Adaptation of dynamic capabilities: A case of small-scale bakeries in a South African Metropolitan City

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Abstract
The paper explores how small-scale bakeries in the South African Metropolitan City adapt and view automation as part of dynamic capabilities. Dynamic capabilities are a set of specific and identifiable processes such as product development, strategic decision making. They are detailed, critical, stable processes with foreseeable outcomes. This paper argues that automation is part of dynamic capabilities and can enhance operational and financial performance in a small-scale bakery context. As such, the paper contributes to operations management literature concerned about efficiency and innovations in small business operations. The study employs a quantitative approach to data collection using a survey questionnaire. The population of the study is 400 bakery managers. A total sample of 120 completed survey questionnaires was achieved. Key findings show a strong correlation between equipment and food safety and show a significant relationship between automation and dynamic capabilities in small-scale bakeries. The study’s findings show that automation is a dynamic capability. It enhances efficiency in production and profitability. This study concludes that there is significant correlation between automation and dynamic capabilities. The correlation explicates the need to integrate automation and other dynamic capabilities for improved operational and financial performance in small business operations.

Introduction
The study of operations has been trying to understand, define, and measure how business capabilities may lead to an increased efficiency and production than rivals. According to Permana et al., (2017) a dynamic capability is the potential of a business to develop and align internal and external factors associated with volatile changes in any given context and/or business environment. Even though there are definitions and research work on dynamic capabilities there are still delays and gaps on the study of dynamic capabilities in small business operations (Pisano, 2017). Debates about dynamic capabilities tend to pay attention to medium sized and large corporate enterprises at the exclusion of small and micro business operations. Unlike other research this study contributes to literature by bringing into sharp focus dynamic capabilities as an issue in the operations management of a small business.

This study will address the research question and objectives that we aim to achieve followed by the literature review. A review of previously published studies on dynamic capabilities. One of the major challenges small-scale bakeries faces is the concern in competition which requires a balance misuse of existing capabilities (Warner, and Wager., 2019). Warner, and Wager., (2019) points out that dynamic capabilities background has become very important research topic in the publications related to strategic management. This area of study explains how business cope with fast changing environments. An overview of the research methods used have been explained below and the research instrument used, followed by the findings and results. Bakeries adapting to new opportunities need to escape the current business situations and set skills to deal with change resistance. Findings of the study from the data collected has been discussed and the last past is conclusions whereby we conclude that for a successful automation process in small-scale bakeries, execution of dynamic capabilities is essential.
Through difficult economic times the business capability to make use of new opportunities in the market has been recognised as business resilience (Owoseni, and Twinomurinzi, 2019). A good approach on operations of a business model does depend on capabilities of the firm (Teece., 2018). Teece., 2018 states that business model designs are the root structure of business success as much as they provide efficiency to operation and new technology. The business model gives an opportunity by which the new technology joined with the use of tangible and intangible assets lead to the streams of profit (Teece., 2018). Similarly, Mikalef et al., (2019) states that the competitive benefit is that the business manages to get results of strengths to quickly respond to environmental changes. These strengths can be described as organizational effectiveness, i.e., “procedures that enable the greatest efficient, effective, and competitive use of a business assets” (Mikalef et al., 2019).

This study has two research questions. First, what is the importance of dynamic capabilities in small-scale bakeries for efficient operations using new technologies? Second, what are the procedures and techniques that business owners mature to merge dynamic capabilities for efficient small-scale bakeries?

These questions demonstrate the need for knowledge that is required to understand how micro-foundation activities merge with higher-order dynamic capabilities such as foreseeing change, new possibilities and modifying organisations (Schoemaker et al., 2018). Schoemaker et al., (2018) points out that it is very important for these three clusters to set the direction for small business but often cannot be recognised by outsiders. Both product and process are critical here considering the level of the business and the nature of the strategy between cost advantage and differentiation (Schoemaker et al., 2018).

Literature review

A collection of business processes describes dynamic capabilities as sensing, seizing, and transforming potential (Bogers et al., 2019). “These three bundles of dynamic capabilities can help small businesses to effectively achieve benefits of innovation” (Bogers et al., 2019). While Schwarz et al., (2020) describes dynamic capabilities as an attraction on a set of fundamental managerial resources, management cognition, managerial social capital, and managerial human capital. Regarding the sensing opportunities before they fully occur, the ability of managers must realise these opportunities through the scanning of environment and creating new opportunities through sensemaking is very important (Schwarz et al., 2020).

