 % were above 55 -60 above. Out of 383 respondents, 39% are female, and 61 % are male.

**Analysis and Findings**

Data was examined for the model hypothesized by the researcher using the support of the existing literature is afore mentioned. The model formulated examines the associations among our variable Employee Wellbeing (EW), Workplace mindfulness (EM) and Transformational Leadership (TL).




*Source: Researcher's Own*

**Workplace mindfulness**

It is measured using 7 statements given by Brown, K. W., & Ryan, R. M. (2003) holding a Cronbach value of 0.917; CR=0.969and AVE=0.689. All measures are found suitable for the purpose of this study. Mean, standard deviation, factor loadings and standardised regression weight of all the statements used for the purpose of this study is also being mentioned in the table No.2.

**Table (1) Reliability of measurement scale along with CR, AVE (N=583)**

| Construct/Variable | Measurement Items | Mean | Std. Dev. | Factor Loading | SRW | Alpha | CR | AVE |
|---|---|---|---|---|---|---|---|---|
| **Workplace mindfulness** | WM1 | 4.23 | .776 | .768 | 0.854 | .917 | 0.969 | 0.689 |
| | WM2 | 4.39 | .822 | .814 | 0.862 | | | |
| | WM3 | 4.25 | .765 | .801 | 0.876 | | | |
| | WM4 | 4.42 | .844 | .844 | 0.887 | | | |
| | WM5 | 4.38 | .839 | .832 | 0.831 | | | |
| | WM6 | 4.36 | .823 | .817 | 0.769 | | | |
| | WM7 | 4.34 | .800 | .798 | 0.753 | | | |
| **Transformational Leadership** | TL1 | 4.53 | .695 | .749 | 0.841 | .884 | 0.954 | 0.747 |
| | TL2 | 4.55 | .656 | .744 | 0.933 | | | |
| | TL3 | 4.54 | .680 | .717 | 0.811 | | | |
| | TL4 | 4.28 | .619 | .706 | 0.825 | | | |
| | TL5 | 4.30 | .634 | .675 | 0.808 | | | |
| | TL6 | 4.34 | .653 | .670 | 0.816 | | | |
| | TL7 | 4.39 | .625 | .642 | 0.872 | | | |
| **Employee Wellbeing** | EW1 | 4.25 | .609 | .753 | 0.865 | .870 | 0.971 | 0.720 |
| | EW2 | 4.29 | .608 | .719 | 0.892 | | | |
| | EW3 | 4.57 | .639 | .686 | 0.715 | | | |
| | EW4 | 4.57 | .662 | .670 | 0.871 | | | |
| | EW5 | 4.56 | .648 | .643 | 0.847 | | | |
| | EW6 | 4.24 | .521 | .556 | 0.993 | | | |
| | EW7 | 4.33 | .577 | .577 | 0.867 | | | |

*Source: Research Output*

**Transformational Leadership**

It is measured using 7statements given by by Carless, S. A., Wearing, A. J., & Mann, L. (2000)holding a Cronbach value of 0.884; CR=0.954and AVE=0.747. All measures are found suitable for the purpose of this study. Mean, standard deviation, factor loadings and standardised regression weight of all the statements used for the purpose of this study is also being mentioned in the table No.2.

**Employee Wellbeing**

It is measured using 7 statements given by; (Keyes, 2002, 2007, 2009) holding a Cronbach value of 0.870; CR=0.971and AVE=0.720. All measures are found suitable for the purpose of this study. Mean, standard deviation, factor loadings and standardised regression weight of all the statements used for the purpose of this study is also being mentioned in the table No.2.

**Table (2) Correlation**

| | Mean | Std. Dev. | EW | | TL | WM |
|---|---|---|---|---|---|---|
| EW | 4.18 | 0.34 | 1 | | | |
| TL | 3.87 | 0.40 | 0.069 | | 1 | |
| WM | 1.52 | 0.22 | 0.063 | | 0.390** | 1 |

*Source: Research Output*

Here the above table depicts values of correlation of various variables. The value of coefficient of correlation i.e. r is also presented in the table. The results confirm the relationship between transformational leadership (TL) (0.795**), organisational justice (OJ) and employee wellbeing (EW) (0.106**), Workplace mindfulness (EM) and transformational leadership (TL) (0.390**), and organisational justice (OJ) and Workplace mindfulness (WM) (0.451**).

**Table (3) Discriminant Validity**

| | **CR** | **AVE** | **MSV** | **ASV** | **TL** | **EM** | **EW** |
|---|---|---|---|---|---|---|---|
| **TL** | 0.954 | 0.747 | 0.004 | 0.002 | 0.864 | | |
| **EM** | 0.969 | 0.689 | 0.169 | 0.058 | 0.056 | 0.830 | |
| **EW** | 0.971 | 0.720 | 0.009 | 0.005 | 0.060 | 0.056 | 0.849 |

*Source: Research Output*

To confirm discriminant validity, the square root of Average Variance Explained for each variable was compared with the corresponding values of correlation. This can be observed from the above table that the square root of the AVE is more than its corresponding correlation values with other constructs (Fornell and Larcker, 1981). This validates the discriminant validity for all the variables.

**Table (4) Model Fit Indices**

| | |
|---|---|
| CMIN/df | 2.682 |
| CFI | 0.886 |
| GFI | 0.847 |
| TLI | 0.879 |
| IFI | 0.887 |
| RMSEA | 0.050 |
| PCLOSE | 0.463 |

*Source: Research Output*

The CFA method primarily conclude that how specific factor in the model represent the data. That can be examined with the help of model fit indices. if parameters of model fits are found to be good the model get validated. Goodness of fit of the structural model can be confirmed as all the values are within the prescribed threshold. Therefore, the model is said to be fit with CMIN/DF = 2.682 (As high as 5.0, Kline, (1998), GFI = 0.847 (>0.80, Hooper, Coughlan, & Mullen, (2008) CFI=0.886 (>0.90, Hu and Bentler, (1999), TLI = 0.879 (>0.90, Hooper et al., (2008) RMSEA = 0.050 (<0.07, MacCallum, Brown, & Sugawara, (1996) and between 0.08 to .10, Mac Callum et al**., (1996), IFI=0.887**. The proposed structured model of the study confirms significant relationship between all the variables(p -value of all the relationships is less than 0.05)

**Table (5) Regression Analysis**

| Dependent and independent variable | B | se | t | sig | Hypothesis |
|---|---|---|---|---|---|
| WM-EW ($R^2$=0.632) | 1.008 | 0.032 | 31.837 | .000 | Supported |

First, it is apparent from the table given above that Workplace mindfulness (WM) has substantial impact on employee wellbeing (EW). Where B (1.008), se (0.032), t (31.837) and p<0.05. Hence the hypothesis (H1) is supported

**Moderation EM-TL-EW**

Model Summary

| R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| 0.4018 | 0.1615 | 0.1359 | 37.6804 | 3.0000 | 582.0000 | .0000 |

Source: authors' analysis.
Note: MSE: Mean Squared Error.

Model

| coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|
| Int_1 (TL) 0.3074 | 0.1367 | 2.2478 | .0250 | 0.0388 | .5759 |

Product terms key:
Int_1 : EM x TL

Test(s) of highest order unconditional interaction(s):

| | R2-chng | F | df1 | df2 | p |
|---|---|---|---|---|---|
| Int_1 | 0.0072 | 5.0525 | 1.0000 | 582.0000 | 0.0250 |

Source: Extant literature and authors' analysis.

Notes: LLCI: Lower Limit for Confidence Interval; ULCI: Upper Limit for Confidence Interval.

The results show significant association among Workplace mindfulness and employee wellbeing and the connection of the moderator (transactional leadership) with the outcome construct employee wellbeing (EW) is also significant = 0.3074, t (582) = 2.24, p < 0.05.

The change in variation is as follows, $\Delta R^2$= 0.007, $\Delta F$ (1, 582) = 5.05, p < 0.05. Thus, the transactional leadership as a moderator variable has a noteworthy effect between the relationship of Workplace mindfulness (WM) and employee wellbeing (EW). Similar results can be observed from the interaction plots given in figure drawn below, both the lines, representing transactional leadership (TL) are criss-crossing one another, thus confirming moderation.

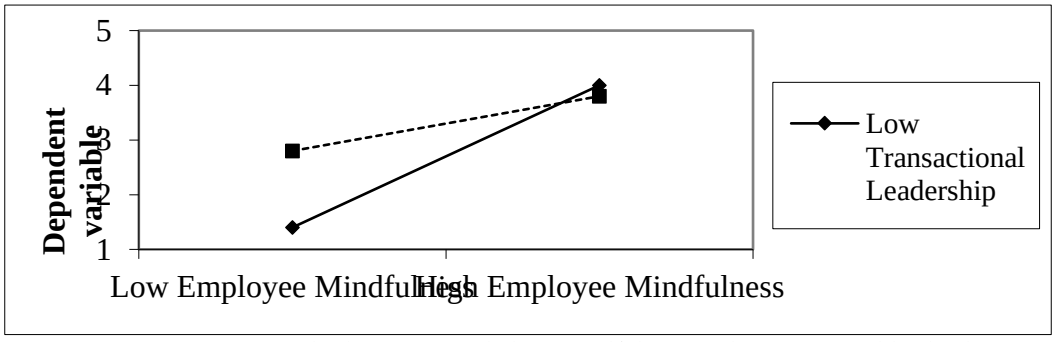



***Figure 2.*** *Interaction Plot between Workplace mindfulness and transactional leadership*
***Source:*** *Researcher's own*

**Discussion and Implications**

With the amalgamation of all the research finding we come to a pause, a rethink, reversal approach for the organization. Where we had started, we are we standing and where are we heading. This paused

derived out of this pandemic has also turned on a blessing in the disguised which has made us ponder the most importantthing in an organization is employee wellbeing, employee are the pillars on which the entire organization stand and anyling in a compromising state to it , will not support the model in long run.

Our research also tries to enlighten us that this can't be done in isolation the workplace mindfulness has a strong relation to study and enact in this regard (Schutte and Malouff, 2011). Workplace mindfulness encourages living in the moment, not be judgemental about surroundings or situation.

It's being tilting invert without be caution about our own left. Which is the need of the hour .Why? How? Such questions often emerge. Here comes the study to invading these managerial questions. Indulging in 50% of our time at our workplace , engulf with 24*7 stressful and conflict filled environment , it is the leader's role to have a closed insight into the situation a bridge a solution to it . Workplace mindfulness can bring a lot of cohesion among the teams, if organization embrace mindfulness the term "me" can be evaporated and "We" can take its place (Lomas et al., 2017). More compassion would be found in the organization leading to more safe and secure environment. Focus of discussion can be root cause rather than the arbitrary upper layer of the issue as behaviours and interpersonal issues.

Look this way all threads of the logic connect our beads of the study too. Companies as Apple, Facebook, LinkedIn are also not untouched with this enlighten concept, they have been using them in their organization for a while. Organization has started incorporating workplace mindfulness training for various advantages as being empathetic, enhanced communication skills, meeting customer needs creativity, more focused groups, inside understanding and list can go on.

However, they can't be studies in separation not training or concept comes to its peak unless the leader support it. Similarly, transformation leadership has been recognized as a strong component in the study as moderator in the relation between WM and EW. A leader, who shows the wisdom path to its followers is necessity the bridge of best from its followers. Giving them a visionary path, simulating the role play to desired can only be in the hands to these transformation leaders (Arnold, 2017, Eisenbeiss & van Knippenberg, 2015, Carleton et al., 2018).

Research has also enlightened us on one more imported beat to this relation that is organizational justice (Jackson, N., 2019; Karam et al., 2019). Organizational has to deeply understand the role of interpersonal and distributive justice in this regard. Neither the mindfulness nor the employee wellbeing can be attained if the manger is not reflecting, fairness, justice and legality in their behaviour, conduct and work. Thus, research strongly support the mangers understandings towards the entire all these significant important variables as WM, TL and OJ to boost and support employee wellbeing in their organization (Saks, 2006, Ambrose, 2002).

**Limitation & Scope for Future Research**

The study also processes certain limitation which needs to address here. First, it may be a possibility of common method bias as self-report data was used for the study. To account for this possibility, we separated predictor and criterion measures in time, randomised question order, employed well-validated scales, and ensured anonymity to participants, as advised (Podsakoff et al.,2012). Furthermore, self-report data was relevant because employees are the best source for evaluating all of the constructs of interest. Second, the study used an MTurk sample, which could have an impact on generalizability and data quality (Berinsky et al., 2012).

However, by following key recommendations in the literature, such as attention checks, screening participants, and fair paying, we were able to alleviate these problems (Keith et al., 2017). To establish generalizability, our findings should be replicated with groups representing a broader range of educational levels. In future research may take some other type of leadership to test the robustness of the model as for as leadership style is concern.

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# Can Social Media Consumption behaviour shape personalities? -A comparison between GenZ and GenAlpha

**Afrinsorwat Khan Faika**
**Mashruha Zabeen**
East West University, Bangladesh

**Keywords**
Social Media Consumption Behaviour, Personality, GenZ, GenAlpha, Consumer Behaviour

**Abstract**

***Purpose:*** *The research aims to find the answer to the question if social media consumption behavior can shape personalities and a comparison has been made between GenZ and GenAlpha.*

***Design/Methodology/Approach:*** *Two surveys consisting of total 150 respondents,75 respondents each were conducted. The two types of respondents were the GenZ and GenAlpha. The respondents of GenZ are basically the students at University and Freshers who just landed to a job. For the GenAlpha cohort students from a private school were surveyed through a Bengali questionnaire provided in hardcopy to get the responses. For getting more detailed information about the GenAlpha cohort schoolteachers were also included as expert opinion and secondary data analysis has also been analyzed for better insights.*

***Findings:*** *According to the study, all five personality traits – extraversion, neuroticism, openness to new experiences, agreeableness, and conscientiousness – have a considerable impact on media consumption, which shapes the personalities of different generations.*

***Practical Implications & Conclusion:*** *Research on social media consumption among Gen Z and Gen Alpha can help managers understand their unique traits, values, and interests. This knowledge can be used to modify workplace regulations, product development, and marketing tactics to effectively engage and manage these generations. Understanding media consumption habits can also be applied to internal communications and marketing information.*

## Introduction

Human beings tend to do what they see as if it is their fundamental nature. Every situation differs to individuals as perspective differs. The purpose of media is making people believe their perspective, the way they portray a particular case. When someone is following something influenced by media, this is where the success of media lies. It must be acknowledged that in this era, from a very early phase of childhood to adults, almost every individual has some kind of media dependency, and it somehow affects the personality that is shaping the personality as well they are bearing. Children who watch instructional television shows, read books, and use interactive applications have higher cognitive and linguistic abilities. Excessive exposure to violent or aggressive media content, such as violent video games or movies, can desensitize individuals to violence and even lead to aggressive behaviour; the "BLUE WHALE" game is a good example here. Individuals often absorb news and information from a specific ideological standpoint may establish and strengthen their own political opinions.

Media consumption behaviour is the way individuals or communities of people get involved with and consume numerous kinds of media, spanning podcasts, social media, online communities, newspapers, magazines, and more. It encompasses every facet of how individuals view, analyse, and interact with media. Numerous elements, such as particular preferences, cultural rules and regulations, improvements in technology, and society trends, have an impact on media consuming behaviour (Abel A. Grijalva Verdugo, 2014). The prevalent theories of media attendance and media effects are challenged by the fact that habits account for a significant portion of media consumption behaviour. Recent advances in the neuropsychology and social psychology of habits, as well as discussions about Internet addiction and other problematic media consumption patterns, have drawn attention to automatic, nonconscious processes and the

importance of self-regulation in understanding media consumption and its effects on behaviour, culture, and society (Larose, 2017). Personality is a reliable psychological trait that can be used to predict numerous additional elements of a person's behaviour and attitudes, notably their music choices, apparel choices, communicating patterns, and more. In the past two decades, psychologists have come to an agreement that most personality traits may be grouped into five broad categories: extraversion, agreeableness, openness to new experiences, emotional stability, and conscientiousness (McCrae, 1997).

Generation Z (Gen Z) and Generation Alpha (Gen Alpha) are leading this technological transformation as today's digital natives, with unparalleled exposure to a variety of media; Knowing how their social media consumption habits affect their personalities is crucial given their unique access to digital content and particular generational features (Anderson, 2022).It is to be acknowledged that GenZ comprises the people born between 1996 and 2010 whereas GenAlpha ranges from 2010 to now. Numerous studies have been done on the media consumption habits and personalities of GenZ and GenAlpha separately as well as on the older generations. Most research have focused on the different media consumption behaviour, how different media affect marketing negatively, and purchase intensions (Gyan Prakash Yadav, Jyotsna Rai 2017, Sadaf Karim, 2019, Mai, Quang Huan,2023).

The connection between people's personality qualities and their use of digital media has received considerable attention in research on digital media. Beginning with (Amichai-Hamburger, Wainanel & Fox,2002) and (Hamburger & Artzi,2000), researchers investigated the relationship between personality and Internet usage in general. These studies are currently concentrating on certain applications of digital media, such as social media (Amichat-Lamburger & Vinitzky.2010),(Correa, Ilinsley, & de Zrga, 2010), (Guadagno, Okdie, & Eno. 2008), (Ross et al. 2009); (Zywica & Danowski, 2008). There were other literatures that focused on specific tools such as AI and their future ahead whereas there were also some research that discussed about how communication shapes the youths. (Dr. V. Thamil Selvi1, Dr. M. Bhuvaneswari et.al, Asst. Prof. PhD. Mustafa Özkan, Research Assistant Betül Solmaz,2017).

We may derive a conclusion that, most of the material now in circulation is concerned with how media exposure affects older generations like Millennials and Generation X, despite the growing database of research addressing the impact of social media consumption on people's personalities, there is still a sizable knowledge gap on how Generation Z (Gen Z) and Generation Alpha (Gen Alpha) differ in this relationship. It is critical to look at any potential changes in the relationship between media use and personality formation, however, as Gen Z is already nearing adulthood and Gen Alpha is growing up in an even more digital environment. Knowing these distinctions can help educators, parents, and legislators better understand the unique opportunities and difficulties that media presents to each generation's development. This research project attempts to fill the knowledge gap by examining how Gen Z and Gen Alpha's social media consumption habits transform their personalities.

It further seeks to give relevant stakeholders the evidence-based information they need to make selections about media exposure and the way it affects these two generational cohorts' psychological development. Now a question needs to be answered, Can Social Media Consumption Behaviour really have an influence in shaping personalities? And how they differ among GenZ and GenAlpha? With that objective in mind, two different types of questionnaires with similar concepts were made for the GenZ and GenAlpha as each generation needs concentration to get the desired data. Regression analysis was performed on the gathered data.

The results show that how social media consumption behaviour can shape personality be demonstrated by using the Big Five Personality Traits (The Five Factor Model)-Extraversion, Neuroticism, openness to new experience, Agreeableness, Conscientiousness. The remainder of the paper is structured as follows: the hypothesis was developed by a review of the literature on the response tactics. The approach addresses the creation of the conceptual framework, questionnaire design, and sample techniques.

**literature review**

***Who are Genz and Genalpha?***

Following Generation X (1961–1980), Generation Y (1981–1990), and Generation Z (1991–2010), the categorization of generations by Brosdahl and Carpenter ,2011 is used. The digital revolution that took place throughout the 1990s gave Gen Z access to Internet technology for the first time, and they were exposed to an unprecedented quantity of technology throughout their development. People of Generation Z are

assumed to be so used to technology that chatting on social media websites makes up a sizable amount of their socializing habits. Whereas, Children of Millennials, Generation Alpha is the generational group born between 2010 and the middle of the 2020s. These youngsters, who range in age from zero to thirteen, have grown up in a society where technology is an essential component of daily life. As a result, they are sometimes referred to as "digital natives," as they are the first generation to have grown up in an age where smartphones, tablets, and other mobile gadgets are commonplace. As a result, to interact with Generation Alpha and foster brand loyalty, marketers must adopt a new strategy (Urrutia, 2019).

***Big Five Personality Model***

According to personality psychologists, "provid[ing] an integrative framework for understanding the whole person" is a major area of focus (McAdams & Pals 2006). The Big Five features have become the standard Approach for assessing personality traits in psychology during the past 20 years. These characteristics are known as dispositional or basic attributes by psychologists. By using this term, the Big Five are set apart from additional aspects of a person's personality such as their typical adaptations (values, attitudes, and interests), self-concepts (self-esteem, identity), and objective chronology (careers, background) (McAdams & Pals 2006; McCrae & Costa 1996). Researchers and practitioners in a range of fields, including the social, therapeutic, and industrial-organizational domains, have found the five elements to be of great use (Grice, J. W.2023).

Media consumption may be indirectly influenced by personality traits like those in the Big Five model, according to theories about media choices such as the uses and gratifications hypothesis and mood management theory and according to research, certain forms of media usage show moderate but substantial relationships with each of the Big Five personality traits (Hall, 2020).Through this study, it is expected to gain understanding about how the five dimensions of this model effect the social media consumption behaviour of the generations and therefore shape their personalities.

**Extraversion**

Talkative, vivacious, aggressive, and outgoing qualities are examples of extraverted tendencies. Extraverts frequently assume leadership roles and are the first to voice their ideas and opinions. They frequently make rapid approaches to others, especially when dating (Salmon, 2012). Users of social media specifically are compelled by FOMO, or the fear of missing out, to check their notifications frequently, which results in problematic social media use and causes them to miss out on meaningful interactions and in-person relationships (Bergman, 2023). In social media or on any other media platform, the concept of "connectedness" is directly tied to connectivity and implicit engagement.

The core of social media firms' business is to commoditize connections and relationships to transform connectedness into connectivity (van Dijck,2013). The social media stars that Generation Z looks up to have a big impact on them. Because people respect the advice and viewpoints of influencers, they are receptive to companies that collaborate with authentic and pertinent influencers. Influencer marketing may be used to engage and effectively reach Generation Z. Generation Z has a mixed or indifferent view toward digital marketing. Currently, Generation Alpha is developing in a highly technical setting.

They often are accustomed to utilizing digital gadgets and have grown up around technology. They are keen to accept new digital platforms and have a high degree of digital literacy. YouTube and TikTok are two of the most widely used platforms for entertainment and education among Generation Alpha. Generation Alpha has a favourable attitude toward digital and social media marketing material. (Matikainen, 2016).

Therefore, it can be hypothesized that,

H1: Extraversion significantly influences social media consumption behaviour and contributes to the shaping of personalities, leading to distinct patterns in preferences, engagement, and self-perception.

**Neuroticism**

The tendency to experience unpleasant emotions, such as rage, anxiety, self-consciousness, irritability, emotional instability, and sadness, is known as neuroticism. People with high degrees of neuroticism react badly to environmental stress, perceive everyday events as dangerous, and may find even slight irritations to be utterly overpowering (Widiger, T. A., & Oltmanns, J. R.2017). People with high levels of neuroticism

may be drawn to media content that mirrors their emotional experiences and coping mechanisms. This could contain content that explores the hardships and difficulties of the individual, drama, psychological thrillers, etc. (Schaefer, M., Rotte, et.al,2013). The emotional impact of media information may also be impacted by neuroticism. When consuming media, those with greater degrees of neuroticism may have more powerful emotional reactions, especially if the material reflects their own emotional states. They may be able to process and cope with their own emotions indirectly through media if there is an emotional resonance that gives them a cathartic outlet for their sentiments (Thomas Bowden-Green, Joanne Hinds, Adam Joinson,2021) They briefly divert their attention from their emotional pain. As a coping method, engaging with media that relates to their emotional issues can provide them with a sense of understanding and validation (Stanisławski K.2019).

Therefore, it can be hypothesized that,

H2: Neuroticism significantly influences social media consumption behaviour and plays a substantial role in shaping personalities.

**Openness to Experience**

"Openness to experience," or simply "openness," is the personality characteristic that most accurately captures the common understanding of open-mindedness. People that are open are often inquiring in the mind, innovative, and creative (Smillie, L.,2017). Due to their quest for fresh and exciting experiences, those with greater degrees of novelty seeking are more likely to consume a variety of media. This conduct may influence how people consume media and how they develop personally (Hirschman, E. C.1980). Different cultures have unique values, beliefs, and customs that affect how its people choose to consume media. People from cultures of collectivism could be drawn to media that stresses family values and communal harmony, whereas people from individualistic cultures would choose media that emphasizes individual success and liberty (Mediatexthack.,2014). The methods through which people may access and consume media material are expanded by new technology. There are more possibilities for media consumption thanks to the growth of cell phones, streaming services, social media, and augmented reality gadgets. This easier accessibility may have an impact on both the quantity and kinds of media information that individuals consume (Abid Haleem, Mohd Javaid, Mohd Asim Qadri, Rajiv Suman,2016)

Therefore, it can hypothesize that,

H3: Openness to Experience is positively correlated with diverse social media consumption behaviour and contributes to the formation of more complex and adaptable personalities.

**Agreeableness:**

Agreeableness is frequently used to characterize a person's degree of friendliness, kindness, and even politeness. A high score for pleasant inclinations also indicates that you have the capacity to preserve connections because agreeable individuals are often liked and prefer collaboration over confrontation (Agreeableness Personality Trait. (n.d.). Thomas,2014). A person's faith in the honesty, plausibility, and objectivity of the information offered by various media channels is referred to as their trust in media sources. According to theoretical terms, the level of confidence that people have in media sources has a significant impact on how they consume media and, as a result, how they develop as people (Kohring, Matthias & Matthes, Jörg.2007). Social influence and recommendations have a huge impact on media consumption behaviour, causing preferences to align and personalities to develop that are influenced by interpersonal interactions and outside ideas. This impact may lead to common interests, a sense of community, and restrictions on exposure to opposing ideas (Arias, E.2019).

Therefore, it can be hypothesized that,

H4: Agreeableness significantly influences social media consumption behaviour and plays a role in shaping personalities.

**Conscientiousness**

Conscientious people have a strong work ethic, are dependable, prompt, pay attention to detail, and display dedication and purpose. They are the people you will see organize their task down to the smallest of details or even a timetable ((Agreeableness Personality Trait, n.d.,2021). People with a stronger sense of responsibility are more inclined to interact with media content that supports their moral, ethical, and social

principles. This could result in a liking for informative material, documentaries, and reliable news (H. Ecker et al., 2022). Higher conscientiousness scores are associated with being disciplined, goal-oriented, and structured. When people have good self-control, they are better able to resist impulsive media consumption and stick to scheduled consumption schedules. They may engage in organized media consumption to match their media choices with their own beliefs, objectives, and responsibilities. To prevent overindulgence, they can set aside certain time windows for media usage (The World Counts, n.d.,2022).

Therefore, it can hypothesize that,

H5: The Interaction Between Conscientiousness and social Media Consumption Behaviour Shapes Personalities

**Research Methodology**

The study used both quantitative and qualitative method for research purposes. For the qualitative approach the literature has been reviewed rigorously and for the quantitative approach's data collection method, a person survey method has been utilised and for each generation the survey approach was different for the convenience and understanding of the respondents.

**Measurements**

For this study, the constructs have been developed from a rigorous review of existing journal and the theoretical framework is based on an established model (Big Five personality Model) which consist of five broad constructs.

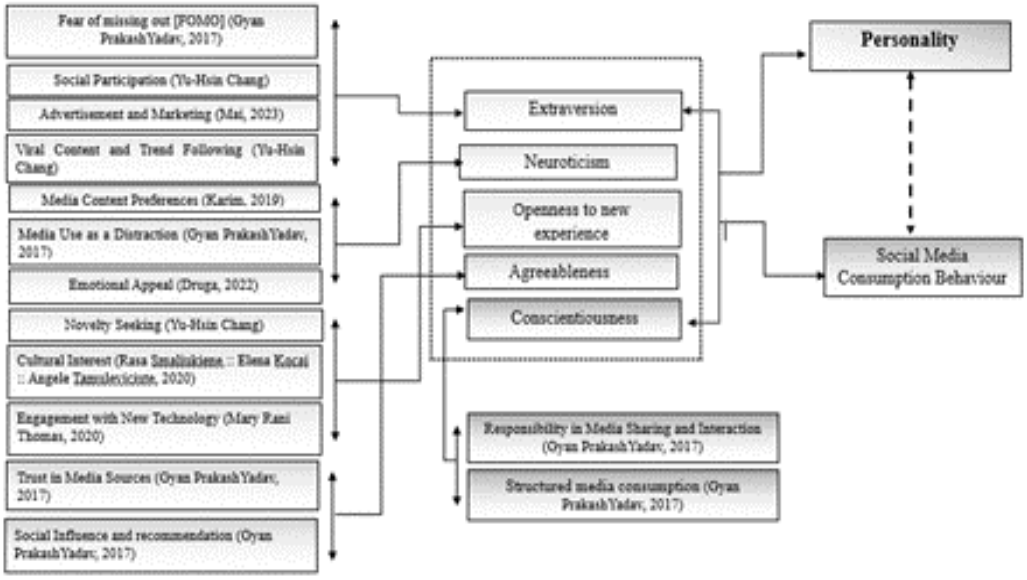


Fig 1: Theoretical Framework

**Questionnaire Design**

The goal of this paper is to quantify the how personality of the respondents is affected by the media consumption behaviour of individuals and a comparison is drawn between two significant generations. So, two questionnaire was developed to collect the primary data. The first segment of the questionnaire included the demographic information of the respondents. In the last segment, the respondents were asked to rate the construct items on a 4-point Likert scale with 'strongly agree' in one extreme and 'strongly disagree' in the other. It is to be mentioned that both the questionnaires we developed based on the same constructs, but the approach were different as the understanding of both groups are on different level that is why for GenAlpha the questionnaire were developed in Bengali and then translated into English for the ease of data analysis.

**Pretest and Pilot Survey**

A pretest and pilot survey were conducted prior to the final survey. Two seasoned researchers initially reviewed the questionnaire. A small number of clients were approached for the pretest for each questionnaire. They discovered several issues. The questionnaires were altered in response to their suggestions, which might encourage more participation from the respondents. After the pretest, a pilot survey of 20 people was conducted for each survey. Tests for validity and reliability were run on the information gathered from the pilot survey. The findings revealed that all the constructs had Cronbach's alpha values above 0.7. This indicates that the elements and structures were coherent. As a result, we completed the questionnaire before starting the survey.

**Sample Area and Size**

The sample has been collected with two methods depending on the generation. For GenZ To eliminate bias, the sample was chosen using a simple random sampling (SRS) procedure. Even though the selection was arbitrary, we tried to make it as representative as we could by choosing individuals from a wide range of ages, educational levels, and other factors. But for the sampling of GenAlpha the sample was collected directly, and all the students present in the class who fall into the age cohort of GenAlpha were considered. 150 respondents made up the sample where 75 respondents were from a private school,75 respondents were from various backgrounds focusing on the GenZ age cohort, which was only conducted in the city of Dhaka and in the month of August 2023.

**Data Analysis Method**

Through the research the regression and the validity of the data has been examined. To come to a solution for the research challenge, hypotheses were put to the test. regression analysis has been performed to determine the extent to which social media consumption behaviour predicts variations in personality traits, controlling for demographic factors. The goal of this paper is to identify the relationship between these variables. These analyses provide the clearest understanding of that kind of interaction to make a Conduct group comparison between GenZ and GenAlpha to identify any generational differences in social media-personality relationships.

**Data Analysis and Findings**

***Demographic Profile:***

From the Table 1 and 2 from the Appendix 2 we can see that for the GenZ there were more male participants whereas for the GenAlpha females were the majority and for GenZ mostly were students and the GenAlpha participants were entirely from student base. For GenZ particularly the respondents were from a middle-class family mostly and undergrad students. As the GenAlpha needed a different approach, from the survey it has been seen that they mostly belong to a nuclear family where mostly fathers are businessman and mothers are housewife. And it can be assumed that because of being in a nuclear family media is a mode for their time consumptions and mostly chose YouTube as their mode of media consumption as they don't have a social media on their own.

**Regression Analysis**

Extent to Which the Independent Variables Can Explain the Dependent Variable?

A regression analysis has been performed to see how much the independent variables chosen in the graphical model can explain the dependent variable customer satisfaction. The R square, in this case, is.934, as we can see from the model summary, which suggests that 93.4% of the variation in the dependent variable (Personality) can be accounted for the change in the independent variables. And the value of the modified R square close to the original R square value. This suggests that the data had a very low error rate. Thus, we can conclude that the regression model fits the data well. Additionally, the ANOVA's significance level of.000 demonstrates how well the independent variables predict the dependent variable, customer personality. From APPENDIX 2, Table 08 we can see, the significance hold for each construct is less than 0.05. Therefore, each of them may accurately forecast the dependent variable. In addition, all three variables' coefficient values are less than 0.05, indicating that the hypothesis is accepted.

**Hypothesis Testing and Results:**

H1: The first hypothesis observes whether Extraversion significantly influences social media consumption behaviour and contributes to the shaping of personalities, leading to distinct patterns in preferences, engagement, and self-perception. The results from the data analysis support this fact as the significance level is level .000. The value of the beta coefficient indicates that 22.6% of the dependent variable, personality can be explained by Extraversion. (β =.226). So, the hypothesis is accepted.

This result is consistent with the views of Salmon,2012 where they illustrated that extraversion is crucial in social engagement. Vân Dijck,2013 argued that extraversion is the most influencing factor to c commoditize connections and relationships to transform connectedness into connectivity.

H2: Hypothesis two (H2) indicates whether Neuroticism significantly influences social media consumption behaviour and plays a substantial role in shaping personalities The results from the data analysis support this fact as the significance level is (.000) below 0.5 Also, the value of the coefficient (β = .457) indicates that 45.7% of personality shaping can be explained by neuroticism.

The hypothesis is accepted. This view has been supported by (Widiger, T. A., & Oltmanns, J. R.2017) that People with high degrees of neuroticism react badly to environmental stress, perceive everyday events as dangerous, and may find even slight irritations to be utterly overpowering(Widiger, T. A., & Oltmanns, J. R.,2017).Schaefer, M., Rotte, et.al,2013 said that The emotional impact of social media information may also be impacted by neuroticism.

H3: Next, we have hypothesis three (H3) where we determine whether Openness to Experience is positively correlated with diverse social media consumption behaviour and contributes to the formation of more complex and adaptable personalities. The hypothesis has been proven to be true from the results of our data collection (significance level .000). The value of the beta coefficients indicates that 79.2% of the dependent variable, can be explained by this construct. (β =.792).

The result is consistent with the views of (Hirschman, E. C.1980) as Due to the quest for fresh and exciting experiences, those with greater degrees of novelty seeking are more likely to consume a variety of media. This conduct may influence how people consume media and how they develop personally (Hirschman, E. C.1980).

H4: In hypothesis four, the target is to conclude whether the Agreeableness significantly influences social media consumption behaviour and plays a role in shaping personalities. The results from the data analysis support this fact as the significance level is below 0.05. Also, the value of the coefficient (β = 0.774) indicates that 77.4% of personality can be explained by agreeableness.

So, the hypothesis can be accepted. The results are consistent with the view of Arias, E.2019 as they said social influence and recommendations have a huge impact on media consumption behavior, causing preferences to align and personalities to develop that are influenced by interpersonal interactions and outside ideas. This impact may lead to common interests, a sense of community, and restrictions on exposure to opposing ideas.

H5: Finally, the last hypothesis (H5) emphasizes The Interaction Between Consciousness and social Media Consumption Behavior Shapes Personalities The significance level is below 0.05 for this construct, with a beta coefficient (β =.222) that says that 22.2% of the dependent variable can be explained by this construct.

So, the hypothesis is accepted. The result elaborates positively with the views of The World Counts, n.d.it has been stated that Higher conscientiousness scores are associated with being disciplined, goal-oriented, and structured. When people have good self-control, they are better able to resist impulsive media consumption and stick to scheduled consumption schedules. They may engage in organized media consumption to match their media choices with their own beliefs, objectives, and responsibilities. To prevent overindulgence, they can set aside certain time windows for media usage.

**Comparison Between GenZ and GenAlpha:**

As discussed, before it has been assured that social media consumption behaviour shape personalities as the hypothesis results were positive. All the five constructs influence the media consumption behaviour and eventually they shape the personalities, in the table below a comparison in been made among the two generations by mean analysis and it is evident that GenAlpha are more influenced or easily influenced towards the media consumption behaviour and as well as the media consumption has much more effect in

shaping their personalities. The Age cohort is basically 0-14 for this Generation. It's crucial to keep in mind that members of Generation Alpha, or those who were born after 2010, are still very young and that their conduct is impacted by a variety of elements, including their parents, carers, classmates, and the environment in which they grow up.

This generation's children are still in the earliest phases of development, and as a result, their conduct is quite changeable. In comparison to older people, children are often more sensitive and influenced by those around them. It's crucial to remember that every generation, including Generation Z, went through a time in their early years when their conduct was significantly impacted by outside forces. GenZ are now in an age where they have already gone through significant stages of development and their beliefs, values and behaviour is rather static and formed, so social media consumption will substantially have less influence in shaping their personalities. And from the survey responses and the analysis similar scenario has been tested as positive. The results shows that GenAlpha personality is more influenced by social media consumption behaviour than GenZ.

| Mean | | |
|---|---|---|
| *Category* | *GenZ* | *GenAlpha* |
| Extraversion | 3.15 | 3.2 |
| Neuroticism | 3.13 | 3.2 |
| Opnenness to experience | 3.17 | 3.2 |
| Agreeableness | 3.19 | 3.3 |
| Conscientiousness | 2.75 | 2.8 |

**Discussions & Conclusion**

The aim of this study is to determine if social media consumption behaviour can shape personality. The Big Five Personality model plays a crucial role in the social media consumption measuring the personality shaping among generations. In this paper we have used the Big Five personality model for evaluating which factors influence personality in case of social media consumption behaviour. From the analysis and findings, it is still a question if personalities have a very strong connection and if it can entirely be shaped by social media consumption behaviour or not, but from the study it can be claimed that there is a positive relation between the shaping of personality and social media consumption behaviour and the effects are much stronger among GenAlpha than GenZ.

**Limitation and Future Research**

The first limitation of this paper is sample size. The sample size is 150 which is equally divided among the two generations, the sample size only meets the minimum number for the generalization. In future, the study can be conducted on a bigger sample size. GenAlpha is the upcoming future so there were a very limited literature to be reviewed. In future there will be more scope to work with GenAlpha The survey of GenAlpha were solely based on one school, for which the results may seem biased, in future the survey can be done on a wide range of schools and other options. Due to time and logistical constraints, this research focuses on Dhaka only. Further research could be conducted on the whole of Bangladesh.

This research is focused on the answer to the question if media consumption behaviour can shape personalities or not but in future It is possible to learn whether there are long-term consequences and how these associations may change over time by conducting longitudinal studies that follow people's media consumption habits and personality traits over an extended period. This strategy could aid in determining causal links and capturing adjustments that might be made as people develop. Look into any mediating or moderating factors that may have an impact on the correlation between media consumption and personality. Parental supervision, peer pressure, cultural context, and self-awareness are just a few examples of the variables that may influence how social media intake affects personality development.

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**Appendix:**

**Table 01**

| Category | | Frequency | Percenatge |
|---|---|---|---|
| Gender | Male | 48 | 64% |
| | Female | 27 | 36% |
| | | | |
| Age | 14-19 | 5 | 7% |
| | 20-24 | 32 | 43% |
| | 25-29 | 28 | 37% |
| | 30-34 | 10 | 13% |
| | | | |
| Occupation | Student | 59 | 79% |
| | Business Owner | 12 | 16% |
| | Government Employee | 0 | 0% |
| | Private Employee | 3 | 4% |
| | Housewife | 1 | 1% |
| | | | |
| Education | Masters/MBA/Undergraduate | 12 | 16% |
| | Undergraduate | 56 | 75% |
| | Higher Secondary level | 7 | 9% |
| | Secondary Level | 0 | 0% |
| | Primary Level | 0 | 0% |
| | | | |
| Family Income | 10,000 or below | 0 | 0% |
| | 10,001-20,000 | 1 | 1% |
| | 20,001-30,000 | 54 | 72% |
| | 30,001-40,000 | 11 | 15% |
| | 40,000 or Above | 9 | 12% |

**GenZ: Demographic Profile**

**Table 02**

| Category | | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 30 | 40% |
| | Female | 45 | 60% |
| | | | |
| Age | 0-6 years | 5 | 7% |
| | 7-16 years | 70 | 93% |
| | | | |
| Grade | 1 | 2 | 3% |
| | 2 | 6 | 8% |
| | 3 | 45 | 60% |
| | 4 | 22 | 29% |
| | | | |
| Father's Occupation | Business Man | 63 | 84% |
| | Service Holder | 12 | 16% |
| | | | |
| Mother's Occupation | Business women | 6 | 8% |
| | Service Holder | 20 | 27% |
| | Housewife | 49 | 65% |
| | | | |
| Family Structure | Nuclear | 68 | 91% |
| | Joint | 7 | 9% |
| | | | |
| Favourite mode of Entertainment | Television | 3 | 4% |
| | Youtube | 48 | 64% |
| | Tiktok | 16 | 21% |
| | Facebook | 8 | 11% |
| | | | |
| Social Media Account | Own | 6 | 8% |
| | Parents | 69 | 92% |

**GenAlpha: Demographic Profile**

**Table 03**

**Variables Entered/Removed[a]**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | Openness_to_Experience, Conscientiousness,Neuroticism, Extraversion, Agreeableness[b] | . | Enter |

a. Dependent Variable: P1

b. All requested variables entered.

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .934[a] | .873 | .869 | .310 | .873 | 198.308 | 5 | 144 | 0.000b .000 |

a. Predictors: (Constant), Openness_to_Experience, Conscientiousness, Neuroticism, Extraversion, Agreeableness

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 95.469 | 5 | 19.094 | 198.308 | .000[b] |
| | Residual | 13.865 | 144 | .096 | | |
| | Total | 109.333 | 149 | | | |

a. Dependent Variable: P1

b. Predictors: (Constant), Openness_to_Experience, Conscientiousness, Neuroticism, Extraversion, Agreeableness

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -.160 | .156 | | -1.027 | .306 |
| | Extraversion | -.263 | .071 | .226 | -3.695 | .000 |
| | Agreeableness | 1.093 | .091 | .774 | 11.997 | .000 |
| | Neuroticism | -.467 | .060 | .457 | -7.807 | .000 |
| | Conscientiousness | -.224 | .032 | .222 | -7.080 | .000 |
| | Openness_to_Experience | .886 | .105 | .792 | 8.435 | .000 |

a. Dependent Variable: P1

**Regression Analysis**

# The African growth and opportunity act (AGOA) and export performance: a case study of the united republic of Tanzania in relation to its east African partner states

**Miraji Hamis Kasunsumo**
Tanzania Revenue Authority, Dar es Salaam, Tanzania

**Keywords**
African Growth Opportunity Act, East Africa Community, Non-reciprocal, Sub-Saharan African countries, and Preferential Trade Programme.

**Abstract**

*This study assesses the effectiveness of the African Growth Opportunity Act (AGOA) on the export performance of Sub-Saharan African countries (SSA) countries. Tanzania's export performance in relation to that of the other three East Africa Community (EAC) partner states, namely, Kenya, Rwanda, and Uganda, is investigated. The study employs a traditional trade model based on the Ordinary Least Square (OLS) procedure, covering the pre-and post-AGOA period from 1990 to 2020, 11 years before the signing of AGOA and 20 years after it. The main differences between this study and previous studies assessing the impact of AGOA preference include a longer sample period, the techniques of treating the model in the empirical analysis, and the number of countries assessed that allows to observe what differentiates the AGOA's impact on SSA countries. A panel model showing the overall impact of AGOA, and individual country regressions are estimated. The panel results show no impact of AGOA on the export performance of the EAC partner states, while to the individual country findings indicate that AGOA has a significant impact only on the total exports of Kenya, to the country of interest that is Tanzania is insignificant. The policy implications of the findings are discussed.*

## Introduction

### Background

The African Growth and Opportunity Act (AGOA) is a non-reciprocal preferential trade programme that the United States (US) offers to the sub-Saharan African (SSA) countries to support their economies (Williams, 2015). Even though the Act provides SSA countries with preferential export opportunities, since 2000, their exports to the US have remained around one percent of total US imports from abroad, with a focus on oil and others energy products (CRS, 2015).

From the year 2000 to 2013, data shows that the total value of trade between East African Community (EAC) partner states and the US increased from USD 2,372 million to USD 3,167 million. The value of exports from EAC to the US improved from USD 186 million to USD 577 million, while the value of imports from the US sharply increased from USD 328 million to USD 1,184 million, resulting in an EAC trade deficit (EAC Secretariat, 2014). Contrariwise, the increased exports reflect inequality among partner states. Whereas 96 percent of EAC exports to the US were from Kenya, Tanzania exported 3 percent, Uganda 0.4 percent, Rwanda 0.2 percent, and Burundi had no export data. (EAC Secretariat, 2014)[1].

Tanzania is one of the SSA nations that is working to grow its exports in order to strengthen its economy. Sayuni (2006) reported that since the 1970s, the country has experienced a persistent trade imbalance where the main challenges are low export volumes concentrating on primary products and high importations of industrial products. Low levels of export products production, competition from other nations producing comparable export goods in the same targeted market, the capacity to adhere to international standards, and low trade facilitation, which drives up export costs, are just a few of the obstacles the country faces in attempting to boost exports (Mueller, 2008).

1 U.S. imports from AGOA beneficiary countries (AGOA countries) represent a small share (1%) of total U.S. imports and are largely concentrated in energy-related products. Oil is consistently the top duty-free U.S import from AGOA countries, accounting for 68% of such imports in 2014.

From the year 1980 onward, the country started to take several reforms to liberalize the economy. Among others, including commitment to the World Trade Organisation (WTO), fiscal reforms to abolish export taxes, and integrating the country into the global economy through trade arrangements and treaties, including membership in EAC and SADC, and signing of the AGOA with the US and Economic Partnership Agreements (EPA) with the EU through EAC, respectively (Milanzi, 2012). Among of the motives for integrating the country into the global economy is to increase the market size for goods produced, earn foreign currency, and create employment opportunities (Brenton & Hoppe, 2006).

In line with the above initiatives, the country adopted administrative measures to promote exports. The Act No. 5 of 1978 established an external trade board and Saba Saba Day as an annual special event for export promotion. The Export Processing Zone (EPZ) Act of 2002 established a special zone to manufacture products mainly for exports, and similarly, the Special Economic Zones (SEZ) Act of 2006 introduced an investment programme to encourage production of products for domestic consumption and exports.

Despite the above measures taken by the government, including the signing of the AGOA and the formulation of the National AGOA strategy implemented from 2016/2017 to 2020/21, the country is still lagging in utilization of the market preference and exports in general. Simon et al, (2021) reported that firms in Tanzania underutilizes the preferential market access, which results in low exports and hence jeopardizes the balance of payments of the country, reduces the level of economic growth, and hinders the creation of employment. Notable, SSA countries eligible for the AGOA, including Tanzania, their low level of exports is due to both supply and demand side considerations (USITC, 2015). The supply side is concerned about being unable to access the market due to high production costs, inefficient trade facilitation, poor soft and hard infrastructure, and a low level of technology in producing goods for export. The demand side is price competitiveness in the market.

According to Condon & Stern (2011), non-reciprocity of the AGOA preference, uncertainty of the time frame, and mixing on the agreement political and commercial criteria have been identified as barriers to regional participation and the opportunity to exploit it. For instance, Simon et al. (2021) report that Tanzanian small and medium enterprises do not exploit well the market opportunities brought by the AGOA because of difficulties in obtaining international permits from the US embassy due to uncertainty in diplomatic relations between the US and Tanzania. As suggested by Muller (2008), the mixing of political and commercial conditions in the AGOA agreement poses uncertainty to firms and investors, which limits the participation of the SSA countries in the AGOA. Another reason for the limited participation of the SSA countries is that the AGOA fails to remove non-tariff barriers to trade, which include a lack of integration into international shipping and freight networks; a lack of complementary investments in critical infrastructure such as power networks, and a lack of trade facilitation and financial assistance (EAC secretariat, 2014; Brenton & Hoppe, 2006).

**Reported challenges faced by the EAC partner states in utilization of the AGOA market preference include the following:**

i). Low level of diplomatic relation between some EAC states and the US, which is the key criteria for the SSA countries to qualify eligibility criteria. Due to that, the flow of trade between EAC and the US is distorted.

ii). insecurity to some of EAC states such as DRC and South Sudan create unfavorable environment to businessmen.

iii). concentration in few eligible products, mainly apparel and garments while the region has the opportunity to produce products from others sector such as minerals, agro-processing, and others.

iv). high cost of trade to businessmen in EAC including transport cost, cost of compliance to standards and cost of production which reduce competitiveness to the AGOA market.

v). uncertainty to investors with intention to utilize the AGOA market preference since the preference is a unilateral program which can be modified or terminated at the discretion of the US president also limited lifespan which create unpredictability to invest long term projects; and

vi). limited participation of private firms, especially medium and small enterprise to respond to the opportunity.

This study assess the impact of the AGOA on the SSA exports to the US. The author motivated by the following factors: First, there are limited studies on the impact of the AGOA on the exports of the SSA countries to the US. Second, as Asante, Bawakyillenuo and Ahiadeke (2011) argue, the realized benefits of the AGOA on export performance are likely to be below expectations[2]. Third, the limited studies that have analysed the impact of the AGOA on SSA countries focus on specific regions or countries, and their findings therefore cannot be generalised to all SSA countries. As a result, the agenda of AGOA preference utilisation and its impact on SSA countries, specifically in stimulating their exports to the US, is not well known at best (CRS, 2015).

***The Enactment of AGOA and its Implementation by EAC Countries***

On May 18, 2000, the US passed the AGOA as Public Law 106 of the 200th Congress. The Act regarded as an extension of tariff preferences granted by the US to developing countries under the programme of the Generalized System of Preferences (GSP), which provides duty-free treatment to the eligible SSA countries to export their products to the US in non-reciprocity. The objective of this law is to boost trade between the US and SSA countries, thereby integrating the latter into the global economy (Ufuo & Alagidele, 2020). AGOA initially intended to be in effect for eight years, ending in September 2008. President George W. Bush of the United States made an amendment in July 2004 to extend the preference for 13 years, from 2008 to 2015. In keeping with this, in June 2015, President Barack Obama extended the duration of the scheme for an additional 10 years to 2025.

According to office of US trade representative, the primary objectives of the AGOA are to promote increased trade and investment between the US and SSA countries; to promote increase access and opportunities for US investors and businesses in SSA countries; and to promote economic development and reforms in SSA countries.

The country's eligibility, product eligibility, and coverage of the products are the key issues in AGOA utilisation. (Condon & Stern., 2011). Sections 104(a) and (b) of the Act empower the president of the US to designate and decertify a Sub-Saharan African country as eligible. The key requirements of the Section for an SSA country to be granted eligibility are that a country has established or is making continual progress towards establishing the rule of law; political pluralism; a market-based economy; and the right to due process. Further, it has removed or does not pose a risk to US trade and investment, has a system in place to combat corruption and bribery, and protects internationally recognised worker rights. Adhering to the Rules of Origin (RoO) and complying with customs regulations are additional criteria. Furthermore, exports in the garment subsector are contingent upon the fulfilment of an apparel visa. The list and information accessed through a specific website for AGOA information.[3] The eligibility criteria reviewed on an annual basis by the office of the US Trade Representative (USTR) and announced by the US President.

The participation and utilisation of the AGOA scheme among EAC partner states have different features. Some countries' access to the AGOA is limited, and not all countries attain eligibility on the same date. Considering the criteria stipulated under Section 106 of the AGOA, only four EAC partner states—Kenya, Rwanda, Tanzania, and Uganda—have been eligible for the AGOA since the enactment of the Act in 2000. Other states followed, such as the DRC, which attained eligibility in December 2002; Burundi in January 2006; and the Republic of South Sudan in December 2012. Nevertheless, not all EAC partners maintain their eligibility status all the time, except for Kenya, Rwanda, Tanzania, and Uganda.

With regard to the utilisation, the Democratic Republic of the Congo lost its eligibility from January 2011 until January 2021, when the US President declared it reinstated; South Sudan lost in 2015; and Burundi lost on January 1, 2016. Further, AGOA apparel benefits for Rwanda were suspended effective July 31, 2018.

[2] AGOA was expected to trigger industrialization as domestic firms expanded and diversified in order to add value to local products for export. It was also anticipated that the ensuing industrialization would increase employment by absorbing surplus labor. To date, however, these expectations have not been met.

[3]https://www.federalregister.gov/documents/2022/05/11/2022-10082/annual-review-of-country-eligibility-for-benefits-under-the-african-growth-and-opportunity-act.

| Country | Date declared AGOA eligible | Date suspended |
|---|---|---|
| Republic of Burundi | January 1, 2006 | January 1, 2016. |
| Democratic Republic of Congo | October 1, 2003 | January 1, 2011 |
| Republic of Kenya | October 2, 2000 | |
| Republic of Rwanda | October 2, 2000 | 30 Jul 2018, only to Apparel |
| Republic of South Sudan | December 20, 2012 | January 1, 2015 |
| United Republic of Tanzania | October 2, 2000 | |
| Republic of Uganda | October 2, 2000 | |

**Table 8: EAC partner states status of AGOA eligibility**

The rest of the study is organised as follows: Section 2 provides a literature review, followed by methodology and estimation technique in Section 3. Section 4 consists of results and discussion, and Section 5 provides policy implications and a conclusion, followed by limitations and directions for future research.

***Literature Review***

***Theoretical review***

Preferential trade arrangement (PTA) in the WTO context is the term that applied when one country provides trade preference over the other in non-reciprocal[4]. The preference may be in different trade arrangement such as reducing or removing of the tariffs also removing or lowering others trade barriers. The history of PTA in in the year 1964, when the United Nations Conference on Trade and Development (UNCTAD) recommended developed countries to grant non-reciprocal trade preferences to developing countries. The later conference of 1968 emphasised non-discrimination in granting preference (UNCTAD, 2008).

The well-known trade preference scheme is the Generalised System of Preferences (GSP), which mainly used by developed nations to allow products from developing nations (beneficiary countries) to enter developed nations' markets at preferential tariff rates. The programme was first implemented in 1971 and is a deviation the most favoured nation obligation principle granted under Article IX of the Marrakesh Agreement. This provision enables the least-developed and developing countries to receive preferential treatment from trade agreements with developed countries after fulfilling all requirements.

Additionally, in 1979, with the intention of improving LDCs into multilateral trade participation, the General Council introduced the Enabling Clause under the GSP scheme to allow importing nations to extend preferential tariff treatment to the products of LDCs (Van Grasstek, 2013). The enactment of the AGOA comes from this ground, where President W. Bush signed and approved the extension of unilateral preferential trade terms to eligible SSA countries. Considering the genesis of trade preferences, theoretical background based on the expected effects of the preference to developing countries. Theoretically, we expect benefits or costs from trade preferences; however, in this paper, the author reflects the spirit of SSA countries towards trade preferences granted through the AGOA by the US government.

According to Persson (2012), the rationale of developing nations towards the trade preference is to diversify their economies and export products to be able increase earnings from exports. This is emphasized by CRS (2013) which reports that the common goal to all trade preference program to LDCs is to promote export growth and economic development. Therefore, trade preference granted to LDSs by reducing tariffs, removing tariffs or removal of trade restrictions is expected to increase exports and diversification of exports products.

