

**Leveraging technology transfer for competitive advantage in African firms**

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## **Abstract**

Africa has long been considered as the next big growth market, according to both experts and economic organisations alike (World Economic Forum, African Union, The Economist, McKinsey). With a youthful population, a burgeoning consumption market, and its increased digital advancement, Africa has unrivalled potential. However, economic progress has lagged, necessitating the need to leapfrog, i.e., harness technological innovation to accelerate economic growth, to contribute towards realising the 2030 Sustainable Development Goal “Decent Work and Economic Growth”. Additionally, Africa cannot afford not to, given the downsides of the lack of economic growth (instability and extremism).

In academic research, technological innovation is driven by firms’ and individuals’ absorptive capacity (AC), i.e., their ability to recognise new knowledge, assimilate it, and apply it for commercial ends. However, there remains a lack of understanding on how to operationalise and leverage AC. The research was undertaken with the aim to understand AC from a micro-foundational perspective within the Africa and 4IR contexts. Qualitative research was conducted across 6 African countries (Ethiopia, Ghana, Kenya, Nigeria, Rwanda, South Africa), with 16 social actors, to gain insights on the processes, mechanisms and factors that contribute towards micro-foundational AC.

The key findings of this research underscore the importance of the individual within the AC process. Additionally, the importance of contextualising AC to a developing market is highlighted. Other key findings reveal the enabling and hindering factors for successful AC. This research aimed to offer a contribution towards AC micro-foundational research, and to offer practical insights for African firms, within the context of the 4IR era.

## **Keywords**

Absorptive capacity, micro-foundational absorptive capacity, individual level, technology transfer, innovation.

## **Declaration**

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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29 March 2021

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## **Glossary of Terms**

<b>AC:</b>	Absorptive Capacity
<b>CEO</b>	Chief Executive Officer
<b>EM:</b>	Emerging Markets
<b>HR:</b>	Human Resources
<b>HRM:</b>	Human Resource Management
<b>IT</b>	Information Technology
<b>KSAO</b>	Knowledge, skills, abilities or other characteristics
<b>LGO</b>	Learning Goal Orientation
<b>R&amp;D:</b>	Research and Development
<b>NAC</b>	Need Absorptive Capacity
<b>SAC</b>	Solution Absorptive Capacity
<b>TA</b>	Technical Analyst
<b>TM:</b>	Talent Management

## 1. Introduction to Research Problem

*To note: technology transfer and technology absorption are used interchangeably in certain academic and grey literature.*

### 1.1 Context

Africa accounts for approximately 17% of the global population, but only 3% of the global Gross Domestic Product (World Economic Forum, 2020, p. 127). Whilst this highlights the significant lag that the continent experiences, it also presents potential of the immense opportunities that lie ahead. The sentiment that Africa is anticipated to be the largest market for growth has been widely shared (African Development Bank, 2021; The Economist, 2020; World Economic Forum, 2020). The key reasons for this include its youthful population (Worldometer, 2021), its burgeoning consumption market (Brookings, 2018) and its uptake in mobile connectivity (Organisation for Economic Co-operation and Development, 2021). However, despite talk of Africa's potential being prominent for more than a decade (McKinsey & Company, 2010; The Economist, 2011), the last ten years have been referred to as the lost decade (African Development Bank, 2021). If the continent continues to lag economically, it may head into the dark waters of instability and extremism (World Economic Forum, 2020).

Africa has in the past faced challenges to economic growth, and coupled with the recent slowdown in the global economy, the implementation of stringent reforms are required in order to secure future economic development (United Nations, 2020). This economic development can be achieved through remaining internally competitive and to opening up new markets, but at this stage, will need to be expedited through leapfrogging (McKinsey & Company, 2016; The Fletcher School, 2020). To leapfrog is defined as to “compress the process of economic development by harnessing technological innovation to overcome [its] many challenges” (The Fletcher School, 2020, para. 6).

Productive economic transformation through technological innovation in the Fourth Industrial Revolution (4IR) will be largely determined by Africa's ability to transfer technology and support the continent with prepared technology and skill bases (African Union and Organisation for Economic Co-operation and Development, 2019). The transfer of technology is thus of critical importance for economic development, for organisations to build technological and innovation capabilities (United Nations Conference on Trade and



Development, 2014). These capabilities in turn enable the upgrading of organisations to deliver more complex, knowledge-intensive activities that are linked to increased value of local production and increased productivity, all which result in growing economies (United Nations Conference on Trade and Development, 2014). Looking back in time, seminal research on economic growth indicates that innovation and national efficiency are key determinants of this progression (Romer, 1990; Solow, 1956). Danquah (2018) describes national efficiency as the ability of an economy to assimilate and apply existing technology from global technology leaders and implement it nationally.

In order to assimilate and apply technology, an existing digital ecosystem needs to exist and economies in Sub-Saharan Africa are the least prepared (United Nations Conference on Trade and Development, 2021). Currently, Africa ranks last in all the Digital Transformation Indices, measured by the Boston Consulting Group (2020), which include infrastructural, digital skill and connectivity aspects.

Despite the massive drive to develop technology, there are concerns that technology, especially frontier technology (ie. artificial intelligence, robotics, biotechnology and nanotechnology) will result in increased inequalities (United Nations Conference on Trade and Development, 2021). The African continent is already plagued with some of the lowest Gini coefficients (a globally-recognised indicator of national inequality), with six African countries being in the top ten of the most unequal countries globally (World Bank, 2021). This provides even further impetus to understand and influence technology transfer in and for Africa.

In order to undergo the much-required economic growth that Africa requires, this research aims to contribute towards how technology transfer can be leveraged, to generate competitive advantage for Africa. This leads to the overarching research problem:

***How can African firms enable their competitive advantage through flexibility, innovation and performance, by technology transfer, in the current technology age?***

## 1.2 Background to the Research Problem

The research problem addresses the need to further understand the micro-foundational factors that influence competitive advantage for firms, underpinned by the AC framework in academic theory (Apriliyanti & Alon, 2017). Despite the AC concept being widely accepted, the understanding of the foundations of a firm's ability to absorb and leverage new knowledge is limited (Distel, 2019). The research thus aims to understand the factors that influence, enable, or hinder the absorption of new knowledge, and the processes and mechanisms by which it is incorporated into organisations. To generate relevant and practical insights, the scope of the study is limited to the investigation into the micro-foundational levers present in African firms that use the latest technology for profitable economic growth. To this means, absorptive AC theory is well suited, according to the original definition by the authors of the seminal academic paper (Cohen & Levinthal, 1990)

A review of a recent bibliometric analysis showed that significant development of the AC theory in various strategic and research fields has been conducted since the original concept, highlighting the robustness and interdisciplinary nature of the AC construct (Apriliyanti & Alon, 2017). This analysis also highlights certain areas that require further research. These knowledge gaps include the processes and capabilities that build internal knowledge, and the opportunities, enablers and barriers (Cuervo-Cazurra & Rui, 2017) that emerge when firms integrate new, external knowledge across their borders from varied environments (Apriliyanti & Alon, 2017).