The literature on this study will examine previous studies that have been published by other scholars in the same vein dynamic capabilities and modern technology. This study explains the dynamic capabilities business model by Teece., 2018. For example, the process of sensing, seizing, and transforming is shown on this literature. In a review study by Bocken and Geradts., 2020 they state that organizational design encourages the solidity of a firm’s capabilities. Bocken and Geradts., (2020) also support how “Sustainable Business Model Innovation (SBMI)” is essential in this topic to achieve competitive advantage, while resolving social and environmental problems. Bocken and Geradts., (2020) “define SBMI as innovation to rely on positive impacts and get rid of the negative ones, through changes in the way business value network create, deliver, and change their proposals”. However, there are distinct types of the concepts of dynamic capabilities that are competing separately, and the frequently asked question is how effectively they adapt to change in the environment? (Suddaby et al., 2020). By contrast, Eisenhardt and Martin (2000), claim that dynamic capabilities can justify businesses adapting to stable environments, while they are unable to explain adaptation in environments with rapid and discontinuous change (Suddaby et al., 2020).

A venture with strong and healthy dynamic capabilities is likely to be profitable, it builds, extends resources and normal capabilities, transform them, and respond to fast changing markets (Teece., 2018). Teece., (2018) support that business enterprise resources should be in order and correspond with the activities of business partners to bring value to consumers. A major part of business dynamic capabilities for grabbing opportunities, in most case it is managerial abilities for creating and improving business models (Teece., 2018). Again, Teece., 2018 points out that a decade ago, managerial competences have developed into smaller sub-field of dynamic capabilities, which mapping and executing new business models had been an essential characteristic.
Dynamic capabilities business model structure

The concept of business model increased the strength during the 1990’s dotcom boom era and after (De Silva et al., 2019). Business ventures began to realize, communicate, and spelled out innovative business ideas that could generate income (De Silva et al., 2019). While there is no consensus on what a business model is, the literature gives a definition on transformation, whereby business models are regarded as the philosophy which organizations produce and capture value (De Silva et al., 2019).

Developing a business model must be done repeatedly because very often there is always a room for improvement (Randhawa et al., 2021). To create such changes and understand business model innovation, businesses often need to act and bring resources into effective actions of dynamic capabilities (Randhawa et al., 2021). However, in this study little has been known regarding promoting innovative business models in roles of dynamic capabilities of small-scale enterprises. De Silva et al., (2019) state that a business model is a well-known principle which appears and develops in people’s minds. It is an organizations terminology that performs and recommend the practical tools and devices (for example, offerings, business plans and marketing strategies) through generating value (De Silva et al., 2019). Teece., (2018) adds that, “to defining what a business model is, it is also worth considering what it is not”.

The dynamic capabilities framework is an interdisciplinary model of the business with key capabilities, reflecting the interdependence (Teece., 2018). A simple structure is presented below except some of the feedback channels such as organizations design, dynamic capabilities are shown in Fig. 1. These capabilities and strategy merge to design and improve a justifiable model, which samples change within business ventures (Teece., 2018). “These leads businesses to achieve sufficient profits to allow businesses to carry its capabilities and resources” (Teece., 2018).

![Fig. 1. Business model of dynamic capabilities (Teece., 2018)](image)

An analysis of strategy is needed to indicate different methods which can be used to avoid the loss of financial gain caused by rivalries striving to be greater. Grainy strategic analysis is necessary to identify separate methods which are valuable to prevent the loss of income through emulation by competitors (Teece., 2018). Teece., (2018) state that there are many methods, including copyright or trademarks to safeguard key knowledge, transforming costs to improve customer lock-in and rapid scaling to achieve large market share and cost advantage.