The theoretical support for this point of view originated from the work of Persson (2012) and Grossman & Sykes (2005), using the demand and supply curves in a partial equilibrium setting. These studies illustrate the effect of unilateral trade preference on the recipient country based on the assumptions of perfect

[4] These include the Generalized System of Preferences schemes, under which developed countries grant preferential tariffs to imports from developing countries. They also include non-reciprocal preferential schemes granted through a waiver by the General Council, meaning the member has been exempted from applying the most favoured nation (MFN) principle (WTO).

competition, trade in a homogeneous product, and the recipient country applying a higher tariff rate than the tariff rate applied by the country granting preferences. This illustrated in Figure 3.

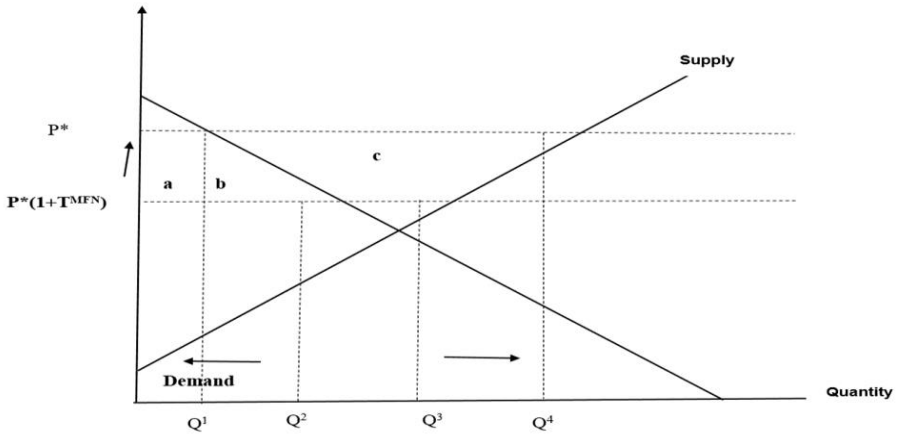


**Figure 1: Theoretical effect of AGOA to eligible SSA countries**

From **Figure 1**, before the enactment of AGOA, the tariff rate applied to all countries exporting to the US (MFN tariff) was TMFN. If the price of a particular product to the US market is at P*, therefore the particular products from the SSA countries when exporting to the US market will be P* (1+ TMFN) and the quantities exported will be the area Q3 – Q2. With the presence of AGOA preference to the SSA countries comprising removal of tariffs to eligible products will make the exported products to be charged at price P* which means exported good will no longer subject to tariffs as was the case in the pre-AGOA period. At that price P*, the quantities exported to the US will increase to be the area Q4 – Q1.

With the presence of the AGOA preference, the welfare of SSA countries will be affected to both producers and consumers. The producers will be better off in the post-AGOA period than before, since the price received when exporting to the US is higher, which also encourages them to produce more exported goods and to earn more. In **Figure 1**, the producer welfare is areas a, b, and c. Consumers suffer in the post-AGOA period because increases in export prices raise domestic prices, creating scarcity of specific products in the domestic market because producers prefer to export their products overseas rather than sell them in local markets. The consumer surplus from Figure 1 decreases in areas and b.

From **Figure 1**, the eligible SSA countries benefit when exporting to the US through the AGOA export preference by receiving a higher export price than in the local markets. Producers increase production of eligible products to export more, which in turn creates more employment. Further, exports generate foreign currency for the SSA countries. Further, provide incentive for new firms to invest in the country in order to take advantage of available export opportunities. These benefits were among the factors that motivated the SSA countries to sign the AGOA with the US (Ufuo & Alagidele, 2020).

*Empirical review*

Using a gravity model for 36 AGOA-eligible SSA countries covering the period from 1997 to 2004, Seyoum (2007) finds that the AGOA has no significant impact on the overall exports from SSA countries to the US. However, when a sector analysis conducted, including apparel, energy, and minerals, the AGOA preference found to be significant, but only for the apparel sector. Mueller (2008) also applies a gravity model with special treatment of the Prais-Winston technique to assess the contribution of AGOA to the exports from eligible SSA countries from 2000 to 2004. Mueller (2008) finds no significant impact of the AGOA, including the apparel sector he studies.

Applying a gravity model to estimate the overall impact of AGOA on imports from SSA, Fayissa & Tadesse (2007) find that AGOA has a positive and significant impact on only 14 out of 32 product categories analyzed and a negative impact on three products. They further examine the impact of AGOA on exports of new products (trade initiation) and the impact on exports of existing products (trade intensification). In the case of the trade initiation, they find that the AGOA had a statistically significant effect on 24 products

out of 99 product categories where the apparel sector has a large share. In terms of trade intensification, the AGOA had a small impact on increasing export volume.

Condon & Stern (2011) assess the effectiveness of AGOA in increasing trade from LDCs using the inclusion and exclusion criteria. They find that AGOA has had a positive impact on apparel exports from a small number of sub-Saharan African LDCs. Apart from the apparel sector; there is little or no evidence of the gains brought by AGOA in any other sectors for LDCs.

Zenebe, Wamisho, and Peterson (2014) evaluate the impact of AGOA on agricultural exports from Sub-Saharan African countries to the US by using gravity models from 1990 to 2013. They find the AGOA did not increase the SSA countries' exports to the US. Zenebe (2013) examines the impact of the AGOA on African agricultural exports to the US using a gravity trade model that included 35 eligible SSA countries in the pre-and post-AGOA periods. The author finds that the AGOA does not have a statistically significant impact on SSA agricultural exports.

Brenton & Hoppe (2006) analyse the impact of the AGOA by considering its contribution to the exports and development of SSA countries up to 2005. They report that, from 2001 to 2005, exports from SSA to the US increased to 22 billion USD, with 90 percent of the increased exports being contributed by petroleum exports. They further report that in 2004, about 96 percent of US AGOA imports of apparel products came from seven countries; about 75 percent of that came from four countries, and Kenya was among them. Tanzania, Uganda, and other countries had substantially increased exports of apparel in 2005 but were not among the major contributors.

By applying a pseudo-Poisson maximum likelihood gravity model simulation, Coulibaly (2017) analyses two preferential agreements extended by the US to detect the impact of the AGOA and Everything But Arms (EBA) on the West African countries. The findings of the estimation reveal that not all African countries have benefited from the AGOA and EBA. Further, he also observes that the West African countries could be exporting more to the EU and the US if AGOA and EBA were implemented without the criteria for country eligibility, product coverage, and rules of origin.

Using socioeconomic factors, Osabohien and Adeleye (2021) investigate the AGOA's implementation status and performance in Nigeria. Relevant stakeholders were interviewed as part of the methodology. They conclude that Nigeria has not yet fully benefited from the AGOA due to a lack of compliance with international standards, a shoddy industrial base, ingrained structural barriers for exporters, and limited productive capacity, among others.

Simon et al., (2021) assess the role of local and international factors in the participation of Tanzanian small and medium enterprises in the market opportunity brought by AGOA. Using survey data with 129 respondents, they find that both local and international-related factors constrain Tanzanian SMEs from engaging in the AGOA market. Among those factors are poor business policies in the country, long bureaucracy in accessing business permits, poor infrastructure in the country, and poor provision of business information in the country.

Overall, a brief survey of empirical evidence above indicates that the effect of AGOA on SSA countries is ambiguous. While some studies find that AGOA has no or small effect in SSA countries, others report some significant impact.

***Methodology and Estimation Technique***

This study employs an econometric trade model commonly applied to assess the volume of bilateral trade and to estimate the bilateral trade potential. The model applied in different studies for the empirical analysis of the bilateral trade, including the assessment of the impact of the AGOA (Choudhri et al., 2017; Nouve, 2005; Zenebe, 2013; and Zenebe, Peterson, and Wamisho, 2014). The model allows testing whether various factors, such as the presence of a regional agreement or preferential trade arrangements, have a statistically significant impact on trade flows (Zenebe, 2013). The econometric analysis conducted by using Stata/IC 15 using a log (ln) linear regression model based on the Ordinary Least Square (OLS) method. The model given below:

$$In\ T_t = \beta_0 + \beta_1 InDY_t + \beta_2 InUSY_t + \beta_3 InE_t + \beta_4\ AGOA_t + \varepsilon_t \quad Eq.1$$

Where $T_t$ is the total exports of each individual EAC state to the US, $DY_t$ and $USY_t$ represent the domestic real GDP and the US real GDP, respectively. $E_t$ is real exchange between the domestic currency against the US dollar, t is the time and $AGOA_t$ is a dummy variable which takes a value of 0 during the pre-

AGOA (1990-2000) period and 1 during the post-AGOA (2001-2020) period. This dummy variable approach applied in different studies, including Seyoum (2007), Tadesse et al., (2008), and Frazer & Van Biesebroeck (2007).

To test the individual impact of the AGOA on four EAC partner states exports to the US, Eq.1 estimated separately for each country: Kenya, Rwanda, Tanzania, and Uganda. Further, estimated in a panel model to get the overall effect of the AGOA. All variables transformed into natural logarithms except the AGOA dummy variable to interpret the estimated coefficients as elasticities.

Because of the existence of multicollinearity among independent variables (see Table 3), Eq.1 is further divided into three models, where each model includes one independent variable at a time plus the AGOA dummy variable as follows:

$$In\ T_t = \beta_0 + \beta_1 InE_t + \beta_2\ AGOA_t + \varepsilon_i\ \ Model\ 1$$
$$In\ T_t = \beta_0 + \beta_1 InDY_t + \beta_2\ AGOA_t + \varepsilon_i\ Model\ 2$$
$$In\ T_t = \beta_0\ \beta_1 InUSY_t + \beta_2\ AGOA_t + \varepsilon_i\ \text{Model 3}$$

Before estimating the individual country models, the author run a panel OLS model with and without fixed country effects to check the overall impact of AGOA based on the assumption that differences in the AGOA stimulation among EAC countries (cross section) could be traced from different intercepts.

Regarding the expected signs of the independent variables, we expected the following: An increase in US real GDP (income) should increase exports to the US as the latter will have greater purchasing power to buy more goods and services. An increase in real GDP in Tanzania and other EAC partner states will indicate more production (income) that would lead to an increase in exports to the US. The real exchange rate depreciation of EAC partner states against the US dollar is expected to increase AGOA exports to the US because the dollar will be stronger against the EAC currencies and hence it would be cheaper for Americans to import from EAC countries.

***Summary of descriptive statistics***

Reports of the descriptive statistics, indicates that in domestic countries, Kenya is leading in GDP with a maximum GDP of USD 100,700 million, followed by Tanzania with USD 62,410 million, Uganda with USD 37,600 million and Rwanda with USD 10,360 million. The mean GDP is highest in Kenya, with a mean GDP of 36,210, and Rwanda has the lowest, with a mean GDP of USD 4,611 million. The US has a maximum GDP of USD 21,370,000 million and a minimum of USD 5,963,000 million. Kenya leads in exports with USD 667 million, followed by Tanzania with USD 153 million, and Uganda and Rwanda with USD 83 million and USD 68 million, respectively. On the exchange rate, Kenya has the strongest currency against the US dollar, and Uganda has the least strong.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| VARIABLES | N | Mean | Sd | Min | Max |
| Kenya real GDP | 31 | 36,210 | 30,760 | 5,752 | 100,700 |
| Rwanda real GDP | 31 | 4,611 | 3,178 | 754 | 10,360 |
| Tanzania real GDP | 31 | 25,450 | 19,290 | 4,258 | 62,410 |
| Uganda real GDP | 31 | 15,920 | 12,260 | 2,857 | 37,600 |
| US real GDP | 31 | 12,980,000 | 4,777,000 | 5,963,000 | 21,370,000 |
| | | | | | |
| Kenya exports | 31 | 300 | 198 | 59 | 667 |
| Tanzania exports | 31 | 54 | 41 | 11 | 153 |
| Uganda exports | 31 | 37 | 22 | 10 | 83 |
| Rwanda exports | 31 | 18 | 17 | 2 | 68 |
| | | | | | |
| Kenya exchange rate | 31 | 74 | 22 | 23 | 107 |
| Rwanda exchange rate | 31 | 500 | 242 | 84 | 943 |
| Tanzania exchange rate | 31 | 1,185 | 651 | 195 | 2,294 |
| Uganda exchange rate | 31 | 2,004 | 948 | 429 | 3,727 |
| | | | | | |
| AGOA dummy | 31 | 0.68 | 0.48 | 0 | 1.00 |

**Table 2: Summary of descriptive statistics**

**Note:** Countries' GDPs and domestic exports are in millions of US dollars. Exchange rate is in terms of units of domestic currency per US dollar.

***Diagnostic tests and Robustness Analysis***

To ensure the robustness of the findings, the author first provides several diagnostic tests, including the tests of multicollinearity, heteroscedasticity, and serial correlation. These tests applied to Models 1-3.

***Testing for Multicollinearity***

According to Wooldridge (2013), multicollinearity may bias the results and cause low t-stats. Therefore, it is important to test before estimation. This study tests multicollinearity by using the Variance Inflation factor (VIF). The VIF above 10 is evidence that there is multicollinearity among variables (Gujarati, 2004). Table 3 reports the collinearity tests. Both US and domestic real GDP, as well as the exchange, are highly collinear in most cases (13 out of 16 cases) with the dependent variable as the VIF values are above 10. To deal with high collinearity, O'Brien (2007) suggests that when the value of VIF is high, the level of collinearity among variables could be reduced by eliminating some of the variables from the model. In this study, the author runs individual regression models with one independent variable at a time along with the AGOA dummy variable against the dependent variable.

KENYA

| Variable | VIF | 1/VIF |
|---|---|---|
| ln_usa_real GDP | 19.57 | 0.051108 |
| ln_kenya_real GDP | 10.73 | 0.093231 |
| ln_kenya_exchange rate | 5.42 | 0.184549 |
| Mean VIF | 11.9 | |

TANZANIA

| Variable | VIF | 1/VIF |
|---|---|---|
| ln_usa_real GDP | 47.9 | 0.020878 |
| ln_tza_excchange rate | 26.7 | 0.037455 |
| ln_tza_real GDP | 13.34 | 0.074969 |
| Mean VIF | 29.31 | |

UGANDA

| Variable | VIF | 1/VIF |
|---|---|---|
| ln_usa_real GDP | 33.55 | 0.029805 |
| ln_uganda_real GDP | 31.49 | 0.031761 |
| ln_uganda_exchange rate | 9.6 | 0.104117 |
| Mean VIF | 24.86 | |

RWANDA

| Variable | VIF | 1/VIF |
|---|---|---|
| ln_usa_real GDP | 43.45 | 0.023014 |
| ln_rwanda_exchange rate | 22.42 | 0.044612 |
| ln_rwanda_real GDP | 8.59 | 0.116451 |
| Mean VIF | 24.82 | |

**Table 3: Collinearity among variables per each country's model**

***Testing for Heteroscedasticity***

Heteroscedasticity refers to data for which the variance of the dependent variable is unequal across the range of independent variables. This study employs the Breusch-Pagan test to detect the presence of heteroscedasticity. The determination is made by observing if the p-value of the test is less than the significance level. In this study, if the value of chi-square is less than a significant level at 5 percent, we conclude that there is no presence of heteroscedasticity and accept the presence of heteroscedasticity if it is greater than that level.

| Countries | Chi2(1) | Prob > chi2 (p-values) |
|---|---|---|
| Kenya | 1.71 | 0.1907 |
| Tanzania | 0.13 | 0.7197 |
| Rwanda | 5.12 | 0.0237 |
| Uganda | 2.36 | 0.1244 |

**Table 4: Summary result for Breusch-Pagan test per each model**

From the results in **Table 4**, the Breusch-Pagan test to all Models 1-3 detect the presence of heteroscedasticity only for Rwanda since the p-value is significant at 5 percent level and better.

***Serial Correlation Test***

A serial correlation test is a determination of the relationship between the same variable measured over different periods of time. The common problem with serial correlation is endogeneity. According to Roberts and Whited (2013), endogeneity is defined as "a correlation between the explanatory variables and the error term in a regression." The technique applied in this study is the application of the lags to the independent variables. The aim is to measure the existing value of variables and the lagged value of the same variables in the previous periods. The Breusch-Godfrey LM test for autocorrelation was used in this study to test for autocorrelation in the errors in a regression model. The hypothesis of the author is that there is no serial correlation.

| Countries | lags (p) | Chi2 | Df | Prob > Chi2 |
|---|---|---|---|---|
| Kenya | 1 | 15.313 | 1 | 0.001 |
| Tanzania | 1 | 6.428 | 1 | 0.112 |
| Rwanda | 1 | 1.667 | 1 | 0.1966 |
| Uganda | 1 | 3.372 | 1 | 0.1663 |

**Table 5: Summary result for Breusch-Godfrey LM test per each model**

**Note**: Values inside are P-values

Breusch-Godfrey LM test in all models applied to individual countries strongly reject the null expect for Kenya. This shows presence of no serial correlation in models for Tanzania, Rwanda, and Uganda, but serial correlation for Kenya.

***Results and Discussion***

This section presents a discussion of the empirical findings. To facilitate interpretation and make it easier for the readers, stars for statistical interpretation are used to present the results of the analysis. To ensure the robustness of the results of the analysis, the autor first report the results of the panel model with and without country-fixed effects, followed by the individual country regression models with corrections for multicollinearity, heteroscedasticity and serial correlation, and potential endogeneity bias.

***Results of panel model***

The estimation results from the panel model with and without fixed effects reveal that the variable of interest (AGOA) is statistically insignificant. This indicates that, overall, the AGOA has not stimulated the exports of the EAC countries to the US. The findings are supported by Condon & Stern's (2011) systematic review of the GOA's effectiveness in increasing trade with the LDCs. Based on a synthesis review of four empirical studies on the impact of the AGOA, Condon & Stern (2011) conclude that the AGOA can only account for a small portion of the increased exports from SSA countries to the US. This is inline with other empirical studies, Mueller (2008) and Seyoum (2007), which employ gravity models in time series data and find that the AGOA has no significant impact on the overall exports from SSA countries to the US. For the other variables used in the models, domestic GDP improves exports to the US in both models, while the US GDP and real exchange rate are significant only when no fixed effects are applied. All the variables have the expected signs.

| VARIABLES | Fixed effects | No fixed effects |
|---|---|---|
| ln_gdp_domestic | 0.701*** | 0.768*** |
| | (0.156) | (0.13) |
| ln_exchangerate | 0.186 | 0.326*** |
| | (0.191) | (0.12) |
| ln_gdp_usa | 0.703 | 0.734* |
| | (0.574) | (0.438) |
| AGOA | -0.132 | -0.115 |
| | (0.152) | (0.152) |
| Constant | -18.65 | -20.27** |
| | (13.28) | (10.23) |
| Observations | 124 | 124 |
| Countries | 4 | 4 |
| R-squared | 0.78 | |

**Table 6: Panel model with and without country-fixed effects**

*** = indicates that the variable is significant at a 1 percent level, ** = significant at a 5 percent level, * = significant at a 10 percent level and no star indicates that the variable is insignificant. Standard errors reported in parentheses under each variable.

***Results of individual regression models***

Each model estimated separately for each country using the following three versions that correct for multicollinearity, potential endogeneity bias, and serial correlation/heteroscedasticity, respectively.

**BM**-Base model results. The dependent variable is regressed against the AGOA dummy and an independent variable at time t to correct for multicollinearity.

**EBC** - Endogeneity bias correction model. The dependent variable is regressed against the AGOA dummy and an independent variable with a one-period lag.

**NW** - The base model estimated with the Newey-West standard errors to correct for potential serial correlation and heteroscedasticity. Since the R-square values depend on the coefficients but not on the standard errors, this procedure does not output these values.

Standard errors in parentheses.
*, **, *** denote significance levels at 10, 5 and 1 percent level, respectively.

***Regression results of Tanzania***

In Model 1, present the importance of the real exchange rate along with the AGOA dummy. The coefficient of the exchange rate in all three versions (BM, ECB, and NW) of Model 1 is positive and significant at 1 percent level, ranging from 1.205 to 1.310, suggesting that a 1 percent depreciation of the domestic currency increases exports by about 1.2 to 1.3 percent. The variable of interest within AGOA in all three versions is negative; however, it is significant only when the EBC model employed.

In Model 2, the coefficients of GDP ranging from 1.689 to 1.725 are all positive and significant at 1 percent level, suggesting that a 1 percent increase in the domestic GDP increases exports by about 1.2 to 1.3 percent. All the coefficients of AGOA are negative and significant, showing that AGOA reduces exports to the US.

In Model 3, the coefficients of US GDP are all positive at the 1 percent level, ranging from 4.599 to 4.878, suggesting that a 1 percent increase in US GDP increases exports by about 4.6 to 4.8 percent. The coefficients for the AGOA are all negative and significant at the 1 percent level.

Overall, the results for Tanzania show that AGOA did not stimulate the exports of Tanzania and even reduced them. The depreciation of the domestic currency and higher domestic and US GDP increased the total exports of Tanzania to the US.

**Dependent variable**: Domestic total exports value to the US (natural logarithm)

| | Model 1: Exchange rate | | | Model 2: Domestic GDP | | | Model 3: US GDP | | |
|---|---|---|---|---|---|---|---|---|---|
| VARIABLE | BM | EBC | NW | BM | EBC | NW | BM | EBC | NW |
| Independent variable | 1.205*** | 1.310*** | 1.205*** | 1.725*** | 1.689*** | 1.725*** | 4.599*** | 4.878*** | 4.87 *** |
| | (0.166) | (0.148) | (0.232) | (0.15) | (0.158) | (0.138) | (0.42) | (0.396) | (0.383) |
| AGOA | -0.304 | -0.453** | -0.304 | -0.354** | -0.277* | -0.354** | -0.710*** | -0.856*** | -0.710*** |
| | (0.232) | (0.208) | (0.221) | (0.155) | (0.16) | (0.14) | (0.191) | (0.18) | (0.169) |
| Constant | 9.405*** | 8.855*** | 9.405*** | -23.67*** | -22.76*** | -23.67*** | -121.4*** | -129.7*** | -121.4*** |
| | (1.025) | (0.908) | (1.51) | (3.509) | (3.693) | (3.227) | (12.63) | (11.9) | (12.37) |
| Number of observations | 31 | 30 | 31 | 31 | 30 | 31 | 31 | 30 | 31 |
| Adjusted R square | 0.8057 | 0.8486 | | 0.9027 | 0.8882 | | 0.894 | 0.9111 | |
| Fixed effect | YES | YE | YES | YES | YES | YES | YES | YES | YES |

**Table 4: Regression of Tanzania**

***Regression results of Kenya***

In Model 1, present the importance of the real exchange rate along with the AGOA dummy. The coefficients of the exchange rate in all three versions of Model 1 are positive and significant at the 1 percent level, ranging from 0.7691 to 0.826, suggesting that a 1 percent depreciation of the domestic currency increases exports by about 0.8 percent. The variable of interest, AGOA, is positive and significant at 1 percent in all three versions of the model, ranging from 0.921 to 0.957, suggesting that AGOA increased exports to the US.

In Model 2, present the coefficients of domestic GDP ranging from 1.403 to 1.446 are all positive and significant at the 1 percent level, suggesting that a 1 percent increase in the domestic GDP increases exports by about 1.4 to 1.5 percent. All of the coefficients of AGOA are positive and significant at the 1 percent level, showing that AGOA increases exports to the US by 0.6 percent when employing the BM and NW models and 0.7 percent when employing the EBC model.

In Model 3, present the coefficients of US GDP are all positive at the 1 percent level, ranging from 4.599 to 4.878, suggesting that a 1 percent increase in US GDP increases Kenya's exports by about 4.6 to 4.8 percent. The coefficients for AGOA are all positive, ranging from 0.283 to 0.311, but they are only significant when the BM and EBC models are used and insignificant when the NW model is used.

Overall, the results for Kenya show that AGOA stimulates the exports of Kenya. In addition, the depreciation of the exchange rate and an increase in domestic and US GDPs have stimulated Kenya's total exports to the US.

**Dependent variable**: Domestic total exports value to the US (natural logarithm)

| | Model 1: Exchange rate | | | Model 2: Domestic GDP | | | Model 3: US GDP | | |
|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | BM | EBC | NW | BM | EBC | NW | BM | EBC | NW |
| Independent variable | 0.826*** | 0.769*** | 0.826*** | 1.446*** | 1.403*** | 1.446*** | 2.806*** | 2.744*** | 2.806*** |
| | (0.218) | (0.244) | (0.153) | (0.155) | (0.156) | (0.202) | (0.33) | (0.365) | (0.449) |
| AGOA | 0.957*** | 0.921*** | 0.957*** | 0.636*** | 0.657*** | 0.636*** | 0.311** | 0.283* | 0.311 |
| | (0.166) | (0.187) | (0.123) | (0.109) | (0.107) | (0.149) | (0.149) | (0.166) | (0.229) |
| Constant | 15.13*** | 15.43*** | 15.13*** | -16.68*** | -15.58*** | -16.68*** | -66.00*** | -64.02*** | -66.00*** |
| | (0.852) | (0.941) | (0.603) | (3.763) | (3.776) | (4.89) | (9.911) | (10.97) | (13.48) |
| Number of observations | 31 | 30 | 31 | 31 | 30 | 31 | 31 | 30 | 31 |
| Adjusted R square | 0.8466 | 0.8209 | | 0.9433 | 0.9387 | | 0.9353 | 0.9206 | |
| Fixed effect | YES | YE | YES | YES | YES | YES | YES | YES | YES |

**Table 5: Regression of Kenya**

***Regression Result of Rwanda***

In Model 1, present the importance of the exchange rate along with the AGOA dummy. The coefficient of the exchange rate in all three versions of Model 1 is positive and significant at the 1 percent level, ranging from 0.375 to 1.068, suggesting that a 1 percent depreciation of the domestic currency increases exports by about 0.3 to 1.1 percent. The variable of interest, AGOA, is insignificant in all three versions of the model, suggesting AGOA did not increase exports of Rwanda to the US.

In Model 2, present the coefficients of domestic GDP ranging from 1.794 to 2.056 are all positive and significant at the 1 percent level, suggesting that a 1 percent increase in the domestic GDP increases exports by about 1.7 to 2.1 percent. All the coefficients of AGOA are negative. However, it is significant only when employing the NW model, which indicates that AGOA reduces exports from Rwanda to the US.

**Table 5** shows that the coefficients of US GDP in Model 3 are all positive and significant at the 5 percent level or higher, ranging from 4.599 to 4.87. This suggests that a 1 percent increase in US GDP increases Rwanda's exports by a range of 4.6 to 4.8 percent. All coefficients for AGOA are insignificant.

Overall, the regression for Rwanda has some mixed results. However, in most cases, it observed that AGOA does not stimulate the exports of Rwanda. In two cases, AGOA reduces exports. However, the depreciation of the exchange rate and an increase in domestic and US GDPs have stimulated the total exports of Rwanda to the US.

**Dependent variable**: Domestic total exports value to the US (natural logarithm)

| | **Model 1: Exchange rate** | | | **Model 2: Domestic GDP** | | | | **Model 3: US GDP** | |
|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | BM | EBC | NW | BM | EBC | NW | BM | EBC | NW |
| Independent variable | 0.375 | 1.068** | 0.375 | 2.056*** | 1.794*** | 2.056*** | 3.952*** | 5.343*** | 3.952** |
| | (0.478) | (0.433) | (0.664) | (0.243) | (0.237) | (0.236) | (1.324) | (1.057) | (1.574) |
| AGOA | 0.856 | 0.24 | 0.856 | -0.741** | -0.208 | -0.741** | -0.277 | -0.653 | -0.277 |
| | (0.636) | (0.578) | (0.652) | (0.3) | (0.289) | (0.35) | (0.6) | (0.48) | (0.616) |
| Constant | 13.40*** | 9.592*** | 13.40*** | -28.90*** | -23.40*** | -28.90*** | -103.4** | -145.3*** | -103.4** |
| | (2.561) | (2.29) | (3.724) | (5.245) | (5.102) | (5.046) | (39.81) | (31.74) | (47.46) |
| Number of observations | 31 | 30 | 31 | 31 | 30 | 31 | 31 | 30 | 31 |
| Adjusted R square | 0.2999 | 0.4937 | | 0.7984 | 0.8013 | | 0.9353 | 0.6812 | |
| Fixed effect | YES | YE | YES | YES | YES | YES | YES | YES | YES |

**Table 5: Regression of Rwanda**

***Regression result of Uganda***

In Model 1, present the importance of the exchange rate along with the AGOA dummy. The coefficient of the exchange rate in all three versions of Model 1 is positive and significant at the 1 percent level, ranging from 0.899 to 1.025, suggesting that a 1 percent depreciation of the domestic currency increases exports by about 0.8 to 1.2 percent. The variables of interest in the AGOA are insignificant in all three versions of the model.

In Model 2, present the coefficients of domestic GDP ranging from 1.185 to 1.197 are all positive and significant at the 1 percent level, suggesting that a 1 percent increase in the domestic GDP increases exports by about 1.2 percent. All of AGOA's coefficients are negative around 0.39 and significant marginally at the 10 percent level, indicating that the AGOA reduces exports to the US.

In Model 3, present the coefficients of US GDP are all positive at the 1 percent level, ranging from 3.206 to 3.420, suggesting that a 1 percent increase in US GDP increases exports in the range of 3.2 to 3.4 percent. The coefficients for the AGOA are all negative at the 5 percent or 10 percent levels.

Overall, the results for Uganda show that AGOA does not stimulate the exports of Uganda and even reduces them. However, the depreciation of the exchange rate and an increase in domestic and US GDPs have stimulated Uganda's total exports to the US.

**Dependent variable**: Domestic total exports value to the US (natural logarithm)

| | Model 1: Exchange rate | | | Model 2: Domestic GDP | | | Model 3: US GDP | | |
|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | BM | EBC | NW | BM | EBC | NW | BM | EBC | NW |
| Independent variable | 0.899*** | 1.025*** | 0.899*** | 1.185*** | 1.197*** | 1.185*** | 3.206*** | 3.420*** | 3.206*** |
| | (0.232) | (0.239) | (0.259) | (0.178) | (0.174) | (0.137) | (0.567) | (0.58) | (0.516) |
| AGOA | 0.0253 | -0.103 | 0.0253 | -0.399* | -0.391* | -0.399* | -0.472* | -0.579** | -0.472* |
| | (0.248) | (0.254) | (0.269) | (0.213) | (0.207) | (0.201) | (0.257) | (0.264) | (0.262) |
| Constant | 10.49*** | 9.682*** | 10.49*** | -10.44** | -10.66** | -10.44*** | -79.63*** | -85.98*** | -79.63*** |
| | (1.616) | (1.649) | (1.834) | (4.075) | (3.991) | (3.152) | (17.05) | (17.44) | (15.52) |
| Number of observation | 31 | 30 | 31 | 31 | 30 | 31 | 31 | | 31 |
| Adjusted R square | 0.5736 | 0.5956 | | 0.7471 | 0.7523 | | 0.6943 | 0.7023 | |
| Fixed effect | YES | YE | YES | YES | YES | YES | YES | YES | YES |

**Table 6: Regression of Uganda**

### *Conclusion and Policy Implication*

This chapter presents the policy implications of the findings of the study conclusion, and the recommendations to SSA countries regarding the utilization of AGOA preference to increase exports.

### *Conclusion*

This study assessed the effectiveness of the African Growth and Opportunity Act (AGOA) on the export performance of SSA countries to the US. Tanzania exports performance in relation to that of other partner states in the EAC examined to observe if AGOA has stimulated Tanzanian exports more than that of its partners. The individual regression results of the three models with different treatments for each model show that AGOA preference did not stimulate the total exports of Tanzania to the US. The individual regression of its partner (Kenya, Uganda, and Rwanda) and the coefficients of AGOA to Kenya's total exports are all positive and significant in all cases, except in one case, which provides strong evidence that the AGOA preference has made a strong contribution to the total exports of Kenya to the US. Conversely, in the estimation results for Rwanda and Uganda, all the AGOA dummy variable coefficients are either insignificant or negative, depending upon the treatment model used. This indicates AGOA has not stimulated the total exports of both Rwanda and Uganda.

Further, using a panel model estimation with the application of both fixed and non-fixed effects, the results show the overall impact of AGOA preference to stimulate the exports of EAC partner states to the US is insignificant. This finding cements the importance of examining the impact of the AGOA on the SSA countries, both in terms of individual countries and country groups, as reported in this study.

### *Policy Implications*

Although Tanzania is accessing the US market through AGOA preference, the findings of the study indicate that the preference has not stimulated Tanzania's exports. Among the challenges identified in this study are a low level of production of AGOA-qualified products; a low level of Tanzanian firm participation; a low level of trade facilitation; and a mismatch between the products that the country has a comparative advantage in producing and those qualified under the AGOA. Policymakers, through a national AGOA strategy, could design appropriate measures to deal with challenges. In addition to that, the Tanzania Revenue Authority (TRA), identified as one of the 14 government agencies facilitating exports with the roles of tax registration, tax collection, and customs clearance, therefore has the potential to facilitate Tanzanian exporters in utilising the AGOA window. Likely, in other countries with good performance in AGOA exports, such as South Africa, the Revenue Authority website contains AGOA-related information.

Further, the individual country regression results of all EAC partner states show that the domestic currency depreciation and an increase in domestic GDP improve exports. Hence, policymakers should consider an appropriate exchange rate policy and/or economic growth strategies to stimulate exports. These policies could be used along with trade agreements such as the AGOA. Furthermore, the findings

show that the US GDP has the most significant effect on the exports of the four SSA countries to the US. This indicates that business cycles in the US may create significant uncertainty for their exports to the US, hence causing big volatility in export revenues. Therefore, policymakers need to be aware of this uncertainty and use a mix of a proper exchange rate policy and relevant economic growth programmes to prepare for it.

Nevertheless, to ensure effective implementation of AGOA and to archive the intended objectives of the Act, SSA countries should call for negotiations with the US government to make reforms to the Act to be accompanied only by trade-related eligibility criteria rather than non-trade criteria that highly affect SSA countries in the utilisation of the preference as observed in this study. This should be addressed in line with the integration of international shipping and freight networks and the opening up of the US-SSA trade facilitation window..

***Limitations and direction for future research***

The results of this study ought to be viewed in light of some restraints. The fundamental limitation of this study that future research might solve is multicollinearity among variables. This necessitates that the author run individual regression models of the variables at a time.

Regarding the future areas for research, studies can investigate why SSA countries within a customs union or common market benefit differently from the AGOA and what areas need to be improved for better utilisation of AGOA preferences. In addition, the impact of US business cycles on the volume of exports from SSA countries can be an important future research agenda.

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# The financial sector of emerging markets based on digital technology evolution in the banking sector - The Ghanaian experience

**Joseph Asare**
**Michael Nana Owusu-Akomeah**
**Emmanuel Atta Kumah**
**Stephen Owusu Afriyie**
**George Oppong Ampong**
Ghana Communication Technology University, Ghana

**Keywords**
financial sector, emerging market, digital technology, financial institutions, government

**Abstract**

*Evaluating the financial sector of emerging markets based on digital technology evolution is crucial, as the market tends to exhibit greater fragility than in the developed markets. As a result, this study is conducted to provide a deeper understanding of the old and new realities of the financial sector of emerging markets and conducts both qualitative and quantitative analyses of technology impacts on financial sector of emerging markets. Further, the study has developed models to help emerging markets leverage digital technology to achieve sustainable financial sector growth. In addition, the SmartPLS modeling was applied to show the linkages between the characteristics of the financial sector in emerging markets and digital technologies.*

## Introduction

The rapid emergence of digital technology has transformed the financial sector in most emerging markets, particularly banking operations. Digital technology has not only changed the way banks operate in developing countries, but it has also become the most important factor that banks need to invest in to improve their performance, develop more products and enhance customer experience. Regardless of the economy in which a bank is located, it is expected to embrace and invest in new digital technologies so that it can provide cost-effective and efficient services to its customers. In recent years, bank customers have become more financially literate, and the introduction of digital banking products such as e-money and challenger banks have led to strong competition between traditional institutions, while the banking sector has also seen constant innovation that attracts more customers (OECD, 2020). In addition, the promotion of digital credit, digital financial literacy, digital financial resilience, and financial well-being has also become a common feature of the financial sector of emerging economies (Sun et al., 2023, Murendo et al., 2017, Grozdanovska et al. 2017, McKnight et al. 2020, Brueggen et al. 2017; and Kabadayi et al. 2019).

Understanding the financial sector of an emerging economy like Ghana is very important for this study. According to Arizala et al. (2021), there is no universally accepted definition of an emerging market. However, the IMF's World Economic Outlook classifies 39 economies as "advanced" based on factors such as high per capita income, greater integration into the global financial system, and exports of diversified goods and services. In this respect, all other economies can be classified as developing and emerging countries. On the other hand, the Corporate Finance Institute defines emerging markets as economies that are experiencing significant economic growth and exhibit some, but not all, of the characteristics of a developed economy. That is, economies that are in transition from the "developing" phase" to the "developed" phase". Emerging markets tend to have high market volatility, high growth and investment potential, a high economic growth rate, and a low median income per capita. On the other hand, David (2018) explained that an emerging market is a term used to describe a country's social or economic activities characterized by rapid growth and industrialization. This definition clearly shows that income is not the only distinguishing feature of an emerging market. However, emerging markets also lack the ability to

produce higher value-added goods and sustained strong growth can also be classified as an emerging market.

**Literature Review**

The OECE (2021) pointed out that digital acceleration has been amplified by advances in global connectivity and that this needs to be supported to realise its potential. In the case of the emerging African market, more than 72% of the population regularly use cell phones to hold a total of about 300 million mobile money accounts, representing rapid growth in the market's financial sector and the highest number globally. In just one year, from 2019 to 2020, the number of e-commerce users in Asia has increased by 37 million to 71 million. The OECD (2021) predicts that Asia will account for almost half of all new mobile subscribers worldwide and more than half of all cashless transactions. However, caution is needed as the next wave of digital transformation driven by technology will continue to shape future emerging markets. It is also important to keep in mind both the further potential of digital transformation and the risk that this digital transformation could exacerbate existing inequalities in emerging markets.

The financial sector of any emerging economy plays a critical role in helping the economy overcome inequalities, as cautioned by the OECD. Even if the financial sector in emerging markets is considered a recent phenomenon, payment and financial systems have evolved over several years. Even though the current digital transformations have remarkably changed the way the financial sector of emerging markets operates and transact, its core objectives and activities have not change with regards to promoting value exchange, financial intermediation, financial risk transfer, and liquidity in today's economy (Freixas et al. 2008, and Bernanke 2013). The financial intermediation role assists the financial sector of emerging markets to facilitate the movement of funds between savers and borrowers by taking funds from savers through deposits and lending to borrowers, governments, businesses, and households. That is facilitates transfer of assets, risk assessments and mitigation, ensures accounting accuracy, and resource pooling (Allen et al. 1996).

Also, Ravikumar et al. (2022) noted that the most promising mechanism that has gained impetus globally to guarantee all-inclusive financial access and foster collective financial inclusion is digital financing. However, this study posits that the benefits of digital technology in the financial sector of emerging economies could be realized if digital technology is utilized to promote financial services such as digital payments, savings, credit, and insurance while building and increasing the resilience of the people in developing economies, as also contained in Hussain et al. (2019) in a different perspective.

**Methodology**

Most studies analyze the technological development that has dominated the financial sector of emerging markets with a quantitative approach through surveys. The authors, including Zhu et al. (2023), found through a survey that digital technology can significantly improve the profitability of banks. In addition, this study uses a qualitative analysis tool to overcome the shortcomings of using a purely quantitative method (Appiahene et al. 2019)

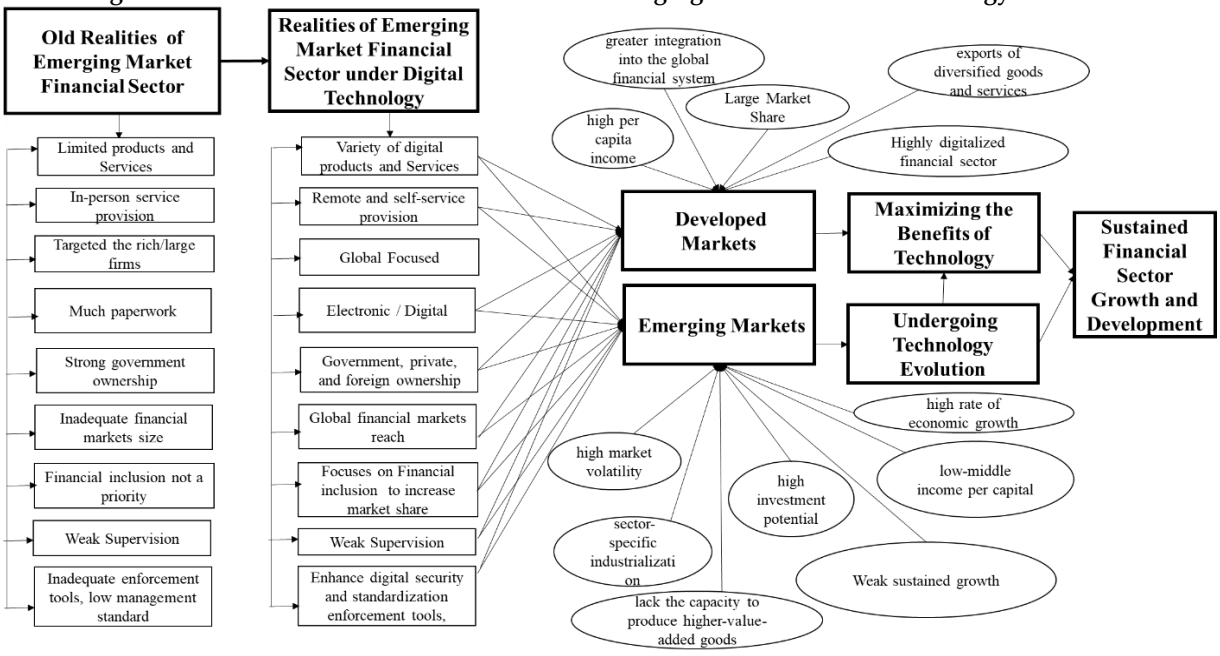
**Findings/Results**

The results of the study show that government policies, private foreign investors, security and enforcement instruments correlate with the promotion of technology (variable 5). In addition, global reachor market correlates with digital financial products (variable 9), transaction medium (variable 2) and security and enforcement tools (3). Private foreign investment (variable 2) is also closely related to government policy (variable 1), financial self-service and integration (variable 11) and global reach and market (variable 10). In addition, technology (variable 5) correlates with digital financial products (variable 9) and transaction medium (variable 6) and is strongly related to all variables, including sustainable market growth (variable 12) and contrast (variable 3). Most importantly, government policy (variable 1) correlates with all variables.

The results of the study in Figure 1 show the old and new realities of the financial sector of emerging markets and the other factors that need to be considered to achieve sustainable growth and development of the financial sector in emerging markets. Figure 1 of the study below shows the relationship between the

old and new realities of the emerging market financial sector and the impact of technological development on the emerging market financial sector. The study from figure 1 shows that emerging markets are characterized by high market volatility, high investment potential, sector-specific industrialization, lack of capacity to produce high-value added products, weak sustainability growth and Low-middle income per capital. On the other hand, developed markets are characterised by high per capital income, greater integration into global financial system, large market share, export of diversified goods and services, and high digitalized financial sector.

**Fig 1 Intersection of Old and New Realities of Emerging Markets Under Technology Evolution.**




## Discussions and conclusions

Emerging markets differ in many important ways, such as demographic factors, geographic location, and cultural factors. However, one important common feature that is considered a desirable factor for economic development is the financial sector. This study found that the financial sector of emerging markets is characterized by old and new realities, as shown in Figure 1 above. These realities have been confirmed in many studies, such as Mohideen et al. (2018), OECE (2022), the World Bank (2016), López et al. (2012), Xavier (2022) and Ravikumar et al. Furthermore, this study found that digital technology dominates the financial sector in emerging markets. For sustainable growth and development of the financial sector, emerging markets need to take full advantage of all the opportunities that digital technologies offer to the financial sector.

## Limitations and direction for future research

Data used for analysis in this study is limited to a specific period, which may not be a true representation of the situation of the financial sector in emerging markets in the future.

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# Student interest in technology transfer with educational technologies in the "Fabrication Lab" for entrepreneurship

**Juan Diego Cerrón Salcedo**
**Alberto Jesús Torres Hinostroza**
Continental University, Arequipa, Peru

**Jair Jesús León Lucano**
**Olger Albino Gutiérrez Aguilar**
Catholic University of Santa Maria Arequipa, Peru

**Keywords**
Business education, Entrepreneurship, Fabrication laboratory, Technology transfer

***Abstract***

*The main objective of the study was to determine the level of interest in entrepreneurship in academic innovation, considering the variables of interest, education, social norms, and entrepreneurship. The research methodology corresponds to a non-experimental design; a digital questionnaire was given to a sample for the study, consisting of 400 students from a private university in Arequipa, Peru. It used reliability and validity tests, factor analysis, and the modeling of structural equations using partial least squares. There were two well-defined phases, firstly, an exploratory factor analysis was carried out, this analysis aimed to condense the information in original variables into smaller series, secondly, a confirmatory factor analysis was carried out, using structural equation modeling based on variances. It is concluded that the proposed structural model, is explained from its variance by 72.5% (determination coefficient) and the factorial load that it exerts on the dependent variable such as university entrepreneurship, is significant and determining.*

## *Introduction*

In the current era, the student interest in technology transfer and the use of educational technologies is experiencing an exponential growth. The students of today are digital natives, and their enthusiasm for technology has become a powerful engine for innovation and creativity. Pinheiro, Moraes & Fischer, argue that it has become essential to prepare young people for a global economy that is increasingly driven by technology and digital manufacturing. In this context, it is relevant to explore how educational technologies and makerspaces can play a critical role in promoting entrepreneurship and the application of student ideas. Tolpygo et al. hold that technology transfer refers to the process of sharing and applying knowledge and technologies developed in an academic or business environment to industry and society as a whole. This transfer is essential to convert research and innovation into practical and marketable solutions. In a world where the pace of technological change is dizzying, students are increasingly motivated by the idea of contributing to society and the labor market through technology transfer and entrepreneurship.

Manufacturing labs, often called Fab Labs, are interdisciplinary learning spaces equipped with advanced tools and technologies that allow students to design, prototype, and manufacture physical products. These environments provide an exceptional platform for students to turn their ideas into reality, fostering creativity and entrepreneurial spirit. When combined with educational technologies, such as virtual reality, artificial intelligence, and online learning, manufacturing labs become places where students can acquire practical skills and apply their knowledge in a tangible way.

Entrepreneurship will be valued more in the future due to the need to constantly adapt to new technologies and the ability to take advantage of them to create innovative and sustainable businesses. Entrepreneurs who embrace technology can have a significant impact on the economy and society, making this skill highly desired in the future business world (Sampene et al. 2022).

Kim et al. maintain that in an increasingly innovation- and automation-driven world, the role of digital manufacturing is becoming a fundamental pillar in diverse industries and economic sectors. First, it offers greater efficiency and flexibility in production, enabling the customization and rapid adaptation of products to changing market demands. This leads to a reduction in costs and production times, resulting in a significant competitive advantage for organizations that can leverage this technology as explained by Hilkevics & Hilkevics (2017). Additionally, it is constantly evolving, fueled by technological advances in areas such as artificial intelligence, 3D printing, robotics, and the Internet of Things. The interconnection of these elements through information technology promotes greater automation and the creation of more agile and efficient supply chains.

This paper not only focuses on promoting entrepreneurship in a fabrication laboratory, but it also analyzes the educational theories and models that underlie technology transfer and digital fabrication within academic settings. Recognizing the importance of a strong theoretical foundation, we explore how pedagogical concepts and learning models, such as constructivism, active learning, and project-based learning, intersect with technology transfer and digital fabrication. This holistic approach not only seeks to provide a comprehensive view, but it also seeks to inspire educators, students, and administrators to rethink and strengthen their educational practices in a world driven by technological innovation.

## *Literature review*

### Entrepreneurship in the digital manufacturing laboratory

Digital fabrication labs are closely linked to entrepreneurship. These spaces are known as "maker spaces" and here manufacturing processes converge with the aim of solving problems in society (Curioso et al. 2020). Kalyaev, Salimon & Korsunsky (2020) analyzed the power of how digital manufacturing technologies, developed in universities, did not stop even during the pandemic; and even better, they managed to become professional businesses thanks to technology transfer once the pandemic was over.

Contreras-Barraza et al. 2022in their study of the perspectives on entrepreneurship in the manufacturing lab, they note that more than 70% learn better how to manufacture, without prior knowledge, in groups that are interested in a common project. In other words, it is better when the lab provides them with projects and manuals so that they themselves can develop and apply the known project. According to Porfírio et al. 2022, Entrepreneurship should be a pillar in higher education. He emphasizes that the social atmosphere should have a positive impact on the interest in carrying out a project, this supported by hackathons and ideathons that are linked to interdisciplinary laboratories that promote application in society, government, and universities.

### Development of novel-engineering-based maker education instructional model

Equitable education is a sustainable development goal. However, there is a gap in education between urban and rural students, as well as a gap in access to information and communication technologies. To address these gaps, a sustainable maker education model is needed that is suitable for rural school students. Therefore, it is important to combine novel engineering, maker education, and design thinking to create an instructional model for a novel engineering-based maker education (Kim, Seo & Kim 2022)

**Fig 1. The Research Procedure of NE-Maker Instructional Model Development** (Kim et al. 2022)

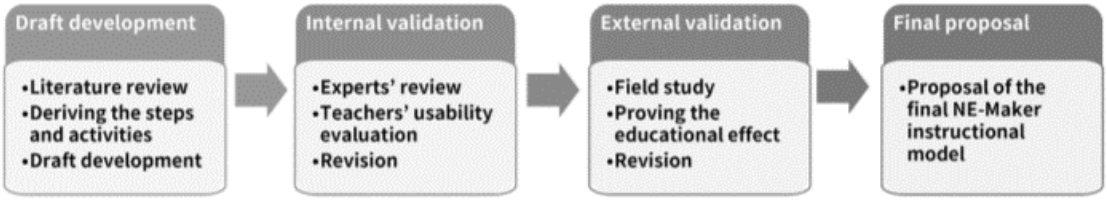



Figure 1 shows the three phases of the development of a novel engineering-based maker education (NE-Maker) model. The first phase is the development of the model, which includes a literature review, the derivation of steps and activities, and the drafting of a draft. The second phase is the evaluation of the

model, which includes an expert review and a usability evaluation. The third phase is the final proposal of the model, which includes the modification and improvement of the draft based on the recommendations derived from the validation process.

In the first phase, the model is developed through a literature review on maker education, novel engineering, and design thinking. This review is used to identify key principles and practices that can be incorporated into the model. Then, the steps and activities of the model are derived from this review. Finally, the draft of the model is drafted. In the second phase, the model is evaluated to ensure that it is effective and appropriate for rural school students. The expert review is used to obtain feedback on the content and structure of the model. Usability evaluation is used to collect feedback on the ease of use of the model. In the third phase, the model is modified and improved based on the recommendations derived from the validation process. Then, the final model is proposed (Li & Zhan 2022).

This educational model has the potential to help close the education gap between urban and rural students. The model is sustainable, as it uses low-cost teaching tools. In addition, it is suitable for rural school students, as it is based on their interests and skills.

(Zheng et al. 2023) in their study "Knowledge-based engineering approach to defining robotic manufacturing system architectures" analyzed that robotic manufacturing systems have proven to be an effective solution for modern manufacturing companies to cope with increasing customer demands and market competition. However, these systems may not be able to fully satisfy user requirements due to the difference between user and design perspectives. Therefore, designing robotic manufacturing systems requires iterative processes that significantly increase development costs and delivery time.

**Fig 2. Relationship of Novel Engineering, Maker Education, and Design Thinking** (Kim et al. 2022)

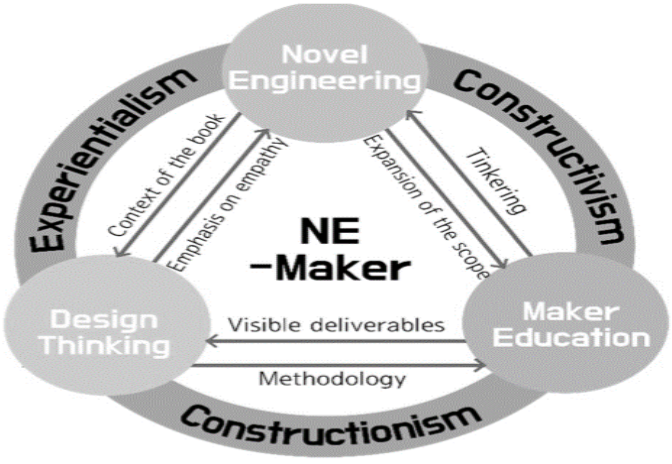



Figure 2 shows a Venn diagram that represents the different forms of engineering. The outer circle represents traditional engineering, which focuses on the design and construction of systems and products. The inner circle represents novel engineering, which is a new approach to engineering that combines engineering education methods and literacy with maker education. The middle circle represents maker engineering, which is a student-centered approach that allows students to learn about engineering through the creation of practical projects (Xu et al. 2023).

The diagram shows that novel engineering is a subset of traditional engineering, but it also overlaps with maker engineering. This is because novel engineering is based on the principles of traditional engineering, but it also incorporates elements of maker education, such as project-based learning and a student-centered approach. The diagram also shows that maker engineering is a subset of traditional engineering, but it also overlaps with novel engineering. This is because maker engineering is based on the principles of traditional engineering, but it also incorporates elements of novel engineering, such as a focus on problem-solving and creative thinking (Tabarés & Boni 2023).

**Fig 3. Draft of the NE-Maker Instructional Model** (Kim et al. 2022)

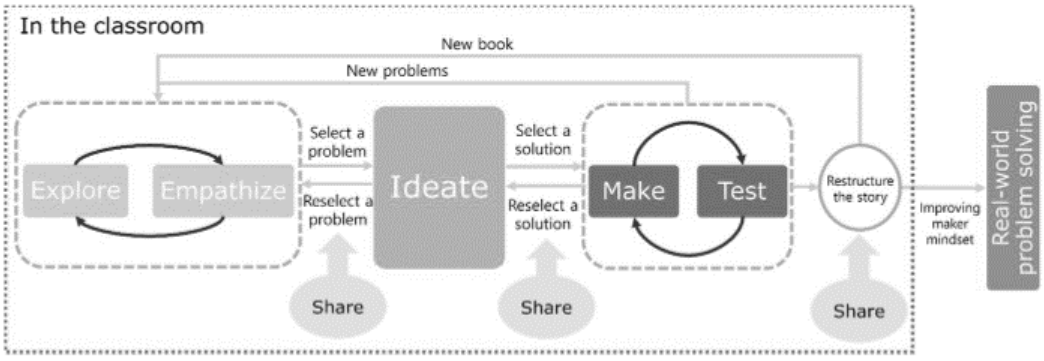



Figure 3 shows a flowchart that represents the novel engineering-based problem-solving process. The process consists of five steps (Tabarés & Boni 2023).