AC research spans several streams, including intra-organisational and inter-organisational learning, knowledge transfer, dynamic capability of AC and micro-foundations of AC, with the latter being the most under-researched (Apriliyanti & Alon, 2017; Volberda, Foss, & Lyles, 2010; Yildiz, Murtic, Klofsten, Zander, & Richtnér, 2021). Theoretically, micro-foundational AC research includes the individual and managerial actions and integration mechanisms, both formal and informal, through which a firm manages its processes and resources that aggregated, determine the firm's AC (Distel, 2019; Flatten, Adams, & Brettel, 2015; Sjödin, Frishammar, & Thorgren, 2019; Yildiz et al., 2021).

Despite understanding the need for micro-foundational theory, the dominant approach to the AC literature is to aggregate (Latukha & Veselova, 2018), leaving the construct at a

theoretical rather than an empirical stage (Distel, 2019). Given that the nature of the AC model is highly dependent on the individual, it is crucial to understand the individual and managerial actors further in order to apply AC (Andersson, Dasí, Mudambi, & Pedersen, 2016; Lowik, Kraaijenbrink, & Groen, 2017; Yildiz et al., 2021). It is at and within these levels that new knowledge is uncovered, assimilated and exploited for the benefit of the firm (Sjödín et al., 2019; Ter Wal, Criscuolo, & Salter, 2017).

### **1.3 Purpose of the Research**

The overall purpose of the study was to contribute to the understanding of how African firms can ensure a competitive advantage, through the leveraging of technology transfer through AC, thereby contributing towards economic growth. More specifically, the aim of the research study was to determine how technology transfer takes place at a micro-foundational AC level, unpacking the “black” box” of AC, often referred to in literature (Soo, Tian, Teo, & Cordery, 2017). This would aim to understand and then enhance the processes and mechanisms that are used to understand and subsequently operationalise absorptive capacity. Since the AC construct is carried out by individuals, it is critical to understand their (Yildiz et al., 2021).

This research aimed to advance the AC research in several ways. First, the research conceptually identified and empirically examined the AC within the context of Africa. Secondly, the researcher attempted to understand the impact that the 4IR has on the mediating and moderating

The rest of the research report is organised as follows: Chapter 2 provides a review of the literature, Chapter 3 outlines the research questions that were investigated, Chapter 4 details the research methodology, Chapter 5 presents the results garnered from the exploratory interviews, Chapter 6 discusses the results relative to the literature, and Chapter 7 concludes the research report.

### **1.4 Business and Theoretical Implications of the Research**

#### **1.4.1 Business Need**

It is well known that theoretically and empirically, AC increases the competitive advantage of firms through the delivery of innovations, enhanced performance and through increased

flexibility (Zou, Ertug, & George, 2018). This competitive advantage would allow African businesses to expand and start

### **1.5 Scope**

The scope of the study covers micro-foundational research

### **1.6 Conclusion**

Africa with its potential for growth through technology, and the urgency to address its technological gap, needs urgent redress of its technological strategy. An identified lens through which to view the problem and solution is that of the absorptive capacity framework. A qualitative, exploratory study was undertaken to aim to understand how to increase the competitive advantage of African firms, through leveraging technology transfer.

## 2. Literature Review

### 2.1 Introduction

This chapter begins with a robust overview of the original theoretical basis of the AC framework and the evolution of the theory. The reader is then guided through the seminal and most cited research papers on AC. This is followed by an examination of the importance of the individual within the AC field. Thereafter, the under-researched micro-foundations stream within AC is discussed, and the nascent barriers and enablers to AC routines are examined.

### 2.2 Theoretical Framing: Absorptive Capacity and its Evolution

AC theory was defined in Coleman and Levinthal's (1990) seminal paper as "the ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends" (p. 128). AC theory was first presented as a model within a technology context that aimed to explain innovative performance largely at a firm level, both within and external to the traditional innovation hub of the Research and Development (R&D) function (Cohen & Levinthal, 1990). Figure 1 below summarises the key concepts proposed by the original authors, much of which has been maintained today.

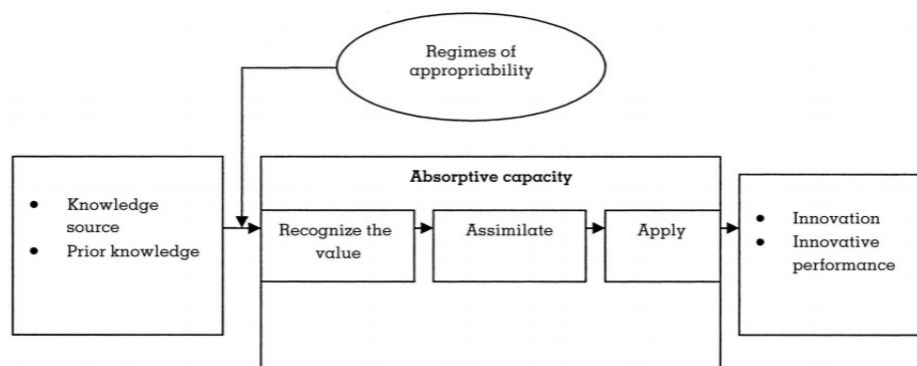


Figure 1. A model of AC based on Cohen and Levinthal's (1990) original theory

Source: Todorova, G., & Durisin, B. (2007). Absorptive capacity: Valuing a reconceptualisation. *Academy of Management Review*, 32, 774–786. doi:10.5465/AMR.2007.25275513

The model involved prior knowledge and a knowledge source, followed by recognition of the value of external knowledge to the firm, and the assimilation and application of this knowledge that resulted in innovation and competitive performance (Cohen & Levinthal,

1990). The authors argued that AC was dependent on the regimes of appropriability conditions, which refers to the extent that new, valuable knowledge spills out into the public domain, and generates economic value return for the innovative effort (Cohen & Levinthal, 1990). Whilst this paper marked the start of the AC concept, it firstly posited that the level of R&D investment is indicative of the AC of a firm, which has since been criticised as being one-dimensional and that it treats AC as a static capability (Lane, Koka, & S., 2006). Taking this research further to an inter-firm level, it was shown in another seminal research paper that a firm's ability to learn from other firms, i.e. their AC capacity, was relative and largely dependent on the firm's individual AC, and not dependent on the traditional measure of AC through R&D expenditure (Lane & Lubatkin, 1998).