Building dynamic capabilities for efficient small-scale businesses

Through the resource-based understanding perception of capabilities, a strong competitive environment relies on resources such as assets, information, processes, and knowledge which have value,
unusual to find and hard to repeat (Kabongo and Boiral., 2017). It is therefore very important to implement strategies that improve organizational effectiveness, through complex routines, tacit knowledge and competencies coordinated by capabilities (Kabongo and Boiral., 2017). In Table 1, the study presents the organizational capabilities recognized management literature of the environment.

<table>
<thead>
<tr>
<th>Capabilities</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total quality management – tacit skills</td>
<td>The ability to use knowledge developed through employee involvement and work in teams</td>
<td>Abbas., 2020</td>
</tr>
<tr>
<td>Continuous improvement</td>
<td>Continuous improvement resulting from organizational efforts to reduce, minimize and eliminate waste</td>
<td>Jagusiak-Kocik., 2017</td>
</tr>
<tr>
<td>Cross-functional management</td>
<td>The strength to employ working relationships between employees and customers.</td>
<td>Shams et al., 2019</td>
</tr>
<tr>
<td>Innovations shared</td>
<td>The capacity to share what an organization envisions for the future</td>
<td>Walpole et al., 2017</td>
</tr>
<tr>
<td>High level of knowledge</td>
<td>The potential to development and new ways to seeks new existing knowledge</td>
<td>Chi et al., 2018</td>
</tr>
<tr>
<td>Constant improvement</td>
<td>The power to continuously provide ways of new innovations and the organization to be ahead of rivals</td>
<td>Aykol et al., 2020</td>
</tr>
<tr>
<td>Process transformation</td>
<td>The capability to renovate existing equipment and technology</td>
<td>Xie et al., 2019</td>
</tr>
<tr>
<td>Raw materials and goods produced</td>
<td>Delivery of goods control systems such as Just-In-Time (JIT) need to be implemented</td>
<td>Kabongo and Boiral., 2017</td>
</tr>
<tr>
<td>Management of rapid change in technology</td>
<td>The management of how new manufacturing good are implemented is crucial</td>
<td>Zolas et al., 2021</td>
</tr>
<tr>
<td>The execution</td>
<td>The ambition to implement Advanced manufacturing technologies and equipment</td>
<td>Kabongo and Boiral., 2017</td>
</tr>
</tbody>
</table>

“The second column provides a description of these capabilities as found in the studies.” The third column displays the corresponding references. As shown, most research in this area focuses on the quantity of both direct and indirect different types of capabilities and related factors, industry growth, organizational size etc. Kabongo and Boiral., 2017 “has revealed that less is known about how capabilities for environmental management are understood, learned, and implemented in practical terms within businesses”.

**Research methodology**

This study is based on small-scale bakeries located in the South African Metropolitan, the city of Johannesburg. This study adopted a convenience sampling approach, which enabled the researcher to choose subjects based on their accessibility and availability. The study employs a quantitative approach to data collection using a survey questionnaire. The population of the study is 400 bakery managers. A total sample of 120 completed survey questionnaires was achieved. The aim of the study was to have both employees and supervisors as participants because of the knowledge they have about their daily operations.

The study describes the research methods that were used when the data was collected and further review the approach that was used which is convenience sampling approach employed when data was
collected. Employees and supervisors of selected small-scale bakeries took part and completed the questionnaires distributed to them. The study tried to discover if these employees had the knowledge about their baking processes, and if they understood automated machinery and dynamic capabilities. The distribution of the questionnaire had some delays that had the researcher taking three to five weeks making means of distribution and collecting data. Some of the participants were not against sending back the data by emails, while some struggled to even use emails. A traditional method was adopted in this research, whereby it had participants using the pencil-and-paper responding method. One of the major challenges encountered was participants who were quite ignorant of the electronic emails, which lead to this study collecting data in person to accommodate all participants. A self-administered survey was adopted whereby all the participants completed the survey and had it returned to the researcher once completed. This research has classified the importance on how efficient bakeries adapt to the fast-changing technology and how at the end they meet their demand and supply.