*-Problem identification: The first step is to identify the problem that needs to be solved. This can be done through observation, research, or collaboration with users.*
*-Problem analysis: Once the problem has been identified, it must be analyzed to understand its causes and consequences. This can be done through data collection, identification of key factors, and model development.*
*-Problem-solving strategy: In this step, a strategy is developed to solve the problem. This may include idea generation, evaluation of alternatives, and selection of a solution.*
*-Solution implementation: The solution is implemented in the real world. This may require prototype development, solution testing, and scale implementation.*
*-Solution evaluation: Once the solution has been implemented, it must be evaluated to determine its effectiveness. This can be done through data collection, result analysis, and user feedback.*

***Technology and Entrepreneurship***

Based on Zahra, Liu & Si (2023) digitalization has driven the creation of new business models. Emerging companies, such as technology-based ones, often arise from the combination of advanced technology and an entrepreneurial mindset. FabLabs prepare students to embrace this disruptive approach. Martínez-Martínez; Shah, Sukmana & Fianto (2022) maintain that technology fosters innovation, and innovation is essential for business competitiveness. FabLabs are a breeding ground for innovation, which in turn contributes to the success of businesses driven by former student entrepreneurs.

***Practical Education vs. Theoretical***

The Experientialism theory, proposed by Dewey and landed in a manufacturing laboratory by Arenas 2023) emphasizes the importance of experience in the learning process. This theory advocates for practical learning as an effective means of acquiring skills and knowledge. FabLabs align with this perspective by providing an environment where students can apply their theoretical knowledge to real projects. Constructivism Ghazi & Matansh (2023) suggests that students build their knowledge through active interaction with their environment. FabLabs, by providing access to manufacturing tools and technology, foster active learning and the creation of solutions to real-world problems. This promotes critical thinking and problem-solving, essential skills for entrepreneurship. Based on the above considerations, the following hypotheses are proposed:

H1. There is a significant relationship between Attitude towards entrepreneurship and Entrepreneurial Intentions Tech Transfer

H2. There is a significant relationship between Perceived Entrepreneurial Capability and Entrepreneurial Intentions Tech Transfer

H3. There is a significant relationship between Business Education and Entrepreneurial Intentions Tech Transfer

H4. There is a significant relationship between Perceived Social Norms and Entrepreneurial Intentions Tech Transfer

***Research Methodology***

The research was carried out with a sample of 400 undergraduate students from the Catholic University of Santa Maria and Continental University in Arequipa, Peru, whose ages ranged from 18 to 24 years, being men (44.5%) and women (55.9%) with a standard deviation of 2,152. The sample was chosen randomly, and the questionnaire was used from May to August 2023 and sent digitally.

The questionnaire is an adaptation that was carried out in the research: "Measuring the intention of university entrepreneurs using structural equations" (Saucedo 2018). The instrument employs a 5-point scale, similar to the Likert scale, with 1 indicating complete disagreement and 5 indicating complete agreement. With a preliminary study sample of 50 students to determine reliability levels, the instrument was validated and approved for research, yielding the following results: Cronbach's alpha $\alpha = 0.877$ and McDonald's coefficient $\omega = 0.942$ which are considered as good (Gliem & Gliem 2003). The Kaiser-Meyer-Olkin (KMO) test was used to measure how well the items in the study fit together into their corresponding factors. The KMO score was 0.869, which is considered to be excellent (Stephanie Glen 2016) (Kaiser 1958).

This means that the items in the study are well-suited for factor analysis, which is a statistical technique used to identify underlying factors that explain the relationships between variables. The software IBM SPSS Statistics (v. 27), Smart PLS (v. 4.0) were used to perform the statistical calculations.

***Findings/results***

For the factor analysis, the variables were codified like this: Attitude towards entrepreneurship (AHE); Perceived Entrepreneurial Capability (CEP); Business Education (EP); Entrepreneurial Intentions Tech Transfer (IEE); Perceived Social Norms (NSP). SmartPLS software was used to calculate the external loads using the Partial Least Squares (PLS) algorithm, which is a regression algorithm that uses weight vectors. The following adjustments were made: the maximum number of iterations was set to 300 and the stopping criterion was set to 10^-7. Table 1 shows the matrix of external loads with their respective values, using items with acceptance coefficients greater than or equal to 0.700 as the cutoff criteria.

**Table 1. External loads sampling adequacy – SMART PLS**

| | AHE | CEP | EP | IEE | NSP |
|---|---|---|---|---|---|
| **AHE2** | 0.878 | | | | |
| **AHE3** | 0.906 | | | | |
| **AHE4** | 0.931 | | | | |
| **AHE5** | 0.867 | | | | |
| **CEP2** | | 0.748 | | | |
| **CEP3** | | 0.868 | | | |
| **CEP4** | | 0.775 | | | |
| **EP1** | | | 0.828 | | |
| **EP2** | | | 0.824 | | |
| **EP3** | | | 0.825 | | |
| **EP4** | | | 0.822 | | |
| **IEE1** | | | | 0.783 | |
| **IEE2** | | | | 0.805 | |
| **IEE3** | | | | 0.911 | |
| **IEE4** | | | | 0.810 | |
| **IEE5** | | | | 0.822 | |
| **IEE6** | | | | 0.893 | |
| **NSP2** | | | | | 1.000 |
| **NSP3** | | | | | 0.706 |

The reliability and construct validity are expressed in Cronbach's alpha, the results are between 0.706 and 0.931, which is acceptable. The composite reliability coefficient (rho_A) (Saidi & Siew 2019) is used to assess the dependability of the results obtained in the development and design of partial least squares (PLS) (da Rosa Possebon et al. 2018) models. To demonstrate composite reliability, the values of rho_A should be

greater than 0.7. The results in this study vary between 0.850 and 0.927. Therefore, the composite reliability criterion is applied, with an acceptance criterion of rho_A > 0.7. This ensures that reasonable levels of reliability and internal consistency are demonstrated for each of the variables. The values of rho_A under this criterion range between 0.850 and 0.927. The values of the average variance extracted (AVE) (Bacon, Sauer & Young 1995) range between 0.680 and 0.878. These results exceed the recommended minimum value of 0.500, indicating that convergent validity is acceptable in the model components (dos Santos & Cirillo 2023).

The results of this study demonstrate that the PLS model is reliable and valid. The composite reliability and average variance extracted values are all above the recommended thresholds. This means that the model can be used to measure the constructs of interest with confidence, as seen in Table 2.

**Table 2. Constructs of reliability and validity**

| | Alpha Conbrach | Rho_A | Rho_C | AVE (Average Variance extracted) |
|---|---|---|---|---|
| **Attitude towards entrepreneurship (AHE)** | 0.918 | 0.927 | 0.942 | 0.878 |
| **Perceived Entrepreneurial Capability (CEP)** | 0.852 | 0.850 | 0.810 | 0.691 |
| **Business Education (EP)** | 0.843 | 0.878 | 0.895 | 0.680 |
| **Entrepreneurial Intentions Tech Transfer (IEE)** | 0.915 | 0.918 | 0.934 | 0.704 |
| **Perceived Social Norms (NSP)** | 0.839 | 18.509 | 0.803 | 0.683 |

The Fornell and Lacker (Hilkenmeier et al. 2020) proposal, determinates a test for discriminant validity was performed by comparing the square root of AVE for each variable to the correlations between the variables. The results showed that the square root of AVE was greater than the correlations for all variables, indicating that the discriminant validity of the model is well established. (See Table 3).

**Table 3. Discriminant validity, Fornell Larcker Criterion**

| | AHE | CEP | EP | IEE | NSP |
|---|---|---|---|---|---|
| **AHE** | **0.896** | | | | |
| **CEP** | 0.541 | **0.769** | | | |
| **EP** | 0.712 | 0.596 | **0.825** | | |
| **IEE** | 0.744 | 0.591 | 0.814 | **0.839** | |
| **NSP** | 0.063 | 0.068 | 0.182 | 0.145 | **0.827** |

*Table 4 shows that the discriminant validity is positive, which proves that the constructs are correctly separated. In other words, the constructs that should be separated by interpretative logic are indeed separated. using the Heterotrait-Monotrait relationship (HTMT). The HTMT coefficient was used in this way because of the results, which are valid because their values are below the 0.85 conservative cutoff point suggested by* ***Rönkkö & Cho****.*

**Table 4. Discriminant validity, Heterotrait-monotrait ratio**

| | AHE | CEP | EP | IEE | NSP |
|---|---|---|---|---|---|
| **AHE** | | | | | |
| **CEP** | 0.670 | | | | |
| **EP** | 0.804 | 0.777 | | | |
| **IEE** | 0.805 | 0.748 | 0.804 | | |
| **NSP** | 0.103 | 0.187 | 0.193 | 0.163 | |

*Table 5 shows the results of a bootstrapping test. This test works by creating 10,000 new samples from the original data, with each sample containing some duplicates of data points. The model parameters are then estimated for each of the new samples. The standard deviation of the estimated parameters is then used to calculate the standard error of the estimate (Vrigazova 2021). Based on the results of the bootstrapping test, hypotheses H1 and H4 are accepted, while hypotheses H2 and H3 are rejected. This is because the p-value for hypotheses H2 and H3 is less than 0.05, which is the significance level.*

**Table 5. Bootstrapping**

| | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T statistics (\|O / STDEV\|) | P Values |
|---|---|---|---|---|---|
| **AHE→IEE** | 0.311 | 0.299 | 0.128 | 2.435 | **0.015** |
| **CEP→IEE** | 0.108 | 0.154 | 0.112 | 0.960 | 0.337 |
| **EP→IEE** | 0.524 | 0.481 | 0.136 | 3.860 | **0.000** |
| **NSP→IEE** | 0.021 | -0.002 | 0.110 | 0.190 | 0.850 |

*Figure 4 is a graphical representation of R2 (coefficient of determination) using Partial Least Squares Structural Equation Modeling (PLS-SEM), which explains that Perceived Social Norms (NSP) -> Entrepreneurial Intentions TECH Transfer (IEE): Perceived Social Norms has a positive relationship with entrepreneurial intentions. For each unit that Perceived Social Norms increases, entrepreneurial intentions averages 0.146 units. It is statistically significant (p<0.001), which means that it is highly likely that this relationship is not going to change. Attitude towards entrepreneurship (AHE) -> Entrepreneurial Intentions TECH Transfer (IEE): Attitude has a positive and very significant relationship with Entrepreneurial Intentions.*

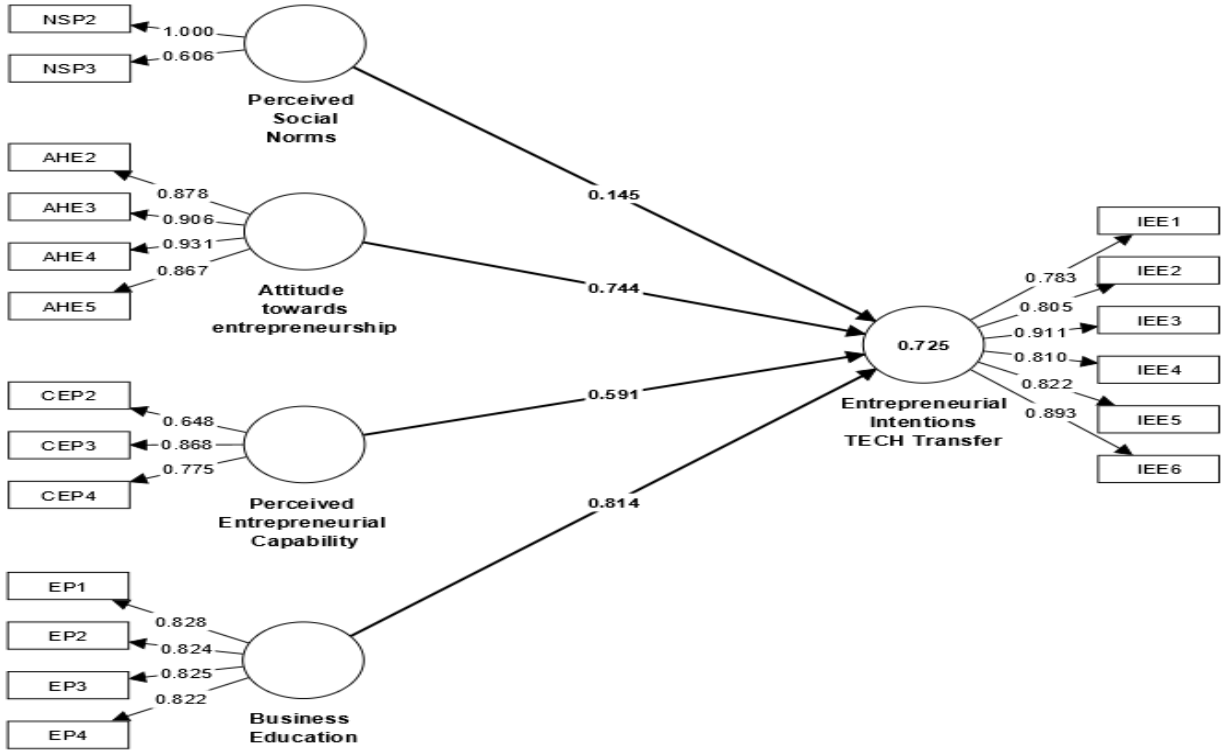
*For every unit that Attitude towards entrepreneurship increases, Entrepreneurial Intentions increases by an average of 0.744 units. This relationship is statistically significant, indicating that there is a moderate probability that this relationship exists and is not due to chance.*

*The Perceived Entrepreneurial Capability (CEP) -> Entrepreneurial Intentions TECH Transfer (IEE): perceived entrepreneurial capability has a positive and significant relationship with Entrepreneurial Intentions, for every unit that Perceived entrepreneurial capability increases, entrepreneurial intentions averages 0.591 units. It is statistically significant (p<0.001), which means that it is highly likely that this relationship is not going to change.*

*Business Education (EP) -> Entrepreneurial Intentions TECH Transfer (IEE): business education has a positive and significant relationship with Entrepreneurial Intentions, for every unit that business education increases, entrepreneurial intentions average 0.814 units.*

*The $R^2$ of 0.725 suggest that 72% of the variability in the Entrepreneurial Intentions TECH Transfer (IEE) can be explained by the variables "Perceived social norms" (NSP), "Attitude towards entrepreneurship" (AHE), "Perceived entrepreneurial capability" (CEP) and "business education" (EP). Therefore, it is inferred that there are other factors not included in the model that are also influencing.*

**Fig 4.** Coefficient of determination $R^2$ – PLS- SEM




*Limitations and direction for future research*

FabLabs play a fundamental role in promoting entrepreneurship in higher education. Through hands-on education, the fostering of creativity and technology, they prepare students to face the challenges of the business world. Some of the world's most innovative companies have originated in FabLabs, which reinforces the importance of these spaces in the global entrepreneurial ecosystem. In a constantly changing world, the relationship between FabLabs and entrepreneurship in higher education is an essential component for forming future entrepreneurs and innovative leaders.

**Fig 5. Guidelines to prioritize ventures with national impact**

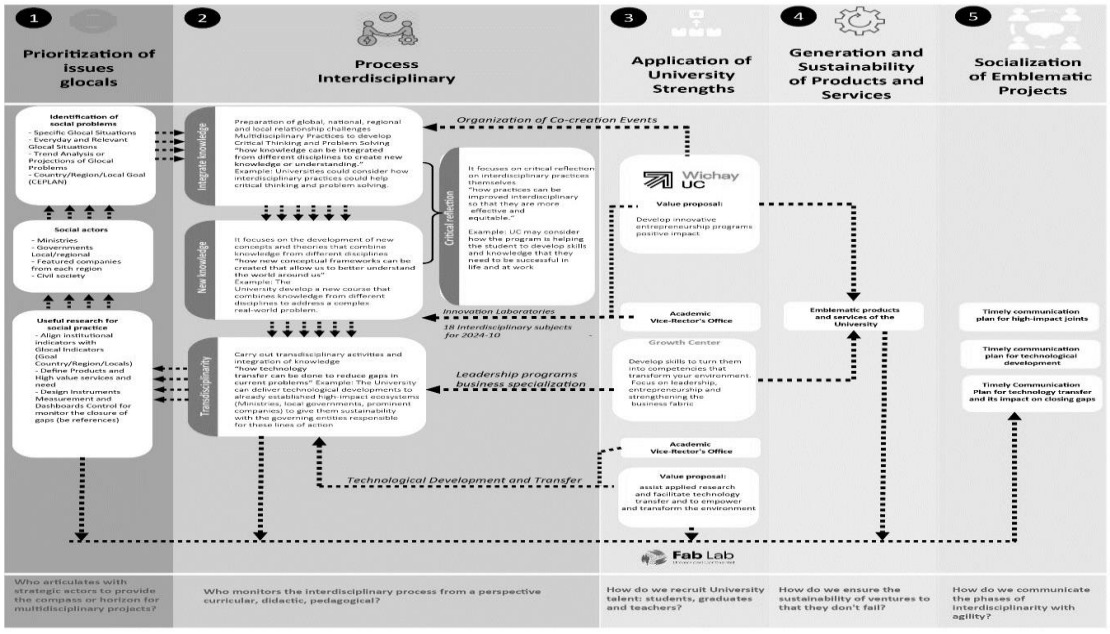



Figure 5 is a prioritization plan for Glocal activities (considering the national plans made by the government for each region, city, and locality). These activities must involve academic and/or administrative areas for the benefit of interdisciplinary entrepreneurship projects by the faculties in the university, supported by business accelerators, scientific production, manufacturing laboratories, and business training centers.

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# Socio-Demography and Emotional Intelligence in Nepalese Banks

**Pradeep KC**
Purbanchal University, Nepal

**Keywords:**
*Emotional Intelligence, Nepalese Banks, Socio-Demography*

**Abstract**

*The current paper results accumulate evidence that Emotional Intelligence (EI) is influenced by socio-demographic factors of employees. However, the research on Emotional Intelligence is majorly conducted in corporate sector and in western nations; since there is a lack of research on Emotional Intelligence in the context of banking sector in developing and least develop country, like Nepal. The objectives of this paper are to analyze the status of Emotional Intelligence among Nepalese bank employees and to measure the impact of demographic factors on Emotional Intelligence. The research approach is quantitative, research design is cross-sectional, descriptive, and inferential too, and population is total numbers of employees whereas sample is 393 employees from commercial and development Nepalese bank. The structured questionnaire was designed to collect primary data through convenience sampling technique with five-point Likert scale. SPSS was used to manage and analyze data. Frequency, Mean and Standard Deviations are used to assess the status of EI, F-test, P-value, post-hoc comparison of mean difference was used to measure the impact of demographic factors on EI, Chronbatch alpha to test reliability of constructs, The research is able to find out that EI is well present in the Nepalese banking. Furthermore, some of the dimensions of Socio-Demographic Variables have a significant relationship with Emotional Intelligence. Marital status, income level and job tenure have significant impact on Emotional Intelligence.*

## *Introduction*

From near about three decades before a great discourse has begun around the issue of emotional intelligence (EI). This issue was largely globalized by Goleman (1995), and specifically by the claim that EI defines a higher amount of variance in individual success than IQ (Gannon & Ranzjin, 2005). The initial conception and empirical model of EI was explored and revised by Salovey and Mayer (1990), who conceptualized EI as "the ability to monitor one's own and others' emotions, to discriminate among them, and to use the information to guide one's thinking and actions" (1990: 189). According to Zeidner et al. (2004), this may be the most widely renowned scientific definition of EI; hence it defines emotional information processing as an essential precursor to emotional regulation. The very fresh research findings say that EI persons are better performers than their counterparts (Law, Song & Wong, 2004). To continue a sustainable productive culture in the competitive business world, business has to be much emphasized on emotional intelligence of their people. The practical implication of emotional intelligence in business consist of areas such as selection, training and development of employees, teamwork, and organization. Today's corporations should coach their human capital in improving their interpersonal skills and coach them to perform smartly within a team in the modern organization (Bar-On et al., 2003). Nepalese banks as financial sector is identified as one of the most dynamic and vibrant areas of the whole economy. Banking has developed significant economic sectors of the Government and ushered in a new dawn of progress on the Nepalese horizon. The sector has translated the hopes and aspirations of millions of citizens into real life. Most of the literature expressed that there are very great crisis on this contemporary issue in Nepalese context as well as all over the globe. In addition to those empirical research studies also proved that emotional intelligence in organizational setting was ignored for a significant time period. Since, researcher had strongly committed to identify the nature of emotional intelligence and measure the influence of socio-demographic on EI in Nepalese bank employees.

Scholars of social sciences have conducted research work a lot on this same issue at the globe perspective, specifically in the western contexts. However, the developing and third world such as Nepal

there was a necessity to explore this issue. Since, the research article is accomplished to know the status of emotional intelligence in the banking sector of Nepal, especially in the areas of commercial and development banks. There are other variables too which have direct influence on the organizational performance of the employees working in different areas of the economy in various parts of the world, like Self-awareness, Self-management, Social-awareness, relationship management and so on.

***Research Objectives***

i) To analyze the status of Emotional Intelligence among Nepalese bank employees.
ii) To measure the impact of demographic factors on Emotional Intelligence.

***Literature Review***

A lot of studies have been focused to find out the relationship between Emotional intelligence and organizational performance. The scholars with this sector of emotional intelligence have developed concepts and theories to identify the conception of emotional intelligence and its relationship with work life dimensions.

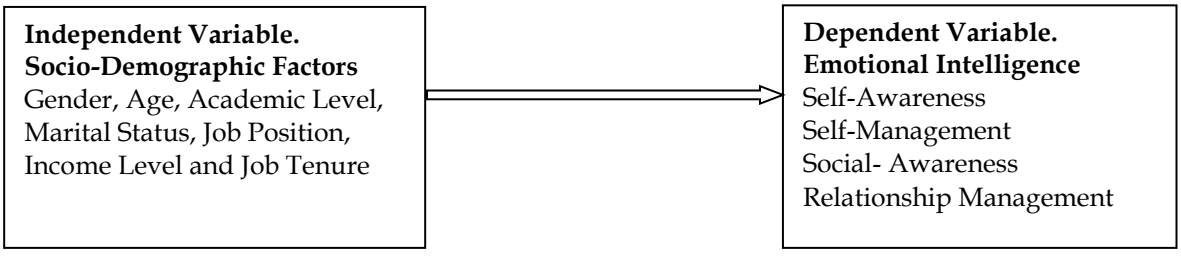
The model of emotional intelligence is designed and conceptualized by four models' ability model, traits model, mixed model, and second-generation model. According to John Mayer and Peter Salovey (1993) emotional intelligence is the capacity to exactly understand one's own emotional patterns and those of others also. Further, Reuven Bar-On (2000) introduced emotional intelligence is connected with well to people and coping with the peripheries to be more productive in an interaction with environmental requirement.

Daniel Goleman (1995) developed emotional intelligence as a competency for understanding our own and others feeling for inspiring our self and for managing our emotions, both within ourselves and in our connectivity. The very new model of emotional intelligence is "trait emotional intelligence." It is a second-generation model that combines many of the individual natures identified in already developed models (Petrides et al., 2007).

Research suggests that there is a positive relation between emotional intelligence and organizational performance (Rahman & Haleem, 2018; Thomas & Tram, 2006; Guleryuz et al., 2008; Mona fared et al., 2010; El Khouly,2011; Mousavi et al., 2012; Moradi et al., 2012). Rahman & Haleem (2018) conducted a survey on university employees and found strong and significant impact of emotional intelligence on job satisfaction. Similarly, Goleman (1995) stated that emotional intelligence is closely related to job satisfaction and job success. Emotional intelligence does expect job satisfaction and job performance. Likewise, Literature revealed mixed results of studies that age, gender, and educational level moderate the relationship between emotional intelligence and job satisfaction. Researchers have shown a relationship between age and job satisfaction, indicating that older workers are more satisfied with their jobs than younger workers.

Moreover, with the increase in the number of years overall job satisfaction of workers increases as well (Berns, 1989; Grady & Burnett, 2000). Furthermore, the level of emotional intelligence of older students was higher than younger students. In addition, the level of emotional intelligence is high among those over 40 years (Bar-on & Handley,1999; Ishak et al., 2011). Researchers also found that age does not increase other relationships such as emotional intelligence, mental health, and spiritual intelligence (Rahim & Malik, 2010).

**Conceptual Framework**



**Research Methodology**

This study is based on a combination of cross-sectional, descriptive, and inferential research design. The population of this study is 47 banks of Nepal including total 27 commercial and 20 development banks among various commercial and development banks of province no. 1, 20 banks with minimum 10 years of experience. Four hundred eighty questionnaires were distributed, 393 were collected consist of 270 male and 123 female respondents and response rate is 78.6%. SPSS software package was used to manage and analyze collected data. Structured questionnaire was developed to collect data through convenience sampling technique with five-point Likert scales. Primary data and secondary data were collected from questionnaire and websites of banks, annual reports, journal articles, dissertations and so on, respectively. Frequency, Mean and Standard Deviations are used to assess the status of EI, F-test, P-value, post-hoc comparison of mean difference was used to measure the impact of demographic factors on EI, Chronbatch alpha to test reliability of constructs. Questionnaire was distributed to 6 branches of each bank including 4 respondents of each branch from various districts of Nepal. Data is collected from different branches of sample banks by using google form.

**Findings**

Based on the collected data, the following findings have been drawn.

| Attribution | Description | No. of cases | Percentage |
|---|---|---|---|
| Age | 20-29 years | 227 | 57.8 |
| | 30 and Above | 166 | 42.2 |
| Gender | Male | 270 | 68.7 |
| | Female | 123 | 31.3 |
| Educational Level | Up to Bachelor | 114 | 21 |
| | Master and above | 279 | 79 |
| Marital Status | Married | 221 | 56.2 |
| | Unmarried | 172 | 43.8 |
| Job Position | Non-Officer | 253 | 64.4 |
| | Officer | 113 | 28.8 |
| | Manager | 27 | 6.9 |
| Income Level | Rs 15000-24000 | 45 | 11.5 |
| | 25000-34000 | 73 | 18.6 |
| | 35000-44000 | 96 | 24.4 |
| | 45000 and above | 179 | 45.5 |
| Job Tenure | 0-4 years | 211 | 53.7 |
| | 5-9 | 109 | 27.7 |
| | 10-14 | 48 | 12.2 |
| | 15 and above | 25 | 6.4 |
| Total | | 393 | 100 |

*Table 1: Demographic characteristics of sample*

A comparison is made between the data results obtained from the questionnaires in the selected banks in Nepal in terms of their age, gender, educational level, marital status, job position, income level, job tenure, and level of emotional intelligence and its characteristics using means and proportions.

**Reliability of the constructs**

All constructs are reliable and acceptable because all the values of Cronbach's Alpha are > 0.7000.

| Cronbatch's Alpha | No. of Items |
|---|---|
| 0.77925 | 4 |

*Table 2: Reliability of the constructs in aggregate*

| Variable | Constructs | No. of Items | Cronbatch's Alpha |
|---|---|---|---|
| Dependent | Self-awareness | 7 | 0.778 |
| Dependent | Self–management | 7 | 0.783 |
| Dependent | Social awareness | 7 | 0.780 |
| Dependent | Relationship management | 7 | 0.776 |

*Table 3: Reliability of the constructs*

| Description | Score |
|---|---|
| Mean | 112.34 |
| Average Index Value | 0.75 (SD0.11) |
| 95% Confidence Interval For Mean | Lower Bound 111.11 |
| | Upper Bound 113.58 |
| Std. Deviation | 12.44 |
| Minimum | 28.00 |
| Maximum | 140.00 |
| Skewness | -1.68 |
| Kurtosis | 10.71 |

*Table 4: Emotional Intelligence (Aggregate Score)*

| Attribution | Description | N | Mean | Std. Deviation | F-statistics | Sig. |
|---|---|---|---|---|---|---|
| Age | 20 to 29 | 227 | 111.742 | 13.169 | 1.037 | 0.309 |
| | 30 and above | 166 | 113.056 | 11.445 | | |
| Gender | Male | 270 | 113.092 | 12.701 | 3.383 | 0.067 |
| | Female | 123 | 110.579 | 11.825 | | |
| Educational level | Up to Bachelor | 114 | 112.090 | 10.517 | 0.043 | 0.835 |
| | Master and above | 279 | 112.382 | 13.201 | | |
| Marital status | Married | 221 | 113.809 | 11.683 | 7.322 | 0.007 |
| | Unmarried | 172 | 110.363 | 13.195 | | |
| Job position | Non-Officer | 253 | 111.648 | 10.727 | 0.996 | 0.370 |
| | Officer | 113 | 113.315 | 16.143 | | |
| | Manager | 27 | 114.200 | 12.470 | | |
| Income levels | Rs. 15000-24000 | 45 | 106.651 | 16.774 | 3.449 | 0.017 |
| | 25000-34000 | 73 | 112.403 | 10.442 | | |
| | 35000-44000 | 96 | 113.138 | 10.719 | | |
| | 45000 and above | 179 | 113.195 | 12.626 | | |
| Job tenure | 0-4 years | 211 | 110.641 | 13.429 | 2.977 | 0.031 |
| | 5-9 | 109 | 114.238 | 11.589 | | |
| | 10-14 | 48 | 113.208 | 10.030 | | |
| | 15 and above | 25 | 116.208 | 10.142 | | |

*Table5: Impact of demographic variables on emotional intelligence*

The result of this table shows different patterns of effect of different demographic variables on the dependent variable.

The results showed that there was no significant difference between the mean EI scores of these two age groups ($F = 1.037$, $p > 0.05$) with a p value of 0.309. The above table clearly depicts that the mean EI consistently increased from the minimum age group (20 to 29 years) to 30 and above age group. It is clear that as the age increases the level of emotional intelligence also increases, it may be vice versa. Mature employees have a higher EI level, as compared to the younger ones due to the nature of the working environment of banks and their level of maturity. Because aged people are very experienced and inspired by more friendly and highly committed behavior in their job.

The mean value of EI for males was 113.09 and for females it was found to be 110.579. The results of F-test showed no significant difference between the mean EI of males and that of female managers implying that gender of the bank employees has no significant relationship with their emotional intelligence ($F = 1.01$,

p = 0.067). The gender has no relationship with the independent variable, the mean scores also shows that male employees are more emotionally intelligent than their female counterparts.

The relationship of educational background of bank employees with their EI was tested by applying ANOVA test but no significant difference between the mean EI of the employees belonging to these groups was found (F = 0.043, p = 0.835). Hence, there is no significant relationship between the educational qualifications of the employee and their emotional intelligence. The mean score of up-to bachelor is 112.090 and master and above is 112.382. The marital status has positive relationship (F = 7.322, p = 0.007) with the level of emotional intelligence, means to say that EI level is low with unmarried people and high with married people because married people are more careful to care, love and co-operate with their co-workers as they have strong bonding with their partner and children.

There is an insignificant relation of job position with emotional intelligence (F = 0.996, p = 0.370). The mean score of non-officer, officer and manager level employees are 111.648, 113.315 and 114.200 correspondingly. The EI is high with high level of job position and vice versa. There is a significant difference between income level and EI (F = 3.449, p = 0.017). The mean score of Rs. 15000-24000, 25000-34000, 35000-44000 and 45000 and above are 106.651, 112.40, 113.14, and 113.20 correspondingly. Here the result shows that EI is high with high income level.

The Post Hoc comparison was done in order to determine the level of significance of the mean differences in relation to different income level groups of bank employees as shown in the following table. There is significant difference in the mean EI score in different categories of income level (F =3.449, p = 0.017). Post-hoc analysis results that as compared to the bank employees having income Rs. 15000-24000, the mean EI score of employees having income Rs. 25000-34000 is significantly higher (Absolute mean difference = 5.754, p = 0.016) that of employees having income Rs. 35000-44000 is significantly higher (Absolute mean difference = 6.487, p=0.005), and that of employees having income Rs. 45000 And Above is significantly higher (Absolute mean difference = 6.5442, p = 0.002). And no significant difference is observed in the case of other income groups.

| | Groups | Absolute Mean | Sig. |
|---|---|---|---|
| Income levels | Rs. 15000-24000 vs. 25000-34000 | 5.750 | 0.016 |
| | 15000-24000 vs. 35000-44000 | 6.471 | 0.005 |
| | 15000-24000 vs. 45000 and above | 6.540 | 0.002 |
| | 25000-34000 vs. 35000-44000 | 0.736 | 0.704 |
| | 25000-34000 vs. 45000 and above | 0.792 | 0.647 |
| | 35000-44000 vs. 45000 and above | 0.057 | 0.971 |

*Table 6: Post Hoc comparison of mean differences in relation to income level and EI*

The relationship between the job tenure and EI of the bank employees was examined with ANOVA test and the results have shown significant differences between the mean EI scores of the employees belonging to different job tenure groups (F = 2.977, p < 0.05) with a p value of 0.031. It is clearly depicted from the results that the mean EI was consistently increasing from the minimum job tenure group (0 to 4 years) to the maximum job tenure group (15 and above years) except (10 to 14) years. Hence, job tenure has a significant relationship with EI.

The Post Hoc comparison was done in order to determine the level of significance of the mean differences in relation to different job tenure groups of bank employees as shown in the following table. There is significant difference in the mean EI score in different categories of job tenure (F=2.977, p=0.031). Post-hoc analysis results that as compared to the bank employees having tenure 0-4 years, the mean EI score of employees having tenure 5-9 years is significantly higher (Absolute mean difference = 3.5973, p=0.016) that of employees having tenure 10-14 years is significantly higher (Absolute mean difference=5.567, p=0.038), and no significant difference is observed in the case of other job tenure groups.

| | Groups | Absolute Mean | Sig. |
|---|---|---|---|
| Job tenures | 0-4 years vs. 5-9 | 3.597 | 0.016 |
| | 0-4 vs. 15 and above | 5.568 | 0.038 |
| | 0-4 vs. 10-14 | 2.568 | 0.196 |
| | 5-9 vs. 10-14 | 1.030 | 0.633 |
| | 5-9 vs. 15 and above | 1.970 | 0.482 |
| | 10-14 vs. 15 and above | 3 | 0.333 |

*Table 7: Post Hoc comparison of mean differences in relation to job tenure and EI*

***Discussion and Conclusion***

This paper is able to assess the present status of emotional intelligence in the Nepalese banks. It is also identified from this article that emotional intelligence is well present in Nepalese banking. This paper clarifies that some of the dimensions of Socio-Demographic Variables have a significant relationship with Emotional Intelligence. Marital status, income level and job tenure have significant impact on Emotional Intelligence. The higher the income and experience of the bank employees, the higher is the level of their emotional intelligence. And married employees are emotionally smarter than unmarried ones. Emotional intelligence, as precious area of social sciences requires a lot of research in the developing and least developed nations like Nepal.

The paper did not find a significant relationship between age and emotional intelligence among bankers. The finding is consistent with earlier research by Bar-On (1997), who found small but consistent increases in emotional intelligence with advancing age, peaking in the 40s age group. According to this present paper, the emotional intelligence of bank employees increases with work experience. This result is consistent with Adeyemo's (2008) study on 215 workers in Nigeria, which found that work experience significantly predicted emotional intelligence. The present research found no significant relationship between emotional intelligence and gender. This is consistent with some previous research, although other papers have reported gender differences in emotional intelligence. Such as, Goleman (1998) found that there were more similarities than differences in emotional skills between male and female groups. There is significant relationship between marital status and income level with EI, the findings of a research paper conducted among 414 information technology (IT) professionals in five major IT cities in India established a link between EI and marital status of the IT professionals (Verma, 2002).

This paper suggests that institutions should not only emphasize candidates' knowledge, skill and capacity when selecting, but also focus on demographic data such as age, marital status, education, job tenure, job position etc. Furthermore, once human resources are selected, institutions should design policies to retain them forever, such as inspiring further academy and providing platforms for individual development. Similarly, training and development programs can be conducted to enhance emotional intelligence in financial institutions, leading to better productivity. Such programs can help to improve emotional maturity, increase knowledge, enhance reasoning and understanding of others, develop decision-making power, and boost socialization skills.

**Limitations and Direction for Future Research**

This study is concerned only with employees working in various branches of banks, that is, commercial and development banks in Nepal. It excludes those banks that have less than ten years of experience. The primary data is gathered using structured questionnaires. The data was based on the respondent's individual interpretation. Respondents can provide wrong information due to factors such as loss of consciousness, hesitation, misinterpretations, and others. This study was prepared via data from a Google Form; therefore, the researcher did not get enough opportunities to visit physically with respondents at their workplace to observe and understand their facial, behavioral, and emotional expressions. This research work is conducted with a research design, that is, a descriptive and analytical research design with a common research approach, i.e., a deductive research approach.

There is also a requirement to conduct research works concerning intrinsic and extrinsic dimensions which have influence on human behavior and their emotional intelligence. Sector-wise research may also

be carried out to see the emotional intelligence level of human capital in various sectors of the nation, to make the economy prosper by having intellect human capital within the country. On the other hand, further research studies with respect to impact of Emotional Intelligence on Organizational Performance by differing research methodology and organization dimensions, are required in this sector especially in the Nepal whether it's manufacturing or service industry. This research paper is based on only the study of employees of commercial and development banks and conducted with only four constructs of dependent variables.

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# Analysing the key Challenges that women Entrepreneurial businesses are facing in the UK: The case of BAME Group

**Zakiya Amani**
**Aliar Hossain**
**Imad Nawaz**

Northumbria University London, UK

**Keywords**
Entrepreneurship, Entrepreneurial Challenges for BAME & Women Entrepreneurship

**Abstract**

*Black Asian Minority Ethnic (BAME) women entrepreneurs are facing several challenges while initiating new business development including professional skills, funding opportunities and other social challenges (Sahira & Surangi, 2022). According to Lawton and Owalla (2021), white entrepreneurs have higher rate of success in terms of operating the business profitably comparing to BAME groups. Therefore, this research will investigate key challenges and barriers that BAME women entrepreneurs are facing in terms of professional skills, business knowledge, understanding market, product innovation and how to deal with various changes in the business environment. Primary data was collected via the qualitative research method and data was gathered through semi-structured interviews from twenty-seven participants. All participants are based in UK from the BAME community and are involved with operating SME businesses in the various sectors. The findings revealed that access to finance, professional skills linked to business, communication (including language) issues and prejudiced attitudes were the major challenges that BAME female entrepreneurs are facing in the UK. However, there is a need for more extensive research. Future research would formulate both gender-related aspects and the racial or cultural aspects affecting the BAME female entrepreneurs' appearance in the business world.*

## Introduction

The landscape of entrepreneurship in the United Kingdom has witnessed a remarkable transformation in recent years, with women playing an increasingly significant role in driving economic growth and innovation (Yadav & Unni, 2016). According to Lawton and Owalla (2021), white entrepreneurs have higher rate of success in terms of operating the business profitably comparing to BAME groups. However, within this entrepreneurial ecosystem, women from Black, Asian, and Minority Ethnic (BAME) backgrounds face unique and distinct challenges that can hinder their business ventures (Sahira & Surangi, 2022). This study aims to shed light on the key challenges that women entrepreneurs, particularly those from BAME groups encounter in the UK. By exploring these challenges, the researchers seek to contribute to a better understanding of the dynamics of female entrepreneurship and the impact of ethnicity on the entrepreneurial journey.

### *Research Aim and Objectives*

The primary aim of this research is to comprehensively analyse and identify the key challenges faced by women entrepreneurs from BAME backgrounds in the UK. This study will delve into the various socio-economic, cultural, and institutional barriers that hinder the growth and success of their businesses. The objectives of this research are as follows:

1. To review the existing literature and theoretical frameworks regarding women entrepreneurship, BAME entrepreneurship, and the intersection of both in the UK.

2. To identify and categorise the primary challenges and barriers faced by women entrepreneurs from BAME backgrounds in the UK.

## Reviewing Existing Literature

### *Concept of Women Entrepreneurs*

The concept of women entrepreneurs encompasses women who actively engage in entrepreneurial activities by starting, managing, and growing their businesses. Women entrepreneurs play a crucial role in the global economy by contributing to job creation, innovation, and economic development. These individuals exhibit various entrepreneurial traits, such as risk-taking, innovation, and determination, while navigating the challenges and opportunities that come with business ownership. Their businesses can span a wide range of industries and sizes, from small start-ups to established enterprises (Cardella et al., 2022). The Global Entrepreneurship Monitor (GEM) (2022) highlighted that entrepreneurship is progressing as there are remarkable raise in the number of women entrepreneurs. Moreover, the GEM's Women's Entrepreneurship Report 2021/2022 illustrated that business start-up rates for females declined by 15% from the year 2019-2020 and remained constant in 2021 (GEM, 2022).

### *Feminist Theory and its Influence on Female Entrepreneurs:*

Feminist theory has significantly influenced the study and understanding of female entrepreneurship. Feminist theories rooted in the broader field of gender studies, emphasised the importance of analysing and addressing gender-based inequalities and discrimination. (Ali, 2018). These theories have shed light on the unique challenge that women entrepreneurs face due to social, cultural, and economic factors that are often deeply embedded in society. Dean et al., (2019) emphasised the need to challenge traditional gender roles, norms, and biases that can impact women's access to resources, opportunities, and support in the entrepreneurial realm.

### *Key Challenges that BAME Women Entrepreneurs are facing.*

BAME women entrepreneurs in the United Kingdom encounter a range of challenges that affect their ability to start, operate, and grow successful businesses. These challenges are often intertwined with both gender and ethnic factors, creating a complex web of obstacles.

### *Access to resources (Finance and Funding)*

Access to financial resources is a fundamental challenge for BAME women entrepreneurs. They often encounter difficulties in securing loans, investments, and grants compared to their male and non-BAME counterparts (Martinez & Jayawarna, 2020). This financial barrier can limit their ability to launch and expand their businesses, as they may lack the necessary capital to cover start-up costs, scale operations, or weather economic downturns. Giazitzoglu & Korede, 2023) study findings reveal that Black female entrepreneurs documented a median turnover of around £25,000 annually which is higher than a third less than white female business owners i.e., £35,000. Furthermore, Rose (2019) reported that female business owners are less likely to take loans compared to men.

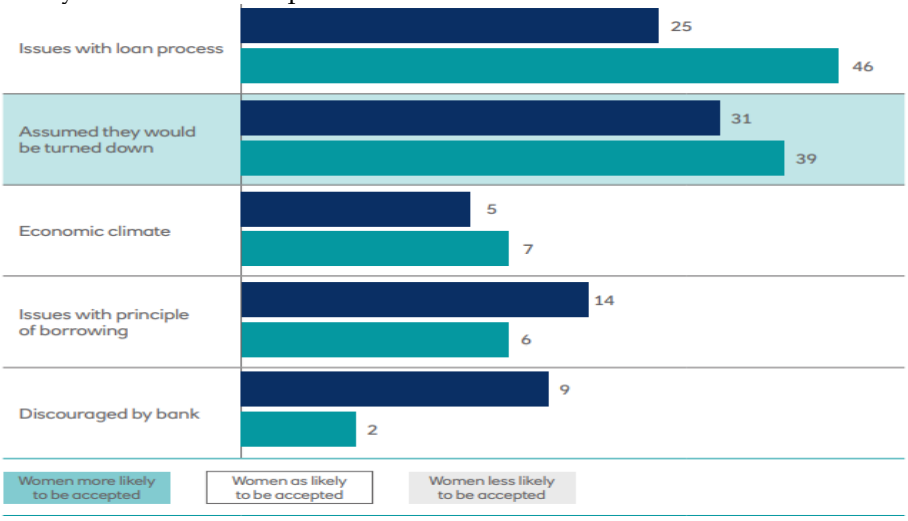


***Figure 1.*** *Women are less likely to seek scale up loans than men (Source: Rose, 2019)*

Moreover, Aman et al., (2022) discussed in a comprehensive manner that poor language expertise, the fear of debt, and the dearth of confidence could also possess a significant part in dissuading BAME women entrepreneurs from attempting to access the formal banking system. This forces them towards their communities or areas for informal solutions. For instance, Rahman et al., (2018) demonstrated that female ethnic minority business owners relied on community and personal sources for finance. Furthermore, LLOYD Bank (2019) gave an illustration of financial support which the Black Entrepreneurs needed.

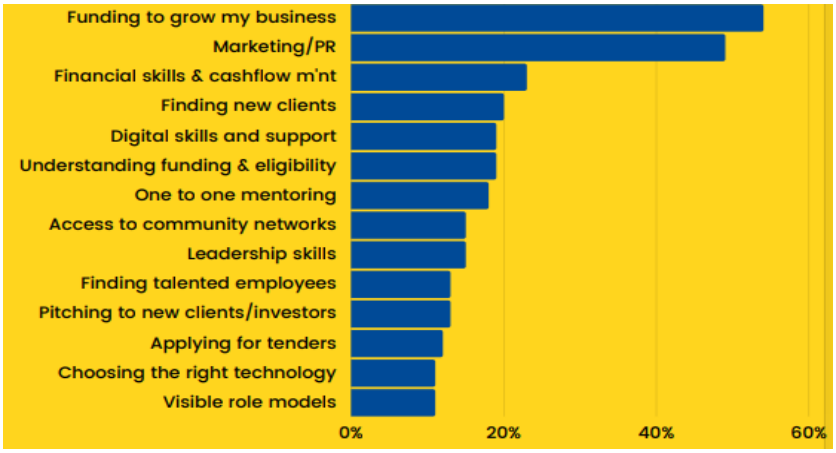


***Figure 2.*** *Financial support needed by Black Entrepreneurs (Source: LLOYD Bank, 2019)*

***Negative Effects of Racism and Sexism***

BAME women entrepreneurs frequently experience the negative impacts of both racism and sexism. They may face discrimination and bias in various aspects of their entrepreneurial journey, including access to markets, networking opportunities, and mentoring relationships. These prejudices can limit their growth prospects and stifle their self-confidence (Sarfaraz et al., 2014). Deigh (2022) interviewed around 300 BAME women managers and explored the BAME females survived in a bicultural world and experienced even higher role conflict. Particularly, the findings demonstrated that these females experienced the double negative impact of racism or sexism and significant stereotypical pictures depending on ethnic regions were contented. Furthermore, TUC (2022) reported the impact of racism and sexism challenges on women business owners.

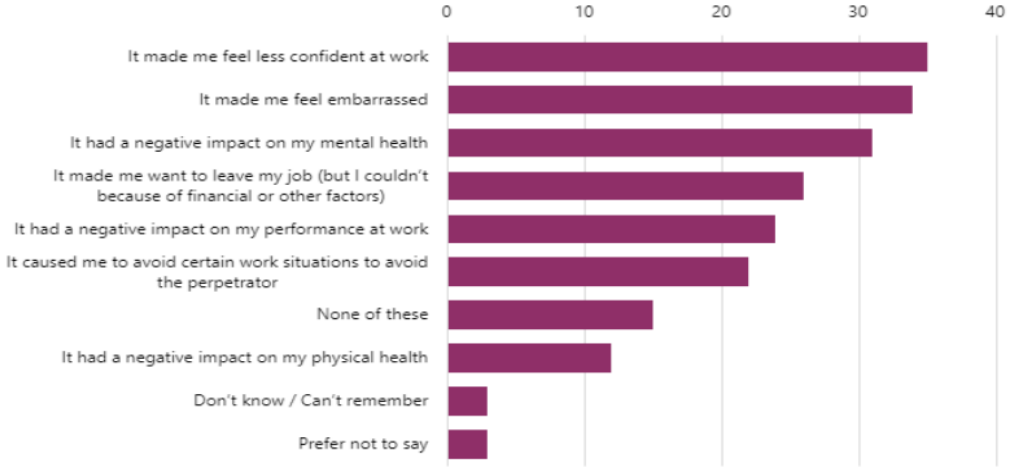


***Figure 3.*** *Impact of racism on BME workers (Source: TUC, 2022).*

***Lack of Professional and Management Skills***

Limited access to education and professional development opportunities can hinder BAME women entrepreneurs' ability to acquire the necessary skills and knowledge for effective business management. They may struggle to access training and mentorship programs that are essential for enhancing their

entrepreneurial capabilities (Hazen, 2023). Moreover, Hwang and Beauregard (2022) suggested that female BAME entrepreneurs are not normally less skilled it must be made evident and many of them possess higher degrees of qualification. However, this expertise might not be relevant to the self-minority BAME entrepreneurs.

***Family Commitments***

Balancing family commitments with business ownership can be a significant challenge for BAME women entrepreneurs (Constantinidis et al., 2019). Female business owners require to be financially independent by means of possessing their own capital and assets. It is because financially independent females normally possess the power to make their own business decisions without managing the influence of family members or spouses (Marks, 2023). Cultural and social expectations often place additional responsibilities on them, making it challenging to devote the time and energy required to run and grow a successful business. This challenge can impact their ability to participate fully in the entrepreneurial ecosystem (Gerlach, 2021).

***Entrepreneurship and Diversity in UK***

BAME entrepreneurship and diversity in the UK have been important topics of discussion and policy development in recent years. The UK is home to a diverse population, and promoting diversity and inclusion in entrepreneurship is seen as crucial for economic growth, innovation, and social equity. The BAME community makes up a huge portion of the UK's population, contributing to the country's diversity and richness (Bishop, 2019). British Business Bank (2023) reported profound effects of entrepreneurial opportunities on gender and ethnicity parities.

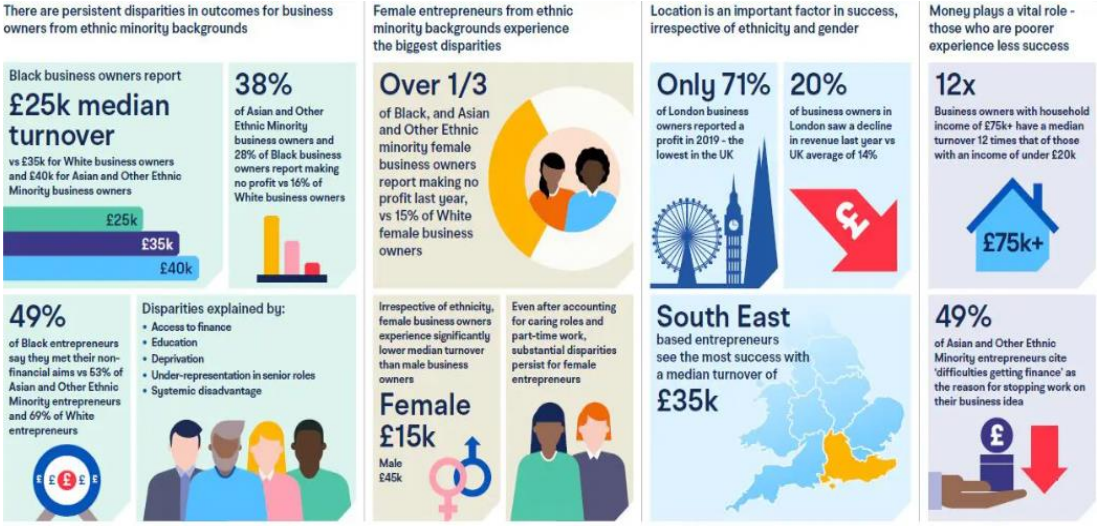


***Figure 4.*** *Diversity and Entrepreneurship in UK (Source: British Business Bank, 2023)*

**Research Methodology**

The motive of this research is to obtain a clear comprehension of the challenges faced by female BAME entrepreneurs in the UK. The analysis requiring accepting the setting in which the female entrepreneurs are rooted, a qualitative research approach catching primary data is more adequate permitting the exploration of uncovered facts of the challenges (Turner III & Hagstrom, 2022). Thus, this research project employed a qualitative method as it could respond to more complicated problems by permitting the participants to give nuanced answers. However, Savin & Major (2023) assert that giving participants the autonomy to use their own words might accompany ambiguous answers that do not appropriately answer the question. This research employed interpretivism philosophy because it could generate great data in validity, also interpretivism concentrates on personal motivations and meanings.

This research used semi-structured interviews to collect data from participants. Watt et al (2022) define semi-structured interviews as one of the qualitative research methods that join the pre-arranged set of open

questions with the chance from the interviews to discover specific themes. Overall, twenty-seven BAME female entrepreneurs from a cross-section ethnic environment were interviewed in the UK.

This research used the thematic analysis technique which contains reading of the collected data, for instance, transcripts from focus groups or interviews and then recognising pattern in meaning around the gathered data to generate themes (Braun & Clarke, 2022). The reason for the selection of thematic analysis is that it aids the researcher to comprehend those facets of phenomenon which respondents talk about in-depth or often and the manners in which those facets of phenomenon are connected (Morgan, 2022). Furthermore, it enables the researcher to build real codes from collected data set, which aids in improving the analysis' authenticity.

The research implemented combination of theoretical sampling and snowball sampling for the qualitative research. Charmaz & Thornberg (2021) define theoretical sampling as one of the iterative sampling procedures which is dependent on appearing theoretical concepts. On the other hand, the snowball sampling technique for gaining a sample that uses respondents to recruit extra participants (Schroeder et al., 2022).

**Data Analysis & Discussion of Findings**

The key themes that emerged after the interview procedure were access to finance, language, or communication issues, staffing problem, and prejudicial attitudes.

***Lack of Finance***

Various published studies revealed that the dearth of access to finance is the major challenge faced by BAME women entrepreneurs (Martinez & Jayawarna, 2020). The findings of this research qualitative data analysis also revealed that access to finance is the biggest challenge for them. Every respondent accepted that access to finance from the country's local bank was extremely hard because of the dearth of collateral (See Appendix 1). This accompanies dependence on personal savings obtaining finance from the banks. One of the participants revealed that the access towards finance was quite easy but as they were immigrants, so getting a simple loan from the bank was troublesome for them.

Only one participant from the twenty-seven ones asserted that she had luck in supporting her finances from the bank. They claimed that during the initiation process, it was easy to get finance support from bank. Number issue arises after the start-up procedure. If the BAME entrepreneurs want to develop and run their business adequately then they must get access from the bank for financial resources. Once there is an easy access towards the finance from local banks, then it becomes efficiently feasible to run the business. Table 1 and Figure 5 depicts percentages of the statements given by respondents who face the challenges for the access towards finance resources.

**Table 1.** Percentage of respondents who faced access to finance challenges.

| Statements given by respondents | Percentage of respondents |
|---|---|
| "Access to finance was major challenge we faced during our business growth" | 70% |
| "I did not face any difficulty in finance by Banks during my initial business days" | 10% |
| "Due to crisis, the cash in the bank was less so it was hard to obtain access to money during the start-up" | 30% |

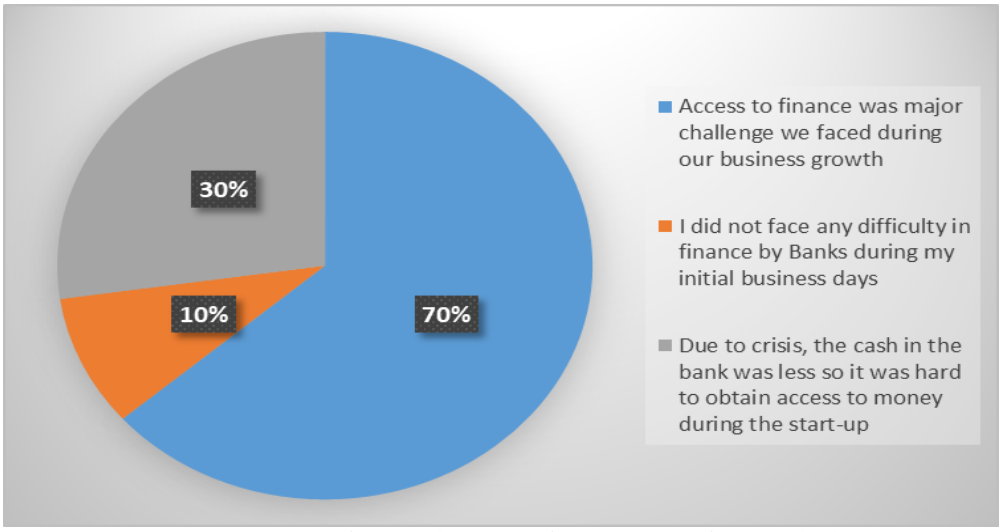


***Figure 5.*** *Percentage of respondents who faced access to finance challenges.*

***Hiring Staff and Lack of Management Skills***

Hiring staff is another challenge for BAME women entrepreneurs in the UK because they could not afford to provide minimum or moderate wages to workers (Appendix 1). It is become growingly problematic for most entrepreneurs with the launch of the National Living Wage (Harper-Anderson, 2019). One of the participants claimed that they initially faced difficulty for the gaining of management experience along with working with others because of the discrimination. Table 2 and Figure 6 showcases the reaction statement proposed by participants in the challenge of hiring staff.