Following the evolution to view the AC concept through a dynamic capabilities lens, and incorporating network theory, a detailed review of the AC literature over the last decade, produced an updated framework (Zahra & George, 2002). This enabled firms to adjust to dynamic market conditions, by reorganising their resources. The revised model reconceptualised the theory, aiming to provide greater understanding and clarity on the domain and operationalisation of the AC concept. The highly-cited research (Apriliyanti & Alon, 2017) distinguished between potential and realised AC, contributing towards understanding the sustainability of AC (Zahra & George, 2002). Potential AC was defined to include the knowledge acquisition and assimilation capabilities, a previously neglected area of research. It was argued that it was potential AC that provided firms the flexibility and freedom to adapt to the dynamic contexts. Realised AC focuses on knowledge transformation and exploitation and it was positioned to include the outputs that resulted in competitive advantage (flexibility, innovation and performance), that improved economic performance. Additionally, an antecedent of AC includes various knowledge sources, with the diversity of these sources heavily influencing the acquisition and assimilation of the knowledge (Zahra & George, 2002). A second antecedent included prior knowledge which includes organisational memory and past experience, being critical from which to direct knowledge searches (Zahra & George, 2002). A summary of this contribution is shown below in Figure 2.

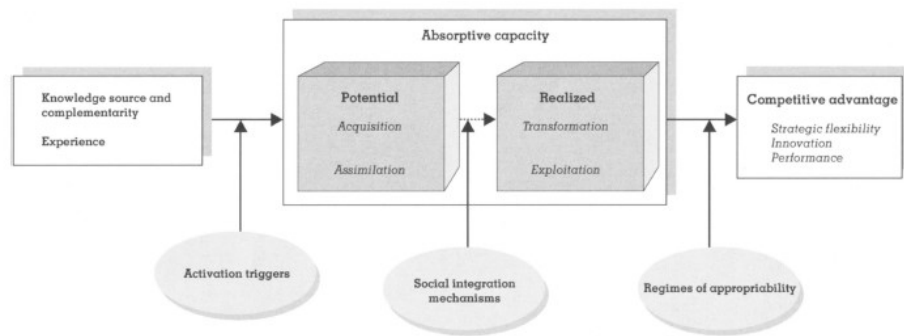


Figure 2. An AC model based on Zahra and George's (2002) research

Source: Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualisation, and extension. *The Academy of Management Review*, 27(2), 185-203. doi:10.2307/4134351

Further analysis by Lane et al. (2006) of the application of the AC concept in literature revealed that it had been reified by numerous research studies, in that the underlying assumptions had been overlooked and that the concept had been applied as a general-purpose solution to a range of problems. The limiting assumptions included that AC was limited to a R&D context; firms develop AC in response to existing external knowledge; relevant, prior knowledge equals AC; and that external knowledge exists in the firm alone. As a result, these drove the justification for the need to rejuvenate the AC concept. The AC construct was then enhanced by emphasising the process-oriented, learning description that was deemed to be critical to overcome the challenge of AC being seen as 'a thing' instead of a capability (Lane et al., 2006).

The recent major development of the model includes research conducted by Todorova and Durisin (2007), whereby the authors proposed that the assimilation and transformation phases within the AC model are interactive and concurrent. The original AC dimensions were then replaced by simply three features: acquisition, assimilate/transform, and exploit. Additionally, value recognition as an antecedent of ACAP was introduced, as indicated in the revised model and shown below in Figure 3.

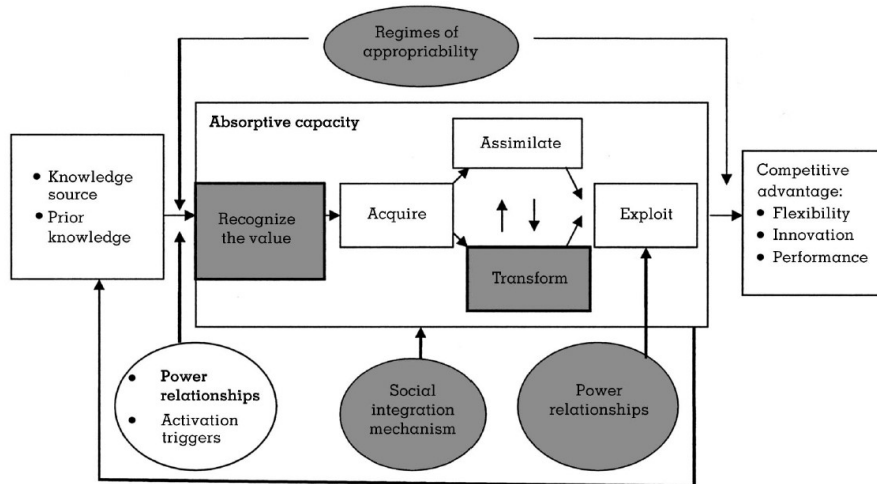


Figure 3. AC Model proposed by Todorova & Durisin (2007)

Source: Todorova, G., & Durisin, B. (2007). Absorptive capacity: Valuing a reconceptualisation. *Academy of Management Review*, 32, 774–786. doi:10.5465/AMR.2007.25275513

Thirty one years since inception, the AC framework has continued to be developed, contributing towards a large body of knowledge that spans numerous business fields, including strategic management, organisational theory, international business (Volberda et al., 2010) and entails the following key areas of applicability: intra-organisational and inter-organisational knowledge, knowledge transfer, dynamic capability and micro-foundations (Apriliyanti & Alon, 2017; Volberda et al., 2010). The micro-foundational AC stream remains an under researched field (Apriliyanti & Alon, 2017; Distel, 2019) and therefore is the field within which this research aims to contribute towards the research gap. This is demonstrated below in Figure 4.

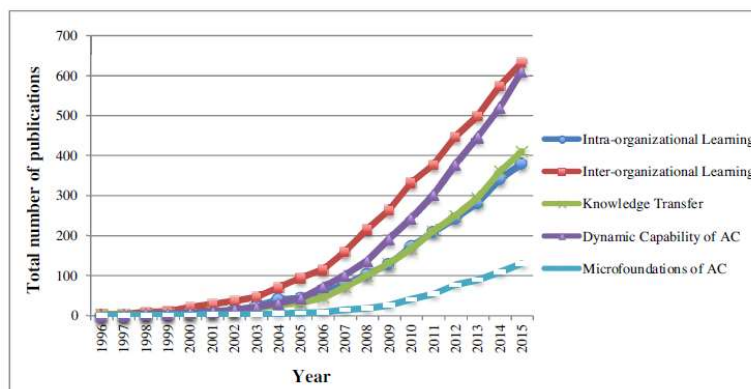


Figure 4. Number of publications within each AC research stream from latest meta-analysis research

Source: Apriliyanti, I. D., & Alon, I. (2017). Bibliometric analysis of absorptive capacity. *International Business Review*, 26(5), p. 901.