“Statkon provides a professional, goal-orientated statistical consultation service to postgraduate students at the University of Johannesburg (UJ)”. The consultations took the researcher through on how to embark on the “research design and methodology, experimental, questionnaire design, and statistical analysis of data”. The analysis of this study was focused on making sense of what dynamic capabilities entailed and how they lead to technological transformation and small-scale bakeries (Warner, and Wager., 2019). This approach is best believed to answer the “how” and “why” proposed in the research questions of the study (Jafari-Sadeghi et al., 2021). Kabongo and Boiral., 2017 state that dynamic capability studies are not entirely related to experience and interpretation by managers in the management field. Their research also suggests that the enhancement of business capabilities rely on the views and ideas of managers and their readiness to welcome and execute changes.

Findings/results

Our research explores on findings and results. For example, the study attempts to analyse and discover whether there is a relationship between automation and dynamic capabilities and the need for small-scale bakeries to adopt dynamic capabilities. Our findings show whether automation can be regarded as a dynamic capability in small-scale bakeries and based on the data of this study, it is shown below that equipment happened to be more correlated than the rest of the automation factors. Findings have shown a complete response rate on equipment speeding up the process of moulding dough and made this factor one where all 120 participants had shown more interest on. This reveals or probes whether could automation be a variable under dynamic capabilities? This study has shown strong correlation among its factors especially on equipment, and the findings presented most of the items of correlation were bigger than 0.3 which is accepted in practice. This shows that automation is variable of dynamic capabilities in small-scale bakeries.

Equipment

The Table below provides different questions asked on this factor equipment. “A complete response of 120 small-scale bakeries was achieved on equipment speeding up the process of moulding dough”. This question had many participants intrigued more than the rest in the data collected. The interest shown on speed in the baking process with ovens being ready for the next load had participants willing to respond. Again, the study experienced majority of interest and willingness of participants to respond on item B1.5 below.

<table>
<thead>
<tr>
<th>Our automated (electrical) equipment…</th>
<th>N</th>
<th>Mean rating/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1.1 provides efficiency in dough mixing</td>
<td>118</td>
<td>3.96</td>
</tr>
<tr>
<td>B1.2 speeds up process of moulding dough</td>
<td>120</td>
<td>3.96</td>
</tr>
<tr>
<td>B1.3 ensures ovens are ready for the next load of baking</td>
<td>120</td>
<td>3.91</td>
</tr>
<tr>
<td>B1.4 ensures speed in our baking process</td>
<td>120</td>
<td>4.11</td>
</tr>
</tbody>
</table>
B1.5 ensures accurate temperature on ovens & B1.6 adds steaming in ovens that reduces the use of oil

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>119</td>
<td>3.71</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>3.44</td>
</tr>
</tbody>
</table>

One of the significant factors on this data is equipment. “Automation begins here whereby bakeries must save time and increase their speed in the baking process to achieve good operational performance”. The above results show that automation in small-scale bakeries is relevant to be part of their dynamic capabilities. This data also discovered that the items on speed in the baking process made the question to be the most rated. “Business ventures like small-scale bakeries have a challenging task of creating accessible and decent employment for our youth”. The table above also presented the mean on the consistency of the instrument. These items are interrelated and disclose how crucial is equipment with automation in small-scale bakeries. This then proves that for small-scale bakery’s dynamic capabilities to be efficient, there is a need to have highly improved equipment to better their speed in operations. This then means automation is indeed a dynamic capability in small-scale bakeries.

**Correlation Matrix**

The correlations simple have a relationship amongst each of the items of this study. Pallant (2007) states that for “the correlation matrix to be considered suitable for factor analysis, the correlation should show at least some correlations of \( r = 0.3 \) or greater”. These findings reveal that majority of the items in particularly the correlation in section B of the questionnaire are bigger than 0.3. According to Pallant (2007), “the Bartlett’s test of Sphericity should be statistically significant at \( p < 0.05 \) and the Kaiser-Meyer-Olkin value should be \( > 0.6 \) or above”.

Table 2. KMO and Bartlett’s test

The below table present the “KMO and Bartlett’s test, which shows the validity of the data of this study and support the factorability of the correlations”.

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</th>
<th>0.847</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartlett’s Test of Sphericity</td>
<td>Approx. Chi-Square</td>
</tr>
<tr>
<td>df</td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td></td>
</tr>
</tbody>
</table>

“The Kaiser-Meyer-Olkin value is 0.847 and this means that this study is valid with the data presented”. “The Bartlett’s test of Sphericity and Sig (anything with Sig is for significance) which is the \( P \) value and at is 0.000 and it should be \( < 0.05 \) and in this study, it is considered as good because it supports the factorability of the correlation matrix”.