**Table 2.** No of participants reacting on hiring staff challenge

| Reaction statements | No of participants |
|---|---|
| "Yes, I was unable to provide demanding wages to my workers" | 6 |
| "Due to lack of financial assistance from banks, I was unable to provide higher salaries to my workers" | 9 |
| "Candidates were highly qualified and demand for higher wages that I could not afford" | 12 |

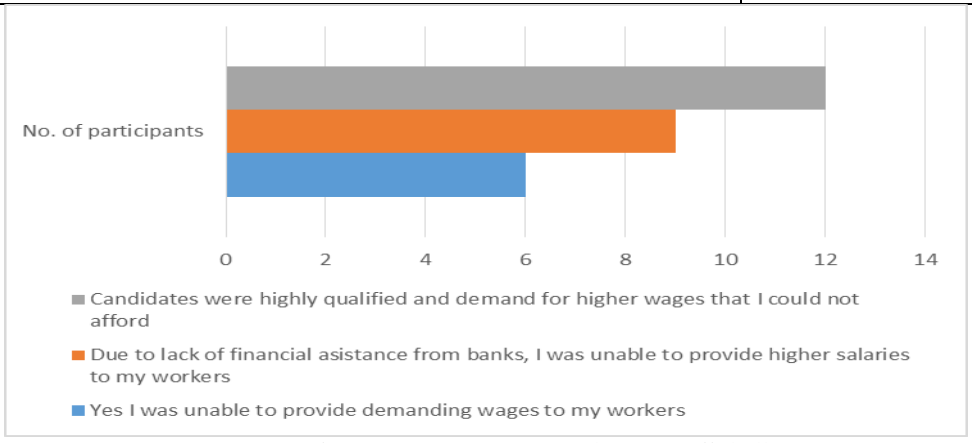


***Figure 6****. No of participants reacting on hiring staff challenge*

***Cultural and Language Issues***

Females from Asian backgrounds encountered communication and language obstacles. A Research conducted by Fielden and Davidson (2012) validated that Asian female entrepreneurs were more disadvantaged or discriminated against accessing financial and business support due to society's androcentric nature and the poor English language skills of female business owners. Discovering solutions to these issues is crucial as the females acknowledged that their communication or language issues were

influencing their business development potential and their self-confidence. Also, complaints from females who had encountered discriminatory exercises contained having to continuously prove their credibility, capability, and worth and having to address systems which are formulated for males by males.

The participants also stated that there was so much potential in the market of entrepreneurs, but they were not able to do anything due to insufficient finance. Nine of the BAME entrepreneurs also stated that because their English language is not good, they could not write and explain properly which however declined their motivation in running the business. Table 3 and Figure 7 portrays language and communication issues which the participants faced.

**Table 3.** Language and communication issues which participants faced.

| Statements | No. of participants |
|---|---|
| "Our English is highly terrible, and we do not properly write it as well" | 15 |
| "I face difficulty while speaking English" | 9 |
| "It was the least barrier which I faced during the business operations" | 3 |

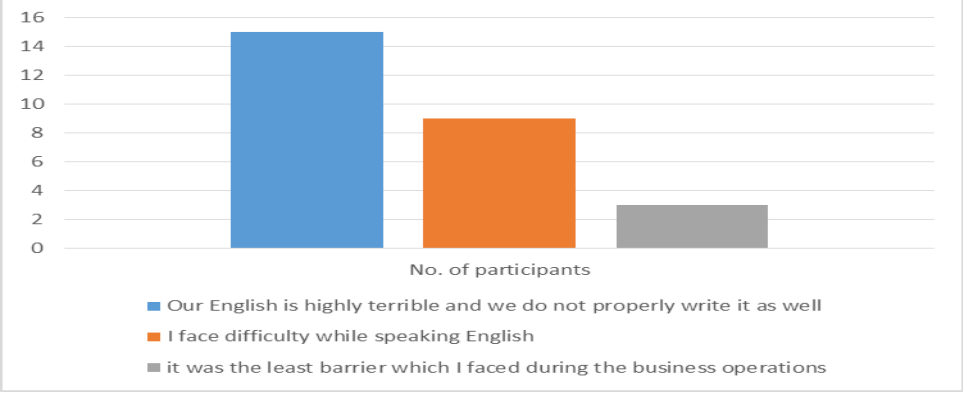


***Figure 7.*** *Language and communication issues faced by participants.*

***The Double Negative Effects of Racism and Sexism***

Prejudicial attitudes of other people were the major obstacles encountered by BAME women entrepreneurs in the UK. Jackson (2021) stated that these BAME female entrepreneurs who encountered double obstacles in accessing financial assistance, they restricted from seeking financial assistance outside their own community. Females from distinct ethnic groups highlighted that they must tackle negative prejudices like they lacked credibility, are uneducated, or possess restricted abilities (Kite et al., 2022). Further, Black females complained of having to tackle the stereotypical picture of the "Black Mama," whereas Asian females are supposed to be "Timed Asian Flowers" (Jackson, 2021).

Furthermore, one of the participants observed that being Black female immigrant in the UK, certain individuals automatically supposed that the BAME business owners were uneducated or lacked education due to their ethnic background and colours of their skins (Yadav & Unni, 2016). An Asian business owner claimed that being a Black woman amounted the lack of poor education and credibility. It was not her sense of viewing, but the sense of how other people views them.

They emphasised that there is vast discrimination in the community and not in the world of business. Certain people believe that BAME entrepreneurs are not interested in anything but only in raising their children and family. According to Deigh (2022), four Afro-Caribbean and African female business owners were not happy to relate to the stereotypical picture of "Black Mama". BAME female business entrepreneurs in this research also argued that being the Black mama or Black female meant they were more expected to be considered within a positive way by males in the sector and they were viewed as being less competitive, less hostile, or friendly.

**Conclusion**

In this modern era, women's participation in business has grown due to the transformation in globalisation and development that has influenced all countries across the world. However, various pieces

of literature continuously highlight the key challenges that BAME female entrepreneurs are facing. Few of the BAME female entrepreneurs failed to build a profit and fewer females were satisfied with their business aspirations. One of the most notable challenges that female BAME entrepreneurs are facing is access to finance. The majority of the female ethnic minority entrepreneurs relied mostly on the community and personal sources of finance. The literature outlined another profound challenge towards double negative effects of racism and sexism that female BAME entrepreneurs are experiencing (Miller, 2020).

Few Black and Asian female entrepreneurs have been discriminated against based on gender and race. Also, BAME female entrepreneurs struggle to obtain management experiences functioning for others because of the dissemination within the mainstream personnel (Gornall & Strebulaev, 2020). These research findings revealed four major themes: access to finance, language and communication barriers, prejudicial attitudes toward other behaviours, and staff hiring. Multiple authors outlined that the management and regulation challenge, but the majority of the study's participants did not encounter. Thus, there is a need for investing further whether management skills, regulations, and other challenges influence BAME women entrepreneurs' business performance.

**Further Research**

Research on Black, Asian, and Minority Ethnic (BAME) entrepreneurs is crucial for understanding the challenges and opportunities they face in the business world. The research in this field is extremely sensitive and establishes unique experiences and perspectives of BAME entrepreneurs. Collaborating with BAME entrepreneurs and organisations that support them can be invaluable in conducting meaningful research. The findings of this research showed that there emerge few obstacles and challenges faced by BAME female entrepreneurs in running their businesses in the UK. The challenges relate to gender and the appearance of cultural or racial aspects. Before any effective tactics can be built to motivate BAME females to be involved in enterprise formulations, further understanding and classification is imperative or crucial. Based on the findings of this research, the researcher would undertake a 3-year extension comparative research (from 2023-2025), seeking the BAME female's and men's comparative experiences in the UK. The new research would offer a more representative and comprehensive analysis and a bigger sample evaluation of BAME females from a range of BAME groups as well comparison of BAME male's smaller sample. The results of this extended research will create the foundation of significant policy suggestions to raise the number of BAME female entrepreneurs in the business world.

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## *APPENDICES*

### *Interviews T1*

| QUESTION 1: What was the major challenge you faced during your business start-up | |
|---|---|
| **Participant 1** | " Due to crisis, the cash in the bank was less so it was hard to obtain access to money during the start-up." |
| **Participant 2** | " Obtaining financial support was the biggest challenge that I encountered during my business world" |
| **Participant 3** | "It was very easy to get the finance from the bank, however, for migrant people, currently, it is not easy very simple to get a certain loan from the bank unless they possess a house in their name." |
| **Participant 4** | " At the time it was very feasible to obtain financial assistance from the bank." |
| **Participant 5** | "Initially, I did not obtain any penny from the bank, however, when my business was running properly, my account was good, they began offering me money to enhance me shop." |
| **QUESTION 2: Did you face any difficulty in hiring workforce as entrepreneur? If yes , then why?** | |
| **Participant 1** | "I cannot find qualified workers to function for the wage that I could provide. Workers were either too inexperienced or expensive". |
| **Participant 2** | "Initially, I faced difficulty in obtaining management experience working for others because of the discrimination within the mainstream staff". |
| **Participant 3** | "In the business world, there is a major discrimination between men and women. It is not considered good to hire women in top positions such as managers. This restricted me from gaining some management experience or skills before starting my own business" |

### *Interviews T2*

| | |
|---|---|
| **Participant 4** | "In the business world, there is a major discrimination between men and women. It is not considered good to hire women in top positions such as managers. This restricted me from gaining some management experience or skills before starting my own business" |
| **Participant 5** | "Hiring staff was also the biggest challenge I faced as an entrepreneur due to my poor management skills" |
| **QUESTION 3: Did you encounter any criticism based on the language or cultural differences?** | |
| **Participant 1** | "There is so much potential within the market, however, I could not do anything without adequate money. This issue is that my English is extremely poor, and I could not write in properly". |
| **Participant 2** | "One of the main challenges that I encountered who properly speaking English." |
| **Participant 3** | "People hurt me by making jokes about my English language, which declined my overall motivation to run my business". |
| **Participant 4** | "I have acknowledged that there are certain parts of my life which would be hard. It is a gift from God, but not discrimination. There are some reasons why certain things occurred, I am learning that I must not do that with others"" |
| **Participant 5** | "The majority of the individuals in the business world talk in English, however, I faced difficulty in speaking it and understanding their viewpoints". |

*Interviews T3*

| QUESTION 4: Are there any gender or race related issues that you are experiencing? | |
|---|---|
| **Participant 1** | "To be black and to be a woman amounts to poor education or lack of credibility. This is not how I view myself but how I sense other people view me. When I dealt with the individuals for the first time, I could feel they were not confident in my capability. I was required to prove to them that I could do the job role before they respected me". |
| **Participant 2** | "There is discrimination of course, not in the business world but in the community. I do not think individuals in the North recognise or appreciate ethnic minorities as we do not receive due recognition or appreciation, especially when you are female it is harder. People believe that we come from cultural baggage, and we are not interested in anything but home or family. We have to work hard to prove them wrong". |
| **Participant 3** | "A lot of the individuals expected me to play sexual games, but it is not what I am. I believe that the stereotype that individuals possess regarding black females is unjustified or insulting. I desire individuals to respect me for what I deserve. I am capable and possess knowledge and skills. I will not and do not utilise my sexuality" |
| **Participant 4** | "I do not feel anything bad when anybody discriminates me against racism or sexism as I always love my black skin". |
| **Participant 5** | "Sometimes my motivation level goes down as the majority of the people around me make fun of my Black Skin". |

*Interviews T4*

| QUESTION 5: Rate the challenges you faced the most, financial, management skills, and language or communication issues? | |
|---|---|
| **Participant 1** | "I faced financial support challenge mostly." |
| **Participant 2** | "Financial issues". |
| **Participant 3** | "Management skills". |
| **Participant 4** | " I am poor at English speaking, so I faced communication challenges the most". |
| **Participant 5** | "English language problem". |
| **QUESTION 6: What was the least challenge you faced? Tell me in one word** | |
| **Participant 1** | "Racism". |
| **Participant 2** | "Racism issue". |
| **Participant 3** | "Financial issue". |
| **Participant 4** | "Racism". |
| **Participant 5** | "Financial issue". |

# Analyzing the key determinants of Investment decisions while setting up an entrepreneurial business in the United Kingdom

**Aliar Hossain**
**Imad Nawaz**
**Nasrin Sultana**
Northumbria University London, UK

**Keywords**:
Entrepreneur, entrepreneurial business, starting stage, United Kingdom, sources of capital, external finance, financial constraints, information asymmetry, poor collateral, opposing personality traits, uncertainty, high cost of capital.

***Abstract***

*Start-ups are essential in developing products in the United Kingdom's economy by stimulating modernization and robust competition* (Dr. Achibane & Jamal, 2018). *Notwithstanding start-ups' vast influence on British economic development, several challenges are coercing these promising ventures. Nearly 40% of UK start-up ventures fail due to obstacles regarding raising new capital in the seed stage* (Philips, 2019).

*The capability to access finance is significant for a start-up regarding starting investment for the business, increasing growth development, and smoothing day-to-day business activities related to cash (Andreas Kuckertz, et al., 2020). This study will also focus on understanding the major constraints faced by entrepreneurial ventures in the United Kingdom while accessing the capital market during the starting phase. The starting stage of a firm refers to the pre-commercialization stage when there is no product to commercialize. In this stage business idea is tested for its viability. Capital needs to channel Research and Development, conduct market research, expand the efficient team, and so on* (Hisrich, 2013). *Therefore, this study aims to find out the important determinants of investment decisions during the starting stage of UK ventures.*

*To conduct the research, data were collected by using primary and secondary sources. To gain primary data researcher used an online closed-ended questionnaire. The questionnaires were distributed to the innovators from the London region via emails or social media platforms. The convenience sampling technique was used to reach these 70 innovators, but 50 responses were received from those respondents. Findings show that most of the respondents identified that the majority of the lenders asked for business plans, guarantors, and professionally audited financial reports which are not easy to generate at the start-up stage by the entrepreneurs.*

## Introduction

### Research context

A start-up is a venture started by an entrepreneur. With a start-up, an entrepreneur wants to pursue a successful business model (Baldridge & Curry, 2022). Start-up plays a significant role in the growth of an economy (Gulati, 2019). Start-ups are not the only providers of economic opportunities, they are also creators of employment and unique products and services that are in latent demand by customers, contributors to GDP, and so on (Cohan, 2019). However, a deficiency of funding can coerce regular business activities and hinder the further development of business (Otte, 2022). There are several obstacles faced by an entrepreneur while starting a new venture; the major challenge faced by entrepreneurs is accessing funds in the early phase of their ventures. Approximately 52% of start-ups fail within three years of starting due to running out of funds in the UK (Szmigiera, 2021). Though the chance of using external funding is vital in the initial stage, more than half of the ventures cannot use traditional sources of external finance due to

inadequate collateral, unsatisfactory cash flows, and colossal information irregularity with external investors (Cosh, et al., 2009).

New ventures usually receive external funding in their development stage. Ample research has been done on start-up financing in later stages, however, very few studies have been conducted on the starting stage financing of firms. The field of study on initial period ventures is somewhat abstruse, the subject is lacking in academic studies. Therefore, this study aims to find out the important determinants of investment decisions during the starting phase of UK ventures.

**1. 2 Research aim, question, and objectives**

The core aim of this study is to 'identify the details that create obstacles for newly created British ventures to utilize different types of finance during their starting stage'.

Several questions are vital to be responded to while pursuing this particular research. However, there is only one question this study needs to answer. This is in the following:

- What are the major constraints the start-ups face while wanting to use external capital sources during the early stage in the UK?

The answer to this question will help new firms specifically the seed stage firms by providing information regarding sources of external finance, constraints connected with retrieving external money, and some suggested preparations they can follow to raise the chances of getting external funding.

To achieve the aim of the research the study also considers some objectives. These are as follows:

1. to explain the need for external capital during the starting stage and available sources an entrepreneur can use during the initial stage in the UK.
2. to use earlier theories to relate the connection between a firm's capital structure and key obstacles they faced in the early phase while wanting to access external finance.
3. to investigate the key determinant that prevents firms from accessing finance sources during the starting phase in the UK.

**Literature Review**

**2.1 Introduction:**

This section provides a brief description regarding the uses of capital and sources of funds in the starting phase for the entrepreneurial business, some key theories to investigate how entrepreneurs face challenges during the starting of the start-ups, and research gaps are also presented. Finally, a summary will conclude this section.

**2. 2 Uses of capital and sources of finance during start-up**

Most entrepreneurial ventures need to raise money in the preliminary stage for three reasons (Barringer & Ireland, 2021). Firstly, cash flow issues such as training employees, establishing a brand, and so on (Tore Frimanslund, et al., 2023). Here company is generating negative cash flow which indicates it spends capital before making a profit. Negative cash flow can be justified early in a company's life but can cause serious problems later. Businesses usually fail if they spend all their capital before making a profit. As a result, inadequate financial resources are a significant cause of new business failures (BURNS, 2022).

Secondly, fixed investment where businesses often need early financing to fund their capital expenditures. The company's founders may be able to support the initial activities. Still, they may be required to purchase land, construct buildings, acquire machinery, or finance other assets (Janaji, et al., 2021). Finally, long product development cycles where companies in some industries need to raise money to cover the initial costs of a longer product development cycle. For example, developing an electronic game usually takes two to four years. It takes ten years to reach a patient from a laboratory in the pharmaceutical industry. This turtle-paced product development requires a significant initial investment to get the expected return (David, 2017).

According to Wilson and Silva (2014), at the different stages of the financing cycle, there are three sources of financing instruments: 1) equity sources, 2) grants, loans, and guarantees, and 3) debt sources (Karen E. Wilson & Filipe Silva, 2014).

To begin with, equity sources of finance are getting finance from bootstrapping, crowdfunding, business angels, and venture capital. Financial bootstrap is one of the funding sources for start-ups; Bhide first coined the term in 1992, where it permits the generation of a business with limited capital. Horváth (2018), Identifies bootstrap as a source where starting capital can be obtained from customers, internal business optimization, external lenders, business partners, owners, friends and families, suppliers, and employees. Crowdfunding is defined as the online collection of funds from many people. The users of this platform typically deliver trivial sums to permit the venture to be comprehended or an opening start-up to collect maiden funding (Herve & Schwienbacher, 2018). According to Block et al. (2019), business angels are people who invest capital in a completely new business with no family connection. Business angels perform four different value-added roles: premeditated role, management role, capital-gaining role, and mentoring role. Many authors agree that venture capital plays an important role in addressing the asymmetric information challenge because due conscientiousness allows them to observe and control the actions of companies (European Investment Fund, 2018).

Besides, several entrepreneurial firms are qualified for government grants in the first phase, particularly those based on cutting-edge research, including university research. Most developed states back private research and development through aid or tax breaks to confirm the optimum distribution of resources for entrepreneurs. These strategies aim to inspire investment in new business, particularly in high-capital-intensive areas such as potential new ventures (Szulczewska-Remi & Foltynowicz, 2016).

Finally, bank finance is considered the most available source of debt finance used by start-ups as external capital (Stuart Fraser, et al., 2015). There are growing academic suggestions that bank funding is an important source of financing for numerous entrepreneurial businesses. Firstly, bank loans eradicate the problem of unequal information between the lenders and the entrepreneur by transferring all investment risk to the borrower (Durkin, et al., 2013). As a result, if the innovation fails, the loan agreement requires settlement of the acquired obligations. Second, banks protect these loans with imperceptible properties such as intellectual property (IP), which can become sources of collateral and thus aid as an advantage in the procurement of finance (Mateos-Garcia, 2014).

**2. 3 Key theories to investigate issues faced by innovators**

Capital structure theory (Modigliani, F & Miller, M.H, 1958), pecking order theory (Myers & Majluf, 1984), and life cycle theory (Berger & Udell, 1998) accept that entrepreneurs face constraints in accessing external finance. They accept Informational asymmetries create barriers in the case of new firms to get funding like greater publicly traded companies. Small businesses naturally do not have the choice of distributing shares and bonds since the expenses are unaffordable for new businesses at the opening stage. These smaller firms are more likely to rely on other financial sources, such as personal loans, bank debt, trade credit, capital from private stakeholders, venture finance, and, in some cases, government grants. Usually, there is a "pecking order" of sources of financing designed to allow the owner of the businesses to hold as much control as possible for a longer time. These theories indicate owners of the firms desire to use personal capital first, followed by short-term loans, long-term finance, and exterior equity.

Agency theory relates to how lenders approach new ventures (Jensen & Meckling, 1976). A new venture has no defined track record, and the financier has little information on borrowers to base their financing decision. The information on borrowers that is provided to the lenders may not be trustworthy or relevant to making the financing decision (Cheng Huang, et al., 2014). This means that the financier must incur additional costs in obtaining and verifying the information required to make and then monitor their decision. Many of these expenses are fixed, regardless of the size of the transaction or the return made by the small firm. According to agency theory, a bank's natural response to these problems is to charge higher interest rates, impose conditions in the loan agreement (e.g., on the use of funds or the provision of information), and request business or personal collateral. When adequate collateral is available, the bank may believe that less information is required because the debt is more likely to be improved in the event of default. Indeed, the bank may believe that providing collateral provides the entrepreneur with a strong incentive to see the business succeed (BURNS, 2022).

Studies by Maditinos, et al. (2019) and Guenzel and Malmendier (2020) say the locus of control means people's(owner's) insight into their control over the business. In the case of startups, if the owners do not

want to share the ownership or any control with other people then attaining any sources of external finance cannot be possible. Several studies by Sarasvathy (2001); McMullen & Shepherd (2006); and Garrett & Holland (2015) confirm that uncertainty is one of the most common things in an entrepreneur's character. However, external lenders, want to secure their investment, hence, want to avoid uncertainty (Nguyen, et al., 2006). Risk can be measured but uncertainty cannot be calculated to take measured steps to reduce damage. That's why they do not want to invest in the most promising businesses of entrepreneurs trying to use their savings (Beck, 2007).

**2. 4 Research Gap**

This study identified several research gaps in this literature review, which should be highlighted here. Firstly, there is a large amount of research conducted regarding financial constraints faced by start-up entrepreneurs, or SMEs in the capital market, but there is relatively little research done on addressing financial constraints faced by start-ups during the early stage of their financial life cycle. Additionally, uncertainty is one of the most pronounced words related to entrepreneurial attributes and works; however, there has hardly been any research conducted on addressing future uncertainty related to start-ups and its owners faced major barriers to accessing finance in the capital market during the starting stage because financial organizations or investors are unable to measure uncertainty. Moreover, the study is conducted on UK ventures; nevertheless, no survey data has been found that can estimate how many new firms face this financial constraint because there is no record related to addressing this particular issue. Finally, it has been discovered that measuring the performance of start-ups in the initial stage is difficult.

**2.5 Summary**

The current study seeks to identify the most important firm-specific factors influencing start-up financing in the initial stage. The study's goal is to determine the significance of firm-specific factors and how these factors influence firms' financing decisions. Information asymmetry, low collateral quality, opposing personality traits of the entrepreneur, uncertainty related to entrepreneur and start-up attributes, and high cost of capital were studied as variables affecting firm control. The analysis investigates the significant firm-specific factors that influence a firm's financing decisions in the starting stage.

**Research Methodology**

**3.1 Introduction:**

This section will explore the brief information concerning the process of conveying research philosophy and research approach. The research design methods that is data collection, and analysis strategy are discussed here.

**3.2 Research Philosophy and Research Approach**

The research onion invented by Saunders (2019), will be followed for the different steps of the study because the research title considers the constraints of UK ventures to access capital markets in the early stage.

To conduct the study the suitable researcher philosophy is positivism since research is objective. The study considers the specific situation that the key determinants that prevent access to external funding for the start-ups of the UK during the seed stage. Besides, the researcher used the research hypothesis to conduct the study and used an Internet questionnaire to collect primary data where the respondents selected suitable answers that were predetermined by the researcher. In this way, the researcher ensures that she/he does not stimulate the reactions given by the respondents.

A deductive research approach will be used for the study. The research used research hypotheses to get the most appropriate reasons that are accountable for funding limitations to the innovators at the starting period in the United Kingdom. An internet questionnaire is used as a research strategy to collect data from the targeted population to test the hypothesis.

**3. 3 Data Collection**

To conduct the study data were collected by using primary and secondary sources. To gain primary data researcher used an online closed-ended questionnaire. The questionnaires were distributed to the innovators via emails or social media platforms so that data were collected directly from the innovators and analyzed to answer the research questions. There are two sections in the questionnaire. The first part contains general information about the innovators and their start-ups such as the names of the respondents and their businesses, the age of the business, the nature and types of business, and so on. The second part covers questions regarding the funding problems that are handled by entrepreneurs during the starting period of their businesses such as whether they applied for loans from any banks or non-bank-financial organizations or not, if the respondents were rejected for any loans, why they were rejected by the lenders, and so on. To conduct the study the targeted population was 70. To reach this target population investigator used an online closed-ended questionnaire. The convenience sampling technique was used to reach these 70 innovators. Questionnaires were distributed through emails and social media platforms and 50 responses were received from the respondents.

To conduct the study secondary data were collected from some institutional publications, different literature reviews, academic journal articles, and so on. Several books and Internet sources like Google Scholar, Emerald, and EBSCO were used to gather some academic knowledge regarding start-ups, entrepreneurial finance, influential factors that prevent access to capital for new start-ups, and so on.

**3. 4 Data Analysis**

After collecting data, the next step was to analyze the data, which indicates that collected data are carefully posted in words (Sekaran & Bougie, 2020). To analyze the data a quantitative descriptive data analysis method is used to identify the main barriers to access finance for the start-up in starting their business in the UK. The researcher used a closed-ended questionnaire to collect data from the innovators. The researcher used a Google form to build the questionnaire which has two sections. All the responses that are submitted using Google Forms are analyzed through MS Excel, which is transformed through graphs and charts, to produce the final result.

**Presentation, Analysis, and Discussion of Data:**

**4.1 Introduction**

To conduct the study the primary data is collected by using a questionnaire. The target population was 70 entrepreneurs and questionnaires were distributed via email and social media platforms. We get responses from 50 respondents. The presentation analysis and key discussion of the responses regarding financing obstacles in the preliminary phase of entrepreneurial businesses are presented here.

**4.2 Basic Features of the Respondents:**

There are two sections of the questionnaire section A contains general questions such as gender, nature and kind of businesses, and age of the businesses. The key features of the respondents are given below:

**Gender**

We got a total of 50 respondents, 38 (76%) male and 12 (24%) female respondents. According to the British Business Bank (2023) report, approximately 25% of entrepreneurs in the UK are female, and most of them are related to the service sector. A smaller number of Female entrepreneurs are prepared to take risks and utilize outside funding because they are more worried about uncertainty regarding start-ups in the approaching future (BVA BDRC, 2022).

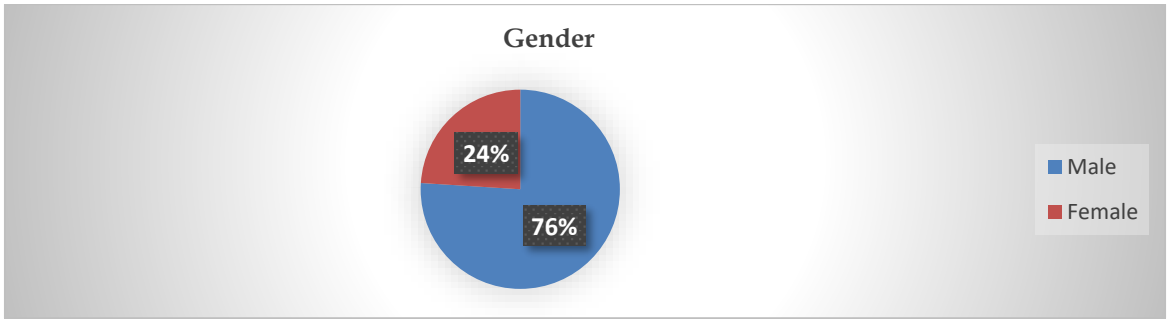


*Figure 1: Forms of Respondents.*

**Nature of Business:**

The below chart describes the respondent's nature of business where the major number of entrepreneurs are sole proprietors which is 74% of the total sample amount. 5 respondents have family-owned businesses. Partnerships, Private Limited Companies, and others have 5, 5, and 1 respondent, respectively. However, there are no respondents from Public Limited Companies.

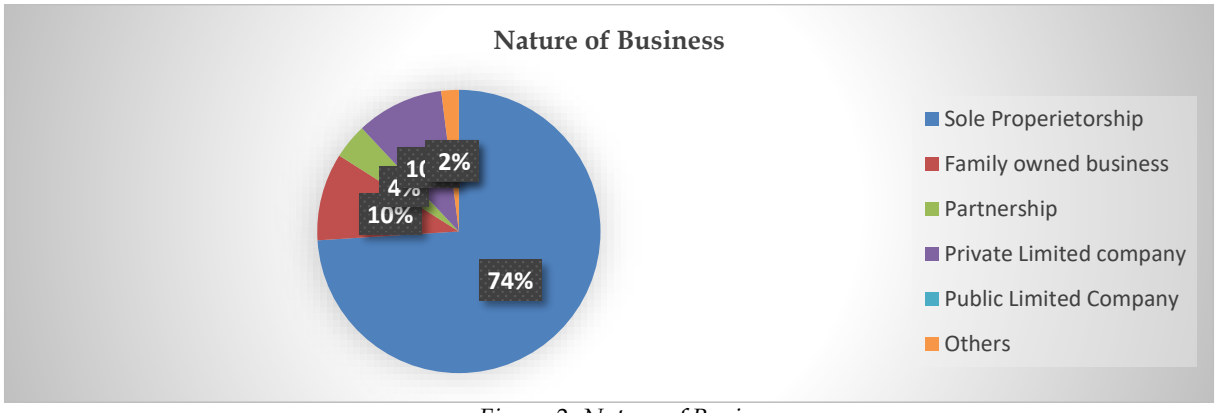


*Figure 2: Nature of Business.*

**Types of Business:**

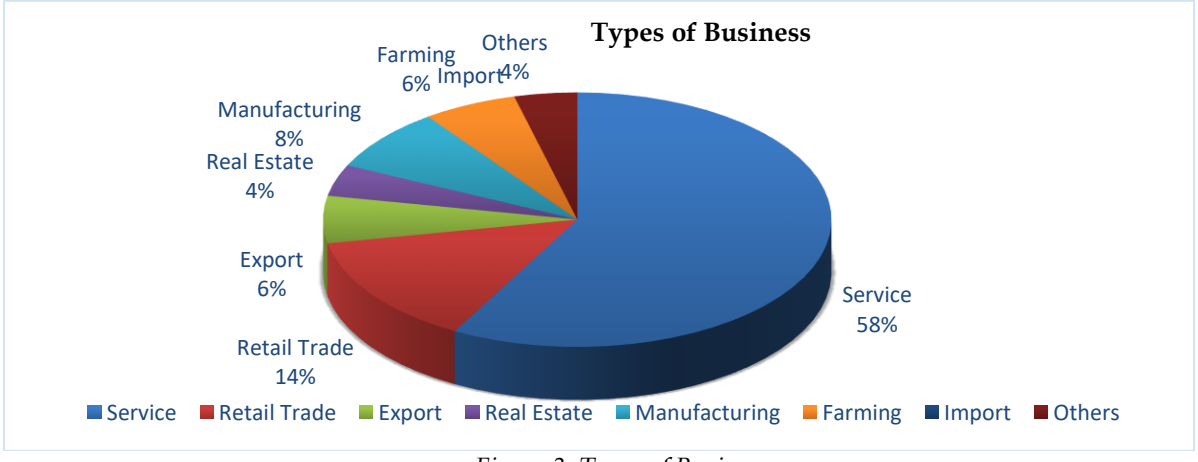


*Figure 3: Types of Business.*

The above figure shows the type of businesses, more respondents are from the service sector comprising almost 58% which is 29 innovators and retail trade has the second highest respondent 7 entrepreneurs which is 14%. We get 3 (6%) responses from export, 2 (4%) from real estate, 4 (8%) from

manufacturing, 3 (6%) from farming, and 2 (4%) from other sectors. However, there are no samples from the import business.

**Age of Business:**

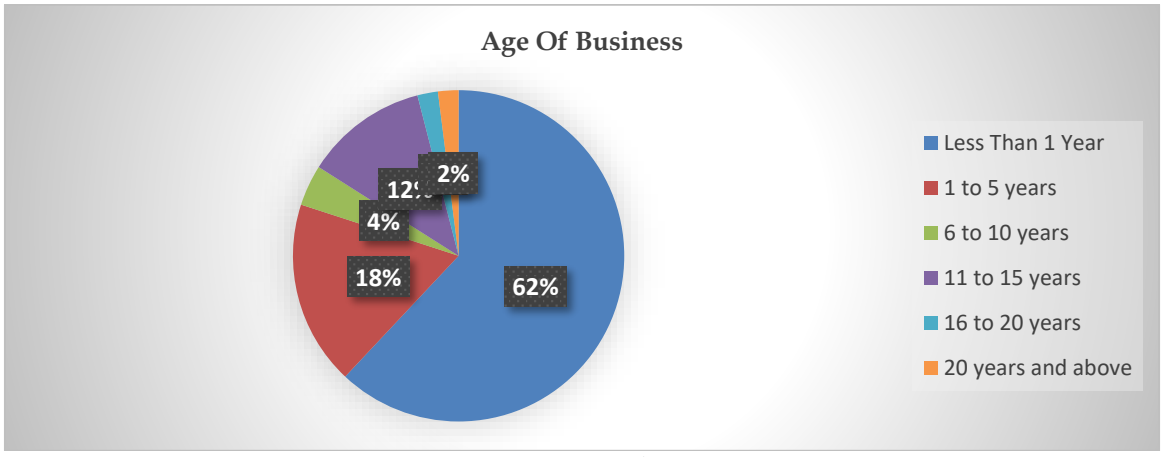


*Figure 4: Age of Business.*

From this pie chart, we can see that most of the respondents have newly established businesses which is approximately 62% (31). This situation indicates that in the UK entrepreneurs are encouraged to start their businesses (GEM, 2023). However, respondents from 1 to 5 years old 9 representing 18% of the total sample prove the assumption that most of the start-ups are wiped out within this time frame (Hulme & Chris, 2020). In addition, start-ups that are 6 to 15 years old account for 6 respondents. We got responses from 6 to 10 years, 16-20 years, and 20 years old and above are 2, 1, and 1 respectively.

In 2022, In the UK there were approximately 350,000 start-ups were wiped out and around 300,000 businesses started their journey. Even with government assistance to reduce COVID-19 impact, innovators experienced hardship with a higher cost of capital, inadequate funding, and a global economic crisis (GEM, 2023).

**4.3 Key determinants in accessing finance for entrepreneurial businesses during the starting period:**

Section B covers questions regarding the key factors that make problems for the respondents to utilize finance during the starting period of their businesses. The researcher asked the respondents if they applied for loans from any banks or non-bank-financial organizations or not, if the respondents were rejected for any loans, why they were rejected by the lenders, what are the requirements of the lenders to get loan approval, and so on. The findings from the respondents are given below:

**Sources of funds:**

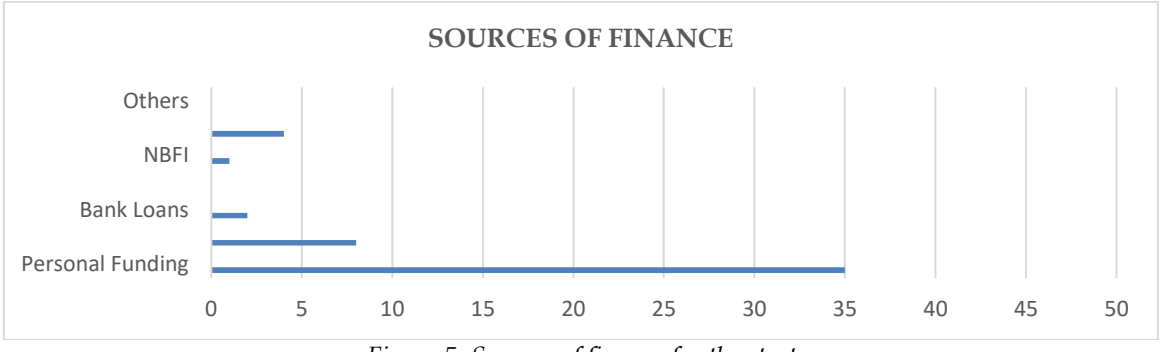


*Figure 5: Sources of finance for the start-up.*

The above picture shows, that more than 80% of the respondents preferred to use personal saving/ funding and finance from family and friends to start their businesses in Britain. Only 2% use Non-Bank-Financial-Institutions (NBFI) to get funding to start their businesses. 4% and 8% of innovators use bank finance and trade credit to start their businesses.

**Seeking loan to finance businesses initially:**

After that researcher asked the respondents are they applied for any loans to support their business finances initially. The below picture shows only 22% of respondents are seeking loans from banks and the majority of the respondents (78%) have not applied for any type of loan from any bank.

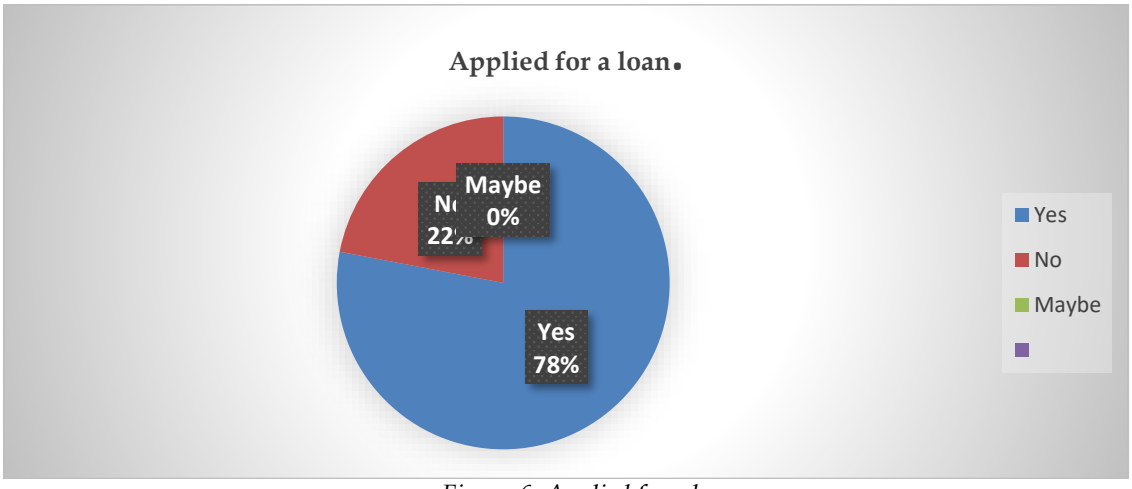


*Figure 6: Applied for a loan.*

**Factors to not interested in any loan:**

The pie chart 7 shows the prime motives of the respondents for not applying for any loans, where almost 30% of the respondents are not interested in loans and almost 40% say the high cost of capital is the most important barrier to seeking loans. Again, 26% feel because of poor collateral quality they cannot get any loan. 2% of respondents say gender discrimination and 2% say other causes will be accountable for not applying for any loans.

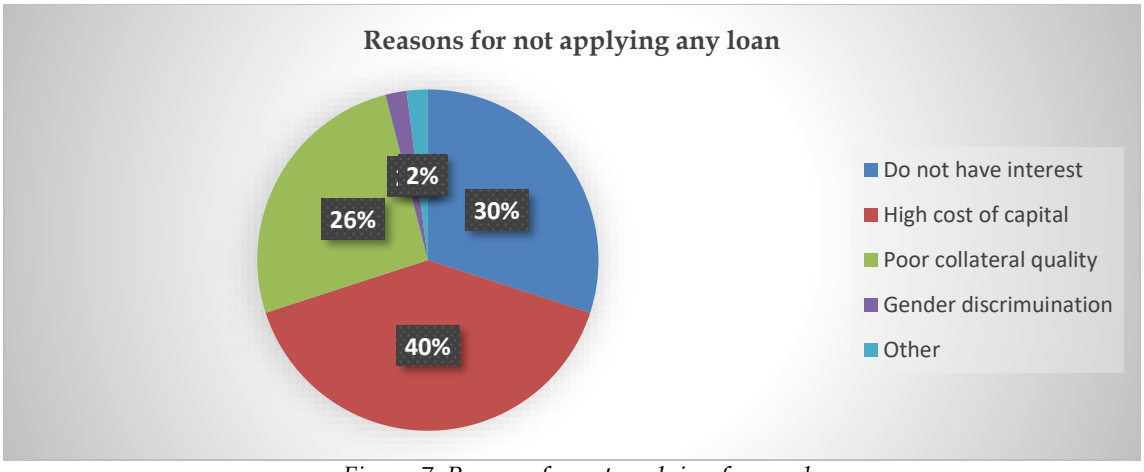


*Figure 7: Reasons for not applying for any loan.*

**Reasons for loan denying:**

Respondents are asked to identify the key causes for denying loans by different banks and non-bank financial organizations. The majority of the respondents identify too small equity (8), inadequate collateral (15), and insufficient mortgage property (14) are the three key causes for the rejection of the loans.

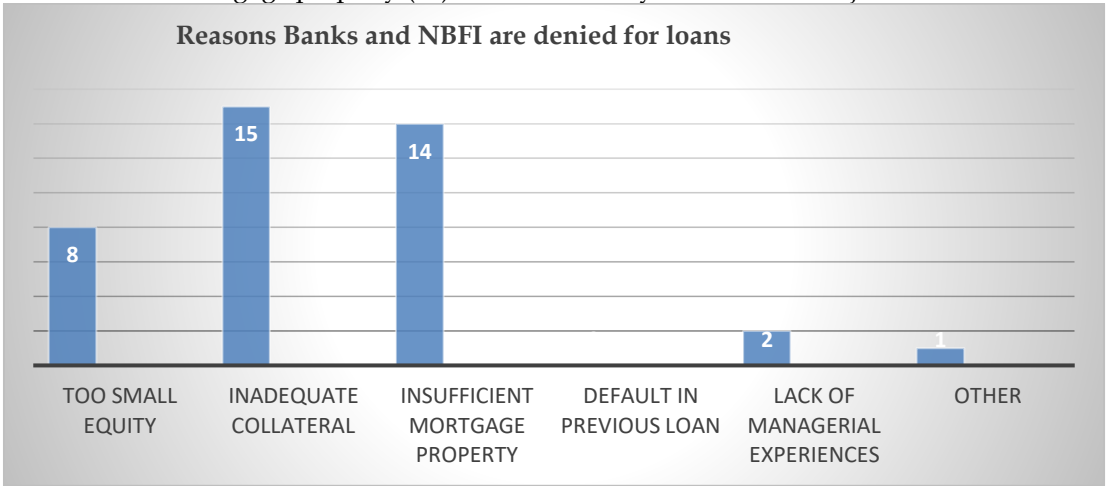


*Figure 8: Reasons for banks and NBFIs denying to offer of loans.*

**Information or papers required for loan approval by the lenders:**

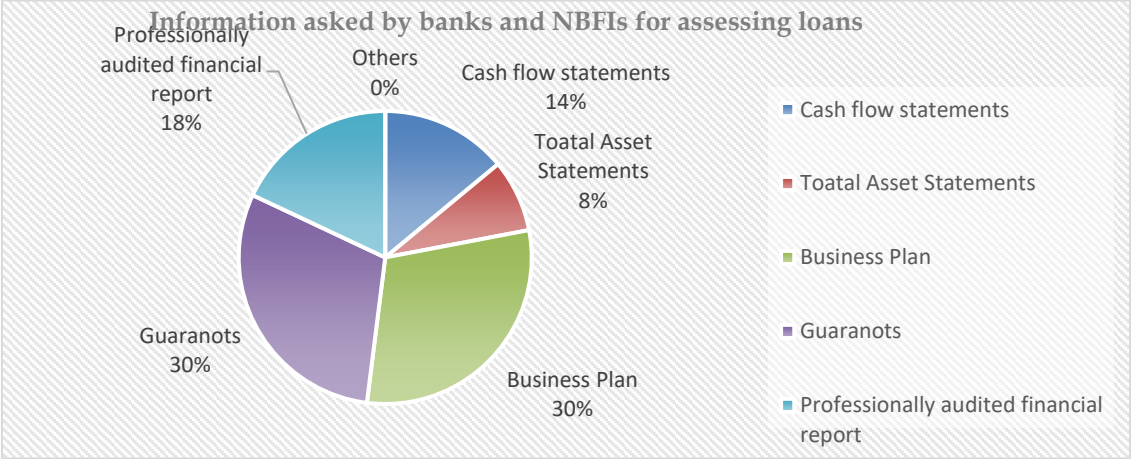


*Figure 9: Information asked by banks and NBFIs for assessing loans.*

From the chart we can see, the information that banks and non-bank-financial- institutions need to assess the start-up loans. Here, the majority of the respondents identified that most of the lenders asked for business plans (30%), guarantors (30%), and professionally audited financial reports (18%). However, some of the respondents identified that they need to show cash flow statements and total asset statements.

After analyzing responses from the respondents, the researcher found some aspects that create barriers for the United Kingdom's entrepreneurs to access finance in the starting phase. Firstly, The UK Entrepreneurs are in the starting phase, they do not have something in hand to commercialize and there is a lack of collateral such as poor quality of business-related papers, and goodwill in the market has not been proven yet (Sandra, et al., 2000). In most cases, innovators do not have professionally audited financial statements such as cash flow statements, profit and loss statements and so on which increases information asymmetry that makes external lenders uncomfortable regarding lending loans for the start-ups (Dr. Achibane & Jamal, 2018). Additionally, the lenders think the business is still unproven, no track record or financial statements are associated with the seed stage ventures which means the creditworthiness of the borrowers is yet to be proven which increases the chances of loan default in the future and creditors increase

the cost of capital so that borrowers do not want the external loan (Maximilian Klein, et al., 2019). Moreover, entrepreneurs who possess personality traits such as optimism and overconfidence may think that their debt guarantees will be undervalued by external lenders which results in preferring crowdsourcing, personal savings, or family and friends over external sources of finance (Susan, et al., 2023). Again, the locus of control means people's(owner's) insight into their control over the business. In the case of start-ups, if the owners do not want to share the ownership or any control with other people then attaining any sources of external finance cannot be possible. However, all entrepreneurial process is related to uncertainty whether the entrepreneur's the opportunity to search for something new character or start their business for totally unproven products or markets (Roach, et al., 2016), external lenders, want to secure their investment hence, want to avoid uncertainty (Nguyen, et al., 2006). Risk can be measured but uncertainty cannot be calculated to take measured steps to reduce damage. That's why they do not want to invest in the most promising proposal of an entrepreneur or entrepreneurs trying to use their savings (Beck, 2007).

**4.4 Summary**

To conclude, this section says start-ups prefer to access internal sources of capital over external sources of capital. On the other hand, institutional investors are external investors who prefer to invest mostly in risk and uncertainty-free projects that confirm the security of their investments. Information asymmetry, poor collateral, opposing personality traits of the entrepreneurs, higher cost of capital, and uncertainty are the key obstacles for the preparatory stage venture to get access to required funding in the UK.

**Conclusion**

The start-up is an auspicious sector for the United Kingdom regarding job creation, economic development, and so on. However, this sector is confronted with enormous problems to exist in the early stage due to inadequate capital. Sometimes most potential proposal has to be wiped out because of restrictions on attaining external finance. Several reasons are liable to make financial constraints such as initial age, small size, gender, regional disparity, low demand by the owners, and fear of rejection but, this study finds out the most suitable determinant regarding financial constraints. These are information asymmetry, poor collateral, high cost of capital, and some personal characteristics of the entrepreneurs such as locus of control and uncertainty related to the entrepreneur's character. These are the key factors for both the lenders and the creditors to initiate either not choosing external sources of capital or proposing restricted terms to create credit rationing.

**5.1 Recommendation**

The novice entrepreneurs that need finance must have to follow some strategy to overcome the probable barriers to attain the sources of capital. the subsequent strategies are suggested:

- New entrepreneurs must be well-informed about institutional lending. This ensures information is available for different loans and novice entrepreneurs can determine the best possible option for them. In the case of the UK, the country is occupied with a bank-based system. Consequently, the banks of the UK have to ensure a developed deal of information that makes it easy for the customer to access more information regarding the requirements of the loan, and processing time. The customer will be directly instructed potential loan will be guaranteed or not.
- Banks and owners of the start-ups should maintain a good connection that will assist in decreasing the chances of trust issues, information asymmetry, adverse selections, and moral hazard problems.
- Capital structure theories must consider the particular situations related to the macro environment of the new businesses. This will support the nascent entrepreneur in picking exact capital forecasting and institutions can be able to know which entrepreneurs have more probability of attaining a loan.
- The local representatives and lending institutions may help new entrepreneurs. They may hire some skilled specialists. The specialist can give free consultancy regarding the entrepreneur's proposals, risks, assessment of the projects, credit retrieval, and so on.
- The policymakers can ensure a guarantee for the new entrepreneurs to get the required funding if the projects look more promising or have high growth potential.

**5.2 Limitation:**

The study was conducted to investigate the major reasons for the financial barriers handled by innovators in the United Kingdom during the starting phase of their businesses. However, samples were not across the country but mainly focussed on London, Birmingham, Manchester, and a few other key regions used to collect a convenience sample that represents the whole population of the research. Therefore, this is a limitation of the research.

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# Employee Empowerment and Job Satisfaction in Nepalese Commercial Banks

**Sonila Shakya**
Purbanchal University, Nepal

**Pradeep KC**
Purbanchal University, Nepal

**Keywords:**
*Employee Empowerment, Job Satisfaction, Nepalese Commercial Banks*

***Abstract***

*The discourse surrounding the issue of employee empowerment (EE) has consistently been of great importance on a global level. The aim of this study is to assess the status, relationship, and impact of employee empowerment and job satisfaction in Nepalese commercial banks. The study employed a deductive approach with descriptive and analytical research designs. The study population includes all employees working in Nepalese commercial banks in Sunsari, totaling 258 individuals. A structured questionnaire was designed to collect primary data through convenience sampling with a five-point Likert scale. SPSS was used to manage and analyze data. Cronbach alpha was used to test the reliability of constructs and descriptive statistics were used to assess the status of employee empowerment and job satisfaction. Furthermore, inferential statistics were used to analyze the relationship and level of significance between variables and measure the impact of employee empowerment on job satisfaction. The research findings indicate that employees have a positive response towards all dimensions of employee empowerment and job satisfaction. Furthermore, the finding revealed a significant impact of employee empowerment on job satisfaction. Thus, commercial banks should continuously work on programs empowering employees to enhance job satisfaction.*

## The Introduction

Organizations are becoming more concerned about knowledge workers in the 21st century, since they are the ones who actually drive business. Organizations to become competitive are giving emphasis on individual participation, appropriate knowledge, and autonomy. Organizations take every precaution in this cutthroat world to guarantee success and effectively manage their workers. In today's environment, the phrase "employee empowerment" is becoming more and more significant and it is viewed as one of the essential components of managerial and organizational success, which rises when authority and control are shared in an organization. Empowerment helps to create autonomy for employees, allows the sharing of responsibility and power at all levels, builds employee self-esteem, and energizes the work force for better performance.

The general concept of empowerment refers to the delegation of legislative power, authority, mission, and sector power by employees. Rodwell (1996) explained the idea of empowerment seems to be a process of allowing or shifting power from one person or community to another. According to Weiner et al., (2010), employee empowerment can be considered as an effective strategy to increase productivity in employees and the optimal use of their skills and capabilities to achieve organizational goals.

Globalization, downsizing and reengineering has given opportunities and challenges for Nepalese organizations. In this globalization, employee empowerment is required for workers to be able to take quick decisions and respond promptly to any updates (Johnson, 1993). Empowerment practices are not yet usual in Nepalese banking. A study on employee empowerment is still a big research gap in the background of Nepalese banking. Nepalese banks' employers may not be able to fully leverage the capacity of their employees without in-depth knowledge on how employees view empowerment and how it relates to their performance. Employee empowerment, if managed properly, increases the employee's and organizational

performance. This research aims to study the status of employee empowerment in the commercial banking sector in Nepal. Furthermore, it analyzes the relationships between employee empowerment and job satisfaction.

### 1.1 Research Objectives

- To assess the status of employee empowerment and job satisfaction in Nepalese commercial banks
- To analyze the relationship between employee empowerment and job satisfaction
- To examine the impact of employee empowerment on job satisfaction.

### Literature Review

A lot of research has emphasized employee empowerment and job satisfaction. Manonmani (2019) studied the impact of employee empowerment on job satisfaction in the banking sector with reference to Thanjavur district. The findings indicate that the empowerment of an employee has a very well-built partnership to promote employee satisfaction. The results verify the direct effect of employee empowerment on employee job satisfaction in Thanjavur District.

Aklilu (2018) analyzed the employee empowerment effect on job satisfaction at the Dire Dawa branch of Ethiopian commercial banks. The goal of this research is to explore the link between employee satisfaction among bank employees and aspects of employee empowerment and their individual effects on the determination of overall job satisfaction. The causal research approach was used in this research. The questionnaires were designed and distributed to 90 selected respondents. Pearson correlation and multiple regressions were employed to analyze the data. The result of this research concluded that empowerment and job satisfaction are related and correlated with each other and are moving in the same direction as one variable moves. Training, reward, information sharing, trust, and autonomy have correlations among themselves.

Dahou and Hacini (2018) analyzed successful employee empowerment: major determinants in the Jordanian context. This correlational cross-sectional field research explores the impact of the six variables on the acceptance of employee empowerment using a hypothesis-testing methodology. The findings of a multiple linear regression study have shown that knowledge sharing; role design, transformative leadership, and decision-making authority have a positive influence on employee empowerment. The strongest impact of exchanging knowledge and implementing the required job design within the company is that supporting these programs will definitely make the empowerment of bank employees successful.

K.C. and Neupane (2020) explored the status of employee empowerment in the commercial banking sector in Nepal. The purpose of this study is to determine the status of employee empowerment in Nepalese banks. Descriptive and exploratory research was carried out for the study. Further, the data used in this research was qualitative as well as quantitative. A structured questionnaire was administered for the study and 150 sampled respondents were selected by the random sampling method from commercial banks. The research concluded that the status of employee empowerment, from the perspective of the workers, is not as expected in the case of the Nepalese commercial banking sector.

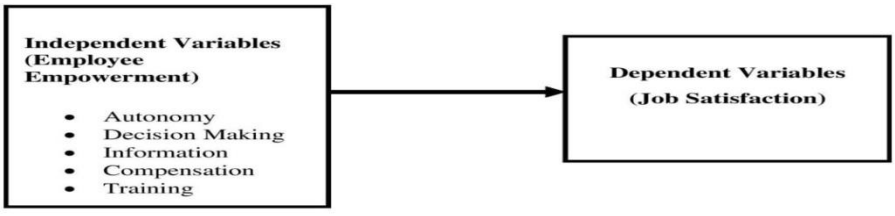


**Fig 2.1 Conceptual Framework**

- **Autonomy**

  Autonomy is defined as the degree to which one, without the consent of others, may make important decisions. Empirical research demonstrated the effects of autonomy on job performance and job satisfaction were significant and had positive relationship (Delic, Djedovic and Mekic, 2021; Liu et al. , 2011).