### **2.3 Micro-foundations in Absorptive Capacity Theory**

Micro-foundations of AC is defined to be: the internal processes and capabilities of firms (Lewin, Massini, & Peeters, 2011) and the “the roles of individuals, micro-activities and units within the firm that serve as AC determinants” (Apriliyanti & Alon, 2017, p. 902). It has been argued that the need for micro-foundational analysis is that a firm’s capabilities and performance stem not from the organisational-level, but rather from the actions and interactions of individuals within the organisational context (Cohen & Levinthal, 1990; Foss, Barney, Ketchen, & Wright, 2010). Considering AC through the macro-level alone and attempting to find explanations for the heterogeneity in firm performance, may lead to erroneous misappropriation of micro-level determinants (Distel, 2019). The focus on understanding the micro-foundational aspects aligns to the current trends in strategy and organisational research (Yildiz et al., 2021).

A recent study showed that via the micro-level, formal and informal integration mechanisms (the manners in which communication and coordination take place across functions in order to resolve problems), are highly correlated to AC (Distel, 2019). Additionally, through the lens of Intellectual Capital-enhancing Human Capital, it has been shown that different types of human resources (HR) arrangements (social, human and organisational) are key as micro-foundations, opposed to exogenous factors (Soo et al., 2017). Both of these findings reemphasise the importance of considering the micro-foundational elements, in aggregating to the macro-level output of firm performance.

Scholars have contended that knowledge alone in an ever-changing, increasingly complex global economy is insufficient to create sustainable competitive advantage, and that it requires unique dynamic capabilities to do so (Khan, Lew, & Marinova, 2019; Teece, 2007; Yildiz et al., 2021). As (Khan et al., 2019) posit, the development and securing of sustainable competitive advantage by applying AC as a dynamic capability is especially important for emerging economies. According to Teece (2007) “The micro-foundations of dynamic capabilities - the distinct skills, processes, procedures, organisational structures, decision rules, and disciplines - which undergird enterprise-level sensing, seizing, and reconfiguring capacities are difficult to develop and deploy”.

The mechanisms in the literature that are well-known to facilitate micro-foundational AC are internal coordination mechanisms and social integration mechanisms (Ruiz, Brion, & Parmentier, 2020). Internal coordination mechanisms are those activities that encourage

knowledge sharing and the acceptance of new knowledge, and include “cross-functional interfaces, participation in decision-making, and job rotation” (Jansen, van den Bosch, & Volberda, 2005, p. 2). Social integration mechanisms that include social interaction, a shared vision, and trust are shown to contribute towards developing knowledge together (Tsai & Ghoshal, 1998). Since this research will adopt the AC framework proposed by Todorova and Durisin (2007), it will also adopt the authors’ view that social integration mechanisms affect all dimensions of the AC framework.

### **2.3.1 Recognising the Value**

The starting point of AC in the seminal paper by Cohen and Levinthal (1990), is defined as ‘recognising the value’ of new external knowledge. It involves the routines for identifying and acquiring the knowledge for benefit of the organisation (Dabic, Vlacic, Ramanathan, & Egri, 2020). The ability to recognise the value of new, external knowledge was shown to be dependent on prior knowledge (Cohen & Levinthal, 1990). It was later argued by Shane (2000) that the diversity of a knowledge base influences the ability to make connections with new, external knowledge. Prior knowledge diversity also influenced the locus of search, in that it steered people to continue searching in areas that they were familiar with (Shane, 2000). More recently, Schweisfurth and Raasch (2018) investigated prior knowledge within the context of being an antecedent of AC, by differentiating between need and solution AC, which are both deemed crucial for innovation. ‘Need AC’ is defined as AC for new customer needs, whereas ‘solution AC’ is what has been defined as the solving for technical problems and providing purpose (Schweisfurth & Raasch, 2018). The importance of differentiating between need and solution AC was defended by maintaining that the knowledge from the different domains contained dissimilar complexity, antecedents and transferral mechanisms (Schweisfurth & Raasch, 2018).

In the assessment of new, external knowledge, Zobel (2017) shows that recognition capacity is facilitated by external scanning (i.e., building external networks) and strategic valuation (i.e., verifying applicability to market segment) procedures and confirmed that recognition does not come automatically. The combination of external scanning and strategic valuation enhances the magnitude, quality and diversity of resources that can be gained for new product development (Zobel, 2017), but are distinct in their function. The assessment of new external knowledge may also be viewed through the lenses of exploratory innovation strategies, that are associated with seeking new information, non-routine problem-solving and experimentation, and exploitative innovation strategies, that

refer to improvements and optimisation to current business (Solís-Molina, Hernández-Espallardo, & Rodríguez-Orejuela, 2018).

Unpacking the micro-foundations of strategic assessment, specific mention is made of the lack of concrete insights into how individuals acquire valuable knowledge for input into 'assimilation', the second phase of AC (Sjödín et al., 2019). Yang and Tsai (2019) and Zobel (2017) provide insights on measurement. (Zobel, 2017) demonstrated that the external scanning and strategic evaluation of an organisation largely significantly influences the innovation ability of an organisation, but alone it is insufficient, without a certain degree of assimilation of external knowledge. Strategic assessment is defined as "organisational activities involved in evaluating external innovation sources and assessing their fit with the firms' businesses' (Zobel, 2017, p. 272). Yang includes the degree of customer orientation and innovation performance as indicators, with Zobel (2017) referring to the fit of the external knowledge with internal competencies; assessing the relevancy to market segments; the evaluation of the potential strategic advantages for the business; and employing business lines for voluntary ideas and knowledge. Zou et al. (2018) argue that AC does not directly contribute towards financial performance, but that innovation and knowledge transfer mediate this relationship. By implication, renewing a knowledge base, allows firms to achieve superior financial performance (Zou et al., 2018).