As per the findings of the correlation in factor analysis, the communalities extraction range between 0.312 and 0.692. In practice communalities must be bigger/greater than 0.3. “The data shows that all the communalities are greater than 0.3 which is good for this study”. “It was at this stage whereby the researcher realised that item B2.4 (which is automation in bakeries ensures that customers have access to quality products by reducing damaged products during delivery) was the lowest with a communality of 0.166”. Because the required value must be 0.3, this had this communality being omitted from the rest of the data.

Our findings suggest that small-scale bakeries should strive to mature dynamic capabilities that are suitable for successfully backing up innovation procedures. Again, build quality of design relationships with customers in time and in new better ways. Previous studies also propose the continuous development double approach and real time interaction (Capurro et al., 2021). The “time” for interconnections is becoming brief small-scale bakeries must develop new skills that are able to promote “real time” relationships with customers (Capurro et al., 2021). Our findings have shown that the speed
and ability to do things quicker and easy may lead small-scale bakeries to discover new capabilities and target market activities (Capurro et al., 2021).

Discussions and conclusions

The study therefore reviews the findings and discuss how these finding mean to the small-scale bakeries within the City of Johannesburg. Small-scale bakeries have had their fair share contribution to the sustainable development of the world (Eikelenboom and de Jong., 2019). “However, it is important for these bakeries to discover methods that drive social, environmental, and economic performance” (Eikelenboom and de Jong., 2019). This study has investigated the importance of dynamic capabilities and the justifiable performance of small-scale business operations. The results proceed the debate about the challenges and the growth of small-scale businesses in remarkable ways. “This research specified, theoretically and analytically, that external integrative dynamic capabilities positively relate to scales of performance and growth in small-scale businesses.” These findings provide a significant foundation for how small-scale businesses might overcome challenges to the employment of sustainability by developing suitable dynamic capabilities and advances current research (Eikelenboom and de Jong., 2019). Teece, 2007 suggest that small-scale bakeries should advance managerial activities that create capably dynamic. Again, they should focus “on the new space of business customer relationships to classify and assess opportunities existing between the world, the inside and the outside of the firm” (Teece, 2007).

Results also showed the relationship between learning, integration and reconfiguration that may help small-scale bakeries to achieve dynamic capabilities. In this case we demonstrated that the firm’s dynamic capability encourages a positive relationship with knowledge/learning and firm performance. Therefore, “we conclude by stating that dynamic capabilities are a result of learning to shape operational capabilities” (Winter., 2003), and that “knowledge management and learning are key elements in creating and renewing dynamic capabilities” (Easterby-Smith and Prieto., 2008), based on sensing, seizing and transforming (Teece, 2007) it to impact positively on business performance (Bitencourt et al., 2020).

Research has recently begun to emphasise the managerial propositions of analytics in the field of Operations Research (OR). It stresses the main challenges in exact principle or providing deployment frameworks (Conboy., et al 2020). However, little research exists on how dynamic capabilities can add value on OR activities, because of uncertain and constantly changing environments (Conboy., et al 2020). To date, several studies in other fields outside the field of OR, “suggest that business analytics may have positive effect on firms’ dynamic capabilities” (Wamba., et al 2017); (Conboy., et al 2020). However, these studies have not specifically studied an OR background and have also continued at a general, higher-order conceptualisation of dynamic capabilities (Conboy., et al 2020). This study considerable contributes to the field of operations and to the context of dynamic capabilities in small-scale businesses.

Directions for further research

This study is limited to 120 small-scale bakeries in the City of Johannesburg region made up of major towns namely Roodeport, Randburg, Alexandra, Sandton, Rosebank, Johannesburg CBD, Booyens, Soweto and Lenasia. The study only focused on bakeries in this city region. The 120 bakeries were operational, and this qualified them to be included in this research. However, there is still a need for future research to be done on dynamic capabilities since at the time of this research a large portion of these bakeries were applying automation in a limited sense and still exploring further options. This study recommends that future research must try to understand transition to automation and how this assist in both operational efficiency and financial performance.

References