**H1:** There is a significant relationship between autonomy and job satisfaction in Nepalese commercial banks.

- **Decision Making**

  Employee participation in decision making increases job satisfaction. The research conducted by Mohsen and Sharif (2020) demonstrates that employee involvement in decision making has a positive effect on job satisfaction. Khezerloo, et al. (2016), conducted study on "the study of the causal effect of participation in decision making on job commitment and Job satisfaction." The finding demonstrates a constructive and significant relation between participation and job commitment and satisfaction.

**H2:** There is a significant relationship between decision-making and job satisfaction in Nepalese commercial banks.

- **Information**

  Information defined as awareness of job priorities, strategies, organizational decisions, and policy changes, environmental relationships, and future decisions in an organization. It is comprised of accessibility of information by relevant employees, organizational feedback system, suggestions from supervisors to employees, exchange of ideas among employees, dissemination of information from the management.

**H3**: There is a significant relationship between information and job satisfaction in Nepalese commercial banks.

- **Compensation**

  Compensation is the payment provided by an employer to its employee for services rendered. Adnan, Zarrar, and Zaffar (2021) revealed that employee empowerment, employee compensation, and employee accountability are all positively and significantly related to employee job performance.

**H4:** There is a significant relationship between compensation and job satisfaction in Nepalese commercial banks.

- **Training**

  Hanaysha (2016) stated that training is the systematic process which seeks to assist employees enhance their skills and knowledge, and develop positive behavior through experiential learning, which is expected to help employees realize greater performance.

**H5:** There is a significant relationship between training and job satisfaction in Nepalese commercial banks.

**Research Methodology**

This research combines cross-sectional, descriptive, and analytical research design to describe and analyze the relationship and impact between employee empowerment and job satisfaction and their constructs. The population of this research paper is the total number of employees within Nepalese Commercial Banks, Sunsari. Three hundred questionnaires were distributed; 258 were collected, consisting of 143 males and 115 females, from junior assistant to senior officer via Google Form, and the response rate was 86%. Microsoft Excel 2019 and the SPSS 25 software package were used to manage and analyze data. A structured questionnaire was developed to collect data through the convenience sampling method of the non-probability sampling technique with a five-point Likert scale. Primary data and secondary data were collected from questionnaires and websites of banks, annual reports, journal articles, dissertations, and so on. Statistical tools such as mean, standard deviation, percentage, frequencies for descriptive analysis and ANOVA, F-test, Pearson correlation matrix, and multiple linear regression for inferential analysis, along

with Cronbach alpha, are used to test the reliability of constructs. The questionnaire consists of a total of 34 items, including 4 demographic, 25 employee empowerment, and 5 job satisfaction.

**Findings**

Based on the collected data, the following findings have been drawn.

***Reliability of the constructs***

All constructs are reliable and acceptable because all the values of Cronbach's Alpha are > 0.70.

| Cronbach's Alpha | No. of Items |
|---|---|
| 0.78 | 30(6 constructs*5 items for each construct) |

Table 4.1 Reliability of the Constructs in Aggregate

| Variable | Constructs | No. of Items | Cronbach's Alpha |
|---|---|---|---|
| Independent | Autonomy | 5 | 0.769 |
| Independent | Decision Making | 5 | 0.763 |
| Independent | Information | 5 | 0.753 |
| Independent | Compensation | 5 | 0.771 |
| Independent | Training | 5 | 0.829 |
| Dependent | Job Satisfaction | 5 | 0.808 |

**Table 4.2 Reliability of the Constructs**

The result from above table shows the reliability measurement scales used for measuring the independent and dependent variables.

| Attribution | Description | No. of cases | Percentage |
|---|---|---|---|
| Gender | Male | 143 | 55.4 |
| | Female | 115 | 44.6 |
| Academic qualification | Bachelor & below | 118 | 45.8 |
| | Master & above | 140 | 54.2 |
| Job position | Junior assistant | 134 | 51.9 |
| | Assistant | 72 | 27.9 |
| | Supervisor | 15 | 5.8 |
| | Junior officer | 26 | 10.1 |
| | Senior officer | 11 | 4.3 |
| Types of banks | Public limited banks fully owned by local promoters | 104 | 40.3 |
| | Joint venture | 78 | 30.2 |
| | Government | 76 | 29.5 |

**Table 4.3 Demographic Characteristics of Sample**

The above table reflects that, among 258 respondents, males exceed females by 10.8%, which indicates that few females are passionate about or have opportunities in Nepalese commercial banking. However, these contexts can be transformed. When an organization has more women on the board, the diversity will trickle down faster (Macheel, 2016). Here, most of the respondents have completed a master's degree or above, which indicates that most of the respondents who have completed a master's level prefer banking. The majority of respondents are junior assistants and very few are senior officers. This means there is very little opportunity at the top level, and the bank structure needs more employees at the operational level.

Lots of respondents are from private commercial banks because of their large numbers compared to joint ventures and governments, and for other reasons as well, such as: more salary, facilities, bonuses, challenging jobs, and so on.

| Constructs | N | Mean | SD |
|---|---|---|---|
| Autonomy | 258 | 3.38 | 0.814 |
| Decision making | 258 | 3.36 | 0.887 |
| Information | 258 | 3.59 | 0.823 |
| Compensation | 258 | 3.62 | 0.828 |
| Training | 258 | 3.74 | 0.849 |
| Job satisfaction | 258 | 3.69 | 0.849 |

**Table 4.4 Status of employee empowerment and job satisfaction**

The above table shows employees have a positive response towards all dimensions of employee empowerment and job satisfaction, as all mean values are greater than three and values of standard deviations are relatively uniform. The mean value of job satisfaction is 3.69, which shows employees are satisfied with their job.

| Pearson's Correlation | N for EI | N for OP | Sig. ( at the 2-tailed) |
|---|---|---|---|
| 0.3484** | 258 | 258 | 0.000 |

**. Correlation is significant at the 0.05 level (2-tailed).

**Table 4.5 Correlation between employee empowerment and job satisfaction**

This result from the above table shows that there is a moderately significant positive correlation between employee empowerment and job satisfaction scale ($r = 0.3484$, $p < 0.05$) in Nepalese commercial banks.

| Model | R | R Square | Adj. R Square | Std. Error of the estimate |
|---|---|---|---|---|
| 1 | 0.724 | 0.524 | 0.514 | 0.5921 |

**Table 4.6 Regression between employee empowerment and job satisfaction**

The above table shows that the R-square value is 0.524, i.e., 52.4% of the variation in job satisfaction are explained by independent variables, and the R-square value is significant at the 5% level. However, it is still leaving 47.6% unexplained; there are other additional variables that are important in explaining job satisfaction that have not been considered in this research. Similarly, the adjusted R-square is 0.514, which means 51.4% of the variation in job satisfaction is explained by independent variables after adjusting the degree of freedom (df). The model summary also indicates the standard error of the estimate of 0.5921, which shows the variability of the observed value of job satisfaction from the regression line of 0.5921 units.

| Model | Sum of squares | Df | Mean square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 16577.229 | 1 | 16577.229 | 175.014 | 0.000 |
| Residual | 37035.198 | 391 | 94.719 | | |
| Total | 53612.427 | 392 | | | |

**Table 4.7 ANOVA**

This table expresses that the model is a good description of the study of the relation between independent variables (autonomy, decision-making, information, compensation, and training) and dependent variables (job satisfaction) because the p-value is 0.000, which is less than the alpha value of

0.050.

| Model | Unstandarized beta coefficients | | Standarized beta coefficients | t-values | Sig. |
|---|---|---|---|---|---|
| Constant | B<br>0.379 | Std. Error<br>0.230 | | 1.649 | 0.100 |
| Autonomy (AT) | -0.027 | 0.071 | -0.025 | -0.374 | 0.709 |
| Decision Making(DM) | 0.018 | 0.064 | 0.018 | 0.275 | 0.783 |
| Information (IT) | 0.062 | 0.074 | 0.060 | 0.843 | 0.400 |
| Compensation (CS) | 0.164 | 0.062 | 0.160 | 2.628 | 0.009 |
| Training (TG) | 0.675 | 0.046 | 0.658 | 14.727 | 0.000 |

**Table 4.8 Coefficients**

**Dependent variable Job Satisfaction**

Taking autonomy, decision-making, information, compensation, and training as independent variables ($X_1$, $X_2$, $X_3$, $X_4$, and $X_5$) model is constructed with equation as below:

$\hat{Y}= \alpha + \beta_1 X_1+ \beta_2 X_2+ \beta_3 X_3+ \beta_4 X_4+ \beta_5 X_5 + \varepsilon i.$

Based on the coefficients, the regression equation for the job satisfaction can be written as: $\hat{Y} = 0.379-0.027X_1+0.018X_2+0.062X_3+0.164X_4+ 0.675X_5$

The above table shows that regression coefficients are significant independent variables. This illustrates that a 1-unit increase in an independent variable at a time when other independent variables remain constant (AT, DM, IT, CS, and TG) will bring a -0.027, 0.018, 0.062, 0.164, and 0.675, respectively, decrease or increase in job satisfaction, and this coefficient is significant at the 5% level. Based on the standard coefficient value, training has the most significant influence on increasing job satisfaction among employees, followed by compensation respectively. Whereas, information, decision making and autonomy has no significant relationship with job satisfaction in Nepalese commercial banks since there p-value is greater than 0.05.

***Discussions and Conclusions***

The study is able to find out the present condition of employee empowerment and job satisfaction in the Nepalese banks. It is also clear from the findings that both employee empowerment and job satisfaction are well present in Nepalese commercial banking. The research shows that there is a significantly positive relationship between employee empowerment and job satisfaction. It can be said that an employee with high employee empowerment has high job satisfaction in comparison to less empowered human capital. All of the constructs of employee empowerment have a positive and significant relationship with job satisfaction. Training has the most significant influence on increasing job satisfaction among employees, followed by compensation. The study found that the main sources of employee job satisfaction are training and compensation among the facets of empowerment. Bank should provide employees with ongoing training in the technological knowledge and skills needed to perform their job effectively and efficiently. In addition to training, bank should compensate employees based on their performances that motivate employees to become best performer and able to provide high quality service to their customers. Furthermore, study revealed that autonomy, decision making, and information also have a positive correlation with job satisfaction hence these factors are also important factors to be considered while empowering employees.

With an in-depth understanding of the significance of empowerment in minimizing job dissatisfaction in the banking sector, this paper supports theory and managerial practice. The outcomes of the research are valuable in various ways for banks, academics, national policy, and so on. This research demonstrates the value of empowerment in Nepalese commercial banks and adds to both theoretical and empirical literature

in the field of employee empowerment and job satisfaction relationships. Banks should focus on training, compensation, information sharing, participation in decision-making, and autonomy for better employee empowerment, which ultimately enhances the level of job satisfaction.

**Limitations and Directions for Future Research**

The study focused on Sunsari district only, but similar studies should explore other districts and institutions to broaden the understanding of employee empowerment in Nepalese commercial banks. A comparative study can reveal similarities between findings. Additionally, conducting in-depth case studies on specific banks can provide comprehensive insights. Exploring employee empowerment in other sectors, like Nepalese universities, is also recommended to investigate its impact on organizational productivity.

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# Sustainability Perspective of Semi-Solid Waste : Economy, Environment and Employment

**R K Arya**
**Anjali Singh**
Department of UG Management Studies, School of Leadership and Management
Manav Rachna International Institute of Research and Studies

**Keywords**
Healthy environment, contentment, environment, eco-system, contamination and toxicity etc.

**Abstract**

*Waste management from the perspective of healthy environment is for any civilised society. India is gradually coming to the term of good well-being for its people. There are several impediments in building healthy environment and contain the avoidance morality rate. Waste creation itself is the mind-boggling issue in India. For example, each person can't be given right or full contentment to have safe drinking water because water accessibility itself is flawed, rivers are hardly clean undoubtedly and hence water which is either used for human consumption or irrigation is not guaranteed free from contamination and toxicity flowing in the farms which poison the vegetable at least since its creation is under clout at first instance, how one can expect its proper treatment which needs significant cost. Organic waste can be separated with minimum intervention and least cost and hence there is a good amount of success on Bioenergy production. But issues of plastic waste and water waste are still unresolvable in India. The cost due to diseases is also insurmountable in India.*

## Introduction

Waste is a result of over production and consumption because production is not well calibrated due to application of human resources and their cost. Unlike in developed countries, the production is required to be efficient using technology and minimum number of human resources to make it efficient and cost effective, in developing countries human resources can be paid any amount due to weak law of wages. In the agriculture sector for example the policy is designed in such a manner which considers the internal production, import and export to provide as per the demand to keep the inflation under control. Secondly there are some agricultures produce which have secondary applications for commercial use.

In India we confront with farmers distress too often because they are not paid remunerative prices of their produce. With abundance of agriculture workers and without calibrated production due to nature of weather conditions there is always imbalance in demand and supply leading to glut or shortfall. Inflation is not a very serious concern imports and exports, which can introduce balancing factor is hardly a point of consideration. No doubt the government has got a public stocking system, but it has many shortcomings like grain lying in the open. Poor treatment to sensitive produce in cold storage is also a negative situation. Restrictions on movement of goods from one State to the other also cause the produce to perish. Time taken by logistics to reach the unprocessed produce in rough weather conditions perishes the produce quite often. The food regulatory body has little control on the usage of pesticides and fertilizer so that quality can be ensured. The processing of surplus produce for delayed usage demands the purity of the raw product free from residues of pesticides. The fruits now a days are harvested before they ripen and hence their sale is left to the chance factor whether these will be left to be destroyed or consumed. There are some pockets in India which assure organic farming and hence they are in high demand among the affluent families.

Therefore, in case supply is restricted demand will clear the supply the issue of waste does not arise. But in case of seasonal crops mostly of elective or supplementary nature like potato, onion, tomato, ginger, and some other raw vegetables whose shelf life unless stored in refrigerators is very short these are to be consumed on the day on these are harvested. Multiple cropping in India is done to protect the cost of consumption by their families or instead of leaving the period idle it is better to grow some crop requiring

only few days to mushroom up. No doubt it pays some dividends to growers, but it does not ensure the consumption by the expected by buyers in that situation these are perished in the villages and not taken to the market because of additive transportation cost. In case such produce reaches Mandis by evening these are to be thrown which makes the space foul and affect the environment. It is very common practice in States where multiple cropping including two main crops and one seasonal crop whose demand and supply determination is not well calibrated. The excess supply of any produce whose cost of production is very little, and demand depends on to chance factor is found to be affecting the environment or increasing the cost of disposal.

Ultimately first of all the waste has to be collected by the municipal bodies and taken to land filler where these continue to mount up before any worthwhile action is taken. Biogas is one such product which can be made from biological waste such as plants. But in India the practice of segregating the various type of wastes is lacking because municipal bodies cannot afford to provide bins where these are dumped before these are collected. Recycling of plastics, cardboard and medical items when collected in systematic manner these are recycled provided their original preparation is done through the raw material of good quality. Similarly, the food waste is created out of unusable part of the vegetable and fruit their disposal is systematic in the developed countries and it is never heard that the garbage is dumped in the vicinity in the open and hence foul smell is emanating out of the dumped waste.

In Delhi there was a contest on these issues that garbage has mounted up to sky height how it would be treated to finish off to clean commercial application. Similarly, sewage from households in crowded cities is passing through drains and finally go through the open passage causing foul smell as well as causing harms to people living on the banks and using the water for bath purposes in the neighborhood. The garbage of food waste which can only be converted to biogas and sewage treatment plant which can only clean the sewage and water to be used for further application in the farms require technological cost and it is unaffordable by the civic bodies because of wages to the workers and fixed cost. These problems are caused by the crowding of the cities where drainage is also narrow and sometimes drains choke causing overflow at any point fouling the streets and cities. Before planning for the environment which is being affected make life and livelihood unsustainable there is a need to plan the cities on an equal basis for employment generation. The crowding of the cities with periphery gaining the preference for new habitation in unauthorized manner later become responsible for sewage and garbage to spoil the whole look of the city. The cost of keeping the environment clean becomes too high in this case that there is little fiscal room with the municipalities to clean. There are few cities which are engaged in refurbishing the drains and roads so that the sewage flow can be uninterrupted and for the whole city it is unrealistic. The rules and regulations need to be stringent for settlement beyond the municipality boundary or periphery.

Political restraint is a need to disperse away such settlers which have become huge cause of the environmental vitiation. So long as people without any planned livelihood settle on the periphery, they are bound to cause nuisance in the area in terms of solid and plastic waste besides open defecation all are harmful to human being. No amount of effort can clean the environment polluted by these settlers. The municipalities remain largely dependent on the state government to provide them the funds for keeping the cities clean because they found incapable of recovering the taxes and token from the people so that the revenue can be used for keeping cities clean. This is happening because there is a tendency of tax evasion and underpayment of water charges. Even in BMC during rainy seasons it has been seen that pits become the death toll for the people. Deluges are very common during the peak rainy season. Why despite of the public outcry the situation could not be made acceptable to the common man is that there is paucity of funds or mismanagement. But in smaller cities people keep living without any basic civic facilities up to their living requirement. These pockets have become slums of permanent nature. The working and living standard in these areas is very low. The cost of diseases is rising in slums and the government fails to provide required medical care. Perhaps this is the reason that private clinics are mushrooming in smaller cities where one can doubt the quality of medical services. The filth continues to accumulate in the neighborhood which is a source of vector borne and water borne diseases.

This situation could hardly be checked during the last 40 years because the migrants without any meaningful skill take shelter in such places and their living standard is not defined and hence their eating habits are liable to create filthy environment around them posing the cost to the society.

Despite the launch of Swachh Bharat Abhiyan there is little which could be done to mitigate the issues in sanitations and hygiene and hence problem is not that awareness will bring improvement. Basically, it is the design of cities, alertness of the city administration and migrants in the crowded cities who develop inferior housing facilities without basic civic facilities start occupying the unauthorized space and become cause of concern for the environmentalists. The inferior use of goods for eating and packaging along with open drainage is the major cause of environmental pollution and diseases also. The solution to this problem is to check the settlement on the municipal boundaries and beyond. To what extent politically it is possible is an issue which lies outside the ambit of environmental protection. India mainstay is still agriculture. Roughly 46 percent of people are employed in the agriculture sector and 70 percent are dependent on it for their livelihood.

Agriculture produces in short or in surplus is both harmful for inflation and income of the farmers. Since the policy for the import or export practically operating in vacuum the prices and income keeps swinging. Farmers are not encouraged to produce any crop which can keep them lively. It is happening to small and marginal farmers whose percentage is roughly 85 percent. These farmers live closer to the poverty line criteria. Some public support is always needed to pacify their aggression. During winter season the crops have very short shelf life. Unless these are consumed on the current basis the produce is perished leading to wastage. The bio waste by some rough estimate is around 280 Lakhs tonnes done due to perishing of fruits, vegetables, and horticulture. When these are not consumed, these are not converted to biogas, but these are dumped in the mandis or in villages where these are further accumulated as mould of garbage or keep lying in the open to be eaten by the animals.

Since animals feeding is also necessary there is an excuse that cows should not be killed but these can remain stray on streets. It is the source of different pollution due to eating and defecation. It cannot be addressed scientifically because the decision which is causing animals to remain stray is not logical. Dung is making the roads and streets slippery and filthy and hence its cost is felt by way of unclean environment in the sub-standard colonies and low productivity of the people living in the substandard areas. But when whole lot of biomasses of unconsumed vegetable is not disposed in scientifically manner it is bound to increase the cost in the form of transportation and filth in

surrounding. The disposal was expected to be difficult because their production was not perceived to entail cost. It has to be avoided at the farm itself. It can be done with the secondary application of the surplus crops. Storing and making commercial products can lead to employment and averting the environment damage.

India has been producing roughly 344GW of biomass. Over the years the crops utilization of sugarcane and paddy in the production of ethanol has curtailed the adverse impact on the environment and brought excess residues under control.

| | |
|---|---|
| Sewage discharge in NCR regions | 744 Million Gallons per day |
| Sewage Treatment Plants in NCR region | 2330 Million Litter Per Day. |
| Medical waste produced | 5900 Tonnes per annum |
| Production of single use plastics not worth recycling | 26000 Tonnes |
| Major Slums and their population in India | 6.54 Crores |
| Bulging of industrial cities due to migration in search of employment | 5.91Cr in UP, 5.73 in Maharastra,3.33 Cr in West Bengal |
| Littered rags collected from big cities | 755TPD |
| Sewage treatment plants and their capacity in Big cities | 1.7 Cr per million ltr per day |

The other menace causing environmental damage is the waste from single use plastics which primarily is the result of loose sale of commodities to be consumed instantly. The cost of packaged commodities is harsh as felt by the low-income group and their limited accessibility to the big stores or ordering online. Therefore, the day long they keep buying from the local shops and vendors several commodities which are supplied in the low-cost polythene. To match the demand for these products the industries are running without alacrity and fear of the administration. Such polythene is hazardous at the first point because the material used in it is contaminated and harmful but when these are thrown after being used are littered or at the most when collected by the van these could neither be segregated nor can be incinerated because of toxic fumes coming out of them. The best which is being done is that these are dumped in one place and used for carpeting the local roads. Segregation is necessary because other material has to be treated differently in case some other good use is possible. The damage caused at the time of production, during consumption and waste cannot be reversed by any means. In any case its production has to be stopped. The government continues to enact laws banning production, but the demand side is more compulsive as the people who are living on the margin will be forced to remain deprived from the use of the commodities which are very essential for their survival. It means the excess migration which has been taking place dotting the cities is the cause of the damage to the environment of this nature.

Basically, migration is harmful to the cities which exist due to their fixed size. In India the rate of urbanization is very slow and hence the extension of municipal limit must be at the cost of acquiring agriculture land from the farmers whose general economic conditions is not praiseworthy. The master plan to acquire land is made once in long many years. Since the farming activity is the compulsion of the small and marginal farmers for their livelihood, they do not want to give up the land so easily. The experience in Haryana says that land acquisition can be done at much higher compensatory prices which is unaffordable for the industries to own the plot because the cost increases phenomenally, which can be hardly paid as promoter contribution. This is one of the reasons MSMEs are discouraged from coming up strongly to run the business. The manufacturing clusters are normally created by the government in various States by the government. Such clusters are not very penetrating in India, the reason for it is that farmers do not sell off their land so easily.

The manufacturing sector continue to remain close ended is caused due to this reason. As the manufacturing sector is restricted to a narrow range, it is enough to conclude that skill development is going on at a very slow pace and formal skill development cannot be thought to be proceeding so easily. It is the informal skill development which is very common in India and therefore thinking of export of manufacturing goods to bounce sounds hollow. The informally trained or unskilled workers from the States like Bihar, UP, MP, Orissa, West Bengal, Jharkhand are migrating to little better prosperous States and these families engage in the low paid occupation and live in unclassified manner which has become a source of pollution and waste production in Indian selective cities. The availability of low paid workers much less than the minimum wages is a proof that education in the rural areas is not up to the mark and farming sector is not very remunerative and also cannot accommodate the ever-increasing population into the farms to pay to them to make their decent livelihood. It means to tackle pollution and waste; it is imperative to reform the farm sector first as has been done in any progressive country.

The sectors of the economy should be capable of producing the output which can justify the income of the people engaged in them. India poverty is attributed to excess engagement in farm sector. It is disturbing the fiscal health of the government, but it has been continuing for a long time. The balance of demand and supply of material or intangible services and also the demand and supply of the manpower both are crucial for keeping the poverty under check. The excess farm workers need to be shifted to manufacturing, but the irony is that they are shifted to low paid personal services which for a moment might not be causing poverty but surely responsible for creating low standard settlement colonies where water waste, food waste and material waste is hazardous in many ways and absolutely it cannot be managed but is being tolerated to the peril. The waste management is the core areas of the cities is not problematic because the RWAs or the natives are alert to the waste and their disposal but when the peripheries take ugly shape then entire city begins to get clumsy due to littering of material and other food waste. Water spoilage is very common even in the posh areas of Delhi. The supply of clean water requires expenditure on chlorination and bleaching

and when the demand is far in excess to the supply there is a pressure on the civic bodies to supply unclean water at short notice and it cause water borne diseases and accumulation of water on shallow places. There are several waters borne diseases attacking poorly nourished settlers in low standard colonies.

In nutshell migration is one of the potent causes of the production of waste and its poor management. The farm sector to begin with has to be vibrant, capable of providing decent income to the people dependent on them. It is possible by increasing the productivity of the farm sector due to several reasons relating to input cost, rainfall, logistics, and small sizes of the farm. Even the agriculture waste and animal waste are yet to be properly treated and managed to fruition. This is suggested by the biomass production in the country and its management with biogas plants which are not very popular in the States. The animal excreta could be used for conversion in compost which is cost saving in organic farming and hut making and it could be a potential opportunity for employment. The intervention of the government in such type of waste management is unavoidable but barring Chhattisgarh no other government has taken initiative to make the waste management effective.

Basically, why waste management is stressed upon is understood from the fact that the organic compounds should go through a cycle in order to sustain the existing situation. Excess use of fuel has been causing global warming and also depletion of the reserve in the earth. Global warming is responsible for hot weather conditions, draughts and floods which impact agriculture, life along the coastline and hence it can deprive the people living on the margin because food shortages and desertion is obvious. Solid waste which is the result of inferior use of material cannot be reconverted to useful product is bound to harm the environment. The biological waste has to be properly converted into useful products to generate employment and keep the environment clean. The water which mixes in it the waste from the kitchen and drains has to flow down in the rivers or seep through the surface which in both cases cause harm to environment as well as to human and animals and hence creating doubt on sustainability.

The application of technology is possible by the government when the whole public is consuming resources. The resource origin goes to one end from there it should restart and goes through cycle then sustainability is ensured; environment is protected, and management can conserve the resources.

The fertility of the soil is affected when imbalanced use of fertilizer is done with cost consideration. The agriculture is unviable to small and marginal farmers because they cannot apply the balanced fertilizer due to their unaffordability and hence the demand and supply imbalance of the produce cause the wastage of the produce because of the unplanned production by the farmers out of compulsion. The inorganic waste remains sticking to the soil and hence causing damage to the soil leading to less income and hence low employment. The micro solid waste from kitchen is just pushed in the drainage making the water be cleaned at sewage treatment plant but the piped water just go through the pipes and lands into rivers polluting them and making unfit for washing purposes adding to the cost of washing by the washer men. The water is not fit for drinking and hence has to be cleaned with proper and costly technological processes which generally cannot be done because of the poor financial health of civic bodies. There is one fundamental rule to learn waste management on the lines of USA.

Whether it is possible to keep three to four bins at short distance so that the different type of waste can be put in them to be collected by the van separately and taken to the reprocessing unit and in the process providing the employment in the chain from collecting and disposing. The littering of any type is fined. The plants residues are collected on timely basis so that these could be converted to useful products. Kitchen wastewater and washroom wastewater flow through the same drainage and hence making the water cleaning difficult. The quality of the soap used for washing also matter as some soaps are very inferior and hence harden the water and make the cleaning difficult. The standardization of the products used in cleansing is extremely important but different income class people are buying different types of cleaning soaps and hence adding to the problem. In case it cannot be enforced then the financial health of civic bodies can be achieved with the help of collection of genuine taxes from all households so that proper employment technology can ensure the cleaning of water at the check points before these passes through to the rivers. Inferior packaging material should not be allowed to be used and the producers be punished severely. The households must follow the rule of separation of different type of wastes and the van should have different compartments in it so that segregation at aggregation point is not difficult.

Slaughtering in the open has to be punished because the waste from the slaughtering, though it is organic in nature it is allowed to remain deposited in the vicinity for longer period of time and hence its impact on environment has to be considered. The sale of animals for slaughtering should be legalized and marketplace should be developed. Biologically degradable material should be enforced for carrying bags so that it could either be extinguished easily or can be reconverted. Valuable production accompanies employment and sustainability. Sub-standard production employs low paid labor and done under the veils.

Therefore, law would be enacted so that policemen have not chance of indulging in gratification. In so far as well-off community usage of products is concerned the taxes can be recovered from them on the packaging material which could be increased in value terms, and this can subsidies the industries engaged in the low-density packaging material of slightly better quality being used by low-income group. Similarly, substandard soap solutions packed by the unregistered firms should be checked and only registered firms be allowed to pack such material to ensure the quality so that waste does not become a problem at a later stage. In India economic cost is enjoyed by every person even though he can afford for higher cost.

**Literature review**

1. In **November 2022, "Theoretical framework of solid waste management" Sailesh kumar and Akshat Jaiswal,** concluded that there is different type of solid waste such as plastic waste, medical waste and paper waste that become degradable which can convert easily, but the environment become more dangerous when the solid waste is not degradable like e-waste and polythene waste etc. And there should be a mechanism (of 3 type dustbins) from municipal corporation to recycle and reduce where the waste management procedure should help to maintain and sustain the environment ecofriendly.
2. **March 2021, "Plastic Waste Management", Prabha Singh and Lily Trivedi",** concluded in her research paper that plastic is the most harmful substance and waste plastic which is not disposable is highly reversible that cause disease. So, in this research paper the researcher worked upon certain revision in methodologies. The government should take strict action upon the society and public of not troughing plastic waste on roadside or not to reuse for household purposes.
3. **In April 2021**, "**Sahil Sanjeev Salvi and Premchand Patil," IJCRT**, stated in his research paper that Sewage treatment process is to ensure that it complies with the several regulatory guidelines that help in removing the solids, organic salts, metals etc. in effective and efficient way so that it can help in irrigation and less polluted water can only mix into rivers, so that it can be easily coverable into fresh drinking water.
4. According to **Satpal Singh, November 2020**, stated in his studies that the citizen participation is the utmost important drive towards SWM in India. There should be active and prompt action against source segregation and treatment process. The policy should be strictly followed against wastage and littering management. Community awareness in terms of people's perception, attitude towards proper disposable of household and industrial waste must be assured.
5. In **2019, "A research paper on Solid Waste Management" Shweta Choudhary**, stated that landfilling is the most dangerous approach. The air quality index become worse due to unhygienic and dangerous gas released. The statistical data gathered related to refused foods and vegetable scraps. Through a study framework the rule of environmental protection is based (reduction, reuse, recycle and recovery). Solid waste is the major issue and certain strategies are made and mentioned in annual reports which should be successfully implemented.
6. According to **Energy and resource Institute by RRN Bhattacharya 2018** state that the rising average incomes are attributed to problems facing Solid Waste Management in India and government took initiative to control the problem through certain interventions, schemes, and surveys etc.
7. According to the **CPCB estimates**, "Urban India generates close to 62 million tonnes of municipal solid waste (MSW) annually with the organic fraction in the range of 40%–60%.29 Plastic waste forms close to 8% of the generated solid waste in the country.30 The per capita waste generation has seen a steady rise from 0.44 kg/day in 2001 to 0.5 kg/day and has been estimated to be growing at a rate of 1.33% per annum.31".
8. A study conducted by the **CIPET- CPCB on the "Assessment and Characterization of Plastic Waste in 60 Major Indian cities"** observes a few important findings as has been mentioned below: *f* 94% of plastic waste generated is recyclable and belongs to the thermoplastic's family, while the rest 6% are non-

recyclable thermoset plastics. *f* 67% of the plastic waste belonged to the HDPE/ LDPE, 10% to PP, and 8.66% to PET amongst others.

After giving thorough background of the waste generation and their basic reasons and how theoretically waste management is possible to serve the economics, employment, and environment, we are providing here how the waste is being dealt to make the process circular to the advantage of economics, employment, and environment.

Three components of waste are separately dealt here.

**Biomass:** the market of biomass is being recognized by the government which is pushed by the government schemes and the interest of global green energy companies. The market is expected to reach Rs 32000 crores by 2030-31. The biomass, the waste which is produced in the rural areas will see the small biogas plants increasing from their original level. There is an overwhelming response of the global green energy companies in biogas generation. The overall objective which is given credence is that for sustainability the waste should be recycled to generate different useful products on a commercial basis. The biogas plants generate supply of clean and reliable power to business in India and biomass is a good source of energy in the subject. The power demand when it would be met in the rural area's employment scenario in the rural areas would be better. At present there is an installed capacity of 10.2 GW. The target set for another 8 years will help in making climate smart decisions and move the world closer to the goal of net zero carbon emission. Sustainability can be felt when biomass energy ecosystem will satisfy environment-friendly choices to consumers.

**Wastewater management:** India is one of the most water stressed country in the world with roughly 60 crore Indians are facing acute water scarcity. It is estimated demand by 2030 would just be doubled the supply in 2030 when water scarcity will be insurmountable, and country will suffer a GDP loss of 6 percent. Therefore, it is imperative to understand the importance of managing needs and resources more efficiently. Here again the circular economy is required to be invoked so that sustainability can be ensured. Every high-income country treats roughly 70 percent of the wastewater. This ratio is 38 percent in upper middle-income countries and 28 percent in the lower middle-income countries. It is hardly 8 percent in low-income countries. In terms of global population, the total treatment of wastewater is barely 20 percent.

The wastewater emanated from raw sewage dumped into water body which can be cleaned in natural process. But the way the population has been increasing accompanied by increase in the urbanization the sewage discharge will be much higher than its capacity of natural purification and hence when it goes into water body the water quality is tarnished because it contains extra nutrients. Alternatively, when untreated water is used for crop irrigation the results are horrifying. 65 percent of the irrigated area if it is included in 40 km of urban centers roughly 89 crores people suffer from serious health risk and 86 percent of the land irrigated with untreated water falls in China, India, Pakistan, Mexico, Iran. Despite its nutrient richness the people consuming vegetables are exposed to the risk of infection with ascaris, amoeba and tapeworm.

There is no policy mandate at central level for wastewater management. Therefore, water resources mismanagement is discernible. Untreated sewage waste is one of the major causes of surface water and ground water pollution in India. Roughly 33000 million liters per day is the sewage water discharged in water bodies of which 7000 MLD could be collected and treated the remaining could not be treated because sewage treatment plants are not functional.

**Single Use Plastics**: Single use plastic items which have low utility and high littering potential become plastic waste ended up in landfills or dumped. Plastic pollution poses environmental, social, economic, and health risks by contributing to climate crisis, ecosystem degradation and resource use. When items made up of single use plastics are furnished with thickness of 120 micron, these can be reused and there is increase in the collection efficiency. A year ban strict ban was declared. The ban triggered the development of innovative eco- alternatives, new business models, and an increase in the manufacturing capacity. The introduction and use of alternatives to banned items led to creation of new employment opportunities in sustainable green ventures.

Fig.1: Theoretical Framework of Biomass Waste Management

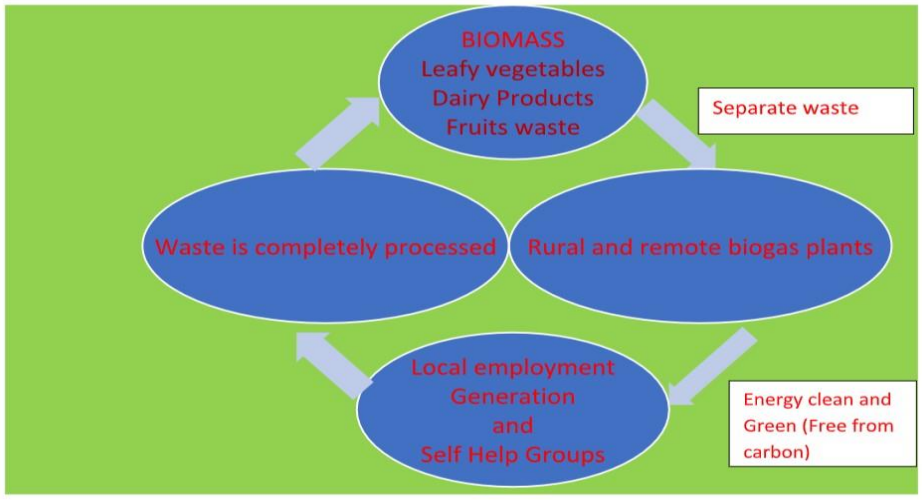



Fig 2: Theoretical Framework of Sewage Treatment Plants

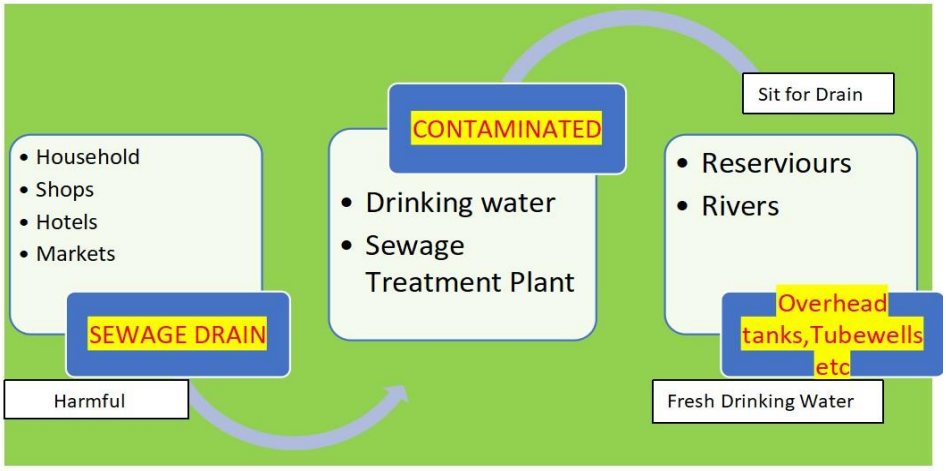
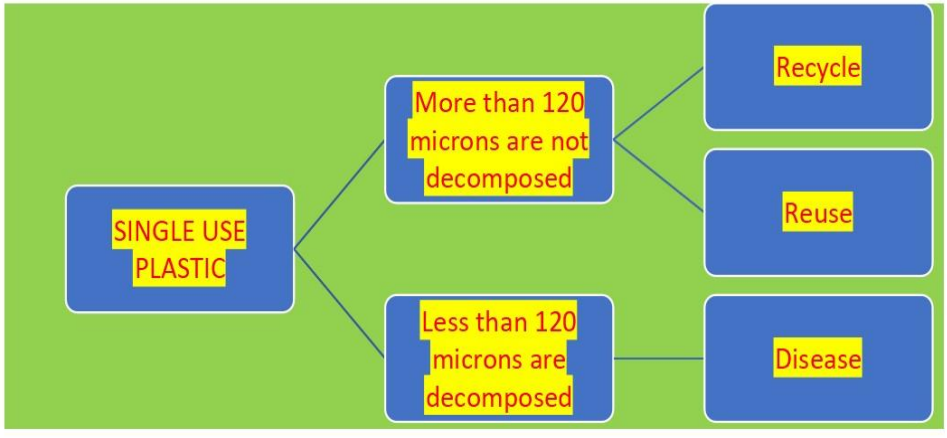



Fig 3: Theoretical Framework of Single use plastic waste management




The cost is the most important factor in disposing of the waste, whereas income is the determinant for creation of waste. The burden on cities is very apparent and civic laws are hardly enforceable because these depend on the country and town planning and also reckless selection of living on the periphery. The

standard of living is determined by the occupation and possession of living space through proper channel. Both these situations are ridiculous in the industrial cities, where people come in search of jobs.

Wastewater badly contaminated with sludge is the biggest challenge in the big cities. Drainage is developed casually, and flow of wastewater is circuitous because municipal bodies lack funds to install costly treatment plants. The water borne disease in unauthorized colonies is very common. The scarcity of drinking water is an unresolvable issue for roughly 60% of the population.

Before waste management, it is important to ensure the quality of waste bring generation. The literature review and common understanding points to the fact that waste management on cumulative basis is unresolvable problem in India because waste quality is debatable issue.

**Conclusion**

The waste generation in popular countries is dependent upon the economic condition of the country and it is different from the developed countries where effort is made to sell the products in packaging to ensure that adulteration is not possible. But selling the products in loose form is very common in India and hence the littering is also routine. The use of substandard goods and packaging is quite common. The rules are framed for production of packing material but are flouted mainly because unemployment is so bad that people break the rules and indulge in substandard production. The rules are framed for sewage discharge but still the people evade the rules and sewage discharge is done in canal before it could have been taken to sewage treatment plant whose functioning is very costly. Therefore, untreated water supplied to farms contaminates the vegetable whose consumption is causing life threatening diseases. The biomass waste is extremely high in India because of the perishing of vegetables when their production is involuntary.

There is an awareness of making best use of biomass to convert this to biogas to use it in the rural areas for small businesses. Migration is disturbing the balance of waste production in the cities and hence municipalities are stressed to handle extra waste. Their financial health not so good, the waste management is tardy and hence economy is burdened due to diseases, unhygienic and pollution. The scarcity of space and dumping in the surrounding area scares away the builders and officers, leading to economic losses. Vast stretches of land is left idle for land fill or dumping. Housing and offices are not possible in close to distant spaces causing economic losses. There is no permanent solution to waste management because of latitudinal reasons including low income, high population, adulteration, laws flouting, political patronage.

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# Readiness for New Ventures in South Africa Through Entrepreneurship Education: A Reflective Thematic Approach

**Thobekani Lose**
Centre for Entrepreneurship Rapid Incubator,
Walter Sisulu University, South Africa

**Priviledge Cheteni**
Centre for Entrepreneurship Rapid Incubator,
Walter Sisulu University, South Africa

**Keywords:**
Entrepreneurship education, Innovation in business, training in entrepreneurship, Entrepreneurial intentions

**Abstract**

*The purpose of this research is to investigate what factors affect students' readiness to start their own businesses once they graduate from college. Case study research was conducted with an emphasis on an undergraduate degree program at a South African university. Data was collected through semi-structured interviews with 15 program participants and analyzed using a reflective theme analysis method. Our findings suggest that the experiential learning methodology employed at the university increases students' levels of self-efficacy in the realm of entrepreneurship, i.e., their belief in their own abilities to create and run successful firms. They look at the benefits of going into business for themselves with optimism. However, our findings suggest that certain students may lack the confidence to take initiative and try new things, making the social support system of teammates and teachers all the more important for helping them feel safe enough to try new things and succeed.*

## *Introduction*

There is widespread consensus around the world that entrepreneurship is an essential component of national progress and economic expansion (Shambare, 2013). In response to this discovery, several countries, including South Africa, have studied entrepreneurship as a fundamental part of their higher education programmes (Lose & Khuzwayo, 2021). Numerous nations have settled on their own distinct approaches to the instruction of aspiring businesspeople (Cheteni & Umejesi, 2023). However, questions have been asked about the calibration of the education provided by higher education institutions [HEIs] with reference to business startups and management.

Although research has shown that entrepreneurship education is associated with the growth of entrepreneurial skills and motivation to engage in entrepreneurship, countries such as South Africa still record low early stage entrepreneurship intentions [TEA]. This is because entrepreneurship education is associated with the development of entrepreneurial skills (Franco, Haase & Lautenschlager, 2010; Bowmaker-Falconer & Herrington, 2020). As a direct consequence, the unemployment rate has remained very high, particularly among the younger generation (Jwara & Hoque, 2018). Because the TEA in South Africa is relatively low, there is a pressing need to analyze the efficacy of entrepreneurship education in developing entrepreneurial readiness among students graduating from higher education institutions (HEIs) in the country. It is vital to establish the necessity of improving entrepreneurial education to ensure that desired economic growth is accomplished, and this is essential to do so. This is especially important in rural communities such as those that characterize the Eastern Cape Province in South Africa, where most of the population lives in rural areas. Compared with urban provinces, these communities have significantly higher rates of poverty, unemployment, and social marginalization.

In general, entrepreneurial activity propels the economy toward greater productive capacity, positively contributes to economic growth, and generates new employment opportunities (Mukwarami, et al., 2020; Uyen & Zainal, 2020). The promotion of entrepreneurial endeavors is one of the top priorities of economic

policy in every country (Mukhatar et al, 2021), since it plays a significant role in both the maintenance and expansion of economic activity (Izadi & Mogaddham, 2019; Mukhatar et al, 2021). According to Masha (2020), the majority of young people with ideas for possible enterprises do not have the competence or ability to transform such ideas into profitable businesses.

There is currently no causal evidence examining the efficacy of Entrepreneurship Education (EE) for youth or "potential future entrepreneurs." The current empirical foundation of the field consists of observational studies (Brown et al., 2011; Von Graevenitz et al., 2010) and quasi-experimental studies (Brown et al., 2011). Furthermore, almost all these studies were conducted in the developed world. Meanwhile, Byabashaija and Katano's (2011) study in Uganda is the only notable study on entrepreneurship education in the sub-Saharan region. This study is one of the first to investigate the effects of EE on youth and young adults in a developing context, and it will shed light on the effect of entrepreneurship pedagogy at one university.

This study contributes to the literature in three ways. To begin, there is acknowledgement of the role that youth have historically played in the realm of entrepreneurship. Second, there is recognition of the importance of youth participation in businesses. Third, there is an emphasis on indigenous youth as the target demographic for placement of entrepreneurship in rural settings. One of the claims that will be made in this paper is that one of the benefits of entrepreneurship is that it has the potential to eradicate poverty. This claim has been made, although it is generally accepted that entrepreneurship is responsible for the creation of jobs and economic development (Bugwandin & Bayat, 2022).

Therefore, this study aimed to investigate the connection between receiving entrepreneurship education and being prepared to engage in actual business activities after graduation. The low TEA observed in South Africa continues to be a source of concern, especially in light of the necessity of expanding education on entrepreneurship to promote economic growth. This is a case study of a rural university offering entrepreneurship education as part of its South African curriculum.

**Entrepreneurial readiness**

The concept of entrepreneurial readiness has been investigated using a wide variety of research approaches. Both entrepreneurial intentions (Malebana & Swanepoel, 2015) and the rate of entrepreneurial activities are closely related concepts that are considered synonymous with entrepreneurial readiness. Research has also taken into account total early stage entrepreneurial activity as a measure of the total number of people who engage in the early stages of the entrepreneurial process (Bowmaker-Falconer & Herrington, 2020). This presents a challenge when considering the assertion made by Siivonen, Peura, Hytti, Kasanen, and Komulainen (2019) that universities have become key economic drivers because of their role in the development of aspiring business owners and conducting research with economic value. According to Malebana (2016), exposure to entrepreneurial education has a positive relationship with entrepreneurial intention. It is customary practice to think of entrepreneurial intention behavior in terms of a person's desire to pursue entrepreneurship as a career path as well as the individual's possession of a powerfully positive attitude toward engaging in entrepreneurial behavior. According to Mars and Rhoades (2012), the concepts of entrepreneurial intention and readiness are effective if entrepreneurs tend to adopt an agency view in which they see themselves as critical agents of social change. This view is necessary for entrepreneurs to have for the concepts to be effective.

**Entrepreneurship Education**

According to Gottleib and Ross (1997), "entrepreneurship education" is simply education for improving the skills of innovation and creativity. Entrepreneurship education has also been defined as education that teaches about identifying business opportunities, allocating appropriate resources (such as finances, marketing, and human resources), and, most importantly, starting a new business (Kourilsky, 1995). According to Davidsson (2004), entrepreneurship education involves teaching participants how to explore numerous opportunities and make good decisions about which ones to pursue.

Many debates surround entrepreneurship education, specifically how education affects intention and its antecedents, such as attitudes toward behavior, subjective norms, and perceived behavior (Kirkley, 2017). According to some studies, entrepreneurship is not inherent and teaching and training can help

develop certain aspects of entrepreneurship (Neck & Greene, 2011; Yu Cheng et al., 2009). This hypothesis is supported by Frank et al. (2010), who argued that intentions are not magical, mysterious, genetic, or intrinsic. They argue that entrepreneurship, like science, can be taught and developed in the same manner. Kuratko (2003) proposes new methods and paradigms for teaching entrepreneurship, thereby rejecting the notion that entrepreneurship is an inherent quality.

According to Jones and Iredale (2010), university-level entrepreneurship education programs are primarily aimed at raising awareness and encouraging students to pursue entrepreneurship as a career path. Enterprises and entrepreneurial behavior are thought to be fundamental skills that people acquire later in life (Lose, 2016).

This study utilizes Koch et al.'s (2021) conceptual framework of entrepreneurship education, as shown in figure 1. EE is generally understood to refer to the entrepreneurship-related education and upbringing of children and young people. EE manifests itself primarily in systematic, intentional teaching and learning in general education schools and vocational (business) schools in South Africa and other countries, although elements of educational and learning processes in family and extracurricular contexts can be classified under this term (Cleveland & Bartsch, 2019). Figure 1 illustrates how the design of the EE in question can have a significant impact on the learning objectives and outcomes, and how EE is integrated into the educational system (Koch et al., 2021). Educating entrepreneurship aims to disseminate theories and characteristics about the entrepreneur, typical fields of action, and the entrepreneurial role in the economy and society, while educating entrepreneurship aims to prepare for entrepreneurial activity in the sense of a direct start-up qualification (Koch, 2003; Lackeus, 2015). "Educating through entrepreneurship" is the third strategy, which involves guiding students through and outperforming entrepreneurial processes, often through business games or business plan competitions (Lackeus, 2015).

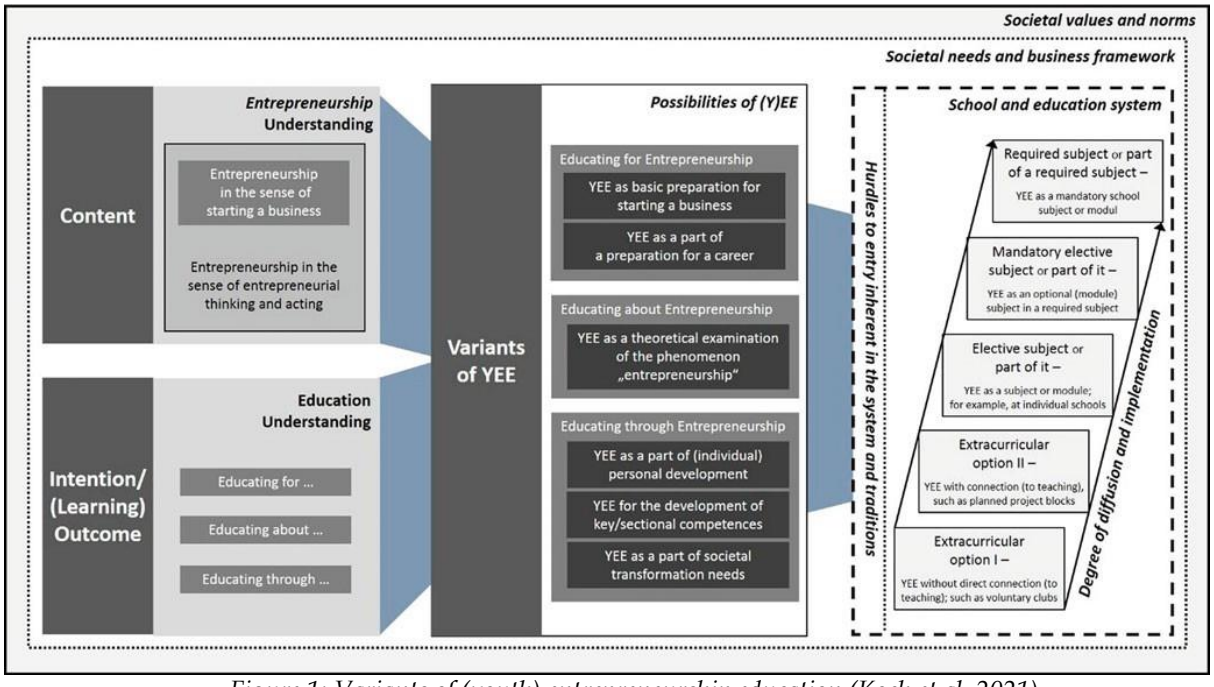



*Figure 1: Variants of (youth) entrepreneurship education (Koch et al.,2021)*

First, this type of education has close ties to the established goals of South African education. They are geared toward helping each student grow into a fully functional, self-actualized adult, and are grounded in a neo-humanist theory of education. Entrepreneurship, which places particular emphasis on the subject of education (Koch et al., 2021), can play a role in this context because it is concerned with imparting students with fundamental abilities related to substantial ways of thinking, acting, and problem-solving in accordance with formal educational theory. Common entrepreneurship education often provides students with information and training that is only marginally useful in the context of future business ventures.

These skills and capacities are also important when addressing everyday challenges, such as those faced in areas of climate change, the environment, and resource depletion.

**Theoretical Framework**

The theory of planned behavior (TBP, 1987) by Icek Ajzen has been the primary theoretical framework that has guided the evaluation of youth EEPs. Most EEP evaluations are theoretically underpinned by Ajzen's theory. The idea that entrepreneurial attitudes, such as perceived desirability and perceived behavioral control, precede intention is at the heart of this theory. According to the model's application to the field of entrepreneurship, perceived desirability is the degree to which a person finds the idea of starting a business, and perceived behavioral control is equivalent to one's perception of one's own entrepreneurial self-efficacy. Finally, entrepreneurial intention, defined as the desire to launch one's own business, is one of the best indicators of future entrepreneurial behavior. As a result, it can be said that TPB is an appropriate theoretical model to illustrate and anticipate entrepreneurial intentions for business ventures given the wide variety of learning outcomes it has produced.

Elmuti et al. (2012) made another intriguing suggestion regarding the connection between perceived behavioral control and intention and behavior. They contended that entrepreneurial self-efficacy and the process by which each person starts a business are directly related. Notably, the association between self-efficacy and intention may be blamed for growing entrepreneurship intentions (Wilson et al., 2007). Entrepreneurial self-efficacy is a belief in one's ability to successfully carry out the various roles and responsibilities involved in entrepreneurship is known as entrepreneurial self-efficacy (McGee et al., 2009). Entrepreneurial intentions are sparked by self-efficacy (Caiazza & Vope, 2016; Elmuti et al., 2012). Ajzen's model is shown in Figure 1.

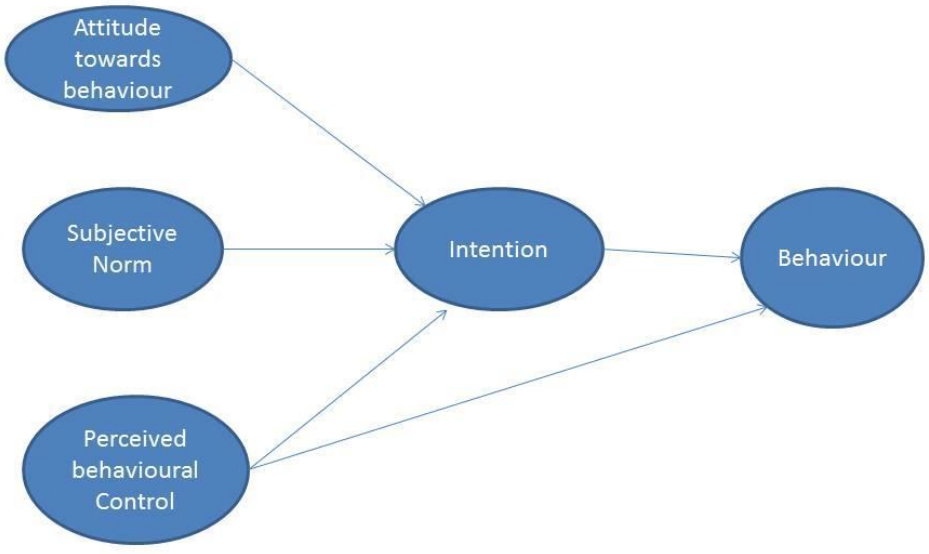



*Figure 2: Theory of planned behaviour*

***Methodology***

The research philosophy known as "interpretivism," which maintains the ontological view that reality can be interpreted from the views and perspectives of social actors in certain circumstances, served as the foundation for the study. This philosophy holds the ontological view that reality can be interpreted from the perspectives of social actors in certain circumstances (Creswell & Creswell, 2018). In other words, as people progress through life and come across a variety of phenomena that pique their interests, they develop their own unique interpretations of the world around them. Interviews are a common way to gather information about phenomena because they give participants the opportunity to discuss not only themselves but also their points of view on the phenomenon being discussed (Bordens & Abbott, 2018).