#### **2.4 The Individual's Role in Absorptive Capacity**

At the individual level, there remain calls for research and further understanding across multiple papers (Andersson et al., 2016; Apriliyanti & Alon, 2017; Distel, 2019; Felin, Foss, & Ployhart, 2015; Ruiz et al., 2020; Sjödín et al., 2019). This is despite original concepts emphasising the criticality of individuals' creativity and cognition as essential components for successful AC (Cohen & Levinthal, 1990). In the context of AC, to overlook studying the micro-level constituents (i.e., individuals' contributions) whilst studying collective outcomes (ie. competitive advantage) would be what is termed as ecological fallacy (Kim, Wennberg, & Croidieu, 2016). This in turn leads to inaccurate deductions about the mechanisms which translate individuals actions into aggregated outcomes (Yildiz et al., 2021). Furthermore, in the daily outworking of AC, it is individuals that physically engage in knowledge seeking activities, that then progress to assimilate this knowledge, and thereafter gain value for organisations by applying it (Sjödín et al., 2019). (Sjödín et al., 2019) further emphasises the pivotal role that individuals play within the AC process, with

the varying proficiency in AC resulting in one of three states - exploitation (the ideal), termination, or becoming “stuck” in limbo.

Recent research has attempted to understand AC at an individual level; in terms of contextual factors such as leadership style, job autonomy and organisational culture (Schweisfurth & Raasch, 2018). More recently, understanding has been sought through employees’ “motivated cognition and creative behaviour” (Distel, 2019, p. 2015); and through a process-driven delineated model, involving key activities for individuals to ensure AC attainment (Sjödin et al., 2019). (Yildiz et al., 2021) investigated AC through the lens of Goal Orientation Theory and showed that individual’s AC was significantly affected by their approach-orientation (ie. driven by the motivation to appear favourable to others) and their learning orientation (ie. driven by the need to master a skill or task).

The ability of individuals with high AC to integrate customer needs and avail them to the organisation are crucial for innovation, and can be accomplished through existing cognitive structures or through innovative knowledge structures (Schweisfurth & Raasch, 2018). Human resources management (HRM) practices have been shown to increase the effectiveness of the various AC constructs (Zhou, Fey, & Yildiz, 2020). Furthermore, talent management (TM) has been shown to be a significant determinant of AC, as it “motivates acquisition and assimilation of intangible assets, creating and developing EM firms’ competitive advantage” (Latukha & Veselova, 2018, p. 514). It is also recognised that it is at the individuals’ level that the AC process is catalysed through connectivity (Andersson et al., 2016). Additionally, it has been shown that it is via individuals’ effort to build both potential AC, through internalising a central external knowledge collection, and realised AC, through implementing that knowledge, that innovations are generated (Ter Wal et al., 2017), further stressing the importance of the individuals’ role within AC.

With regards to the identity of the individuals, it has been understood that technological gatekeepers existed in organisations and were thought to be the bridges between external information and the organisation (Enkel, Heil, Hengstler, & Wirth, 2017; Ter Wal et al., 2017). Initially the role of gatekeepers was understood to transform external knowledge into a form for internal audiences, but this shifted to a focus on how gatekeepers build networks used to source this knowledge (Macdonald & Williams, 1994). More recently, organisations assigned gatekeepers to dedicated functions, known as scouting units, to ensure they are not tied down by operational activities (Monteiro & Birkinshaw, 2017).

Additionally, if there are internal gatekeeping functions, as has been identified in most research, these gatekeepers are situated within R&D functions organisation (Enkel et al., 2017; Ter Wal et al., 2017).

#### **2.4.2. Individual characteristics**

It has been established in Section 2.4 that the individual's role is pivotal in the success of the AC process, yet there remains a lack of systematic research on how individuals engage in the AC process (Sjödin et al., 2019; Yildiz et al., 2021). However, there is a growing body of research that has contributed towards building a complete understanding (Sjödin et al., 2019; Yildiz et al., 2021).

Firstly, the identification of external knowledge is largely dependent on the ability and willingness of the individual to recognise it (Distel, 2019; Enkel et al., 2017). Individuals' abilities are shown to play a significant role, with Schweisfurth and Raasch (2018) showing that employee innovativeness is an antecedent to both need and solution AC, which are both necessary for innovation at a firm level. Need AC constitutes as a firm's ability to explore, assimilate, and exploit knowledge, about customer's needs from the external environment (Schweisfurth & Raasch, 2018). Solution AC stems from the original research on AC (Cohen & Levinthal, 1990) and refers to the technical solution knowledge that most literature focuses on (Lane et al., 2006; Schweisfurth & Raasch, 2018; Volberda et al., 2010). The willingness, or motivations, of individuals is a misunderstood area, but recently, Sjödin et al. (2019) showed the significance of initial and continued motivation in securing the success of AC, specifically by being an antecedent to action within the AC process.

Viewing individuals as a human capital resource, Ployhart and Moliterno (2011) define individuals as a unit-level resource that consists of the interactions of an individual's "knowledge, skills, abilities or other characteristics" (KSAOs) (Ployhart & Moliterno, 2011, p. 127). These KSAOs are further refined to represent cognitive (i.e., general cognitive ability, knowledge skills and experience) and non-cognitive (i.e., personality, values and interests). Ployhart and Moliterno (2011) argue (circularly) that the individual, or human capital, enables the AC process, which in turn changes the individual, which then adds value within a specific context. Lowik et al. (2017) investigated the impact of individuals' human capital (i.e., prior knowledge diversity), social capital (i.e., network diversity) and cognition (i.e., cognitive style) on AC (Adner & Helfat, 2003). It was then shown that individuals' prior knowledge diversity, which is a combination of education, work

experience and life experiences, significantly contributes towards knowledge identification in AC. Lowik et al. (2017) further argued that individuals' external network diversity, the degree to which individuals have relationships with people outside their organisation, including customers, suppliers, universities, family and friends, also considerably influences external knowledge recognition. However, the most influential factor was that of bisociative cognitive style, "a decision-making style in which individuals use imagination and intuition to seek solutions outside disciplinary boundaries to discover connections that are not readily apparent" (Lowik et al., 2017, p. 1325).

In response to the call for a better understanding of micro-foundational AC from an individual perspective, Yao and Chang (2017) investigated how individuals' attributes contribute towards the evolution of AC, specifically through the lens of individual learning goal orientation (LGO) and civic virtue. It was shown that LGO, the motivation of an individual to need to advance and develop, through understanding and mastery, increased the organisation's potential and realised AC (Yao & Chang, 2017). More significantly, it was shown that civic virtue, the discretionary participation in the organisation's activities and governance, was a strong mediator between potential and realised AC (Yao & Chang, 2017).