This research was conducted in the context of a South African university that offers entrepreneurship programs. A HEI in the Eastern Cape province was selected for sampling using both convenience and purposeful criteria. First, the university was representative in that it was located in a non-urban area and offered general entrepreneurship education. Among these were the institution's geographical isolation, its incorporation of entrepreneurial modules into the required coursework, and the relatively large number of students enrolled in its entrepreneurship programs. This research project was conducted as a rich, detailed qualitative ethnographic field study to examine the entrepreneurial processes experienced by students in situ (Eberle & Maeder, 2016). Observation, video/audio recordings, interviews, and written and visual materials were used to collect data from 15 students who developed new ideas, the purpose of which was to help and assist other people with better options in various areas of society related to students' education. There were seven classes, with 371 students enrolled. Participants' biographical information is presented in Table 1.

*Table 1: Demographical information of participants*

| Respondent | Gender | Age | Education level |
|---|---|---|---|
| 1 | Male | 25 | Undergraduate |
| 2 | Male | 21 | Undergraduate |
| 3 | Male | 23 | Undergraduate |
| 4 | Male | 22 | Undergraduate |
| 5 | Female | 21 | Undergraduate |
| 6 | Male | 21 | Undergraduate |
| 7 | Female | 19 | Undergraduate |
| 8 | Male | 20 | Undergraduate |
| 9 | Male | 23 | Undergraduate |
| 10 | Female | 24 | Undergraduate |
| 11 | Male | 27 | Undergraduate |
| 12 | Female | 28 | Undergraduate |
| 13 | Male | 23 | Undergraduate |
| 14 | Male | 34 | Undergraduate |
| 15 | Male | 24 | Undergraduate |

This study obtained an ethical clearance certificate required by all institutions of higher learning. This was accomplished by satisfying the requirements of a research ethics committee at the institution where the researchers worked (Sefotho, 2022). Informed consent was obtained from each of the 15 entrepreneurs' students prior to the start of data collection, and we gave them the option to decide whether they wanted to continue taking part in the research (Okeke, et al., 2022). We protected all the participants by assuring them of their right to confidentiality and anonymity. This was accomplished by adhering to the principle of non-maleficence (Babbie, 2012).

**Data Analysis**

The objective of this study was to investigate the effectiveness of EE on youth or young adults' readiness among enrolled and graduated students in a rural university setting. As a result, all interviews were openly and selectively coded by one researcher and discussed with other members of the research team to establish a reliable coding system in accordance with grounded theory principles. The codes were then classified and clustered to identify the higher-level attributes. A reflexive thematic analysis approach was used to analyze the data gathered. Analyzing patterns and themes in qualitative data is much simpler with the help of reflexive thematic analysis, a method that is both accessible and theoretically malleable (Braun & Clarke, 2021). In the reflexive TA approach, the researcher is seen as an active participant in the knowledge-creation process (Braun & Clarke, 2019). The researcher's interpretations of the meaning patterns across the dataset are represented by codes. As a reflection of the researcher's interpretive analysis of the data, reflexive thematic analysis is conducted at the nexus of (1) the dataset, (2) the theoretical

assumptions of the analysis, and (3) the analytical skills and resources of the researcher (Braun & Clarke, 2019). Using the same approach, we were able to identify different association types that could be described by mapping five themes (cultural, resources, psychological, models, and systems).

***Findings And Discussion***

The analysis framework presented in Figure 3 provides a summary of the main themes and patterns across certain categories and subcategories, which are important for an adequate appreciation of the relationship between entrepreneurship education and readiness to engage in entrepreneurship after graduation.

Table 2 provides the theoretical direction for respondents' real and lived experiences. The codes provided were then considered to establish categories and themes based on observable data patterns. Five codes were extracted from participants' data.

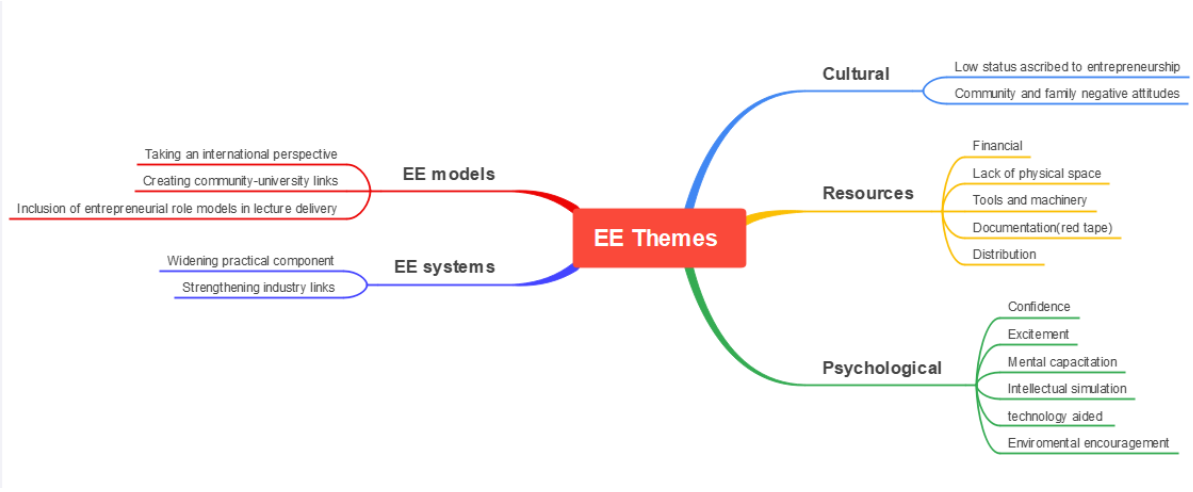



*Figure 3: Themes generated.*

It should be noted that the constant comparison technique originated in grounded theory and is often conducted together with other grounded theory strategies that include theoretical sensitivity. This technique involves the recognition of concepts and cases for a more detailed analysis, as they are likely to be central to deducing the emerging theory. As expounded by Kolb (2012), when employing the comparative analysis strategy, important codes are first deduced from a dataset using purposeful and systematic coding. To establish the relationship between entrepreneurship education and readiness to engage in entrepreneurship, a sampling of relevant phrases that reflected the views and opinions of the students was necessary.

*Table 2: Initial coding of data extracts*

| **To what extent has education in entrepreneurship made you ready to engage in entrepreneurship?** | **Codes** |
|---|---|
| *"The entrepreneurship module has actually opened up a certain area in my mind. Now I admire the work of many entrepreneurs. I realised that entrepreneurship is an adventure, a way of life and a means of survival. But I think something needs to be done to adequately ensure readiness. Look getting psychological equipment is one thing. But let's consider the initial capital, the space and the networks. More need to be done" [P5]* | ✓ -Sense of psychological readiness<br>✓ Excitement for entrepreneurship<br>✓ Materially not ready |

| | |
|---|---|
| *"I feel that the entrepreneurship module has made opened my eyes to see how I can be financially independent through being a player in the economy, but I think this idea that you educate at a certain university then you go for incubation somewhere else and then you seek funding from banks and government is wrong. Why can't we create a model where you get a full package on one spot. I think that would make me more ready than I am now. To me readiness is enhanced if entrepreneurship education is heavily linked to practical activities of real businesses." [P7]* | ✓ Intellectual excitement<br>✓ Practically not ready<br>✓ Theoretically ready<br>✓ Not ready with distributed route to entrepreneurship |
| *"Entrepreneurship is not just about knowledge acquisition; it entails real engagement in opportunity generation and persevering through various challenges to convert an opportunity into actual profit generating activities. There are opportunities to be converted, business plans to be formed, value chains to be analysed, viability test to be conducted, funding to be secured, markets to be assessed and so on. Readiness can only be attained if there is practical work related to these aspects of entrepreneurship. I see that the main challenge relates to these things." [P12]* | ✓ Not ready – inadequate resources<br>✓ Theoretical readiness<br>✓ More practical support required |
| *"While I can argue that I have been capacitated mentally to be an entrepreneur. In other words, I have mental readiness, something remains missing. My question is – Why is it that entrepreneurship is not taught by entrepreneurs. I think in order to be fully ready to engage in entrepreneurship, I need lectures from the entrepreneurs themselves. Universities should promote adequate linkages and networks to allow entrepreneurs to teach entrepreneurship in universities."[P6]* | ✓ Mental readiness<br>✓ Doubt readiness. Believes in the use of role models<br>✓ Not ready. Inadequate linkages |
| *"Entrepreneurship education modules are wonderful and have done well to make me ready to engage in entrepreneurship, but I still face conflict from the society and community that I come from. Look, after graduating from the university, my family and other people in my community expect me to get employed somewhere and be a manager somewhere. Very few will appreciate me going to university and then coming back to struggle again, trying to establish and run a self-employment venture. I think entrepreneurship education should be done in conjunction with advocacy and community mobilisation to change views and attitudes in entrepreneurship." [P8]* | ✓ Intellectual excitement<br>✓ Not ready – poor community and family acceptance of entrepreneurship as a career option<br>✓ Resource limitations<br>✓ Poor university-community links |
| *"Personally, I am not ready to engage in entrepreneurship after graduation because I foresee big challenges in the real activities of entrepreneurship. I need funds, I need tools and equipment and I need space. The University does not offer those things, so how can I be ready?"[P4]* | ✓ Resource limitations (not ready)<br>✓ Negative attitudes (not ready) |
| *"I am ready to go my brother, I come from a background where there are existing entrepreneurs who are making money already. In fact, my* | ✓ University – home education<br>✓ Readiness through family entrepreneurship |

| | |
|---|---|
| *parents run some entrepreneurial projects at home. I think I am now ready to take those projects to another level."[P7]* | |
| *"I cannot say that I am fully ready because after graduation, I still have to seek the services of an incubator to help me set up my venture. Something which the University has not done. So, readiness is elusive."[P11]* | ✓ Feeling unsure<br>✓ Unsure about readiness<br>✓ Distributed entrepreneurship education not the best approach |
| *"I think there is need for an overhaul of the entire entrepreneurship education system in order to make individuals like me ready. Why can't the university have its own real entrepreneurship ventures which it uses to allow practical exposure of entrepreneurship. Learning by doing is more powerful than these simple lectures."[P2]* | ✓ Nor ready – model of entrepreneurship education is unconvincing |
| *"Look, I hear that in China students are more entrepreneurial than us here in South Africa. Why can't our education be organised in such a way that we have international exchanges of entrepreneurial students and lecturers where we get to know how they are doing it in China or in the United States of America?"[P1]* | ✓ Not ready due to a localised approach<br>✓ Adopt an international approach |
| *"The Covid-19 pandemic have increased my readiness to be an entrepreneur. I saw people losing their employment as businesses closed. I then realized that having your own venture is critical. It gives you independence and financial or job security compared to being employed. In addition, businesses nowadays are more based on technology which makes entrepreneurship easier to start."[P5]* | ✓ Environment-enhanced readiness<br>✓ Technology-enhanced readiness |
| *I cannot become an entrepreneur straight from graduation. I think I need to go out and work somewhere first before I can become an entrepreneur. There is less hustle as a member of an organisation than as an entrepreneur."[P14]* | ✓ Not ready<br>✓ Poor appreciation of the entrepreneurship career option |
| *"I think I still need to meet a real entrepreneur before I can describe myself as ready to start my own venture. University education on entrepreneurship is more theoretical yet entrepreneurship is practical." [P15]* | ✓ Initially feeling uncertain<br>✓ Feeling abstracted<br>✓ Feeling comfortable with time |
| *"I am not sure about my readiness. I will see when I graduate and start initiatives to start a venture."[P10]* | ✓ Unsure about readiness |

A majority of the students agreed that the entrepreneurship module opened up their mindset and views about entrepreneurship. P5 and P7 affirmed that the module opened their mindsets and showed that they could be self-dependent. However, P7 stated that readiness can only be attained if EE is taught as a practical and funding package. He further lamented that the incubation of an entrepreneurship idea can be achieved in one university. The fact that both respondents used the word "mindset" is intriguing because it suggests that being an entrepreneur was once seen as unattainable or unrealistic. This is consistent with previous research (Palmer et al., 2021) showing that entrepreneurship education boosts self-efficacy by giving them practical skills and experience that prepares them to start their own businesses.

A similar view was held by P12, who stated, "Readiness can only be attained if there is practical work related to the aspects of entrepreneurship'." Thus, P6 noted that as much as they are mentally capacitated by the module, a key question is why entrepreneurs do not teach entrepreneurship. Such views are dominant in the module because students believe that the person who once travelled on a rough road is the most suitable to advise others on how to navigate it.

On the other hand, P8 feels that while the modules have equipped him with the necessary skills, the family expects him to work elsewhere. In his own words, "Only a few can appreciate me going to a university then coming back to struggle again." This view tells us that entrepreneurship is not seen by families or communities as something sustainable or something that can drive them out of poverty. This view is the norm, especially in rural areas from which participants come. There is a concern that parents will send their children to attain certificates and degrees so that they can work in the public sector. However, given that entrepreneurship is a risky business opportunity, it is understandable why families and communities feel the way they do.

Participant P4 put it bluntly: "I am not ready to engage in entrepreneurship after graduation because I foresee challenges." The student goes on to state that challenges such as funding, equipment, and office space are issues that need to be addressed. While these views are true, entrepreneurship involves navigating such terrain and creating it someday. Therefore, as pointed out by Cheteni and Umejesi (2022), entrepreneurs in rural areas of South Africa would not pursue a venture if the risks were considered high. The students interviewed were from similar communities in South Africa.

A student (P2) described the module as "a slap in the face because we had invested so much time into it, despite understanding the rationale behind the rejection," in an interview with the class. The interview probes provide more insight into how they make sense of the content. Despite the apparent truth of this reasoning, students have a harder time wrapping their heads around the dynamic forces that impact their process. As a result, various explanations were put forth by the students as to why things went wrong after graduation.

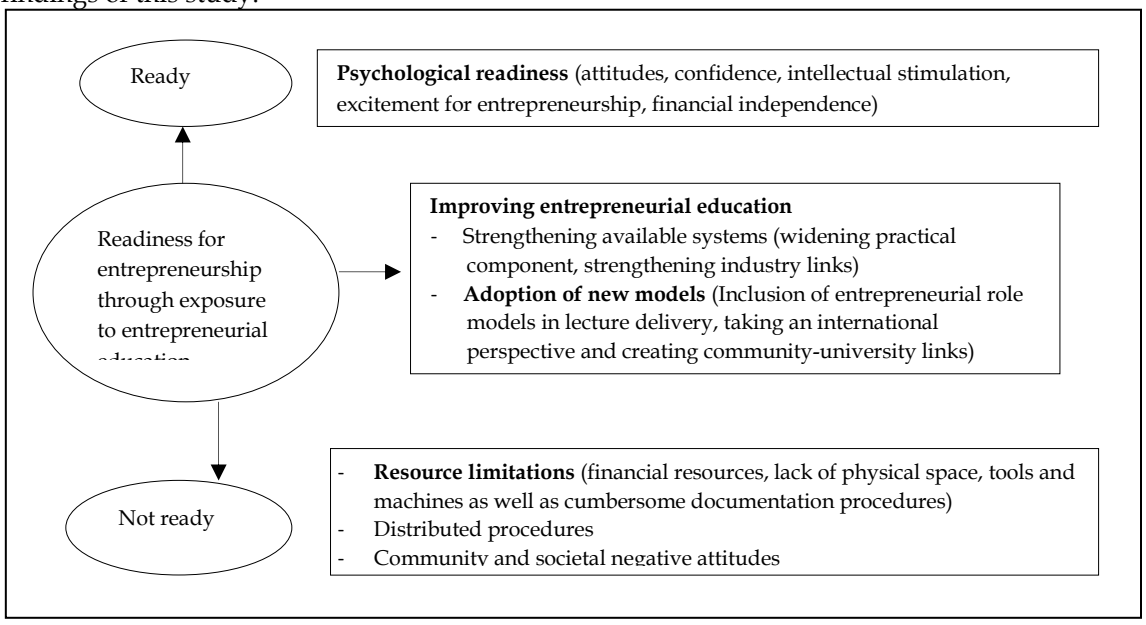
**Discussions**

This study, as in Loss (2021), found that the practical component of entrepreneurial education is essential to realizing the desired outcomes from entrepreneurial education. Respondents felt that practical work should be strengthened within the entrepreneurship modules. This study found that readiness to engage in entrepreneurship among students is likely to be achieved under circumstances of strengthened practical exposure. A dichotomy of views emerged from this study, with some students describing themselves as ready, while others felt unready, which relates to Shambare's (2013) findings that students often possess optimistic and pessimistic views of entrepreneurship education. This study further found that readiness to engage in entrepreneurship is affected by factors such as family history or background as well as the nature of the communities of origin. Shambare (2013) commented that exposure to entrepreneurship education does not guarantee that students will engage in entrepreneurship.

This study supported this position and found that a significant number of respondents preferred financial security associated with paid employment to earned finances. This study also found that it is essential to ensure that the learning environment in higher education is favorable and capable of stimulating entrepreneurial creativity. These observations are also shared by Roman and Maxim (2017), who noted that some higher education environments can stimulate the emergence of ially oriented graduates. This study found the need to ensure that entrepreneurship education is accepted and valued in the community to foster changes in students' attitudes. It has been observed that students feel that there is a need to strengthen community links and networks that promote a holistic approach to entrepreneurship.

These findings are consistent with those of Mars and Rhoades (2012), who suggested that a higher education system should foster an agentic perspective in which universities and students see themselves as important agents of social change. This is important, as it translates to ensuring that universities and students lead to notable matters of development. The students also shared views on what can be done to improve the entrepreneurial education system in South African HEIs. Respondents felt that the system should include community personnel and entrepreneurial role models who can inspire students in order for them to become more equipped to pursue entrepreneurial careers. Another important finding from the

data collected is the need to create a centralized entrepreneurship system that combines all important role players, such as funders, business incubators, and government departments, so that students can receive a hybrid entrepreneurship system that makes them fully prepared as they graduate. Figure 4 summarizes the key findings of this study.




**Theoretical implications**

Conceptualizing and empirically testing the antecedents of students' entrepreneurial readiness, this study provides insights that theoretically enhance the discourse on entrepreneurial readiness. Therefore, this study provides empirical evidence that emphasizes the significance of students' perceptions of the quality of entrepreneurial education and the competence of teaching staff in propelling students toward an entrepreneurial mindset. It has been empirically shown that student readiness for entrepreneurship increases when professors are enthusiastic about teaching the course, encourage students to engage in entrepreneurial-related activities, and model entrepreneurial behavior. The extant literature generally agrees that a competent lecturing team correlates with students who are ready to start their own businesses, so this finding is not surprising (Ahmad et al., 2018; Bignotti & Le Roux, 2016). South African schools can improve students' access to business by bolstering their teachers' skills through activities such as career fairs and talks with local business owners.

College freshmen from low-income households who lack employment background knowledge would benefit greatly from this opportunity. The growth in university-based entrepreneurial endeavors has been the subject of increasing scholarly interest over the past three decades around the world (Ferreira et al., 2019). They go on to say that these "entrepreneurial universities" are actively seeking out opportunities to make a positive impact on the economy beyond their core competencies of teaching and research. This new research bolsters the idea that universities are becoming more comfortable with their role as stimulators of entrepreneurial drives and economic growth. Turpin and Garrett-Jones (2000) and Etzkowitz, Webster, Gebhardt, and Terra (2000) point out that universities that want to be entrepreneurial need to take entrepreneurial action and that universities' roles are growing in importance as society's knowledge production system evolves. Ferreira et al. (2018) elaborate on the significance of this duty by identifying two primary ways in which entrepreneurial universities boost academic entrepreneurial capability: the development of practically skilled human capital and the dissemination of academic research findings to businesses. The new understandings revealed by this investigation confirm and expand upon the aforementioned premises. First, the authors argue that innovative educational institutions can serve both the knowledge transfer needs of businesses and the creation of highly skilled human capital. To build upon this foundation, this study argues that academic entrepreneurial capability enhancement in universities'

success depends on two main factors: the adequacy of their curriculum and course content and the competence of their lecturing team.

This research highlights the importance of having a competent lecturing team to effectively implement the desired entrepreneurial drive motivation and economic development, as well as the importance of ensuring a curriculum that drives the entrepreneurial uptake propensity of students. This research emphasizes the significance of ensuring that the curriculum is not only relevant but also adequate in its pursuit of the stated goal of increasing students' entrepreneurial mindset (Gelaidan & Abdullateef, 2017).

Finally, this research highlights the fact that in some cultural settings, ensuring adequate curriculum and course content and a competent lecturing team may not be sufficient to propel entrepreneurial ambitions. Interesting insights can be gleaned from analyzing the nationality distribution of responses to questions about entrepreneurial preparedness, the relevance and adequacy of the curriculum and course content, and the competency of the lecturing team. Even though they have high confidence in the curriculum, course content, and lecturing team's ability, African Black students have reported a very low level of entrepreneurial readiness.

**Policy implications**

Several studies have highlighted the significance of entrepreneurship education, particularly due to the fact that there is a clear correlation between entrepreneurship education and entrepreneurship readiness (Gelaidan & Abdullateef, 2017). This study has important policy implications, one of which is that administrators and policymakers in charge of higher education should seriously consider entrepreneurship among subjects taught at universities. As a result, our research provides support for expanding relationship-related coursework in higher education. Policymakers and academic practitioners should collaborate to create curricula and course content that incorporate the relevant theoretical ingredients to motivate the entrepreneurial drive and maximize its impact on economic development. Particular focus should be given to ensuring that the curriculum and course content are relevant and adequate to maximize the motivational impact of the entrepreneurial mindset. Fundamentally, we must embrace incentives that facilitate learning and help students gain a deeper understanding of how to apply entrepreneurial principles in real-world situations. Universities in South Africa also need to recruit and retain highly qualified faculty members to carry out the course of study. The findings of this research also show that cultural factors tend to affect individuals' propensity to take an entrepreneurial tack. This situation warrants the attention of policymakers.

**Conclusion**

The motivation for this research was the need to evaluate how well HEIs prepare their students for entrepreneurial endeavors. According to the interviews conducted for this research, some students believe they are mentally prepared, but are hindered by a lack of opportunities to gain practical experience in entrepreneurship. To be more prepared to engage in entrepreneurship, respondents believed they needed strong industry links and exposure to practical tasks. It is suggested that HEIs implement the recommendations provided in this study, such as the need to expand the practical elements of entrepreneurial education and heavily involve the community to alter mindsets and elevate the standing of small business owners. It is essential for students to learn about the value of self-employment over traditional employment.

Areas of future research include studying the psychological and cultural factors that influence or affect entrepreneurship readiness among students and graduates, especially those residing in rural settings.

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# Does business cycles influence FDI inflows- A case study of India

**Leena Ajit Kaushal**
Management Development Institute Gurgaon, India

**Keywords**
Business cycle, India, FDI inflows

**Abstract**

*The present study investigates the dynamic association between foreign direct investment (FDI) inflows and business cycles in India. FDI plays a crucial role in fostering a nation's economic progress and promoting technical growth. Nonetheless, foreign investments also exhibit synchronous relationship with the business cycles, which are relatively more evident in the present uncertain times. Finding reveal that foreign investments in India have a countercyclical trend, meaning they tend to move in the opposite direction of the business cycle, both in the short and long term. Nevertheless, the immediate consequences of this countercyclical activity outweigh the long-term consequences.*

## Introduction

The significant surge in Foreign Direct investments (FDI) in the past three decades may be attributed to the phenomenon of globalization, which has had a profound influence on the macroeconomic transformations of many countries. Foreign Direct Investment (FDI) offers recipient nations substantial benefits, such as a substantial inflow of capital, transfer of expertise, and improved access to international markets, consequently positively influencing economic growth and development prospects (Zekarias, 2016). However, the crucial factor for the successful implementation and achievement of maximum advantages from these investments lies in the supportive policies implemented by the government. The advantages may be derived from the augmentation of the current reservoir of knowledge in recipient countries, the dissemination of information through employee training, the transfer of expertise, effective administration, and organizational techniques (Vujanović et al., 2022). Foreign Direct Investment (FDI) plays a crucial role in providing significant capital resources that have the ability to assist and support technical advancements for local enterprises in the nations where the investment takes place. MNEs enhance the knowledge and connectivity that facilitate the development of enterprises into unfamiliar and undeveloped overseas markets (Mijiyawa, 2017).

Several studies have examined the elements that are associated with global business cycles. There is a widely accepted agreement on the significant influence of business cycles on global trade. There often exists a bi-lateral association between these variables (Grinin et al., 2016); Allegret & Essaadi ,2011).

The relationship between capital flows and crises has been thoroughly examined since the occurrence of the 2008 financial crisis. This literature argues that the increase in capital flows raises the likelihood of crises because it causes inflationary effects on asset values. Nonetheless, the unexpected rises in capital and the formation of financial and real estate asset bubbles have also been noticed by Gallagher, 2011. Investigation reveals that variations in capital flows to developing nations are mostly influenced by shifts in fundamental economic variables, such as foreign output and domestic productivity (Li & Tanna, 2019). In the current volatile global climate, academics are explicitly examining the relationship between economic cycles and the periodic patterns of capital movements (Cerutti et al., 2019). It is worth noting that while business cycles influence FDI inflows, they are not the sole determinant.

The emergence of COVID-19, the ongoing trade conflict between the United States and China, geopolitical tensions, and the trend towards less global integration have significantly threatened and endangered the global economy and international trading system. The epidemic's effect on trade has garnered significant attention, similar to the global financial crisis of 2008-09. Researchers have shown that the pandemic resulted in a more severe decline in trade compared to the global financial crisis of 2008-2009. It is because the epidemic produced both a decrease in demand and a decrease in supply, whereas a decrease in demand mainly caused the recession in 2008-2009.

Therefore, studying the effects of economic cycles on foreign direct investment (FDI) in the current unstable global climate might provide insights on how pandemic-related economic disruptions affect the influx of FDI.

This study examines the influence of the business cycle on foreign investments in India, an emerging Asian economy, considered a potential China plus one destination. The study utilizes the Non-linear ARDL approach to evaluate the short and long-term relationship between FDI inflows and business cycles.

**Literature review**

The alternating stages of economic boom and decline characterize business cycles. FDI inflows are higher during economic booms with strong economic growth and consumer demand because investors perceive prospects for expansion and profitability. However, market demand, financial instability, and increased uncertainty may reduce FDI inflows during economic contractions or recessions. There are several instances, such as the 2008-09 subprime crisis, the recent trade wars, covid-19 pandemic, US-Russia war, among many others, where FDI inflows are influenced by business cycles.

Luk and Zheng (2020) examine the movement of funds between nations in developing countries and the link between FDI and debt financing. The model anticipates a rise in FDI during a financial crisis owing to the value differential between foreign and domestic investors. The study contends that their model aligns with evidence of pro economic cycle moments in developing economies.

Doytch (2021) looks at sectoral FDI inflows and the business cycle connection in 19 Eastern European and Central Asian nations. The findings show that aggregate services sector FDI rises during recessions and reduces during booms. Extractive, manufacturing, and financial/non-financial services FDI are acyclical and do not follow the business cycle.

Shi (2019) examines the correlation between currency devaluation and the amount of foreign direct investment (FDI) flowing into a country. It finds that fluctuations in short-term FDI significantly impact the extent of utility loss caused by monetary shocks in business cycles. They exert minimal influence on overall welfare throughout economic cycles caused by productivity shocks. To achieve optimal outcomes, the authors recommend maintaining long-term FDI while reducing abrupt changes in the locations where firms carry out their production activities.

Cavallari & d'Addona (2013) establish a favourable association between US foreign direct investments (FDIs) and the cyclical circumstances of the host country. According to the study, the responsiveness of foreign investments to changes in output is greater during periods of economic boom than during periods of economic decline. However, the surge in currency volatility deters US foreign investment.

Alfaro et al. (2004) discovered evidence of pro-cyclical FDI in 69 countries. Furthermore, they discovered that FDI flows positively affect the host country's GDP growth. In contrast, Neagu and Schiff (2007) discovered that FDI inflows were counter-cyclical when they examined a panel of 116 developing country states from 1980 to 2007.

During economic downturns, Bengoa and Sanchez-Robles (2003) discovered evidence of counter-cyclical FDI in Latin American countries. On the other hand, Albulescu & Ianc (2016) examined the impact of counter-cyclical fiscal policies and foreign direct investment (FDI) inflows on the overall economic stability in several nations within the Eurozone. The correlation between business cycles and FDI inflows may vary among different areas. The study conducted by Nunnenkamp & Spatz (2004) across 50 developing nations found that FDI had a stronger correlation with Latin American economic cycles than Asia. Buckley et al. (2004) studied the relationship between inward foreign direct investment (FDI) and economic growth in developing host countries. They found that FDI has substantially impacted promoting economic growth in these countries by facilitating the transfer of capital, managerial expertise, and technical skills.

Warżała (2014) examines the impact of the worldwide economic crisis and shifts in FDI on the economy of Poland. The study highlights that the decline in FDI inflows in Poland from 1990 to 2012 was due to reduced business investment capacity, decreasing profits, increased bank loan fees, and negative global economic growth projections.

Rodríguez & Bustillo (2015) asserts that Overseas FDI flows display a pro-cyclical trend, i.e. witnesses a rise during economic expansion and a decline during economic contractions. Furthermore, the study illustrates that interest rates and currency rates in the domestic nation have an adverse effect on OFDI flows.

Wang &Wong (2007) investigate the influence of economic growth volatility on FDI outflows from OECD nations. Their research demonstrates that increased volatility in economic development has a significant detrimental effect on outflows of FDI. The findings highlight the fact that economic shocks can have different impacts on FDI outflows, depending on whether it is a boom or a recession. This suggests that fluctuations of the same magnitude throughout these two periods have diverse outcomes.

The literature study indicates that economic variations, such as periods of expansion and recession, have a significant influence on foreign direct investment. However, it is crucial to acknowledge that several additional macro variables have a substantial impact on the association. Considering this, the current study investigates the aforementioned relationship while controlling for key macro variables, as described in the literature.

**Methodology**

The study utilizes a commonly used ARDL (non-linear Autoregressive Distributed Lag) econometric approach to analyse the non-linear connection between FDI inflows and the business cycle in both the long and short term. This approach allows for the use of lagged variables in conjunction with non-linear functions. Further, we model FDI inflows as a function of the variables under consideration as follows:

$$FDI \ \ f\ lnFDI_{-1}, O_{gap_p}, O_{gap_n}, lnGDP, lnReer, lnForex, Inf, Pvt_{inv}, Ir_{diff}$$

*Where FDI-1, O_gap_n, O_gap_p, lnGDP, lnReer, lnForex Inf, Pvt_inv and Ir_diff represent* the lagged FDI, positive output gap, negative output gap, real effective exchange rate, foreign exchange reserves, inflation, private investment and interest rate differentials, respectively, sourced from World Bank and https://fred.stlouisfed.org/. To ensure that the sufficiently long period of data is in a time series format, the study considers quarterly data series of the variables as mentioned earlier.

In order to gauge the business cycle and comprehend the cyclical fluctuations in an economy, the output gap is used as a proxy. Therefore, the Hodrick-Prescott (HP) filter is used in the study to calculate the output gap. The HP filter is a popular approach in macroeconomics for separating a time series into its trend and cyclical components.

The output gap is derived from the estimated cyclical component. It represents the deviation of the actual GDP from its potential level or trend. The output gap at time t is calculated as:

$$Output\ Gap\_t\ =\ (GDP\_t\ -\ \tau\_t)\ /\ \tau\_t$$

Here the trend component is depicted by τ_t and the cyclical component by y_t - τ_t.

**Findings and Discussion**

The study tests both the short and long-run asymmetric effects of the output gap (a proxy for the business cycle) on the FDI inflows. Table 1 below shows the short-run coefficients for the independent variables (IVs) on the dependent variable (DV) FDI inflow. The Output Gap effects are broken down into positive output gap (O_gap_p) and negative output gap (O_gap_n), signifying the periods of economic boom and economic downturns or recessions, respectively. Findings reveal significant short-run asymmetric effects with total FDI Inflows appear countercyclical in nature, given the negative coefficient for the positive gap and positive coefficients for the negative gap. GDP, foreign exchange reserves and private investments have a significant and positive relationship with FDI Inflows.

REER, inflation and the long-run interest rate differential (10-year G-Sec yield minus 10-year treasury bond yield US) have a negative relationship with FDI inflows, with inflation exhibiting the sole significant relationship. While a negative relationship between REER and FDI inflows is theoretically expected due to factors like exchange rate risk and reduced competitiveness; nonetheless, the insignificant relationship in could be attributed to several reasons, including market size, political stability, investment climate, regulatory environment and overall economic conditions. Henceforth, in the presence of these other determinants, the impact of REER on FDI inflows may be overshadowed, leading to an insignificant relationship, as in the case of India.

Significant worldwide inflation frequently exerts an adverse influence on the influx of FDI and the volume of exports. The study conducted by Phan et al. (2023) asserts that Vietnam's FDI and export value may be negatively influenced by excessive inflation, hence impeding economic development in the aftermath of the COVID-19 epidemic. Research indicates that inadequate inflation control might potentially result in Vietnam losing its competitive edge in attracting FDI. Nevertheless, if Vietnam can effectively manage inflation below the average of other nations, it will have a competitive edge in attracting FDI inflows. Tan & Tang (2016) analyse the causal relationships among domestic investment, foreign investment, exports, the rate of interest, and economic development in the ASEAN-5 nations.

A significant trend of forex accumulation is widely evident in the East and Southeast Asian region, over the last three decades (Matsumoto, 2022). The existing body of research examining the reasons behind this active accumulation of reserves indicates that the main motivations are a precautionary measure to mitigate the impact of sudden capital inflow disruptions on the economy and a growth-oriented strategy involving currency depreciation and export promotion. Osigwe & Uzonwanne (2015) examined the Granger causality relationship between Nigeria's foreign reserves, exchange rate, and FDI. They suggested that policymakers determine the optimal exchange rate level that effectively enhances foreign reserves and FDI.

A higher interest rate differential, which indicates higher interest rates in India compared to the US, can increase foreign investors' capital costs (Garg & Prabheesh, 2021). Higher borrowing costs and higher expected returns required by investors discourage FDI inflows, as they reduce the potential profitability of investments. Nevertheless, it is evident that while higher interest rate differentials may signal economic instability, a favourable investment climate can still attract foreign investors despite the higher interest rates, as in the case of India.

Private investments significantly influence FDI inflows since they demonstrate confidence in the growing local economy (Jenkins, 2006). Domestic private enterprises' investment in their own markets signals potential profitability and market opportunities. Foreign investors may be attracted to invest in such markets to tap into the consumer base and benefit from the growth potential. The findings reveal that assets generally lose value during economic downturns. These periods allow foreign investors to acquire cheaper assets and enter into host country and establish operational footprints, so in India. National authorities frequently utilise the tactic of providing appealing incentives to entice investors to perceive their country as a highly profitable choice. Foreign investors frequently perceive India as an emerging market with significant long-term growth prospects. Consequently, even during economic downturns, they remain eager to invest, assuming these downturns to be temporary. They aim to exploit lower asset valuations and capitalize on potential growth opportunities.

The study indicates that despite the short-term economic decline, investors view India as a market with significant long-term growth prospects. This is because investor sentiment and risk perception greatly influence decisions on FDI. Therefore, during economic contractions, investors may be inclined to capitalize on reduced risk. However, international investors have a distinct inclination towards avoiding risk during periods of economic growth.

*Table1: Non-Linear ARDL Model*

| *Variables* | *Coefficients* | *Std error* |
|---|---|---|
| *Const* | *-218.161**** | *72.621* |
| *Log fdi (-1)* | *-1.278**** | *0.145* |
| *O_gap_p* | *-42.485**** | *15.306* |
| *O_gap_n* | *14.008** | *7.024* |
| *Lngdp* | *6.618**** | *2.312* |
| *Log(reer)* | *-0.593* | *1.338* |
| *Log(forex)* | *2.452*** | *1.003* |
| *Inflation* | *-0.055*** | *0.022* |
| *Pvt_invest* | *0.050** | *0.027* |
| *Ir_diff* | *-0.04* | *0.079* |
| *Δ fdi (-1)* | *.0555** | *0.023* |
| *Δ O_gap_p* | *-0.052*** | *0.014* |
| *Δ O_gap_p(-1)* | *0.093*** | *0.242* |

| |
|---|
| *Adjusted R-square:0.644* |
| *F-statistics:9.679* |

*Note: *** , **, * refers to 1%, 5% & 10% significance level*
*Std. errors are reported in parenthesis*

The diagnostic tests, namely the JB test, LM test, and Arch test, provided in Table 2 below, provide additional evidence supporting the significance of short-run asymmetry effects. The model is free from autocorrelation and heteroskedasticity.

*Table 17: Model Diagnostic tests*

| | JB test | LM test | Arch Test |
|---|---|---|---|
| Stat | 0.969 | 6.632 | 1.016 |
| P value | 0.298 | 0.235 | 0.313 |
| Lags | 0 | 1 | 1 |
| Short Run Asymmetry Test<br>W- stat: 7.792<br>P-value: 0.020 | | | |

The significance of the long-run relationship between the IVs and DV is confirmed by the Bounds test presented in Table 3.

The test is significant at the 1% level, given that the F-Statistic lies above the upper-bound critical value of 7.197. The ARDL bound test also allows for successfully handling a wide range of optimal lags. Furthermore, it does not impose the limiting requirement that all variables must have the same integration order, especially when variable integration is borderline I (0)/I (1).

*Table 3: NARDL bound test of co-integration*

| Cointegration Test | | |
|---|---|---|
| Observation: 44 | | |
| Number of Regressors (K) | | |
| | I(0) | I(1) |
| 10% critical value | 3.33 | 4.34 |
| 5% critical value | 4.08 | 5.2 |
| 1% critical value | 5.92 | 7.19 |
| F- statistic= 9.678 | | |

The findings presented in Table 4 demonstrate that the long-term impact of the business cycle is asymmetrical. Both positive and negative coefficients are statistically significant. The long-run asymmetry test confirms the significance of this effect. FDI inflows appear to be countercyclical in the short and long run, but the countercyclical effects are more significant in the short run relative to the long run. Also, the negative effects of the output gap on FDI inflows are far higher than the positive effects. In the short run, FDI inflows are influenced by the timing of investment decisions. During economic contractions or downturns, foreign investors may take advantage of lower asset valuations and invest in positioning themselves for future growth. The countercyclical behaviour in the short run reflects the opportunistic nature of investors capitalizing on undervalued assets. However, in the long run, FDI decisions may be driven by more fundamental factors such as market potential, infrastructure, and policy stability, which can dampen the countercyclical effect.

*Table 18: Long-Run Asymmetry results*

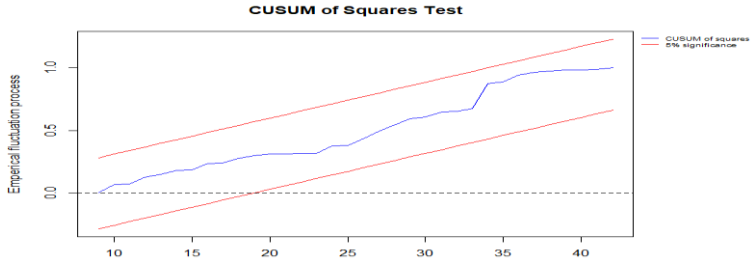
| ***Variables*** | ***Coefficients*** | ***Std error*** |
|---|---|---|
| ***O_gap_p*** | *-33.231**** | *12.211* |
| ***O_gap_n*** | *10.957*** | *5.517* |
| ***Lngdp*** | *5.177**** | *1.861* |
| ***Log(reer)*** | *-0.464* | *1.045* |
| ***Log(forex)*** | *1.918*** | *0.751* |
| ***Inflation*** | *-0.043*** | *0.017* |

| | | |
|---|---|---|
| ***Pvt_invest*** | *0.039** | *0.022* |
| ***Ir_diff*** | *-0.033* | *0.0621* |
| ***Long Run symmetry test***<br>***W stat: 4.767***<br>***P value: 0.092*** | | |

*Note: ***, **, * refers to 1%, 5% & 10% significance level*
*Std. errors are reported in parenthesis*

The stability of the parameters is confirmed by the CUSUM of Squares Test below (Fig.1).

*Figure 1: CUSUM of Squares Test*




## Conclusion

The analysis reveals that FDI inflows exhibit a countercyclical pattern, displaying a significant positive correlation with Gross Domestic Product (GDP), foreign currency reserves, and private investments. Conversely, FDI inflows have a robust negative correlation with inflation rates. During periods of economic recession or depression, the value of assets such as real estate, infrastructure, and enterprises may decrease. As a result, foreign investors may see this as a favourable opportunity to invest due to the reduced prices of these assets (Lane, 2003). Furthermore, having sufficient reserves instils trust in foreign investors, ensuring them ample liquidity to mitigate possible risks and uphold stability in the financial system. This, in turn, draws foreign direct investment inflows to India. Additionally, the increased GDP growth, which signifies a more prominent and growing market, entices investors to emerging nations such as India as it communicates a rise in consumer demand and company prospects. Conversely, higher inflation diminishes local currency's buying ability, escalating manufacturing costs, such as labour, raw materials, and other resources. Consequently, this renders it costlier for foreign investors to conduct operations within the host nation. As a result, their ability to generate a profit may suffer, reducing the attraction of FDI. The findings provide valuable insights for policymakers.

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# What makes Vietnam a more attractive FDI destination than India

**Leena Ajit Kaushal**
Management Development Institute Gurgaon, India

**Keywords**
India, Vietnam, China plus one strategy, FDI inflows

**Abstract**

*The study examines the crucial drivers that make Vietnam a preferred FDI destination over India following the 'China plus one' strategic initiative by the global MNCs to diversify their supply chains and expand operations beyond China. Findings reveal that Vietnam offers numerous benefits, including closeness to China, competitive manufacturing costs, a favorable investment climate, and excellent manufacturing capabilities. However, challenges like infrastructural development and talent shortages must be addressed. In addition, labor, trade, and financial freedom are the prospective areas where India need to expedite its reforms to provide conducive business environment.*

## *Introduction*

*The International Monetary Fund (IMF) categorizes India, Philippines, China, Malaysia, Vietnam and Thailand as "emerging Asian economies" (EAEs). Despite the gloomy outlook for the global economy, Asia and the Pacific continue to be a vibrant and active area*[5].

*Foreign direct investment (FDI) is increasingly directed into emerging Asian countries. These economies provide a large market, a growing middle class, potential growth opportunities, and sustained competitiveness. Investors seek cost-effective economies such as China, India, and Vietnam, among others, for investments aimed at improving efficiency. India's huge market and highly educated, English-speaking workforce consistently attract investment in specialized areas, especially technology. (Le et al., 2021). These economies experience rapid shifts from rural to industrial and service-oriented urban areas, accompanied by the emergence of an expanding middle class. This middle class drives the demand for a wide range of goods and services, stimulating economic development and investment. Many EAEs have implemented substantial market liberalization, relaxed barriers, and enacted regulatory changes to stimulate investment, company activities, and economic expansion (Nguyen, 2020; Maroof, et a., 2019).*

Due to lower labor costs, multinational companies (MNCs) can establish economically sound manufacturing operations and boost their global competitiveness. It could be executed through vertical FDI or platform FDI. Furthermore, growing consumer demand in these economies enable businesses to establish local operations and meet local demand. Such investments are driven by market seeking motivation and mostly classified as horizontal investments (Nguyen, 2020). Horizontal FDI refers to the duplication of specific elements of the production process in foreign countries to meet local market demands (Helpman et al., 2004). It is often motivated by a want to reduce transportation costs. Vertical foreign direct investment (FDI) is distinct from other forms of investment since it entails the fragmentation of the production process over many sites. The motivation behind it is to exploit disparities in manufacturing prices across various countries (Venables, 1999).

Following the tumultuous business climate in China since the beginning of the US-China trade war, the Covid-19 outbreak, China's zero Covid-19 policy, and the related global supply (GVCs) disruptions, companies have adopted the strategic approach of China+1 to diversify their operations and supply chains in order to reduce risks and improve resilience (Basu & Ray, 2022). The Indian government had high hopes of becoming a strategic plus-one partner; however, most investments have gone to Vietnam rather than India. It is evident that Vietnam is attracting substantially more significant international investments owing to the country's expanding economy and welcoming business environment. The present study thus aims to investigate the factors that makes Vietnam is most preferred destination over India.

5 https://www.imf.org/en/Publications/REO/APAC/Issues/2023/04/11/regional-economic-outlook-for-asia-and-pacific-april-2023

*Overview of 'China plus one' strategy*

Foreign investors are currently contemplating adopting the "China plus one" (China+1) strategy. This approach involves multinational corporations (MNCs) diversifying their supply chains and reducing their reliance on China as their only manufacturing and sourcing hub. The strategy involves establishing supplementary manufacturing or procurement operations overseas in addition to the existing headquarters in China. The aim is to mitigate potential risks arising from rising expenses, disruptions in the global supply chain, trade conflicts, and geopolitical instability. The unpredictable global landscape, changing trade dynamics, multiple ongoing geopolitical events, and increasing challenges of doing business in China give rise to concerns about overdependence on a single market, whether for market access or production location. It has led to the adoption of a China-Plus-One strategy. The choice of a "plus one" location primarily depends on advantageous investment conditions, competitive manufacturing prices, the availability of trained labor, infrastructure development, and proximity to key markets. Investors are turning their attention to growing Asian countries such as Vietnam as part of their strategy. Vietnam offers low manufacturing prices, regional and global market access, and an attractive investment climate. Moreover, Vietnam's youthful and proficient workforce, low salaries, improvements in infrastructure, political stability and good governance foster a favorable economic climate.

**Foreign Direct Investments in Vietnam**

Overall, investing in developing Asian economies such as Vietnam as part of a plan allows firms to diversify their risks, gain access to new markets and cost-effective manufacturing, and profit from favorable investment conditions. In April, reported FDI inflows into Vietnam were just over US$3.4 billion, the most significant monthly gain in 2023[6]. In 2021, Vietnam received $22.4 billion in FDI, a 13.5% increase from the year before. This is the largest influx Vietnam has ever seen in the previous five years. Additionally, Vietnam attracted the greatest amount of foreign investment in 2020 in Southeast Asia. According to the World Bank, the manufacturing sector contributed over 25% of the GDP in 2021. In December 2022, Vietnam's exports reached $700 billion, a rise of $31.5 billion over the previous year. With a total export value of $292 billion, it was the greatest exporter in 2020. The production of electronics, textiles, and footwear has increased in Vietnam. The Vietnamese government is simultaneously concentrating on enhancing manufacturing capabilities and pressuring businesses to advance up the value chain for better-quality finished goods.

**Vietnam's Economic Strength**

The regional advantage of Vietnam's location in Southeast Asia, close to the Asia Pacific region, China, and the ASEAN groups, strengthens its position in the global value supply chain and economic ties with other Asian nations[7]. Vietnam also benefited from low labor costs vis-a-vis other Asian competitors, including India. Low-cost labor is thus a significant driver for attracting investments, including the ones moving out of China [8]. Over the years, various reforms undertaken by the Vietnamese government have improved the investment environment, making it conducive for investors. The government offers numerous incentives, including tax cuts and streamlined relaxed procedures enabling ease of doing business. The government's commitment to attracting foreign investment has resulted in a more business-friendly environment (Mallon, 2004).

Timely and practical investment for infrastructure upgradation, particularly ports, railways, roads, special economic zones, and industrial parks, has started reaping benefits. Besides easing transportation and logistics, advancement in communication has also been a game changer for businesses to thrive and prosper (Bui & Nguyen et al., 2022). Vietnam's entry into the World Economic Organization (WTO) in 2007 signaled its emergence as a dedicated and robust economic partner for the global community. Subsequently, the nation has engaged in many bilateral and regional trade agreements. Overall, Vietnam has entered into

*6* https://www.vietnam-briefing.com/news/vietnam-fdi.html/#:~:text=Vietnam%20Adds%20US%243.4%20Billion%20in%20FDI%20in%20April,-May%204%2C%202023&text=Registered%20capital%20from%20foreign%20direct,2023%20to%20US%248.88%20billion.

*7* https://www.worldbank.org/en/country/vietnam/overview

*8* https://www.vietnam-briefing.com/news/why-manufacturing-is-driving-vietnams-growth.html/

18 bilateral, regional or multilateral trade agreements. The latest accords, namely the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the EU-Vietnam Free Trade Agreement (EVFTA), are seen to enhance Vietnam' attractiveness as a center for manufacturing and exporting9. Vietnam is recognized as an economy with a burgeoning population of over 97 million people. However, in terms of overall size, it is far smaller than India, which has a population of 1.3 billion. Vietnam is also home to young, talented professionals, but India equally competes with it in terms of its vast educated and talented IT professionals. The market size of this magnitude may constrain investors looking to develop massive setups that appeal to a wide range of buyers.

Nonetheless, Vietnam's evolving manufacturing sectors, electronics, Information technology, and renewable sectors are very promising for investors. The rapid growth Vietnam offers early movers (MNEs) has an excellent potential for future growth. Moreover, the improved regulatory environment and political stability also significantly enable a conducive business climate and enhance investors' confidence.

The investigation reveals that as a preferred "China plus one" destination, Vietnam offers proximity to China, competitive manufacturing costs, a favorable investment climate, and better manufacturing capabilities. However, challenges like infrastructural development or talent shortages should be addressed. However, Vietnam has effectively utilized its favorable business climate and growing consumer market to attract the departing multinational enterprises (MNEs) from China and new investments. Since the industry-specific characteristics, distinct business objectives, and firm-specific requirements primarily influence investors' preferences (Grim et al., 2020), investors must analyze country-specific locational advantages since Vietnam and India offer significant specific benefits and future growth prospects.

The study also draws comparison between Vietnam and India based on various components of *Index of Economic Freedom* for the year *2021*(Table 1) and over the period 2014-2021 (Table 2) "published and created by the Heritage Foundation and the Wall Street Journal" and *World Governance Index* (Table 3 & 4) by World Bank. These scores provide a snapshot of the economic freedom and business environment in each country. We choose this time period because the Modi government since then has introduced various FDI liberalization and structural reforms to attract global investments.

*Table 1: Comparison based on the Heritage Index rankings of Vietnam and India:*

| INDEX YEAR 2021 | INDIA | VIETNAM |
|---|---|---|
| OVERALL SCORE | 56.5 | 61.7 |
| PROPERTY RIGHTS | 59.2 | 51.3 |
| JUDICIAL EFFECTIVENESS | 55.9 | 35.9 |
| GOVERNMENT INTEGRITY | 48.1 | 38.0 |
| TAX BURDEN | 78.7 | 80.3 |
| GOVERNMENT SPENDING | 78.5 | 86.0 |
| FISCAL HEALTH | 18.0 | 82.8 |
| BUSINESS FREEDOM | 76.7 | 65.2 |
| LABOR FREEDOM | 41.3 | 62.6 |
| MONETARY FREEDOM | 72.1 | 69.0 |
| TRADE FREEDOM | 69.4 | 79.0 |
| INVESTMENT FREEDOM | 40.0 | 40.0 |
| FINANCIAL FREEDOM | 40.0 | 50.0 |

*Source: Index of Economic Freedom, Heritage Index.*

*Note: Lower to higher score represent worst to best ranking.*

The highlighted parameters in Table 1 reflect the aspects where Vietnam ranks better than India.

9 https://www.state.gov/reports/2022-investment-climate-statements/vietnam/

*Table 2: Index of Economic Freedom (2014-2021)*

| *Country* | *India* | *Vietnam* | *India* | *Vietnam* | *India* | *Vietnam* | *India* | *Vietnam* | *India* | *Vietnam* | *India* | *Vietnam* | *India* | *Vietnam* | *India* | *Vietnam* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Index Year* | 2021 | 2021 | 2020 | 2020 | 2019 | 2019 | 2018 | 2018 | 2017 | 2017 | 2016 | 2016 | 2015 | 2015 | 2014 | 2014 |
| *Overall Score* | 56.5 | 61.7 | 56.5 | 58.8 | 55.2 | 55.3 | 54.5 | 53.1 | 52.6 | 52.4 | 56.2 | 54 | 54.6 | 51.7 | 55.7 | 50.8 |
| *Property Rights* | 59.2 | 51.3 | 63 | 52.6 | 57.3 | 49.8 | 55.4 | 46.4 | 55.4 | 49.7 | 55 | 15 | 55 | 15 | 50 | 15 |
| *Judicial Effectiveness* | 55.9 | 35.9 | 64.1 | 40.1 | 61.6 | 40.3 | 54.3 | 36.3 | 44.4 | 32 | NA | NA | NA | NA | NA | NA |
| *Government Integrity* | 48.1 | 38 | 47.2 | 33.8 | 47.8 | 34 | 47.2 | 30.4 | 44.3 | 24.6 | 38 | 31 | 36 | 31 | 31.5 | 26.9 |
| *Tax Burden* | 78.7 | 80.3 | 79.4 | 79.5 | 79.4 | 79.7 | 79.4 | 79.7 | 77.2 | 79.6 | 77.1 | 79.3 | 79.4 | 79.1 | 79.4 | 77 |
| *Government Spending* | 78.5 | 86 | 77.9 | 75.9 | 77.3 | 74.1 | 77.7 | 74 | 77.4 | 74.6 | 78.1 | 75.1 | 78.3 | 77.1 | 77.8 | 71.4 |
| *Fiscal Health* | 18 | 82.8 | 13.1 | 58 | 14.7 | 40.7 | 13.2 | 27.3 | 11 | 21.1 | NA | NA | NA | NA | NA | NA |
| *Business Freedom* | 76.7 | 65.2 | 65.6 | 65.6 | 57.1 | 63.5 | 56.4 | 63.2 | 52.8 | 61.2 | 47.6 | 58.3 | 43.3 | 61.5 | 37.7 | 62 |
| *Labour Freedom* | 41.3 | 62.6 | 41.2 | 62.5 | 41.8 | 62.8 | 41.8 | 60.4 | 41.6 | 62.2 | 47.8 | 62.6 | 48.7 | 62.9 | 74 | 68.3 |
| *Monetary Freedom* | 72.1 | 69 | 73 | 68.2 | 72.4 | 68.9 | 75.9 | 75.4 | 75 | 76 | 72.8 | 70.6 | 65.3 | 66.8 | 65.5 | 63.6 |
| *Trade Freedom* | 69.4 | 79 | 73.4 | 79.6 | 72.4 | 79.2 | 72.4 | 78.7 | 72.6 | 83.1 | 71 | 83 | 64.6 | 78.6 | 65.6 | 78.7 |
| *Investment Freedom* | 40 | 40 | 40 | 40 | 40 | 30 | 40 | 25 | 40 | 25 | 35 | 25 | 35 | 15 | 35 | 15 |
| *Financial Freedom* | 40 | 50 | 40 | 50 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 30 | 40 | 30 |

*Source: Index of Economic Freedom* https://indexdotnet.azurewebsites.net/index

*NA- not available*

Table 3 below draws comparison between Vietnam & India based on some key governance indicators from the World Bank's Worldwide Governance Indicators (WGI).

*Table 3: Comparison based on the WGI rankings, World Bank of Vietnam and India (2021)*

| INDICATOR | VIETNAM | INDIA |
|---|---|---|
| **VOICE AND ACCOUNTABILITY** | 13.04 | 51.69 |
| **POLITICAL STABILITY AND ABSENCE OF VIOLENCE/TERRORISM** | 44.81 | 24.53 |
| **GOVERNMENT EFFECTIVENESS** | 62.02 | 62.50 |
| **REGULATORY QUALITY** | 37.98 | 49.52 |
| **RULE OF LAW** | 48.58 | 51.92 |
| **CONTROL OF CORRUPTION** | 47.12 | 46.63 |

Table 4: Comparison based on the WGI rankings (2014-2021)

| Country | VA | VA | PS | PS | GE | GE | RQ | RQ | RL | RL | CC | CC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **RANK** | India | Vietnam | India | Vietnam | India | Vietnam | India | Vietnam | India | Vietnam | India | Vietnam |
| **2014** | 60.10 | 9.36 | 13.81 | 44.29 | 45.19 | 52.88 | 33.65 | 30.77 | 55.77 | 42.79 | 39.90 | 41.83 |
| **2015** | 60.59 | 10.34 | 17.14 | 50.00 | 57.21 | 56.25 | 38.46 | 35.10 | 55.29 | 43.27 | 44.23 | 41.83 |
| **2016** | 61.58 | 10.34 | 14.76 | 54.76 | 56.73 | 53.85 | 42.31 | 32.69 | 52.88 | 57.21 | 45.19 | 37.50 |
| **2017** | 58.62 | 10.34 | 18.57 | 54.76 | 56.25 | 53.85 | 43.75 | 35.58 | 53.37 | 55.29 | 47.12 | 31.25 |
| **2018** | 57.97 | 8.21 | 14.15 | 49.53 | 64.90 | 53.37 | 45.19 | 37.50 | 54.81 | 52.88 | 49.04 | 37.02 |
| **2019** | 56.04 | 11.59 | 19.81 | 48.11 | 59.62 | 54.33 | 47.60 | 38.94 | 51.92 | 52.40 | 46.15 | 33.17 |
| **2020** | 53.14 | 11.59 | 19.81 | 45.28 | 66.35 | 62.02 | 47.60 | 43.27 | 53.37 | 48.56 | 46.15 | 42.79 |
| **2021** | 51.69 | 13.04 | 24.53 | 44.81 | 62.50 | 62.02 | 49.52 | 37.98 | 51.92 | 48.56 | 46.63 | 47.12 |

*Source:* https://info.worldbank.org/governance/wgi/Home/Documents

*Note: The WGI indicators with higher values corresponds to better outcomes.*

Compared to the Vietnam's economic freedom score of 61.7, it was the 90th freest economy per the 2021 Index of Economic Freedom, however, in 2023 it is ranked 72nd with the economic freedom score 61.8. Vietnam is placed 14th out of 39 Asian countries, and its overall score is higher than the global and regional averages. On the contrary, in 2021 with 56.5 points India was ranked 121st freest economy, whereas with a total score of 59.8 out of 100, India still ranked 121st out of 184 countries (https://www.heritage.org/index). The Vietnamese economy has significantly improved its overall ranking and is becoming increasingly market oriented as it integrates into the global trade and investment system. The Vietnamese reforms includes partial privatization of state-owned firms, trade liberalization, and increased acknowledgement of private property rights. Even so, institutional flaws continue to stymie longer-term economic development.

While regulatory quality and the rule of law ratings in Vietnam is lower than in India (Table 3), several other factors may contribute to the preference for Vietnam over India, including economic growth and stability, strategic location and access to markets, investment incentives and free trade agreements, a competitive labor market, and political stability (Contractor et al., 2020). As a result, while regulatory quality and the rule of law are significant considerations for investors, they are not the only ones. Investors consider various aspects, including market potential, cost competitiveness, business convenience, resource availability, and government policies. Each investor may prioritize different criteria depending on their sector, ambitions, and risk tolerance.

## Conclusion

It is widely recognized that a business environment conducive to investment maximizes the benefits of private investment and guarantees the involvement of GVCs. In order to promote investment attraction and business-driven economic expansion, countries should prioritize the resolution of legal, regulatory, administrative, and institutional barriers that impede the investment process and operational efficacy of businesses. The growth of the private sector relies on a country's capacity to build a legislative and institutional framework that facilitates the investment, formation, and expansion of productive local and foreign companies, both inside the country and beyond.

Financial freedom, labor reforms, and trade liberalization are the primary proposed areas for India's development. In order to promote trade, India is already triangulating its industrial, FDI and trade policy. India implemented the Foreign Trade Policy (FTP) 2023 to increase exports and improve the business climate for exporters. Moreover, the policy emphasizes the "export control" regime. The strategy is designed around four fundamental components—Incentive to Remission, Export Promotion via Collaboration, Ease of Doing Business, and Emerging Areas—and relies on engagement and trust with exporters. The strategy aims to maintain firmly established initiatives while being flexible to accommodate the changing requirements of the current era. At the same time labor reforms are also the integral part of conducive business climate, which though has been given enough attention by the Indian government but still deserves timely adjustments to attract MNEs.

The ongoing realignment of India's industrial strategy, including the execution of production-linked incentive (PLI) measures, is of utmost importance. An allocation of Rs. 1.97 lakh crore has been designated to bolster India's industrial capacity and promote exports in fourteen key sectors, such as automotive, pharmaceutical, and textile industries. India has impressive manufacturing skills, particularly in the medium-tech sector. However, its involvement in global value chains is still restricted. The objective of PLI is to optimize the developmental advantages obtained from the activities of multinational firms and promote the incorporation of economies into global value chains by aligning the strategies of major corporations to attract Foreign Direct Investment. Henceforth, implementing these measures can assist India in establishing a conducive business environment and positioning itself as an attractive investment hub, effectively competing with nations such as Vietnam.

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# Lecturer Perspectives on the Relevance of Skills and Credentials in the Teaching of Entrepreneurship

**Sizwe Mkwanazi**
University of Johannesburg, South Africa

**Keywords**
Business-school, Credentials, Entrepreneurship, Lecturer, Skills

**Abstract**

*This paper analyses lecturer perspectives about skills and credentials relevant in the teaching of entrepreneurship in a university-based business school/department. The theoretical approach of this paper observes Myles Mace's profile dating from 1947 at Harvard Business School as one of the first pioneers in the teaching entrepreneurship at university. In addition, other profiles, and theoretical frames of teaching entrepreneurship in business schools are engaged. The research employs a case study design to answer a research question: What skills and credentials are relevant in teaching entrepreneurship, successfully, in an unequal society and within a business school? Seven (7) in-depth semi-structured interviews with academics at a university-based business-school and in the business management department were conducted. Different perspectives were documented. These fresh perspectives depart from the externalist agency views that tend to apply in determining the desirable skills and credentials of an entrepreneurship lecturer. The findings in this study show that experience in years of teaching plays a key role in the lecturers' abilities to teach the subject dynamically, confidently, and critically. The study concludes that the lecturer's academic qualification and experience enhance the relevance of their teaching and enable them to explore societal issues such as inequality in relation to entrepreneurship. The range of qualifications amongst interviewees in this study show no evidence that specific qualifications and credentials are more relevant than others, rather displays that lecturers in entrepreneurship find their unique voice and areas of interest. This research contributes to scholarly debates about what it takes to be a credible "teacher" in entrepreneurship. The practical implications of this study propose better support for entrepreneurship lecturers through focused development programmes, affiliation in progressive entrepreneurship networks and capacity building beyond KPIs. Future research must tackle lecturer capabilities to teach entrepreneurship in a context of an increasingly inequitable society.*

## Introduction

Teaching entrepreneurship in changing economic times and holding lecturer credibility in a constantly restructuring economy is motivation for this paper. The paper draws on the historic understanding that entrepreneurship was first taught at Harvard Business School in 1947 at Harvard Business School by Myles Mace. This was came after improvements made to a module called the Management of New Enterprise (Harvard Business School, 2000). Furthermore, this paper builds on the view that entrepreneurship and management as subjects taught in business schools evolved from Schumpeter's "Theory of Economic Development" published in 1934 (Katz, 2003). This study contributes to the body of research that is concerned with progress in the teaching of entrepreneurship beyond Myles Mace and Schumpeter as well as the Euro-American view of the subject. This paper then argues that entrepreneurship lecturers must hold professional qualifications and have the pre-requisite experience to teach entrepreneurship. This study moves away from using the term 'lecture' as this is not the scope of focus but rather teaching of entrepreneurship in a business school.

## Business Schools and teaching of entrepreneurship

Business schools teach and conduct academic research on entrepreneurship (Lerner, 2018). Professors in the entrepreneurship discipline are salaried on average 164 thousand USD per annum in about 120 business schools in the world (AACSB International, 2014). This is an indication that entrepreneurship education has gained momentum in the top university-based business schools. As such the teaching of

entrepreneurship happens in business schools beyond the formal degree studies. Short learning programmes are also offered and these enable the transfer of entrepreneurial skills to students not part of a business school (Fulgence, 2015). This shows that business schools are essential in the delivery of entrepreneurship education; a subject that has become important for societies around the world.

**Contextualising Entrepreneurship Education**

Entrepreneurship education is described as "teaching and learning about techniques, traits, attitudes, science and art of assessing and using economic opportunities to deliver new valuable solutions" (Fayolle, 2013). This paper is a case study of a Business School based in a university in South Africa. Pomerantz, (2019) explains that South Africa is expansively unequal and continues to find ways to deal with this challenge. The Worldbank, (2022) confirms that the country has desperate levels of inequality with escalation in poverty amongst the poor and gini coefficient of 67 placing it amongst the most unequal countries in the world. Whilst entrepreneurship is cited as a solution very little focus is given to the availability of skills and credible teaching of entrepreneurship with a view to restructure South Africa's economic opportunities in response to the escalating levels of inequality. This paper then addresses the relevance of lecturer skills and credence in teaching entrepreneurship within the context of inequality.

**Research Question and Objectives**

The research question in this study is: What skills and credentials are relevant in teaching entrepreneurship, successfully, in an unequal society and within a business school?

The study's objectives are to establish the skills and credentials of lecturers teaching entrepreneurship in a university-based business school, to contextualise the relevance of thereof and to explore parts of the teaching practice with reference to inequality. All these objectives advance the study's main contribution to literature concerned about the teaching of entrepreneurship at university and in developing country contexts.

This paper comprises a literature review, research methodology, findings, discussion and conclusions.

**Literature Review**

Entrepreneurship Education (EE) is the teaching and learning of enterprising, the process of envisioning, recognizing opportunities and the associated risks when setting up a new venture (Sirelkhatim and Gangi, 2015a). Another definition of entrepreneurship education provides that it is the essence of teaching and learning about the founding of a new venture in response to opportunities (Neck and Corbett, 2018a). This definition echoes (Sirelkhatim and Gangi, 2015a) and (Kuratko, 2005) by giving an understanding that entrepreneurship can be learnt, a concern that dominates research in entrepreneurship (Ruskovaara, Hämäläinen and Pihkala, 2016). Sirelkhatim and Gangi (2015b) and Neck and Corbett, (2018b) agree that in essence lecturing of entrepreneurship is to help students build new ventures.

Academics are educators, lecturers, scholars and professors tasked with the responsibility of transferring skills and knowledge through lessons (Walter and Block, 2016). Academics conduct research and they implement the teaching programmes of institutions in which they affiliate unless their role is solely research (Fayolle, Verzat and Wapshott, 2016). On the contrary academics are also advocates for change in their respective fields and they use research to influence new thinking about industry, climate change, sciences and business (Maresch *et al.*, 2016). Globally renowned expert scholars in EE are Alain Fayolle, Donald Kuratko, Mwasaliba and others who continue to explain EE as well as the role of academics in the field of entrepreneurship education. Below are contributions which these scholars have made about the role of academia and academics in EE.

EE academics are faculty members who provide instruction in entrepreneurship courses and they also do research in the field (Lin and Xu, 2013), often they are affiliated with business schools where they design and teach entrepreneurship courses (Bridge, 2017). However, the other group of people that plays a key role in supporting academics in business schools are the administrators that coordinate activities including managing collaborations with external stakeholders (Yarnall, Tennant and Stites, 2016). Business schools play a critical role in ensuring that quality EE is delivered through allocation of resources, leadership support of EE and EE strategy (Cao and Jiang, 2017).

**Skills and Credibility through the Lens of the Characteristics of Lecturers**

The sought-after entrepreneurship and business school lecturers' characteristics are discussed and reviewed on this section. These play a role in understanding the lecturing context and the person who does the lecturing. First is, *Gender:* both male and female lecturers are perceived somewhat differently by different groups of students. According to (Batten *et al.*, 2014) male students expected a lecturer to have clarity in their voice and female students expect a lecturer to have good class control. Second is, *Personal capability:* refers to lecturer authenticity, attitudes, attributes and actual teacher actions which students perceive as essential for their learning (Kreber and Klampfleitner, 2013). Third is, *Work experience:* addresses the concern of the lack of technical skills among students when they graduate from a university programme (Bennett, 2006). Lecturers with prior industry experience or those that are entrepreneurs are believed to help students better understand realities of a subject such as entrepreneurship and they help student overcome some barriers to launching new ventures (Lim *et al.*, 2016). Fourth characteristic is, *Business interest(s):* academics with business interests although their commitment to teaching entrepreneurship leaves them with little time to run business ventures they portray traits of being futuristic, being tolerant for ambiguity, proactiveness, internal locus of control and confidence (Izedonmi and Okafor, 2005). A lecturer's experience in business had no direct impact on the success of teaching entrepreneurship although it is believed by many that lecturer's industry experience is more beneficial; it is not the case with entrepreneurship (Carey and Matlay, 2007). Fifth is, *Participation in EE courses:* the involvement of lecturers in teaching EE courses provides them with an understanding of student expectations, employability prospects and to have a clear overview of those elements that increase students' entrepreneurial intention (Morrison, 2014). Sixth is the, *Participation in EE curricula development:* lecturers that are authentic to EE and whose interest is to see university wide EE, they tend to participate in the design and development of university-wide and cross-discipline EE focused curricula (Kalimasi and Herman, 2016). Seventh is, *Participation in (business) school EE plans:* this is essential for senior members of business schools to participate in EE planning and curricula implementation (Kuratko, 2005), professors in EE within a business school should be able to provide compelling rationale for resource allocations towards EE and further EE plans to empower staff members delivering entrepreneurship courses (Martinez-pecino and Melero, 2011). Finally is, *Participation in EE regional plans:* this means taking part as an academic in shaping the context of entrepreneurship which plays a massive role in new venture start-up behaviour among youths and EE graduates interested in bringing their ideas to implementation (Gaddefors and Anderson, 2017).

The capabilities and characteristics of entrepreneurship lecturers or academics include negotiation skills, application of entrepreneurship program design framework (EPDF) and being able to implement best practices in EE (Gedeon, 2014). Faculty members require the above stated skills (Kuratko, 2005); these are people who are often referred to as academics these terms are interchangeable they refer to those with accredited qualifications and capacities to deliver university education (Song Lin). Lecturer or faculty member credibility and authentic in their teaching has an impact on students development of passion for a subject (Kreber and Klampfleitner, 2013).

Credentials refer to the obtained third-party reports (e.g. qualifications) of an academic occupying a role in an institution (Batten *et al.*, 2014) and also their ability to balance a teaching methodology and personality characteristics (Oregbeyen, 2010). Credentials of lecturers influence the perceptions about their credibility and how they are viewed by their students (Batten *et al.*, 2014). Five factors influence the credentials of academics in a context of teaching at a university. First one is appearance (APP) which refers to the lecturers' ability to cope with pressure, emotional stability and presenting themselves as conscientious (Chamorro-premuzic *et al.*, 2008). According to students general attractiveness, age and gender also played a role on how they perceived a lecturer's credibility as a matter of first impression (Batten *et al.*, 2014). The second set are accessories (ACC) which are the physical resources used by a professional worker such as dress code items which are used by a clientele (students) to form their perception about one's personality and credibility (Kokkinos, Kargiotidis and Markos, 2015).

In cases where lecturers are unable to demonstrate their credentials, mentorship and support framework may be used to improve their credibility profiles (Turner *et al.*, 2016). The lecturers' skills and credentials influence their understanding of entrepreneurship as well as their philosophical approaches in

teaching the subject (Bennett, 2006). The capabilities approach theory by Amartya Sen is an example that echoes a developmental approach to supporting individuals to excel in their responsibilities by equipping them with skills, resources and capabilities they need (Dang, 2014).

**Research Methodology: Data Collection and Research Design**

This research employs a qualitative research method to study the application of lecturer skills and credentials in teaching entrepreneurship in a business school based in South Africa. The qualitative research approach used here has proven useful in studying this growing field of entrepreneurship through interviews and feedback from experts (Smith and McElwee, 2015). This paper presents a case study of a South African university business school.

**The Case Study**

Johannesburg is labelled as South Africa's economic hub boasting two public universities with business schools. This study focuses on one of the business schools in the city that attracts youth and senior professionals. The business school also contracts lecturers from other departments to deliver the teaching of entrepreneurship within the school. The school is about 10-12 kilometres away from Sandton, the Africa richest square mile also next to one of Africa's poorest townships, Alexandra.

The case study's data was collected through interviews. The interviews were face-to-face with seven (7) lecturers contracted by the business school in Johannesburg, and a set of questions was prepared and used to guide the interview process. The lecturers have varied experience in teaching entrepreneurship and differing qualification levels, and backgrounds. A research interview process can go out of hand if the interviewer is under prepared and does not have systematic way of running the research interview process (Mojtahed *et al.*, 2014)

The sample selection focused on both those teaching in an entrepreneurship programme and the faculty members teaching entrepreneurship as an additional subject to students outside of the business studies field. In deciding the sample size of this study was dependent on the accessibility of the target group and confirmations to participate in the interviews (Emmel, 2015). The sampling strategy applied in this study was by means of snowball sampling where the first interviewees nominated other entrepreneurship lecturers to be contacted for interviewing (Rager, 2005).

The participation of interviewees was based on agreed principles of academic research and a written consent to conduct the research was signed by interviewees before interviews could start. Pilot interviews play a key role in establishing time taken to do an interview, revision of language or terms used where necessary and revising the length of questions, as necessary. Two pilot interviews were done and suited this study and the number of questions asked on this study. Revisions were made to question one where the question about skills for teaching entrepreneurship was expanded to include methods used in teaching entrepreneurship.

**Results and Findings**

The findings of this study show that lecturers drive the teaching of entrepreneurship in business schools, and they bring with their societal experience when applying their skills. Below are profiles of the seven (7) lecturer participants of the study and some key data about their qualifications, the level of teaching, number of students and years of experience.

**Table 9 Interviewee Profiles**

| Highest Qualification(s) | Level of teaching Entrepreneurship | Average number of students taught per year | Experience in years. |
|---|---|---|---|
| **MBL, PhD** | UG and PG | 40 | 20 |
| **M. Tech** | UG | 90 | 2 |
| **B. Com Hons, M. Com** | UG and PG | 35 | 6 |
| **PhD** | UG | 70 | 13 |
| **MBL** | UG and PG | 200 | 10 |
| **PhD** | UG and PG | 40 | 3 |

| | | | |
|---|---|---|---|
| **MBA, PhD** | UG | 40 | 2 |

The academic qualifications of the interviewees are a demonstration of their credentials. This means that all the interviewees had the necessary basic skills and knowledge to teach entrepreneurship. However, not all have done their post-graduate (PG) studies in the field of entrepreneurship they had to adapt their knowledge of commercial subjects to teach entrepreneurship is one of their subjects.

These lecturers reflected on their own experiences and approaches of teaching entrepreneurship in response to the interview questions of this study. They were asked questions to which they provided their own accounts and answers. The first question was what skills and methods do you use in teaching entrepreneurship? The second question was an opinion and an experience-based question, is a university-based business school one of the best-suitable places to teach entrepreneurship? The third question, focused on how to (the entrepreneurship lecturer) develop the skills of teaching the subject? The final question was about the ways they use to enhance their credentials? These questions are based on the main research question, objectives of this study, which is what, are the fundamental skills, and an entrepreneurship lecturer in a formal requires credentials and university-based business school. The training of entrepreneurs who are already in business and others whose primary focus is to start a business enriches the lecturer with practical knowledge of doing entrepreneurship in the real world**.**

*"These people are not necessarily students but are already out there." (Interview Excerpt 1)*

However, other entrepreneurs who are in practice have never had entrepreneurship education and do not see a need for it, which can be hard for any entrepreneurship lecturer to function if dependent on drawing intelligence from lecturing seasoned entrepreneurs (Lubango and Pouris, 2007). Findings of this study show that another one of the key elements of teaching entrepreneurship an experiential learning approach which focuses enriching student experiences with focus on the end goal of becoming entrepreneurs. Experiential learning is demonstrated as a way of building student entrepreneurs' confidence and this form of learning supports one's entrepreneurial intention.

*"My philosophy entails having the students experience what they must be in the end. I am trying to produce an entrepreneur and at the end of day." (Interview Excerpt 1)*

The downside to the kind of philosophy stated above is that not all students join an entrepreneurship course because they want to be entrepreneurs. To further this argument is that are different reasons why students enrol in university programmes some of these include an aim to achieve a career goal or just engaging in a journey of discovering their life ambitions. Based on this, the teaching of entrepreneurship cannot be exclusive to only those students who want to become entrepreneurs and hence entrepreneurship educators should have an open mind about this.

*"A group's ability to work is assessed. Students are trained in a group setting to manage conflict, organising and producing the final document." (Interview Excerpt 2)*

A further highlight on the skills-based methods that the interviews commented on was that they teach students to make decisions and the theory is irrelevant when students had been exposed to it during early years of their entrepreneurship programme. In further review of the field notes, it was emphasised that a lecturer requires business planning, critical thinking and decision-making skills to share this knowledge with students to whom he/she is teaching entrepreneurship. This statement is supported by (Lubango and Pouris, 2007) arguing that the industrial experience of academics it affects the inventiveness of their teaching.

*"We plan the projects and give dates for reporting, working with entrepreneurs (beneficiaries) and giving presentations." (Interview Excerpt 5)*

According to (Lubango and Pouris, 2007) industry experience affects a university's entrepreneurial character and its ability to be inventive.

*"In Entrepreneurship modules Industry experience is important to apply the theory to practice."*

*"A work experience is essential since entrepreneurship is a practice.*

*I started a business – I am more aware about what is happening out here" (Interview Excerpt 3)*

In addition, a few interviewees reported that they had to know the business world and have recent experience of it; otherwise, they would not have any insight about entrepreneurship, authentic learning and its trends.

*"You need a recent experience not from long time ago, technology is fast changing and there are new ways to start a business, which you need to share with students as a mentor and coach." (4)*

Several things inform the skills requirement of entrepreneurship lecturers. These include subject matter, taking students through the process of learning and making use of outside partnerships supported by the outcome's framework.

*"I put my students through a process. I do not teach I put them through a learning process instead of me rushing through a content. I go through the learning content at a very high level. It takes me less time to get the principles across. They go do the research. They read before class. The test is to help them prepare and read up." (Interview Excerpt 5)*

The research skills of a lecturer from a basic to an advanced academic level a role in students' learning experiences, using a research-based teaching method students are also taught basics of research and they do use such skills when they start businesses.

*"They write a case study after interviewing an entrepreneur. It is a watered-down research project. The research helps my students build an analytical ability." (Interview Excerpt 4)*

In selecting skills-based methods for teaching entrepreneurship, lecturers consider the calibre of students and level of those students in the course. Not all student that start university are ready and that those who are exiting are ready for the real world.

*"I depend on my skills to collaborate, learn and project assessment where I connect the dots and I use other management skills to compile MOUs (Memorandum of Understanding)" (Interview Excerpt 5)*

In the use of a practical approach to teaching entrepreneurship, there was a consensus from the interviewees. The consensus is that they found that their teaching skills more useful when teaching entrepreneurship to students that are in practice-based programmes for instance those in health, fashion and tourism. The viewed these students as having a high chance of using their knowledge to start businesses in their fields of expertise as opposed to those trained in entrepreneurship only.

*"Unlike teaching the subject to general management students who still need to find themselves the students from FADA wanted to start interior design practices or a homeopath practice. But that is where the creative skill in teaching comes in." (Interview Excerpt 6)*

The further feedback from this study is that the ability and skill to use teaching and learning technology was provided as a response to the question of skills in teaching entrepreneurship. This was clear demonstration that there are those basic teaching practices that apply across teaching and learning in a university or in a business school in this case. The skill identified was that of using technology to present content.

*"I also use of videos – case study video. The videos I use are based on a case study.*

*The most important skill is to be able to present the content and to use practical examples." (Interview Excerpt 7)*

**Table 2 Developing Skills as an Entrepreneurship Lecturer**

| Interviewee | Question: how did you (the entrepreneurship lecturer) develop the skills of teaching the subject? |
|---|---|
| **1** | Through training practising entrepreneurs, from previous work experience as a Loans officer and training 60 potential entrepreneurs |
| **2** | By looking at research in teaching entrepreneurship, the regulatory book of the business school and from my experience as a business consultant |
| **3** | Using students' reflections and my experience in business |
| **4** | It is a result of academic freedom and by working with other colleagues |
| **5** | Using my experience having been a student in the same institution and exposing students to the community context |
| **6** | Made a deliberate attempt to move away from old practices to adopting the new skills set and engaging in collaborations |
| **7** | Lecturing exit level students and with limited support, I lecture and assess |

The concepts of skills and credentials are expanded in this study to include and focus on networking, continuous professional development and being relevant as a lecturer of entrepreneurship. The respondents indicated several things they do to enhance their credentials, these include attending academic and industry

conferences, running their own businesses, using support from guest lecturers, sharing insights from their own research and using business current affairs in their teaching.

*Build your network and invite entrepreneurs as guest lectures/ government.*

*Plant people from SEDA (Small Enterprise Development Agency), SARS (South African Revenue Service), government and entrepreneurs in your teaching schedule. Make them big part of your teaching.*

*'I have always been involved in business; the reason was for me to learn what my students are doing (setting up a start-up every year).*

*"When you tell people that you are teaching entrepreneurship, they show interest and ask why you don't come up with a project we can even fund you.*

*They want to know if you have practical side of entrepreneurship or not." (Interview Excerpt 2)*

**Table 3 Developing Skills as an Entrepreneurship Lecturer**

| Interviewee | Question: how do you enhance your credentials? |
|---|---|
| **1** | Using guest lectures, involving entrepreneurs in the teaching and learning. Understanding of current affairs. |
| **2** | Member of IBASA (professional body membership), workshops, events and sharing with people about my research findings |
| **3** | Participating in professional conferences (SAIMS), academic citizenship and from module teaching and learning evaluations |
| **4** | Doing research in my domain and with students, always involved in business, conferences, and government events on entrepreneurship |
| **5** | Through collaboration, being an entrepreneur, attending conferences and documenting my practices in teaching entrepreneurship |
| **6** | Using my 20 years of work experience, remaining connected to practices, reading Steve Blank. |
| **7** | Through research and postgraduate supervision |

## Discussion

Lecturer skills and credentials play a significant role in the teaching of entrepreneurship in the context of South Africa. The country is one of the most unequal countries in the world with the gini-coefficient of 0.63 in 2023. This means that the rich are getting richer, and poor are becoming poorer. Because of this and other reasons lecturers such as the ones interviewed here must contextualise entrepreneurship and think together with students on how they can pursue entrepreneurship in a society that is dominated by inequality. This takes experience, involvement with stakeholders external to the university and networking that exposes students to entrepreneurship resources that they otherwise would not have had access to. Although this burdens lecturers it can empower students and be a positive display of the credence and stakeholder management skills of a lecturer.

## Practical Implications and Conclusions

Business school lecturers are reviewed from time to time by means of key performance indicators (KPI) like all other employees, but focus is given on the abilities and professional credits a lecturer accumulates over time (Manero[a] and Prieto, 2014). Business schools aim for accreditation with external bodies, which pay attention to the calibre of staff and expertise in a business school. What the findings of this study contribute to this thought is that entrepreneurship lecturers should be supported in the development of their skills, teaching methods and credentials to perform their best in delivering the intended EE outcomes.

Some challenges brought forward by this study is the lack of staff synchronisation in the business school context presented here. Lecturers teaching entrepreneurship at different levels do not engage and share best practices about the subject. Another challenge is the inadequate support of entrepreneurship students who have business ideas but lack resources to explore those. Schmidt and Soper, (2013) address the need to have business school that embraces global interconnectedness, however, the concern raised in two of the interviews was that the benchmarking of entrepreneurship teaching practices with best institutions such as Massachusetts Institute of Technology (MIT) has not happened in the Johannesburg based business school context and it is a problem since it creates a limited exposure to best practices. The other area of concern was the recruitment process of students that did not intend to do an entrepreneurship

course, these students were found to be wondering in a programme and not accepting of the challenging teaching methods of entrepreneurship.

**Limitations and Directions for Future Research**

This research study is limited to a Johannesburg based business school which teaches entrepreneurship from undergraduate until a graduate level. Future research must review the question of how the skills of entrepreneurship lecturers are enriching students in an entrepreneurship programme and how lecturers can deal with the escalating inequality. Furthermore, future research in this area must consider a methodological approach that will allow a big number of participants from the field of entrepreneurship education. Such will improve research understandings of EE and business schools. This research was only limited to qualitative research within one business school context. A consideration of multiple business school contexts will improve research in this area.

**Research Note**

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# Resilience Amongst Students at a University that Promotes Entrepreneurship

**Sizwe Mkwanazi**
College of Business and Economics
School of Management, Department of Business Management,
University of Johannesburg , South Africa

**Keywords**
Covid-19, Students Higher education, Entrepreneurship, Resilience

**Abstract**

*Students, particularly those that are classified as disadvantaged, face many struggles in higher education. These are students from low-income backgrounds and often rely on the campus facilities to enrich their university experience and to make up for some of their disadvantage. Since the Covid-19 pandemic research in higher education has been following the trends in student life experiences and development. Most of this research suggests that Covid-19 has created new challenges for students and the university. While this is true most of the challenges were already present but only amplified by the Covid-19 pandemic. This paper argues that Covid-19 has only been a season of hard "reboot" into resilience. Qualitative data from thirteen (13) semi-structured interviews with South African university students is used to demonstrate the Covid-19's re-awakening of resilience amongst disadvantaged students. This data is also analysed to understand the effects of resilience in the broader student experience in higher education. The data shows that students have concerns about on and off-campus experiences, turbulent online learning, and limited funding as well as the livelihood strategies they have had to adopt. The findings show the lived experience of performing against all odds amongst disadvantaged students. It is also evident that while this is embraced by society and some research it normalises student hardship and campus inequities. In conclusion the blind-spots in student hardship and as exacerbated by Covid-19 are highlighted. This paper assists researchers, university management and student development officers to meet halfway the student resilient efforts in a meaningful way. In practice this research provides university entrepreneurship mentors and student development practioners with tangible student needs to consider when dealing with students amidst a crisis, but also when mentoring students to become entrepreneurs in a difficult period.*

## Introduction

Research on the effects of covid-19 pandemic on students in higher education in South Africa is sparse and has naturally focused on physical and mental health (e.g. Theron). Other research that sought to address student experiences of university during the covid-19 lockdowns has since limited its focus to online learning and accessibility of campuses. All these are important and useful to understanding some of the practical challenges that students experienced during the covid-19 lockdown in South Africa. However, a need to show the intricacy of student life experiences during covid-19 lockdowns still exist. This research employs reflexivity and extracts from qualitative research data to provide a case for student experiences during the different stages of covid-19 lockdown(s).

This paper argues that South African higher education students are resilient and more specifically those who are black and from low-income families. This argument is based on research that shows that students from low-income families endure university against all odds. Walker provides the finer details of student suffering and poverty at university. Walker cites lack of access, food, cash, basics and sharing of NSFAS allowances with family as challenges that are faced by students at South African universities. The resilient character of these students has been more exposed by the Covid-19 pandemic and the choices that their university made in response to the pandemic. These choices were rather exclusionary and sought to create a distance between the university and students. This meant the processing of inquiries was delayed, those students seeking to correct funding issues and NSFAS matters could not access campus in the usual ways.

In addition, the university shielded itself under the state of emergency regulations thus leaving those students determined to make progress with no choice but to remain resilient in the university produced struggles.

The argument of this paper is located both reflexivity research on student life and in studies concerned about low-income and poor students in a South African university. The Covid-19 lockdowns were experienced differently by different people and classes of society whilst exacerbating poverty levels amongst low-income families. Therefore, this paper notes that students have had to be more resilient during covid-19 (making it against all odds) switching to online mode of learning and through limited access to campus support. They also have had to survive covid-19 against the societal challenges that ordinary citizens live through. Inequality worsened the situation in South Africa where already poor people are enduring through daily hardship and struggles for food security. The same students enduring university come from such families but were lockdown at home with little opportunities to earn a living or even engage in food searches including asking neighbours and friends to donate some. The same applied to students who were out of campus residence with no access to one another and limited in how they could assist each other navigate or cater for their daily needs including sharing of basics such as food. In addition, the other deprivation seen in both society and in student life is that the opportunities to share the pain of lockdown were also limited. Even though understandable that in person gatherings and interactions were limited the cost of accessing online communication platforms or cell phone calls were also prohibitive to those poor students and families having to choose between buying airtime and bread. Therefore, the struggles of low-income students mirror those of their societies including their resilience during the covid-19 lockdown period.

The following sections are literature review structured to define the key concepts and the reflexivity framework used in this paper. It is followed by the presentation of the methodological approach used, discussions and conclusions of the study.

**Literature Review**

This literature review is structured to provide the study's key definitions and framework. In this paper the concepts of student hardship, co-construction of knowledge through interview and reflexivity are defined. I define student life as the main inquiry about student resilience in a South African university during Covid-19.

**Framing Student Hardship at a South African University**

Hardship is part of student experience in higher education especially in the context of poor and unequal societies like South Africa. Walker, (2020:62) conceptualises this into three kinds of hardship related to income namely acute, limited, and transient hardship. In *acute hardship* a student has no secure income year on year and lives with multiple insecurities. In the category of *limited hardship* status, a student has sufficient disposable family income and has access to a private sector bursary. In *transient hardship* a student may move upwards to limited hardship or spiral down to acute hardship. Typically, a student in this category would have a source of external support, such as a bursary, and access to a laptop, but with little unallocated disposable income to spend on things like clothes. Habib, (2019) argues that student hardship is not the responsibility of university executives, but they have a responsibility to ensure that universities produce enough professional graduates. While this is a widely accepted view, it is also true that hardship faced by students is a cause for dropouts and reverses progress in increasing professional graduates (Moodley and Singh, 2015).

In addition, Hammett and Staeheli, (2013) argued that higher education in South Africa has been tasked with an exceedingly big responsibility of addressing poverty within a context of powerlessness where some students have lost hope for personal and social advancement. In this research I recognise these broad understandings of hardship and how these impact on student life at university including the choices students make about addressing the challenges they face while at university. In the face of hardship, students explore ways and limited choices to survive.

One avenue is creating survivalist or necessity micro-enterprises (Karanja *et al.*, 2008). During this process, the same students are also encouraged in other ways to see entrepreneurship to secure their future

(Nwokolo, 2017). This idea often assumes that students, since they have some educational attainment, can run their micro enterprise during and post-university (Peters and Brijlal, 2011). This futuristic view withdraws attention from the real/pragmatic reasons students engaged in the creation of micro-enterprises and avoids addressing the differences in the understanding and conceptualisation of entrepreneurship (Vally and Motala, 2014). Unlike this futuristic view, this research will draw attention to some of the real reasons for (or not) pursuing entrepreneurship amongst students, including their general understanding of the concept.

**Co-construction of knowledge through Interviews**

Research in higher education pertaining to interviewing and building rapport notes that power dynamics, reciprocity and co-construction of knowledge inform the doctoral student and interviewee experiences (Clegg and Stevenson, 2013). Where reflexivity is applied doctoral students can resist extractivist tendencies that dominate research between Africa and the West. As is the main argument, the lack of reflexivity studies focusing on doctoral students' risk producing researchers that are on the tandem of extractivism or best classified as riding on the backs of others to obtain an additional degree.

In response to the challenge of understanding power dynamics, establishing reciprocity and an interview that allows for co-construction of knowledge, normal institutional ethics procedures are deemed sufficient. However, these responses fall short of experiences that detail the interview experience beyond the already established ethical procedures. The Black research PhD experiences are an arena to explore the power dynamics, understand the process of establishing reciprocity and interview co-construction of knowledge.

Reflexivity in this study provides a theoretical base on which to reflect on the interviews conducted by the two researchers. The approach enables the researchers to explore the constructs of power, reciprocity, and co-construction of knowledge as the underlying factors to creating a research experience that is pure and feels less extractivist compared to research projects with no regard for reflexivity.

**Reflexivity and resilience**

Literature on reflexivity and the interview has for a long time neglected the need to consider the interviewer and interviewee perspectives to research participation. There is also very little research on reflexivity addressing the use of other approaches of collecting data in qualitative research other than interviewing. It is only in the recent past that researchers have dedicated time to probe reflexivity in qualitative research more holistically. This paper expands on Palaiologou, Needham and Male's, (2015) definition of reflexivity and defines it as the researcher's role and position in the organisation of their research. This includes being reflexive about the background, privilege, and baggage the researcher holds. However, this kind of approach is prone to biasness. In dealing with this I use a reflexivity framework that provides space to provide a clear background to my involvement with this research and I explore reflexivity as a doctoral research issue that can improve research on student resilience in higher education. Furthermore, the literature review addresses three aspects of reflexivity and in addition the theoretical contribution of this study.

**Reflectivity as a doctoral research issue**

Most research in the South focuses on doctoral student research projects that employ ethnography as a method of research and other similar studies elect to follow the feminist paradigm. There is nothing wrong with all this. However, these sharpen the need for studies that focus on the broader experiences of students whose work is not underpinned in ethnography and limited to paradigm specific requirements. This paper opens the concept of reflexivity in research as an important issue in doctoral study experiences of Black students pursuing their PhDs abroad. This then makes reflexivity an open subject to discuss broadly the doctoral research.

**Methodology**

Educational research is complex and messy. Researching education in South Africa does require researchers to appreciate the contextual issues that define society such as poverty, inequality, and low

incomes. This paper employs a qualitative research methodology. The overarching design is a reflexive case study of fieldwork research and the interviews conducted with students at a South African university. The case study contextualises the Covid-19 pandemic and the student experiences of the lockdown period.

I now turn to opening the qualitative methodological approach of this study. This method is well established in educational research, and it is applied with various research paradigms when seeking in depths account about issues in education. In this research I use the qualitative methodology to understand through semi-structured interviews the concerns and discomfort of students who turn to resilience to hold onto their studies in a difficult time. Unlike other research I do not commit to specific research paradigms but opt for amplifying the voice of students and my experience of asking questions about covid-19 experiences of students within a large fieldwork research project.

The remainder of this methodology section provides the context of the study, the number of interviews and ethical considerations. I also make a case for reflexivity in researching education and for the usefulness of knowledge gathered in engaging with such a process. The context of the study is an 18-month fieldwork project conducted at a university in Pretoria, South Africa. A university that attracts students from poor backgrounds and low-income families. About 70% of students at this university are black and rely on the National Student Financial Aid Scheme (NSFAS) to finance their studies. Under usual circumstances these students stand in long queues to hand in their funding applications with stacks of documents evidencing their poverty. These include affidavits from their unemployed parents or guardians, some because of non-existent family structures they ask other family members to provide these documents for them. Obtaining these documents presents a different struggle of interacting with government officials in the police and in social services. When successful the students get NSFAS allowances at the average of R1000 (70 USD) to cover their basic needs and even share with their poor families. These students often and collectively occupy picket lines to have their demands heard. Although the university sees the availability of NSFAS funding as a chance to break the chains of poverty for both low-income students and families this remains to be seen amongst growing levels of unemployment amongst graduates. The students at this university had a difficult time prior covid-19 and continue to experience hardship. This is explored in the discussion of the interview findings thus the argument about resilience.

The table below shows the number of participants in the main study and those students that expanded on their experience of the covid-19 period. The main study as already explained in the introduction is about a broader question on conceptions and promotions of entrepreneurship amongst at the Pretoria university. It was relevant to ask the questions about covid-19 experiences because of the significant effects of the pandemic on student livelihood and its exacerbation of hardship amongst students, and society. In addition, the pandemic was topical and a reason for concern in most conversations I also could not ignore it. As a researcher I took the opportunity to systematically ask the covid-19 to question adopting a more reflexive approach in interviewing the participants listed on the table below. I also took a chance to learn about their experiences and share my own experiences with them.

*Table 10 Getting to know the Interviewees*

| | |
|---|---|
| Gender distribution | 7 Female Students & 6 Male Students |
| Study level | 7 Final Year, 4 Second Year & 2 First Year |
| Fields of Study | Photography, Arts, Somatology, Business, Engineering |
| Source of Funding | NSFAS Funding and bursaries |

An ethical clearance was obtained to conduct interviews via WhatsApp and financial support via airtime vouchers and data bundle advances were provided. This was based on both the practicality of the research project and avoiding asking interview participants to use their meagre finances, as cited by the ethics committee, to finance their participation in the interviews. The range of responses to the covid-19 questions is spread across the gender binary, study fields and levels of study. My approach to ethics was to ask the questions in a conversation style and bearing witness to the experiences that students were sharing.

At the same time openly sharing my own experiences and asking further questions exploring the subject. Instead of: 'tell me about your covid-19 experience' I asked 'How are you doing? where are you? What is happening where you are?' thus unlocking the conversation about the experiences. Furthermore, I shared my experience of coming into South Africa from Oxford on a repatriation flight during lockdown this further opened the dialogue between myself and the interviewees. Thus, I could state that this approach allowed rapport and reciprocity in the interview.

**Results and Findings**

Qualitative data is drawn from 13 student interviews stating the challenges posed by Covid-19 in both their broader student experience and for their academic progress. These students are mainly from low-income families and see university as a gateway to success. As was the focus of my fieldwork to understand the conceptions of entrepreneurship amongst students some interviews allude to the student strategies of raising income through selling of goods and services to increase their cash. This shows the intricacy of resilience amongst students and the desperations for income or cash.

The resilience themes emerging from the 13 interviews are: uncertainty (future job, attainment of educational qualification, slim to zero chances of employment, close of opportunities to earn an income), compromised educational experience (not meeting lecturers, unable to do practical training or work integrated learning projects, struggling to cope, limited use of campus facilities, slow adaptation to online learning), funding (NSFAS as a source of income), Lack of income and support from existing sources of funding for the missing middle students (fear of potential income cuts due to poor economic performance and the wide-spread budget cuts in both public and private sector thus affecting individual households, and breadwinners), digital divide (devices to access online lessons, lack of internet access), close of opportunities for recreation and denied religious practice (no church or preaching),

**Uncertainty: Job, Employment and Opportunities to Earn an Income**

Employability refers to readiness and preparedness for employment from the lens of university education and higher education policy in South Africa. Majority of students from low-income backgrounds hold a belief that university education provides them a status of employability. However, the Covid-19 pandemic threatened this belief and hope. It reversed the gains of confidence amongst students who already made it into higher education through challenging circumstances.

The vignette below provides a view of a student's experience concerned about finding employment. The student uses 'marketable' to refer to being employable. This shows that the student already appreciates the effort he has made to reach a state of employability but exposes how the conditions presented by the Covid-19 pandemic are invalidating his efforts. The student expresses that Covid-19 has made unemployment worse. This according to the vignette also means that unemployment is unbearable during Covid-19 not only the closed prospects to secure a job. The student has a view on who to blame for the problem and that is the government. The student feels let down by government systems. Whilst wearing a hat of resilience the student also recognises that they have done their part including meeting set requirements.

This student says I have worked hard to tick all the boxes but with all that I have become I still cannot be guaranteed employment. This vignette shows two sides to resilience that is the acts of making it against all odds to meet requirements only to be met by a system that does not recognise those efforts or reward them with a job as it is the desire of the student to know that they are guaranteed an employment opportunity. This then prompts me to probe whether this is not a fair ask and concern coming from a student? As a researcher in entrepreneurship promotions in higher education I battle with views that look down at the efforts and resilience of students by asking for more where there's already none. This happens when students express their employment concerns that mentors, lecturers, and policy makers saying students must drop the job seeking mentality but create their own jobs or that they must become job creators.

**Student 1:** the issue of unemployment is broad. When I spoke at first, I did not say that I am comfortable with unemployment. I'm saying that it's so much of a reality that if I were to stress about it, I would be depressed. It is a reality beyond, because you find that most people that we know are unemployed, COVID

19 made it worse. It's more of a government issue; I wouldn't blame myself and say that I am un-marketable, I am marketable. I am a young person, I do have a qualification, and have studied. I am marketable in terms of what is required in our country to say that a person between the ages of 15 and 35 whatever, I am within that space. I don't know how to put it because I don't want to lambast the government as it is a broad issue. Even if I were to go to the Western Cape right now and find another student, I think we will speak the same issue of unemployment being hard. We see the opportunities; I follow them almost every day. When I wake up, I check the circulars, I check where I meet the requirements and apply but do not receive call backs.

The student uncertainty was exacerbated by Covid-19 and similarly the appetite for resilience under hardship. The uncertainty is marked in the following excerpts using words such as (1) scared, (2) scepticism, (3) limitation in movement (cannot go abroad), (4) companies closing and (2) industries cutting down on staff. The first excerpt cast self-doubt. The student identifies themself as 'knowing nothing' and this in conjunction with the limited learning opportunities during Covid-19 portrays that the student assumes further disadvantage on top of that which already exists. The disadvantage of being less knowledgeable university student is now combined with the lack of opportunity to learn under Covid-19. The student expresses being scared and that they are sceptical but states that nonetheless they are still excited. An excitement I consider essential to understand that the student has made gains amidst the challenges and that excites them. These gains are basic but when obtaining these against all odds they breed this excitement. This is a student who originates from a low-income family where being at university is only a dream, but the student is in university and the possibility to work through covid-19 to obtain a university qualification excites them enough that it matters a lot to obtain a job but even if not obtain they remain excited.

**Student 2:** Because of coronavirus I am scared because companies are going to be sceptical about hiring people from the university who know nothing. But still, I am excited.

When one of the respondents was asked: What opportunities do you think are readily available for you after completing your studies? The student's response highlighted lack of opportunity in South Africa and a future of uncertainty. The student identified entrepreneurship as an alternative whilst 'trying to find a job.' Both these seem to be big life demands and directions for a future post university in a Covid-19 era. The student clearly communicates taking further responsibility for their future over and above their existing responsibilities as a student which entail attending lectures, writing assessments and student life. Student 4 echoes the expressions made by student 1 and 2 of applying for jobs including waking up early to read job circulars. These students apply for opportunities even though they do not receive response about their applications.

**Student 3:** uhm, to be honest my course does not have much in South Africa and it is not easy again to go abroad because of Covid. What I thought of doing is to continue with the business and continue with entrepreneurship while trying to find a job so that I can learn more because I am not yet in the industry. I will use what I have from my savings.

**Student 4:** Yes, I was still applying for jobs whilst I was still there, but nothing came up. A lot of companies would tell us that because of COVID nothing is working out. A lot of companies were not hiring, and other companies would even tell us that they are closing due to COVID. Others would be cutting down staff, it was just a challenge.

These experiences of uncertainty amongst students explain a long-lasting and strenuous demand on their side to face the new odds brought by Covid-19.

**The Compromised Learning Experience**

The learning experience plays a major role in student life in higher education. This informs the medium, space and time for learning. The learning experience also has a bearing on inclusion, access and understanding. All these issues when denied compromise the learning experience. I return to these issues in the next interview excerpts. The covid-19 pandemic reproduced a compromised learning experience at Fundisa university. It changed the medium being the terminology used from attending lectures in a venue to space being a student's dormitory in campus residence or a room at home if they had one. The time for learning for some was negotiated between family commitments and coping with Covid-19 demands, and limited access to other amenities.

**Student 5:** I still have another year… it is a bit complicated now. There was something for practical, but we could not attend them due to Covid-19. They called us to come and work there… because we were far. I was doing a Diploma, Fundisa switched us from Diploma to Degree – so last year I was doing my first years and second year modules together. So, we couldn't go there to finish the second-year modules.

I now return to the points about inclusion, access and understanding as indicated in the opening paragraph. Covid-19 reversed the gains to inclusion, access and understanding of curricular as those already achieved by students through their own resilience. This explains partly the view of this paper that students survived the Covid-19 pandemic through a sense of revived resilience. Like student 5, they explain a reality that 'things were fine' but during the heightened restrictions put in place to regulate during 'coronavirus' students couldn't meet lecturers. This means learning changed including how it was delivered, the place of delivery became a small screen and understanding limited to what could be heard, and less of what could be felt or a shared sense of understanding within a lecture room. The student also missed out an opportunity to do practical work at nursery they hoped to work in.

**Student 6:** Oh, okay… I am Lunga*, I am doing my second year in landscape technology at Fundisa. I am 19 years of age. At first things were going well at Fundisa, we were fine, and the lecturing process was okay but due to corona we got disturbed and couldn't meet lecturers – so that is how we got disturbed, and everything got back to normal – after lockdown or rather level one lockdown.

Students already experiencing comprehension and performance challenges in their modules have had to re-master their ways of coping within the adjusted conditions of learning. The excerpts from Students 6 and 7 reflect the difficulties experienced by students and how these reshaped the learning experiences in unusual ways even if they wore their resilience. These are students in their final year of study, and it would be assumed that they would be confident as they navigate learning under Covid-19, but this is not true. Instead, they indicate experiencing hardship; things getting harder and harder, challenging modules and shortened period of study (excerpt from student 6).

**Student 7:** To be honest it is very challenging – the more you are reaching the finishing line it is the more things get harder and harder. The modules are very challenging, they need more time and attention. Due to covid we are affected. We are doing semester courses. The semester was 3 months. It was very hard; we pushed a lot – we need time to study and understand. Time was running out. We attended classes for a few weeks. The next thing we had test week, assignments, and exam.

As already indicated on the first theme that uncertainty dominated student experiences the excerpt provided below is another unique account about the change of use of learning spaces on campus. This change brought about uncertainty within the campus and the use of different spaces that were accessible prior to the Covid-19 lockdowns. This is a Black student in photography and needed to use a campus studio, the only one they have access to. However, numbers were restricted, queues long and working hours still limited. These measures were in place to keep safe from coronavirus spread. This meant that low-income students had to carry lack of income, slow progress in academic work and the health protection burden as they navigated their access to the facility.

**Student 8:** Truly speaking it wasn't easy, especially with this COVID 19 season. Our studios are small, and we only have three printers, and you will find that you have a lot of students waiting to print. You find that there are 30 students wanting to print and it is stipulated that only 15 students can be at the printing studio, with the maximum of 20. The other 10 students must remain outside. Those inside won't leave the studio until they are finished with their work. There's a time I had to stand outside. You could arrive at 8am and stand outside until 3pm only for the studio to close at 6pm.

**Funding, Lack of Income and Cash**

Funding, lack of income and cash is a problem faced by students hailing from low-income families. Government funding and making higher education fee-free since 2015 has assisted many students especially those from Black families to gain access to higher education. However, the financial aid allowances aren't always enough to meet student needs. Below is a vignette from an interview transcript presenting part of an interviewer-interviewee dialogue about student financing. In the vignette the student begins the conversation explaining their source of income and specifically that which they receive from the National Student Financial Aid Scheme (NSFAS). The student provides their uses of the funds and explains

their dependency on this aid. They also highlight that the financial aid income is not enough to cover all expenses they supplement it with additional cash obtained from their family members. This shows a persistent problem of funding, lack of income and cash even when a student is a beneficiary of the government funding aid.

**Student 9:** I use the money I get from NSFAS. When I am short my family helps especially with transport and clothes.

**Interviewer:** How much does NSFAS give you? Interviewee: R1500 per month.

The above also shows the precise value of the allowance provided by the funding aid. It is below minimum wage in South Africa and can barely afford students all their needs per month. But still, it appears that the allowance is essential for the interviewee to maintain a livelihood and as such any lack of this money would create a deficit and lack in taking care of their needs. The NSFAS funding income can be seen as a critical resource for sustaining the livelihoods of low-income students monthly. This then prompts the need to ask further questions, one of which is, how do these students take care of their needs during recess and how did they take care of their needs during the lockdown? It is clear from the interview vignette that any disruption to the flow of the allowance into their student's bank account created a lack in cash and that it was sustaining to still have the allowance paid out during the Covid-19 lockdown period.

On the theme of resilience students seek continuously other sources of income. The following excerpts are from student interviews that highlight the enterprise activity that two different students created as means for income and creating opportunities for themselves. The first excerpt is of a student who started a 'cleaning company' providing hygiene services. Their motivation is not necessarily the demand for the service they are offering, and their skills set but an avoidance of lack of job opportunities. The interviewee uses a common phrase that is 'we cannot blame the government when it comes to job opportunities. This interview shows someone taking up responsibility for a government shortfall and making means for another stream of income in addition to aid.

**Student 10:** In the generation that we are in now it is no longer a call but a must. I even myself have got a cleaning company that is also more on fumigation and disinfection services. So, entrepreneurship is no longer a call but a must because now we cannot blame the government when it comes to job opportunities.

Whilst the excerpt above shows a student whose pursuing an enterprise to generate cash and fight what he calls a generational fight the excerpt below shows the contrary. The excerpt below is from a student whose experience with enterprise is unfavourable and could not thrive during the pandemic. This excerpt is a window into many student struggles for generating cash in a pandemic. However, the last sentence in the excerpt shows a resilient attitude and that is to 'work hard' for a positive end. This could mean until they obtain their academic qualification or until an opportunity for the enterprise becomes available. This excerpt shows different pockets of resilience amidst obvious struggles.

**Student 8:** I have my own business which is a wellness spa it was not going well because of the pandemic – those were my challenges so far. But now I am planning to work hard for me to reach the end goal.

**The Digital Divide, Internet Access, and Recreation**

The covid-19 pandemic and the government response to it did exacerbate the already existing divide. Internet access at home become more important as activities like work and study switched to online. The switch also moved recreational activities to online these include body exercise, religious activity, and other performance portable for virtual display. All this happened amidst concerns about those living in squalor and lacking decent homes and basic network coverage.

Five excerpts below provide accounts of different experiences that should leave higher education scholars asking: how are students surviving university? Since student hardship and resilience have been normalised in the South African context these questions are not always asked and more especially when they only affect the voiceless, poor, and low-income students. Through my own interaction and interviews with the students I gathered that (1) a student participant in my research had a difficult time studying online, (2) a student from a rural area felt excluded from university, (3) internet access was a challenge and (4) sporting and religious practices were shut down.

**Student 9:** As for COVID, I had to study online, so it wasn't easy because I didn't have a phone to maybe submit some of my assignments. I was left behind and the pressure of it was not easy. Fortunately, I got a

phone, so I submitted my assignment, of which from then it worked. Another thing is that it is way difficult without contact learning. Now that it is covid we are learning online we still must adapt to this online learning. It is difficult because some of us come from rural areas we do not have resources to deal with network connections, we run out of data, we do not have computers to type assignments, we must go to internet cafes and pay. Since covid has interrupted it is difficult for us as students.