## **2.5 Other factors that influence AC**

### **2.5.1 Barriers**

AC has often been referred to as a 'black box', given the lack of understanding regarding its construction and implementation (Distel, 2019; Soo et al., 2017). Therefore, comprehending the drivers and enablers was key to understanding this 'black box', making the AC concept more practical and attainable.

Whilst the benefits of AC are well-researched, barriers remain in the application of the theory for firms' competitive advantage. Limited focus has been given to barriers, despite their important role in successful AC (Cuervo-Cazurra & Rui, 2017). Barriers can lead to firms not being able to upgrade capabilities, and eventually disappearing (Cuervo-Cazurra & Rui, 2017). A recent study proposed to understand the barriers by grouping them into "internal (managerial biases and weak social integration) and external barriers (muted activation triggers, conflicting source relationships and feeble appropriability regimes)" (Cuervo-Cazurra & Rui, 2017, p. 727). The importance of managers within the successful

application of AC is well documented, as elaborated on in section 2.6. However, the existence of managerial biases limits AC, with managers being either supportive or averse to sources of knowledge, due to their own career considerations or to their preference of particular strategies (Sengul, Gimeno, & Dial, 2012). Additional managerial biases exist in the form of “not-invented-here” attitudes, which may result in the dismissal of information and the hampering in the organisational learning process (Hannen et al., 2019). Weak social integration mechanisms are those barriers that pertain to limitations of the processes and mechanisms within the organisation that enable the coordination of actions and activities between employees (Cuervo-Cazurra & Rui, 2017). The importance of social integration mechanisms within the AC framework was highlighted by Von Briel, Schneider, and Lowry (2019). Social integration mechanisms are understood to promote knowledge absorption by connecting people and also by nurturing a sense of shared purpose amongst people (Von Briel et al., 2019). The authors posit that social integration mechanisms facilitate AC throughout the recognition, assimilation and exploitations phases of the AC process.

External barriers include those of muted activation triggers, conflicting source relationships and feeble appropriability regimes (Cuervo-Cazurra & Rui, 2017). Activation triggers defined by the researchers who coined the term, include those events that prompt an organisation to respond to internal or external stimuli (Zahra & George, 2002). Internal stimuli comprise organisational crises, that include a performance failure or important events, whilst external stimuli constitute those developments that may affect the future of an industry, that include radical innovations, technological movements and changes in external policy (Zahra & George, 2002). Conflicting source relationships concern the sources of the external new knowledge, and their different interests, that may mediate the AC process, with (Gimenez-Fernandez, Sandulli, & Bogers, 2020) recognising the importance of diverse sources in AC and recent work by (Boons & Stam, 2019) in crowd-sourcing introducing complexity to the contingency. Lastly, the feeble appropriability regimes refer to the ability of the organisation to protect its innovation and is especially pervasive in the current era where firms need to decide whether to aim for optimal innovation accomplishment or trade that off with enhanced appropriability (Venturini, Ceccagnoli, & van Zeebroeck, 2019).

Geographical or regional differences, education levels, industrial sectors, and cultural differences have been shown to have varying impacts on both firm performance and AC,

in the case of poor technology spill overs between foreign and domestic firms in Vietnam (Nguyen & Diez, 2019). It has also been shown that the level of knowledge integration, moderated through higher order organising principles, has a direct influence on the AC of a firm (Venturini et al., 2019). On the one hand, the concern of knowledge spill overs, and losing intellectual property to competitors, often causes firms to limit the level of knowledge integration (Venturini et al., 2019). On the other hand, the presence of barriers may not be an entirely bad thing, with barriers offering, in some cases, the ability to filter out poor ideas, limit excessive knowledge information flow, and facilitate more efficient use of resources (Sjödín et al., 2019). Through an HR perspective, communication and power distance barriers exist, and act as limitations to high levels of interaction and knowledge exchange (Soo et al., 2017).

The investigation of barriers to AC within context is important in order to operationalise the AC theory (Schweisfurth & Raasch, 2018). To enhance and drive AC, the enablers of absorptive capacity for external technology integration are addressed next.

### **2.5.2 Enablers**

This study examined the AC construct according to the influence of micro-level antecedents (Distel, 2019) and TM processes (Latukha & Veselova, 2018), and the roles that information technology (Trantopoulos, von Krogh, Wallin, & Woerter, 2017) and cultural factors play (Andersson et al., 2016).

Subsequent to broadening the scope to include current individual, managerial and organisational-level factors in one study, it was important to understand the barriers that constrain these factors, and thus reduce the success of technology absorption in EM firms, a field that has historically not been well-researched (Cuervo-Cazurra & Rui, 2017). Additionally, it was crucial to understand the enablers that enhance these factors, given the urgency and drive for firms to protect their human capital, increasingly being seen as their main source of competitive advantage (Latukha & Veselova, 2018).

As detailed in section 2.4, individuals and their behaviours, characteristics, patterns and decisions significantly influence the success of AC. At an organisational-level, (Yildiz et al., 2021) identified team-level coordination as a factor that influences efficient utilisation of individual-level capabilities. Furthermore, it is argued that only effective coordination



results in individuals' successfully understanding and utilising new knowledge (Yildiz et al., 2021).

## **2.6 The Multilevel Nature of Absorptive Capacity: The Role of Managers and Leaders**

As (Zou et al., 2018) explicate, the role of managers within AC theory has been a matter of focus for several years, with the seminal paper by (Cohen & Levinthal, 1990) recognising that at a managerial level, there exists the ability to monitor the external environment and to transform external technical knowledge into a form that is comprehensible to other employees. **Whilst dated, it is worth noting the findings**, that have persisted. Given the significant role that AC played in driving innovative performance, antecedents of AC were investigated, with (Volberda et al., 2010) surmising three classifications: managerial, intra-organisational and inter-organisation. (Teece, 2007) recognised that it was managers that implemented the organisational measures required to assemble the external new knowledge and influenced the formal processes by which it was converted into organisational knowledge. It was further recognised that managers' combinative capabilities and manager's cognitions and dominant logics significantly influenced a firm's ability to integrate and exploit external knowledge (Augier & Teece, 2009; Volberda et al., 2010). At an intraorganizational level, it was argued by (Jansen et al., 2005) that organisational processes related to coordination capabilities (i.e., interfacing between functions, participation, job-rotation) predominantly impact the acquisition and assimilation phases of AC. Additionally, organisational processes related to socialisation capabilities (i.e., connectedness and socialisation tactics) predominantly impact assimilation and exploitation phases of AC (Jansen et al., 2005). Whilst not in scope for this study, interorganisational antecedents included the diversity and interdependency of external knowledge (Zahra & George, 2002). Managerial inputs may also act as barriers, as (Cuervo-Cazurra & Rui, 2017) indicate that managerial biases significantly influence AC within an EM context. Whilst the research has produced reliable insights into managers' impact on AC, it has been argued that in order for micro-foundational AC understanding to advance, there is a need to continue developing theories and methodologies at multiple levels, including individual, team, company, industry and country level (Apriliyanti & Alon, 2017). The presence of managerial biases (prejudices for or against sources of knowledge) largely impact an organisation's ability to integrate external knowledge, by acting as a barrier to the recognition and acquisition phases (Cuervo-Cazurra & Rui, 2017).

In much of the AC literature, “management” and “leadership” are used interchangeably (Butler & Ferlie, 2020; Yang & Tsai, 2019; Yildiz et al., 2021) but for current purposes, leadership will be discussed separately. Firstly, the 4IR digital age has shifted the nature of work, with important implications for leadership (Larson & DeChurch, 2020). This is especially significant from a team leadership perspective, as the word “team” has become more loosely defined, with the incorporation of broader networks into the team and the inclusion of individuals, the meaning of which has changed with the introduction of AI technology (Larson & DeChurch, 2020). Secondly, literature and research have demonstrated the importance of leadership’s role in influencing successful AC outcomes, with leaders influencing the priorities of individuals. Salvato and Vassolo (2017) argued that that leadership largely influences the priorities of individuals and productive dialogue, that results in ensuring competitive advantage. Yildiz et al. (2021) demonstrated that leaders are essential for channelling the activities and priorities of individuals during their exploration of new knowledge. Since each of the phases of the AC process have different trade-offs and opportunity costs, it is essential that leaders coordinate the efforts of individuals (Yildiz et al., 2021). Cuervo-Cazurra and Rui (2017) indicate how poor leadership was partly responsible for the failure of a significant business in adopting new knowledge and capabilities. Empowering leadership within a knowledge-intensive work context has been shown to be encourage employees to lead themselves, motivating employees to take part in knowledge activities that are beneficial for themselves and the organisation (Chuang, Jackson, & Jiang, 2016). Butler and Ferlie (2020) pointed out that leaders that combine transactional and transformative leadership enhance learning capabilities, by maintaining useful routines and reworking unnecessary ones. Transactional leadership is based on exchanges between individuals, with the subordinate being rewarded for good work or punished for unacceptable work, and involves the establishment of goals and consequences (Flatten et al., 2015). Transformational leadership, considered the superior leadership style, involves inspiring the change of subordinates’ attitudes, values and aspirations, to bring about benefit to the organisation (Flatten et al., 2015). In addition to the extant literature on transactional and transformational leadership, there is an additional style of leadership, known as empowering leadership, that focuses on leaders that encourage their employees to build knowledge-based external communities that foster the exchange of knowledge (Whelan, Parise, & Aalbers, 2011). Thirdly, there has been a call from literature to further understand micro-foundational AC through the lens of leadership (Apriliyanti & Alon,

2017), by investigating the impact of various leadership styles (Flatten et al., 2015; Yang & Tsai, 2019) and the effect of leadership characteristics.

As the above arguments indicate, AC has been long recognised to be influenced by managers and leaders, and more recently it has been recognised that absorptive capacity is enacted through individuals (Yildiz et al., 2021). However, it is the synergies between individuals across levels that ultimately result in successful technology transfer (Andersson et al., 2016; Distel, 2019). Therefore the multi-level nature of AC needs careful consideration within the aforementioned contexts, especially given that there is a lack of this combined analysis in literature (Andersson et al., 2016).

## **2.7 Absorptive Capacity within Africa**

Recent studies on technology transfer were conducted in mostly developed markets. A recent longitudinal study compared Swiss manufacturing firms, with data access systems and network connectivity as the moderators for their AC (Trantopoulos et al., 2017). A case study of two Chinese automotive firms provided insights into internal and external barriers (Cuervo-Cazurra & Rui, 2017). Yet another study investigated AC within a HR context, making use of data gathered from a large sample of Australian firms (Soo et al., 2017). A further study defined the difference between need and solution AC, upon investigation within several divisions of a large manufacturer, with a Swiss head office and global divisions (Schweisfurth & Raasch, 2018). A longitudinal, qualitative study of three large Swiss manufacturing firms produced an AC process model (Sjödén et al., 2019). A mixed-method study on German firms revealed two aspects, perspective-taking and creative behaviour, as micro-foundations of AC (Distel, 2019). An alternative study investigated technology transfer via AC within the Vietnamese context (Nguyen & Diez, 2019). Another longitudinal study investigated the relationship between AC and TM within Chinese and Russian firms (Latukha & Veselova, 2018). Finally, a study of acquired Chinese subsidiaries reveals the benefit of HRM practices for AC success (Zhou et al., 2020). Since AC is a concept that is contextual in nature (Ugur, Churchill, & Luong, 2020), if AC is to be applied in Africa, it needs to be understood in the context of Africa.

## 2.8 Conclusion

Considering the backdrop that this chapter has presented of the well-developed AC literature coupled with the current knowledge gaps, opportunities remain for research inroads that may offer value to practitioners and future research. This research study aimed to arrive at findings to extend the current micro-foundational AC body of knowledge and additionally, to extend beyond, to the African market, within the current 4IR context. This chapter concludes with a summary of some of the knowledge gaps identified in the literature, shown in Figure 5.