The following excerpt places internet and online access as an essential in the life of the student from whose interview the excerpt was taken. They explain that this need is driven by the need to learn and to compensate for in person classes which they also describe as essential for understanding the content being lectured to them. They make further propositions that two in person lectures would bridge divide and inequalities in understanding. However, this was not possible under the Covid-19 regulatory policies. They prohibited gatherings and lectures as such. Places of higher learning were shut, lecture halls locked, and campus gates barricaded. But in a university that promotes entrepreneurialism amongst students one would imagine a situation where the 'student entrepreneurs' are supported to keep their enterprises afloat but from the accounts of students in this study this did not happen but instead they and their enterprises were left to lookout for their needs for internet and opportunity.

**Student 2:** My needs are not that much. I need access to the internet since we have now started learning online and doing things online. I need access to internet to researches and do my online classes. Watch videos online and tutorials. My other need is to have at least a minimum of two contact classes. Even if they group us according to the appropriate number that doesn't exceed the covid regulations. We need contact classes as students, some of the things our minds and brains are not the same. Some of the things are only understandable when things are done physically and practically than when they elaborate to us through the phone. That is my needs. When to apply for those needs…. At least we must have unlimited access to the internet throughout the week. Some of us study on weekends. When I do not have the gigs especially – I use that time to push my schoolwork.

Of the major struggles and concerns that students were dominated by during Covid-19 lockdown over and above learning online it was the demise of recreation and opportunity to express religion. These experiences are essential in the life of a student but also contribute to resilience. Recreation offers physical well-being, sense of belonging and activity whilst religious practice provides motivation, grounding, and some perseverance for people in general, and coping mechanisms for students who are religious. Over and above religious practice also provides students with a community that shares a common spiritual understanding and an approach to processing events in and outside of university. The Covid-19 lockdown and its enforcement rendered all this impossible thus leaving students frustrated and hopeless about the very same elements that promote resilience in their lives.

**Student 6:** Yes, I do. I'm one of Jehovah's Witnesses so we have so many activities at church. We go out preaching, this was easier before COVID and now with COVID we no longer go out as much. We no longer go out. We call people to preach to them or over a text. Other than that, I'm currently on this other competition that going on at Loreal. They have a competition that is going on and I'm waiting for the results as we submitted some things. They should be doing the shortlisting by Friday.

The findings shared are personal accounts and evidence of the fall of various essentials that low-income students rely upon at university. These essentials also influence the degrees of resilience amongst students. The absence of NSFAS allowance during recess or university break has a detrimental effect on student livelihoods including the cash that is available to them. This affects how they exist on campus, online and in the social spaces they create. The Covid-19 pandemic disrupted the flow of all these essentials and created an additional struggle and as such these require additional resilience on the part of low-income and poor students committed to making it 'against all odds.'

**Discussion**

Universities pride themselves as institutions that provide a suitable climate for students to start new business or to pursue entrepreneurship. However, Covid-19 pandemic proved that the conditions and climate provided by university for student entrepreneurship is limited and cannot be sustained in times of emergency. As such all students left campus and went back to their homes during lockdown. This meant some of students gave up on their ideas whilst some continued to work on those resiliently. This then shows that even though universities promote entrepreneurship students have themselves to rely on especially in

times of difficulty as exemplified by the Covid-19 pandemic.

Students persisted working on their ideas even during Covid-19 and without full university support. Without their persistence and resilience, they would be without income and even lose their ideas. Their commitment shows a true entrepreneurial spirit and willingness to work on their entrepreneurial activities even during trying times. However, the university was exposed for its partial commitment to student entrepreneurship besides that it promotes entrepreneurship amongst students.

**Practical Implications, Conclusion and Study Limitations**

The research question in this study is: how and in what ways did students reproduce resilience during the covid-19 pandemic. This question is addressed on this part in two ways. Firstly, through the discussion of the resilience of students in a university promoting entrepreneurialism amongst students and secondly, through an analysis of my experiences as a researcher conducting the study.

This paper has discussed student resilience during covid-19 through a qualitative and reflexive lens providing rich insights about the realities of students during the pandemic. But it also shows the relevance and applicability of the reflexivity as a tool to understanding student resilience in higher education. The paper contributes to debates about student resilience by showing through literature the traverse of student hardship and livelihood. It provides a specific account of the day-to-day experiences of students during the covid-19 pandemic and amplifies the voices of the students in the process. This research has practical implications for the work of student development practioners and mentors. It helps them understand and deal effectively with the realities of students in a crisis such as a pandemic.

The study was limited to a single university case study, and it only used a qualitative research approach. Future research can compare two university case studies especially in the South African context where there are comprehensive universities and the universities of technology. To accommodate big student number participation a future study may adopt a mixed methods approach to studying the resilience of students.

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# A quantitative Study on Instructors' perspectives about teaching modalities in the classroom for a graduate hybrid Program

**Gabriel De Freitas**
**Iris Billy**
**Charles Crain**
**Ana Gonzalez**
Campbellsville University, Kentucky, USA

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Teaching modalities, Instructor perspectives, Classroom instruction, Pedagogical practices, educational technology, Technology integration, educational innovation, Faculty development

**Abstract**

*This research article delves into the multifaceted domain of teaching modalities, exploring the diverse perspectives of instructors within the contemporary classroom environment in a graduate hybrid program, which offers classes online with partial face-to-face hours. With the rapid evolution of technology and pedagogical practices, educators are increasingly presented with a spectrum of choices regarding instructional methods. This study seeks to provide an insightful analysis of instructor perspectives on these teaching modalities, shedding light on the factors that influence their adoption, efficacy, and perceived impact on student learning. To gather a comprehensive understanding, a quantitative method research approach was employed. Data was collected through surveys involving a diverse range of educators across various academic disciplines. Instructors recognize the importance of adaptability in the modern classroom. They acknowledge that students possess varying learning styles and preferences, and, as a result, teaching modalities must be flexible to accommodate these differences. Educators increasingly embrace blended learning models, combining face-to-face instruction with online elements, to cater to the diverse needs of their students. The purpose of this research article is to offer a comprehensive analysis of instructors' perspectives on teaching modalities in the classroom. Emphasizing the importance of adaptability, the role of technology, the need for professional development, and the evolution of assessment practices in shaping contemporary pedagogy. Understanding and respecting the varied viewpoints of instructors is essential for the successful integration of teaching modalities and, ultimately, for improving the quality of education in the digital age.*

## Introduction

Online education has been the fastest expanding component of higher education. Because it is so different from traditional classroom-based settings, numerous doubts have been raised about the quality of education provided through the online modality. Enrollment in online programs, in the United States, continues to increase and has increased for the fourteenth straight year with over 3.2 million students enrolled exclusively in online classes (National Center for Education Statistics, 2018; Seaman et al., 2018). The United States has seen online course registrations grow approximately 10% from 2018 to 2019 while the total number of course registrations remained unchanged. At the same time, online education has a 20% higher attrition rate than face-to-face programs. This attrition has been attributed to a lack of engagement leading to students feeling isolated (Purarjomandlangrudi et al., 2016; Stott, 2016). Furthermore, the pandemic has moved many more students into the online environment as many colleges across the United States were forced to quickly move their classes online. It is currently unknown when full face-to-face instruction will resume.

As enrollments in online education continue to grow and the future of higher education course delivery remains unknown, it is imperative that educators design courses that are engaging and provide collaboration among students as well as faculty.

**Research objectives**

The objective of this research is to investigate instructors' perspectives about teaching modalities in the classroom in graduate higher education in a private university in Campbellsville, Kentucky.

**Significance of the study**

This study seeks to investigate instructors' perspectives about teaching modalities in the classroom to promote a sense of engagement in graduate online students. The results of the study will help teaching organizations to care for knowledge management to improve teaching modalities and understand what works best for classroom management and keeping students engaged.

**Literature Review**

As per Carle (2009) teaching modalities have evolved over time in response to changes in society, technology, and educational theory. In ancient civilizations, education was primarily oral, with knowledge being passed down through storytelling, chants, and memorization. Carle, (2009) further stated that formal education was often reserved for the elite, and the focus was mainly subjects such as philosophy, rhetoric, and literature. As per Carle (2009) the teacher-student relationship was characterized by a master-apprentice dynamic based as follows:

**Print Revolution (15th - 17th Century)**

The invention of the printing press by Johannes Gutenberg in the mid-15th century revolutionized education. Books became more accessible, leading to the proliferation of written materials and the standardization of curricula. This period saw the rise of formal schools and the emergence of more structured teaching methods.

**Industrial Revolution (18th - 19th Century)**

The Industrial Revolution brought about significant societal changes, leading to the need for a more standardized and mass-produced form of education to prepare individuals for factory work. The "factory model" of education, characterized by rigid schedules and standardized curriculum, emerged during this time.

**Progressive Education (Late 19th - Early 20th Century)**

Progressive education, championed by educators like John Dewey, emerged as a response to the rigidities of the factory model. It emphasized experiential learning, critical thinking, and a more child-centered approach. The focus shifted from rote memorization to active engagement and problem-solving.

**Technological Advancements (20th Century)**

The introduction of audio-visual aids, including film projectors, tape recorders, and later, computers, began to influence teaching methods. Distance learning and correspondence courses also became more feasible with the advent of the postal system and later, radio and television.

**Digital Age (Late 20th Century - Present)**

The proliferation of personal computers, the internet, and digital technologies transformed education once again. E-learning, blended learning, and online courses became more prevalent. The availability of multimedia resources, interactive simulations, and virtual classrooms opened up new possibilities for teaching and learning.

**Personalized Learning and EdTech (21st Century)**

Recent years have seen a growing emphasis on personalized learning, which tailors' education to individual student needs and preferences. Educational technology (EdTech) continues to play a pivotal role,

with tools like learning management systems (LMS), virtual reality (VR), and artificial intelligence (AI) being integrated into teaching practices.

**Globalization and Cultural Diversity**

As per Alonso Dias & Blazquez Entonado (2009) society has become more interconnected, educators are increasingly recognizing the importance of culturally responsive teaching and inclusive education to accommodate diverse student populations. Alonso Dias & Blazquez Entonado (2009) caption these in the following:

**Pandemic Response (2020s and onwards)**

The COVID-19 pandemic accelerated the adoption of remote and hybrid learning models, necessitating a rapid shift to online teaching platforms and digital tools (Alonso Dias & Blazquez Entonado, 2009)

As per Alonso Dias & Blazquez Entonado (2009) in early 2022, there's a continued focus on flexible, learner-centered approaches. Competency-based education, micro-learning, and the integration of AI for personalized instruction are areas of ongoing development. The evolution of teaching modalities is ongoing, and educators are likely to continue adapting to new technologies and educational theories in the future (Alonso Dias & Blazquez Entonado, 2009).

**Traditional Learning:**

Traditional learning, also known as face-to-face or in-person learning, is the conventional method of education where students attend classes in a physical classroom setting with a teacher present. As per Alonso Dias & Blazquez Entonado (2009) traditional learning often involves direct interaction between students and the instructor, as well as peer-to-peer interaction.

As per Alonso Dias & Blazquez Entonado (2009) the characteristic of traditional learning includes:

- In-person instruction by a teacher or instructor.
- Structured classroom environment with set schedules.
- Face-to-face interaction between students and teachers.
- Use of textbooks, physical materials, and classroom resources.

**Blended Learning:**

Blended learning, also known as hybrid learning, combines elements of both traditional and online learning (Alonso Dias & Blazquez Entonado, 2009). In this modality, students participate in a mix of in-person classroom instruction and online learning activities. The online component may involve assignments, resources, discussions, or assessments. Alonso Dias & Blazquez Entonado (2009) characterize the following as to blended learning:

- Integration of face-to-face and online instruction.
- Flexibility in the delivery of content and activities.
- Utilization of digital tools and resources for learning.
- Opportunities for self-paced and independent learning online.

**Online Learning:**

Online learning, also known as e-learning or distance learning, is a mode of education where instruction and learning activities take place entirely over the internet or through digital platforms (Alonso Dias & Blazquez Entonado, 2009). As per Alonso Dias & Blazquez Entonado (2009) for online learning students engage with course materials, communicate with instructors and peers, and complete assignments online.

Characteristics of online learning as per Alonso Dias & Blazquez Entonado (2009) are as follows:

- Learning takes place via digital platforms, websites, or learning management systems (LMS).
- No physical classroom attendance is required.
- Instructional materials, assessments, and resources are accessible online.
- Provides flexibility in terms of time and location for learners.

These teaching modalities have unique advantages and may be chosen based on factors like the nature of the subject, learner preferences, access to technology, and external circumstances (such as during a pandemic). Many educational institutions now incorporate a combination of these modalities to create a more flexible and tailored learning experience for students.

Theoretical frameworks play a crucial role in shaping educational practices and informing research on teaching modalities. Liu, C. & Matthews, R. (2005) showcased three prominent theories for learning namely constructivism, social learning, and experiential learning and how they relate to the choice of teaching modalities:

**Theories of Learning**

***Constructivism***

Constructivism is a learning theory that posits that learners actively construct knowledge and meaning from their experiences (Liu & Matthews, 2005). The theory of constructivism emphasizes the importance of prior knowledge, social interaction, and individual interpretation in the learning process. As per Liu & Matthews, (2005) a traditional classroom setting, constructivism can be implemented through activities that engage students in critical thinking, problem-solving, and discussions Liu & Matthews, (2005) discuss using Socratic questioning techniques to encourage students to construct their own understanding. Constructivism aligns well with blended learning, as it allows students to engage with content both online and in-person (Liu & Matthews, 2005). Online resources can provide opportunities for exploration, while face-to-face interactions can facilitate collaborative sense-making and knowledge application. Online learning platforms can be designed with constructivist principles in mind by incorporating interactive simulations, multimedia resources, and discussion forums that encourage active engagement and knowledge construction (Liu & Matthews, 2005).

**Social Learning:**

Social learning theory emphasizes the importance of social interaction and observation in the learning process. As per Brownstein, Brownstein, Gerlowski, (2008) social learning suggests that individuals learn from observing others and from the consequences of their actions in social contexts.

In a traditional classroom, social learning can be facilitated through group activities, discussions, and collaborative projects. These interactions allow students to learn from their peers, share perspectives, and develop communication skills.

Blended learning can promote social learning by providing opportunities for both in-person collaboration and online discussion forums (Brownstein, Brownstein, Gerlowski, 2008). Students can share experiences, exchange ideas, and learn from each other's viewpoints. Social learning can be fostered in online environments through collaborative tools, discussion boards, virtual group projects, and peer feedback mechanisms. Social media platforms can also be utilized to create virtual learning communities (Brownstein, Brownstein, Gerlowski, 2008).

**Experiential Learning:**

According to Carroll & O'Donnell, (2010) experiential learning theory emphasizes the importance of direct experience and reflection in the learning process. It proposes a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Experiential learning can be integrated into traditional classrooms through activities such as simulations, case studies, hands-on experiments, and field trips (Carroll & O'Donnell, 2010). These experiences provide students with opportunities to apply theory to real-world situations. Blended learning can incorporate experiential elements by combining online resources with in-person experiences. For example, students may engage in virtual simulations or virtual reality experiences before applying their knowledge in a hands-on lab or fieldwork. As per Carroll & O'Donnell, (2010) there may be challenges to implement experiential learning entirely online, virtual labs, interactive simulations, and virtual field trips can provide opportunities for students to engage in experiential learning activities in a digital environment.

In summary, theoretical frameworks like constructivism, social learning, and experiential learning provide valuable insights for designing and selecting appropriate teaching modalities. Each theory offers

principles and strategies that can be applied to various educational contexts, including traditional, blended, and online learning environments.

**Student and Instructor Perspectives on Various Teaching Modalities**

The last few years have shown how professors and students have adapted to new teaching modalities. Some have excelled in this new endeavor while others, students, and professors alike, have been a little more resistant. Online/Remote learning has increased dramatically since the beginning of the COVID19 Pandemic. Teaching online and hybrid courses is a relatively new concept for many students and especially professors (Winters, Nogueira, Durand, & & Arakawa-Belaunde, 2023)

The concept of online learning has been regarded by many academicians as not as rigorous, or academically challenging for students as the traditional brick and mortar classroom setting. Professors who are asked to transition to a different mode of instruction, normally online or hybrid, from what they have been accustomed to for years, could have a conflict with their expectations of an online course and with what their role in the course should be (Matos, 2023).

Many face-to face teachers still tend to believe that online education does not offer the same quality and integrity as a classroom setting offers (Matos, 2023). Furthermore, professors that do not possess the confidence or motivation needed for teaching in a new modality may hinder the development of the student academically and/or their own pedagogical advancement as well. In the case of these professors, individualized training will likely be needed to enhance their performance and their motivation. This training will prove beneficial in ensuring professors will be able to conduct classes effectively and efficiently in whatever modality is needed (Matos, 2023).

With the rapid development of information technology, simulators, cloud computing, Internet of Things (IoT) and various other teaching tools, there are multiple ways for professors to teach in different modalities and still ensure students are engaged, have their needs met, and stimulate their interest in learning (Nie, 2023).

**Student-Centered Approach to Multiple Teaching Modalities**

The student-centered approach has previously been associated with brick-and-mortar classes. This approach is centered around promoting creativity, collaboration, and problem solving (Koehler & Meech, 2022). Since the onset of the COVID-19 Pandemic, multiple technological advances have been developed to ensure professors have access to various avenues to ensure student success in all modes of delivery. This approach has greatly increased since new technologies have allowed for a more practical learning environment, instead of a more theoretical one.

One great aspect of the student-centered approach is that the method of teaching switches from teaching to guiding and the course content relies more on practice than theory which, in turn, leads to an increased enthusiasm for learning from students (Zhang, Zhang, & Zhang, 2023). Student-centered learning increases the chances that student's needs are met and entices students to achieve more due to being actively involved in the learning process. As students perform better, their grades will increase, attendance will increase and the possibility of students dropping out will decrease (Zhang, Zhang, & Zhang, 2023).

The normal brick and mortar teaching approach has been turned upside down over the past three years. Technology in the classroom, whether face-to-face or online, has increased dramatically and learning outcomes have followed suit. This was all due to the need for a better understanding of teaching and learning during the pandemic, as well as the desire to ensure students and professors have the tools and opportunities, they need to enhance their skills in areas that may have been underdeveloped (Koehler & Meech, 2022).

Online and Hybrid delivery modes are becoming the new normal within the higher education arena. All stakeholders are responsible for ensuring students have a productive learning community. These communities are comprised of instructional technologists, professors, graphic designers, and administrators to name a few. These learning communities are paramount to the success of students, the institution, and higher education as a whole (Galvis & Carvajal, 2022).

**Faculty Development and Training**

According to a study on faculty members' involvement in faculty development, the study participants claimed that faculty development represented their overall growth as faculty members (Steinert, 2012). They did not just see faculty development as the improvement of certain abilities linked to teaching, research, or administration, but also as the growth of themselves as faculty members, including personal and professional development. Even though faculty members welcome the chance to define their career goals and values, form collaborative relationships, and acquire skills to advance their career path, the literature, curiously, does not report many faculty development programs that focus on career development (Steinert, 2012).

It would appear that investing in career development through faculty development constitutes a crucial step forward given that faculty members are our most valuable resource (Whittaker & Montgomery, 2014). Seminars in this area could concentrate on developing academic identities, career planning (including a summary of various career choices), and the benefits of mentoring. Mentorship may really improve hiring, retention, and the atmosphere that supports the academic position, and as a result, it should be considered as an educational area and a method in the development of faculty (Whittaker & Montgomery, 2014). The promotion of wellbeing, burnout prevention, and time management should all be seen as crucial areas for faculty development (Whittaker & Montgomery, 2014).

Faculty development can be a key factor in encouraging organizational and curricular change (Whittaker & Montgomery, 2014; Steinert, 2012). In other words, it may support the promotion of teaching as a research activity and foster an environment in the classroom that values and honors leadership, creativity, and quality in education (Whittaker & Montgomery, 2014; Steinert, 2012). Additionally, faculty development can promote changes to the curriculum and foster consensus as well as enthusiasm (Whittaker & Montgomery, 2014; Steinert, 2012). By addressing the formal, informal, and hidden curricula and strengthening organizational capabilities, it can also help to change the institutional culture (Whittaker & Montgomery, 2014; Steinert, 2012). Faculty development, for instance, can encourage culture change by assisting in the development of institutional policies that support and reward excellence in teaching, communicate the expectation of professionalism among all faculty members, encourage a reexamination of the requirements for academic promotion, if appropriate, and offer educational opportunities (Whittaker & Montgomery, 2014; Steinert, 2012).

**Challenges and Barriers**

Professors had to modify their old teaching strategies and become accustomed to new online teaching platforms after institutions decided to relocate their classes online due to the COVID-19 virus fears (Na & Jung, 2021). This was done in order to continue the delivery of meaningful learning experiences. However, despite their efforts, a number of research indicates that teachers still encounter challenges when instructing in distant classrooms. To lessen the burdens, it is vital to recognize these issues and offer the proper support (Na & Jung, 2021).

Despite being compelled to close their facilities because of the COVID-19 outbreak, schools have been able to maintain instructional programs in large part uninterrupted. There are, nevertheless, a number of difficulties to overcome. In a recent study conducted in Italy, a number of technological, educational, and societal issues have been highlighted as a consequence of the examination of an online discussion forum with international experts, ISTAT data, and remarks made by opinion leaders in Italy (Ferri, Grifoni, & Guzzo, 2020).

The most significant technological issues include the unpredictability of Internet connections when thousands of students and workers are connected at once, as well as the fact that many students lack technology devices. Numerous research, notably in developing nations like Ghana and Malaysia, have emphasized this issue (Ferri, Grifoni, & Guzzo, 2020). Given the abundance of online resources and the lack of structured content, as well as the social and cognitive issues that teachers and schools must address in this situation, the pedagogical challenges are related to the lack of digital skills on the part of both teachers and learners. Students' lack of engagement and motivation is linked to the societal issue of the decline in interpersonal communication between teachers and students as well as among students (Ferri, Grifoni, & Guzzo, 2020).

In order to keep students' attention, a clear and consistent strategy should be created, offering structured and planned educational material (content, methodologies, and common goals), as well as more suitable e-learning platforms that make use of interactive suitable digital learning resources (video, animations, quizzes, and games) (Na & Jung, 2021; Ferri, Grifoni, & Guzzo, 2020). Co-creation platforms might be created and made accessible to encourage student involvement in the production of instructional materials (Na & Jung, 2021; Ferri, Grifoni, & Guzzo, 2020). Also, whenever possible, a blended approach should be employed to strengthen a sense of community belonging, enhancing social contact and collaboration between students and teachers as well as among them (Na & Jung, 2021; Ferri, Grifoni, & Guzzo, 2020). Experts believe that as students require in-person contacts, face-to-face instruction should be used in conjunction with online instruction (Na & Jung, 2021; Ferri, Grifoni, & Guzzo, 2020). To promote customized, inclusive, and participative online learning paths, the use of intelligent technologies for remote education, such as artificial intelligence, needs to be strengthened. If this is integrated with the pedagogical approach teachers employ, it can create new opportunities and add value to online learning. In reality, this study showed the need for more effective personalization of learning (Na & Jung, 2021; Ferri, Grifoni, & Guzzo, 2020).

**Methods**

Data were collected from 33 graduate business professors using a questionnaire of instructors' perspectives about teaching modalities in the classroom.

**Please indicate your gender**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Male | 17 | 51.5 | 53.1 | 53.1 |
| | Female | 14 | 42.4 | 43.8 | 96.9 |
| | Prefer Not to Say | 1 | 3.0 | 3.1 | 100.0 |
| | Total | 32 | 97.0 | 100.0 | |
| Missing | System | 1 | 3.0 | | |
| Total | | 33 | 100.0 | | |

Table I Gender

**How many years of experience do you have in teaching graduate courses?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 0 or 1 | 4 | 12.1 | 12.1 | 12.1 |
| | 2 or 4 | 5 | 15.2 | 15.2 | 27.3 |
| | >5 | 24 | 72.7 | 72.7 | 100.0 |
| | Total | 33 | 100.0 | 100.0 | |

Table II Age

**Study Population**

Data were collected from graduate business professors at Campbellsville University in KY, USA via Survey Monkey Thursday, November 2, 2023. We performed convenience sampling by recruiting participants from the Graduate Business Program at Campbellsville University. The participants voluntarily provided informed consent. Professors were instructed via email to complete the survey online using a link from Survey Monkey. The duration for survey completion was approximately 5 minutes. The appropriate sample size required for regression analysis was computed using the G*Power 3.1.9.2 software. For an effect size (f2) of 0.02, significance (α) of 0.05, and power (1 − β) of 0.80, the minimum required sample size was 50, and we distributed the survey online to 50 graduate business professors with the hope of no potential withdrawal. A total of 33 surveys were retrieved in the final analysis.

**Validity:** To measure the validity of the questionnaire, the questionnaire was distributed to 15 professors outside the sample. The notes and feedback about the survey were collected. The language and research notes were collected on the survey before its final distribution.

**Reliability:** To measure the reliability of this questionnaire, Cronbach's Alpha was used, and the results show that the value of Cronbach's alpha was more than 0.6 for all variables of the study, which makes it reliable.

**Measures**

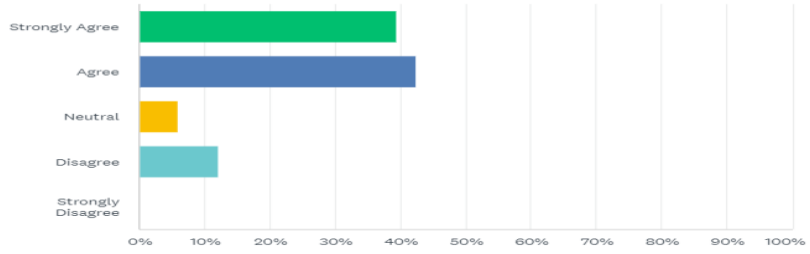
***General characteristics***

We collected information about participants' sex and age with sex characterized as male and female and age with the ranges of 18-24, 25-34, 35-44, and 45+.

The professors responded the following questions:

Please indicate your level of agreement with the statement: "Blended learning, combining both online and in-person instruction, enhances student engagement and learning outcomes."

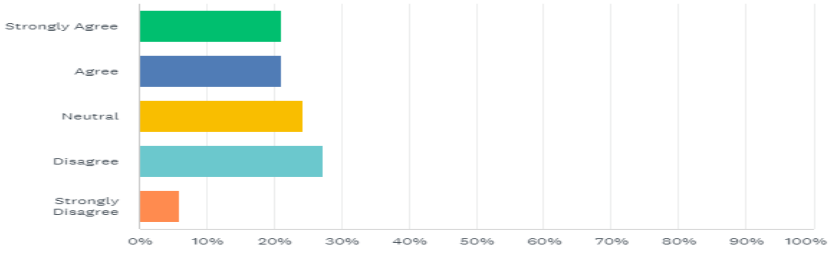
Answered: 33 Skipped: 0



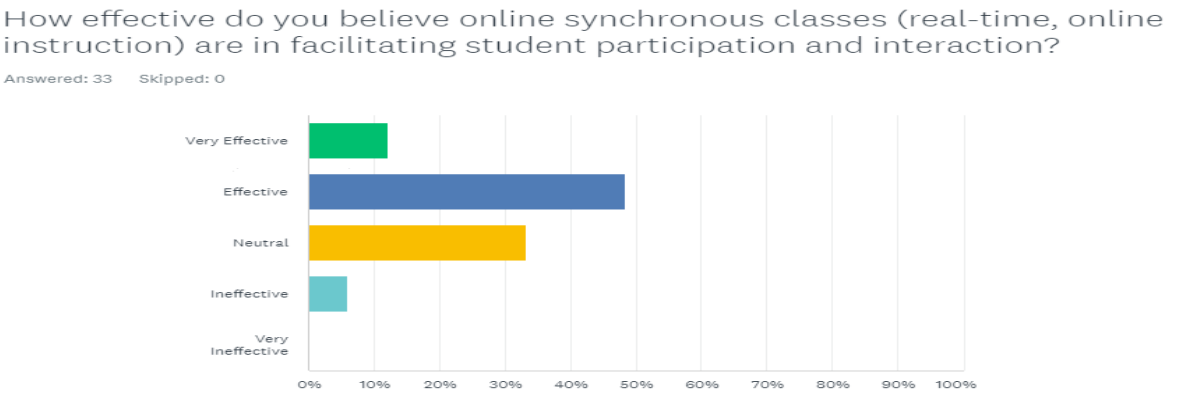

| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Strongly Agree | 39.39% | 13 |
| Agree | 42.42% | 14 |
| Neutral | 6.06% | 2 |
| Disagree | 12.12% | 4 |
| Strongly Disagree | 0.00% | 0 |
| TOTAL | | 33 |

To what extent do you agree with the following statement: "Traditional face-to-face teaching is the most effective teaching modality for fostering meaningful student-teacher interactions"?

Answered: 33 Skipped: 0




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Strongly Agree | 21.21% | 7 |
| Agree | 21.21% | 7 |
| Neutral | 24.24% | 8 |
| Disagree | 27.27% | 9 |
| Strongly Disagree | 6.06% | 2 |
| TOTAL | | 33 |




| ANSWER CHOICES | RESPONSES | |
|---|---|---|
| Very Effective | 12.12% | 4 |
| Effective | 48.48% | 16 |
| Neutral | 33.33% | 11 |
| Ineffective | 6.06% | 2 |
| Very Ineffective | 0.00% | 0 |
| TOTAL | | 33 |

**Statistical Analysis**

As described in the research design, the instructors were given a choice to indicate their level of agreement with the statement: "Blended learning, combining both online and in-person instruction, enhances student engagement and learning outcomes." A total of 14 (42.42%) instructors agree with the statement, 13 (39.39%) instructors strongly agree with the statement, whereas 4 instructors (12.12%) disagree with the statement. Moreover, when asked on the survey to what extent do you agree with the following statement: "Traditional face-to-face teaching is the most effective teaching modality for fostering meaningful student-teacher interactions"? a total of 7 (21.21%) instructors agrees with the statement, and 9 (27.27%) instructors disagree with the statement. However, when asked on the survey how effective do they believe online synchronous classes (real-time, online instruction) are in facilitating student participation and interaction, the majority of instructors 20 (60.60%) selected effective and very effective.

With the ever-changing educational landscape, consideration should be taken because many students did not start their college-level program expecting to complete their degree requirements in the online environment. Those who did choose to continue their education in the online environment may have very little experience learning in an asynchronous classroom. Flexibility in teaching modalities can cater to diverse learning styles and preferences among students. The use of blended learning, combining both online and in-person instruction, enhances student engagement and learning outcomes, which could be a useful bridge from a traditional in-person classroom to the world of online learning. Faculty should create guidelines on the way to use new technology, setting online learning expectations, and cultivating a safe learning environment will be essential when attempting to create an engaging online classroom. Flipped classroom models, where students learn content before class and engage in active learning during class, may improve overall learning outcomes. Also, incorporating real-world case studies and practical applications in the curriculum may improve the relevance of classroom instruction.

**Quantitative Results**

Statistics were utilized to ascertain the instructors' perceptions about teaching modalities in the classroom for a graduate hybrid program. In the survey, the instructors were asked to reflect on their preferences and comfort levels with blended learning, combining both online and in-person instruction, and how it enhances student engagement and learning outcomes. Most of the instructors reported that they preferred a blended learning environment, the instructors were given a choice for their preferred teaching modality and stated they could use either a face-to-face instruction or online instruction, perhaps a combination of both. Descriptive and inferential statistics, specifically an ANOVA, were used to analyze

the results from the survey. For the Likert-scale survey, the instructors were asked to reflect on teaching modalities from the course and then indicate the extent to which they strongly agree (5) strongly disagree (1) with each phrase as it relates to a blended learning environment. Instructors' perspective on blended teaching modalities from the course was statistically significant for incorporating real-world case studies and practical applications in the curriculum, which improves the relevance of classroom instruction, $F(5, 27) = 3.274$, $p < .019$; and the effectiveness of peer-to-peer collaborative projects and group activities in promoting a deeper understanding of course material in various teaching modalities, $F(5, 27) = 3.416$, $p < .016$.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Please indicate your level of agreement with the statement: "Blended learning, combining both online and in-person instruction, enhances student engagement and learning outcomes." | Between Groups | 3.418 | 5 | .684 | .676 | .645 |
| | Within Groups | 27.309 | 27 | 1.011 | | |
| | Total | 30.727 | 32 | | | |
| To what extent do you agree with the following statement: "Traditional face-to-face teaching is the most effective teaching modality for fostering meaningful student-teacher interactions"? | Between Groups | 8.933 | 5 | 1.787 | 1.173 | .348 |
| | Within Groups | 41.127 | 27 | 1.523 | | |
| | Total | 50.061 | 32 | | | |
| How effective do you believe online synchronous classes (real-time, online instruction) are in facilitating student participation and interaction? | Between Groups | 4.006 | 5 | .801 | 1.411 | .252 |
| | Within Groups | 15.327 | 27 | .568 | | |
| | Total | 19.333 | 32 | | | |
| Please rate the following statement: "Flipped classroom models, where students learn content before class and engage in active learning during class, improve overall learning outcomes." | Between Groups | 2.918 | 5 | .584 | .803 | .558 |
| | Within Groups | 19.627 | 27 | .727 | | |
| | Total | 22.545 | 32 | | | |
| How strongly do you agree with the idea that self-paced online courses (asynchronous) can provide students with more flexibility in their learning schedules? | Between Groups | 1.370 | 5 | .274 | .577 | .717 |
| | Within Groups | 12.812 | 27 | .475 | | |
| | Total | 14.182 | 32 | | | |
| In your experience, how effective is the use of educational technology (e.g., learning management systems, multimedia tools) in enhancing the teaching and learning experience? | Between Groups | 1.115 | 5 | .223 | .541 | .743 |
| | Within Groups | 11.127 | 27 | .412 | | |
| | Total | 12.242 | 32 | | | |
| Please rate your level of agreement with the statement: "Incorporating real-world case studies and practical applications in the curriculum improves the relevance of classroom instruction." | Between Groups | 2.082 | 5 | .416 | 3.274 | .019 |
| | Within Groups | 3.433 | 27 | .127 | | |
| | Total | 5.515 | 32 | | | |
| To what extent do you believe that student feedback and input should influence the choice of teaching modality for a particular course? | Between Groups | 5.112 | 5 | 1.022 | 2.028 | .107 |
| | Within Groups | 13.615 | 27 | .504 | | |
| | Total | 18.727 | 32 | | | |
| How effective are peer-to-peer collaborative projects and group activities in promoting a deeper understanding of course material in various teaching modalities? | Between Groups | 12.494 | 5 | 2.499 | 3.416 | .016 |
| | Within Groups | 19.748 | 27 | .731 | | |
| | Total | 32.242 | 32 | | | |
| Please indicate your level of agreement with the statement: "Flexibility in teaching modalities can cater to diverse learning styles and preferences among students." | Between Groups | 1.797 | 5 | .359 | .603 | .698 |
| | Within Groups | 16.082 | 27 | .596 | | |
| | Total | 17.879 | 32 | | | |

## Discussion

### *Limitations*

There are several limitations to this study. While the small sample size of 33 participants can be considered a limitation, there are no large studies to date that investigate instructors' perspectives about teaching modalities in the classroom. This study included instructors from graduate programs; therefore, future studies should include instructors from various disciplines and levels of education. This would provide insight into how social presence is perceived by a more diverse population. Future studies on teaching modalities in the classroom should focus on harnessing emerging technologies, adapting to evolving educational needs, and exploring the impact of diverse learning environments. Researchers should continue to investigate how virtual and augmented reality, artificial intelligence, and other innovative tools can enhance traditional teaching methods and provide more personalized learning experiences. Moreover, the ongoing examination of remote and hybrid learning models, which gained prominence during the COVID-19 pandemic, will shed light on the optimal balance between in-person and online instruction. As

education continues to evolve, these studies will help educators refine their approaches, ensuring that the classroom remains an effective and inclusive space for students of all backgrounds and abilities.

**Recommendations**

Recommendations for teaching modalities in the classroom should prioritize flexibility and adaptability, recognizing that a one-size-fits-all approach is often insufficient in meeting diverse learning needs. Educators should harness technology as a valuable tool, incorporating it to enhance engagement and facilitate personalized learning experiences. Additionally, a balanced mix of in-person and online instruction should be considered, leveraging the strengths of each modality to create a dynamic and resilient educational environment. Furthermore, fostering a student-centered approach, where active participation and critical thinking are encouraged, remains crucial. Finally, instructor professional development should continually address evolving pedagogical strategies and technology integration, ensuring that educators are well-equipped to navigate the ever-changing landscape of teaching modalities and deliver high-quality education to their students.

**Conclusion**

The study identified instructional activities of teaching modalities in hybrid courses. Educators believe that courses should be engaging, motivating, and allow students to develop a greater understanding of the content. Research shows when the strengths of online tools and face-to-face interactions were present, students perceived the support of instructors as well as the convenience of being able to work at their own pace on their own time. Varied opportunities for interacting with the content, and the recognition of diverse learning preferences, were very important for the educators of this study. Educators supported the placement of instructional activities in classes was significant and impacted largely students' engagement with course content. The purpose of an online class is to provide information, prepare students for face-to-face activities, and review or practice what was learned. The purpose of a hybrid or blended class is to take advantage of the best features of both online and more traditional forms of learning to complement, reinforce and elaborate on one another. The purpose of a face-to-face class is to ask questions, receive immediate feedback, share experiences and perspectives, collaborate with classmates, and network with classmates. There is the need to have dynamic connections between face-to-face, hybrid, and online classes and educators increasingly embrace blended learning models, combining face-to-face instruction with online elements, to cater to the diverse needs of their students.

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# Technology and Institutions: What can research on Artificial Intelligence (AI) technology and institutions learn from each other?

**Iris Billy**
**Hannah Anush**
Campbellsville University, Louisville, USA

**Keywords**
Artificial Intelligence, Artificial general intelligence, machine learning, deep learning techniques, expert systems, algorithms, institutions, voice, and face recognition

**Abstract**

*Artificial Intelligence (AI) is not contained within the walls of technological organizations; over the decades, it has significantly impacted other industries due to the exponential practical implications of the technology and major break throughs as a result of AI implementation.*

*Many authors have conducted relevant research about AI and its assistance in industries like banking and finance, education, manufacturing, healthcare, and others to find direct correlation between application of AI technology in data analysis, decision-making, end user impact and satisfaction, time, and cost savings.*

*This study aims to perform in-depth analysis of various previous studies, and to conduct market research to comprehend the meeting point of Artificial general intelligence and Institutions and what they have to offer to each other; a detailed analysis of the way various strategies applicable through machine learning, deep learning techniques, voice and face recognition applications, expert systems assisting in comprehending customer behavior and patterns, and to identify potential demand, automation of key functions of inter-organization departments through algorithms, and building blocks that form institutions can be adopted by AI for future models and prospectives, and also to understand any gaps in the practical implications of AL that institutions can possibly incorporate in the future; thereby increasing efficiency and effectiveness of both AI and Institutions.*

## Artificial Intelligence in Current Education

The mention of artificial intelligence brings to mind a supercomputer, a computer with immense processing capabilities, including adaptive behavior, such as inclusion of sensors, and other capabilities, which enable it to have human-like cognition and functional abilities, and indeed, which improve the supercomputers interaction with human beings. Indeed, different motion pictures have been made to showcase the abilities of AI, such as in smart buildings, such as the ability to manage air quality in a building, temperatures, and or playing music depending on the sensed mood of the occupants of the space.

Within the education sector, there has been increased application of artificial intelligence, going over and above the conventional understanding of AI as a supercomputer to include embedded computer systems. For example, embedded into robots, AI, or computers and supporting equipment enable the creation of robots that improve the learning experience of the student, from the most basic unit of education, early childhood education. Indeed, Timms posited that cobots or the application of robots, working together with teachers or colleague robots (cobots) are being applied to teach children routine tasks, including spelling and pronunciation, and adjusting to the students' abilities. Similarly, the web-based and online education, as enumerated in different studies, has transitioned from simply availing materials online or on the web for students to simply download, study, and do assignments to just pass, to include intelligent and adaptive web-based systems that learn instructor and learner behavior to adjust accordingly, to enrich the educational experience. Artificial intelligence in education, according to Chassignol et al., has been incorporated into administration, instruction or teaching, and learning.

**Nature of Artificial Intelligence**

Artificial intelligence (AI) is conventionally heavily associated with computers. However, it is evident, from a review of the various articles, particularly within the context of the education sector, that while computers may have formed the basis the development of artificial intelligence, there is a gravitation away from the computer alone, the hardware and software, or the equipment, as being artificial intelligence. Embedded computers, sensors, and other emerging technologies have facilitated the transfer of artificial intelligence to machines and other items, such as buildings and robots.

Indeed, Chassignol et al. provides a two-faceted definition and description of AI; they define AI as a field and a theory and as a field of study, they define AI as a study area in computer science. Further AI pursuits are aimed at solving different cognitive problems commonly associated with human intelligence, such as learning, problem solving, and pattern recognition. As a theory, Chassignol et al. defined AI as a theoretical framework guiding the development and use of computer systems with the capabilities of human beings, more particularly, intelligence and the ability to perform tasks that require human intelligence, including visual perception, speech recognition, decision-making, and translation between languages.

**The Future of Learning: AI-driven Education**

AI-driven education is disrupting traditional teaching approaches and shaping the future of technology in industry. AI solutions for education analyze enormous data sets using sophisticated algorithms, providing personalized and adaptable learning experiences. Students get personalized learning, immediate feedback, and access to immersive technologies like augmented and virtual reality in education. Conversational AI in education, like chatbots and virtual tutors, offers quick assistance, promoting independent learning. AI chatbots for education are revolutionizing the way students learn. With their natural language processing and machine learning algorithms, these chatbots provide instant and personalized support to students, answering their questions and guiding them through the learning process. Creating interactive and engaging learning experiences allows students to grasp concepts more easily and retain information better.

**Technology and Institutions**

According to Cairns (2017) Artificial Intelligence (AI) technology and educational institutions can learn from each other in several ways, fostering a mutually beneficial relationship. Here are some key areas of exchange.

**Personalized Learning**

***AI Learning from Institutions***

AI can learn about the diverse learning needs and preferences of students in different contexts. By analyzing data on student performance, engagement, and interactions, AI can adapt content and resources to better suit individual learners.

***Institutions Learning from AI***

Educational institutions can learn from AI's ability to deliver personalized learning experiences at a scale. They can implement AI-powered tools and platforms to enhance adaptive learning, providing tailored content and support to each student.

**Data-Driven Decision-Making**

***AI Learning from Institutions***

AI can learn from institutions' expertise in educational data collection, management, and analysis. This includes understanding the nuances of student demographics, performance metrics, and contextual factors that influence learning outcomes.

***Institutions Learning from AI***

Educational institutions can benefit from AI's advanced analytics capabilities. AI can help identify trends, patterns, and insights in large datasets, enabling more informed decision-making regarding curriculum development, resource allocation, and instructional strategies.

**Accessibility and Inclusivity**

***AI Learning from Institutions***

AI can learn from institutions' efforts to create inclusive learning environments for students with diverse needs, including those with disabilities. Institutions have expertise in designing accessible content, providing accommodations, and ensuring equal access to educational resources.

***Institutions Learning from AI***

AI can offer solutions for automating accessibility features, such as text-to-speech and closed captioning, to make educational content more inclusive. Institutions can adopt AI-driven tools to enhance accessibility measures and provide a more equitable learning experience.

**Curriculum Design and Content Development**

***AI Learning from Institutions***

AI can learn from institutions' subject matter expertise, curriculum design principles, and pedagogical approaches. This includes understanding the nuances of different disciplines and the instructional strategies that best facilitate learning in specific domains.

***Institutions Learning from AI***

Institutions can leverage AI for content curation, generation, and recommendation. AI can analyze vast repositories of educational content to identify relevant resources, suggest materials for specific topics, and even generate custom learning materials.

**Literature Review**

The article establishes the benefits of utilizing technology and solutions that are supported by Artificial Intelligence in organizations belonging to different industries; as the authors attempt to study factors like decreased cost, increased revenue, and improved business process efficiencies that are documented by various organizations. Businesses that have embraced the updates in technology have reaped the benefits organizationally and environmentally; by improved data management, and updated technology to keep up with industry standards (Enholm, Papagiannidis, Mikalef, & Krogstie, 2021). The adoption of AI and its other formats were a change that needed to be supported by the top management, introducing technology using a top-down approach to make the process more acceptable to the employees.

This study also defines key terms like Artificial intelligence, machine and deep learning, and the difference between AI and information technology. The environment where the organization operates evolves with the implications of AI, and many challenges that traditional methods failed to address have successfully been overcome with AI that benefits the overall environment and industry. The below framework establishes the two-way benefits and value creation between AI and institutions, along with the process of leveraging these benefits for both improved technology and to create superior business value.

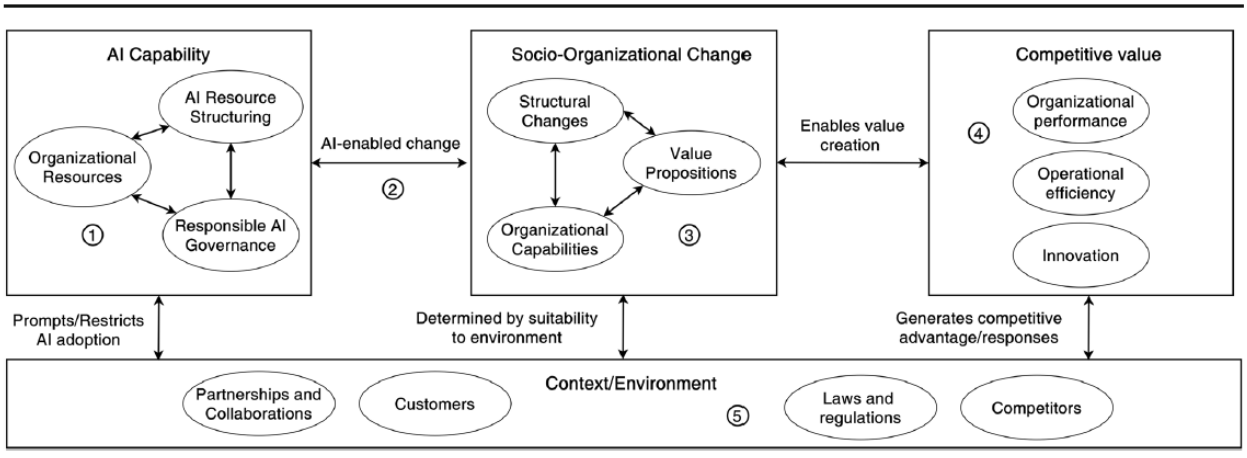


**Image source citation: (Enholm, Papagiannidis, Mikalef, & Krogstie, 2021).**

The fields of Artificial Intelligence technology and advanced technology like Robotics have played a major role in the digital transformation of organizations, and in contributing towards development of growing economies and government organizations. The author studies the various interdisciplinary technologies of AI in the fields of engineering, technology, and business (Ayoko, 2021). Components that have been examined are cultural factors, technology in strategic decision making, reduction of redundant tasks, improvement of processes and streamlining them have been keenly examined and documented in the article. The author divides and studies both internal and external transformation strategies and the benefits thereby leading to overall understanding of the technological benefits resulting from the changes. The multi-disciplinary approach adopted by the author is refreshing as different perspectives are studied in-depth from various organizations with different structures and even differences in geographical locations.

Artificial intelligence and related technologies have the capability to create massive impact on many industries, researchers have especially studied the benefits in the public health care organizations where patient care and experience can be improved multiple folds with the implementation of AI. Technology has the ability to provide impactful insights into healthcare from a multitude of perspectives, including social, behavioral, and environmental that have not existed before. Innovations in medical devices that can be worn by patients and can transmit real time data and readings to ensure adept care by the physicians has also increased the efficiency factor of healthcare. Special data about different factors like pollution, weather related effects, greenhouse gas emissions, etc. can be gathered easily and interpreted to provide analysis and results forecast so corrective measures can be rolled out (Fisher, & Rosella, 2022).

Although there are ample benefits, technology still has the probing need to learn and evolve where there is a lack; research findings note the disparity in healthcare accessibility in rural areas where technology cannot be implemented due to infrastructure limitations, deficiencies identified in measures to ensure inaccurate data predictions and gaps in data prediction models. The below image is a relevant visual depiction of six priority factors that are necessary to use AI and build on the relationship matrix between technology and public health organizations.

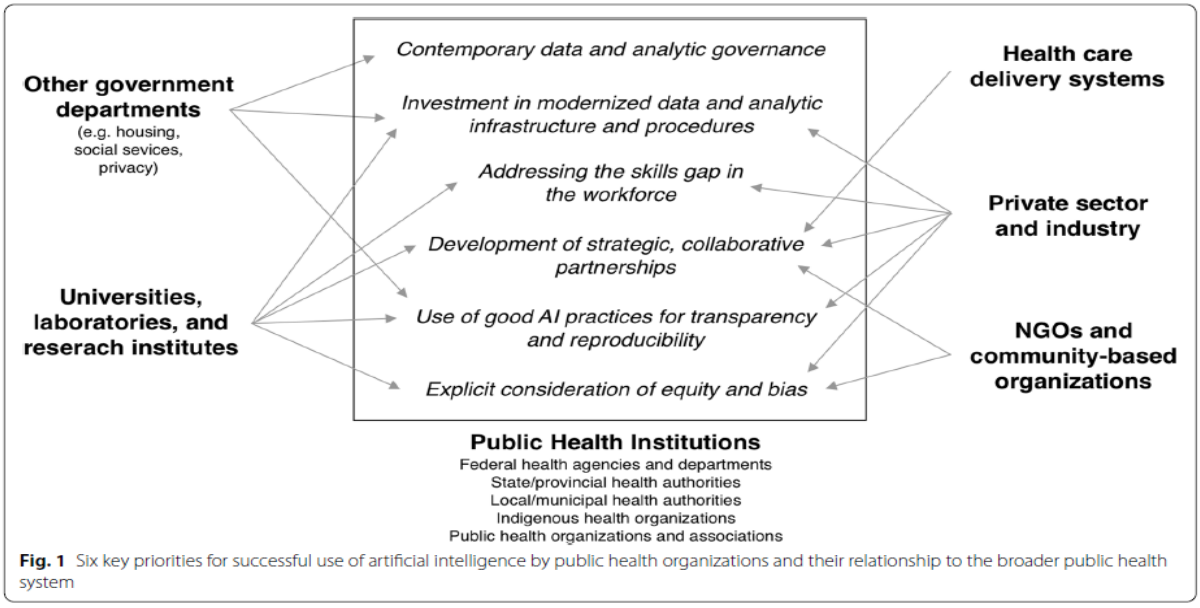


**Fig. 1** Six key priorities for successful use of artificial intelligence by public health organizations and their relationship to the broader public health system

Image source citation: (Fisher, & Rosella, 2022).

Research has been conducted to comprehend the exponential growth of Artificial Intelligence (AI) which has been a disruptive technology bringing change and innovations into the industry over the decades. Various traditional concepts and structures have become obsolete due to the rapidly changing environment for technology and organizations are in the race to adapt to the advances that can catapult their performance and returns. Although AI was developed to enhance correlation and theoretical

implications on data originally, the benefits have multiplied with the advent of frequent innovation and core functional changes. Thousands of technology patents for various industries have been registered for AI by many countries, all indicating the utility of technology and its superior ability to solve problems of bigger magnitude and huge volumes of data. Many researchers have also performed in-depth analysis of AI and its applications in institutions, the top ten articles and citations have been displayed in the table below (José, Juan, José, & Jaime, 2021).

| Article | C | Year | Authors | Journal |
|---|---|---|---|---|
| Managerial applications of neural networks: The case of bank failure predictions | 625 | 1992 | Tam, K. Y., Kiang, M. Y. | Management Science |
| Alignment between Business and IS Strategies: A Study of Prospectors, Analyzers, and Defenders | 608 | 2001 | Sabherwal, R., Chan, Y. E. | Information Systems Research |
| Modeling supply chain dynamics: A multiagent approach | 557 | 1998 | Swaminathan, J. M., Smith, S. F., Sadeh, N. M. | Decision Sciences |
| Conformance checking of processes based on monitoring real behavior | 537 | 2008 | Rozinat, A., Van der Aalst, W. M. P. | Information Systems |
| Credit rating analysis with support vector machines and neural networks: A market comparative study | 505 | 2004 | Huang, Z., Chen, H., Hsu, C.-J., Chen, W.-H., Wu, S. | Decision Support Systems |
| Yahoo! for amazon: Sentiment extraction from small talk on the Web | 432 | 2007 | Das, S.R., Chen, M. Y. | Management Science |
| Telos: Representing Knowledge About Information Systems | 431 | 1990 | Mylopoulos, J., Borgida, A., Jarke, M., Koubarakis, M. | ACM Transactions on Information Systems |
| Corporate distress diagnosis: Comparisons using linear discriminant analysis and neural networks (the Italian experience) | 401 | 1994 | Altman, E. I., Marco, G., Varetto, F. | Journal of Banking and Finance |
| Time series properties of an artificial stock market | 378 | 1999 | LeBaron, B., Arthur, W. B., Palmer, R. | Journal of Economic Dynamics and Control |
| Bankruptcy prediction using neural networks | 363 | 1994 | Wilson, R.L., Sharda, R. | Decision Support Systems |

*Note*: C: Total number of citations.

Image source citation: (José, Juan, José, & Jaime, 2021)

The above research indicates the growth of scientific interest in the applications of technology in institutions and the interrelations factor between both. The trend has shifted towards technology and institutions as both can benefit from each other for greater economic strength, welfare of the industry and environment, countries with most patents for technologies have gained influential recognition by implementing AI in different fields of management.

## Conclusion

AI in education initially took the form of computers and computer-related systems, and later, the form of web-based and online education platform. Embedded systems have made it possible to use robots, in the form of robots or humanoid robots as teacher colleagues or independent instructors, as well as chatbots to perform teacher or instructor-like functions. The use of these platforms and tools have enabled or improved teacher effectiveness and efficiency, resulting in richer or improved instructional quality. Similarly, AI has provided students with improved learning experiences because AI has enabled the customization and personalization of learning materials to the needs and capabilities of students. Overall, AI has had a major impact on education, particularly on administration, instruction, and learning areas of the education sector or within the context of individual learning institutions.

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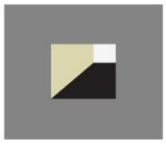

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## Name of the Contributors


Hamaad Yousuf
Muhammad Ali Bhatti
Muhammad Akbar Awan
Mpho Sharon Makgedi Makaleng
Kingston Xerxes Theophilus Lamola
Clifford Fisher
Lydia Barber
Olivia Hodge
Nayer Fardows
Daud Nayer
Agnes Nayer
Sarah Nayer Jaffar
Asser Letsatsi Tau
Emmanuel Innocents Edoun
Charles Mbohwa
Anup Pradhan
Emmanuel Innocents Edoun
Charles Mbohwa
Anup Pradhan
Vidhu Gaur
Afrinsorwat Khan Faika
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Miraji Hamis Kasunsumo
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Priviledge Cheteni
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Jair Jesús León Lucano
Olger Albino Gutiérrez Aguilar



**Centre for Business & Economic Research (CBER)**

79 College Road, Harrow, Middlesex HA1 1BD, UK

Email: editor@cberuk.com; Web: www.cberuk.com