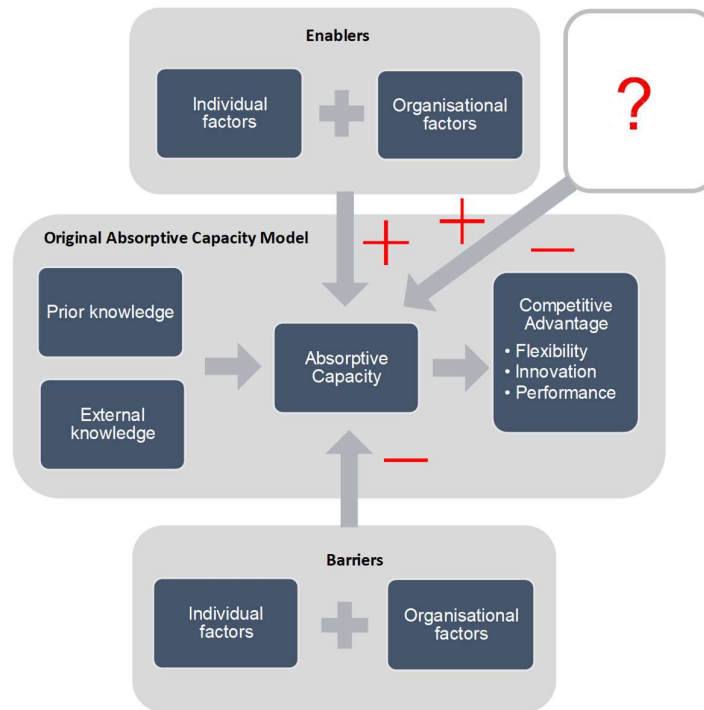


Figure 5. Summary of literature study knowledge gaps

- Sources: Adapted from Coleman, W. M., & Levinthal, D. A. (1990). *Absorptive capacity: A new perspective on learning and innovation*. *Administrative Science Quarterly*, 30. p. 140, 141;
- Cuervo-Cazurra, A., & Rui, H. (2017). *Barriers to absorptive capacity in emerging market firms*. *Journal of World Business*, 52(6), p. 732;
- Distel, A. P. (2019). *Unveiling the micro-foundations of absorptive capacity: A study of Coleman's Bathtub Model*. *Journal of Management*, 45(5), p.732.

### **3. Research Questions**

#### **3.1 Introduction**

The research aimed to explore and understand the micro-foundational AC constructs within Africa, within the current 4IR era. In doing so, the research aimed to answer three main research questions, to contribute towards the existing knowledge gaps within AC theory. Each research question is based on extant literature from Chapter 2.

#### **3.2 Central Research Question**

***How can African firms enable their competitive advantage through flexibility, innovation and performance, by technology absorption, in the current technology age?***

##### **3.2.1 Research Question 1**

The aim of this research question was to understand the role that individuals play within the micro-foundational stream. Individuals are a key proponent to AC success (Apriliyanti & Alon, 2017; Ruiz et al., 2020; Sjödin et al., 2019; Yildiz et al., 2021). Specifically, micro-foundational AC literature with a focus on individuals required extension, given the research on more recent issues such as the growing impact of social skills of individuals within the workplace (Deming, 2017), the moderating effect on individuals through organisational design (Distel, 2019) and the increasing impact of machines on human-machine relationships (Choudhury, Starr, & Agarwal, 2020). Additionally, AC research called for further insights into leadership styles, through the perspective of an individual and manager (Apriliyanti & Alon, 2017; Flatten et al., 2015). This led to the first question:

***Research Question 1: How does technology absorption at an individual level influence an organisation's micro-foundational AC?***

##### **3.2.2 Research Question 2**

As illustrated in Figure 4, micro-foundational aspects (those internal processes and capabilities of firms (Lewin et al., 2011) and “the roles of individuals, micro-activities and units within the firm that serve as AC determinants” (Apriliyanti & Alon, 2017, p. 902)) are

under-researched and calls from literature exist to unpack this 'black box'. Additionally, there are knowledge gaps that exist concerning the barriers within service industries (Cuervo-Cazurra & Rui, 2017) and to understand the contextual factors that underlie the routines and processes of AC theory (Distel, 2019; Ugur et al., 2020). The following research question was proposed to contribute understanding these knowledge gaps, specifically from an African and 4IR perspective:

***Research Question 2: How is new knowledge acquired, assimilated and transformed inside the organisation?***

### 3.2.3 Research Question 3

This question aims to understand how the firm's capabilities are deployed into the marketplace, through innovation, increased performance or flexibility, to deliver competitive advantage, aiming to understand the internal-routines (Khan et al., 2019), internal capabilities (Sheng, 2017), as well as the contextual factors (Ugur et al., 2020).

***Research Question 3: How are these (developed) capabilities externally leveraged to improve the competitive advantage of the firm?***

In Table 1 below, a summary is shown of the Research Questions, with the corresponding sections in the Literature Review, with the associated sources of the knowledge gaps that were addressed.

*Table 1. Summary of research questions and sources*

<b>Research Question</b>	<b>Section in Literature Review</b>	<b>Sources of Knowledge Gaps</b>
<b>RQ 1</b>	Section 2.3 Section 2.4 Section 2.6	<ul style="list-style-type: none"> <li>• Micro-foundational AC processes and capabilities (Apriliyanti &amp; Alon, 2017)</li> <li>• Individual traits and dispositions (Yildiz et al., 2021)</li> <li>• Deep insights into how individuals engage AC, their interactions with others, and how they overcome barriers during implementation (Sjodin et al., 2019)</li> <li>• Impact of leadership styles on AC (Flatten et al., 2015)</li> </ul>

<b>RQ 2</b>	Section 2.3 Section 2.5 Section 2.6	<ul style="list-style-type: none"> <li>• Micro-foundational AC processes and capabilities (Apriliyanti &amp; Alon, 2017).</li> <li>• Micro-level variables and the mediating relationship between integration mechanisms and AC (Distel ,2019).</li> <li>• Contextual factors (Ugur et al., 2020)</li> <li>• Call to understand AC barriers within service industries (Cuervo-Cazurra &amp; Rui, 2017)</li> </ul>
<b>RQ 3</b>	Section 2.3 Section 2.5	<ul style="list-style-type: none"> <li>• Micro-foundational AC processes and capabilities (Apriliyanti &amp; Alon, 2017).</li> <li>• Contextual factors (Ugur et al., 2020)</li> <li>• Internal routines (Khan et al., 2019)</li> <li>• Cross-level studies (Lowik et al., 2017)</li> <li>• Examine internal capabilities (Sheng, 2017)</li> </ul>

## **4. Research Methodology and Design**

### **4.1 Introduction and Research Design**

This chapter addresses the research methodology and design that was used for the study. It outlines the need to address the business and research problem through a qualitative exploratory approach, given the under-researched micro-foundations of AC theory, and the need to understand how to ensure successful AC within the African and 4IR contexts. The researcher collected data from two key actors within the micro-foundational construct, individuals and managers, through semi-structured interviews. Thereafter, a thematic analysis was conducted in order to contribute towards a model that was of academic and practical value. Finally, the limitations, as well as the validity and reliability concerns that are intrinsic to qualitative research of this nature, are addressed.

The aim of the research was to understand AC at a micro-foundational level. Qualitative, exploratory research was used as the basis for the study. According to Quinlan, Babin, Carr, Griffin, and Zikmund (2019), an exploratory research approach allows for richness and depth of data, in order to capture undeveloped phenomena. Whilst there is a plethora of literature that has been published on AC and numerous variations of the AC model exist, most of the research conducted neglects the micro-foundational stream, as shown in Figure 4. Additionally, the mechanisms and processes through which AC is understood, lack depth and detail and there remain calls from literature to investigate (Andersson et al., 2016; Apriliyanti & Alon, 2017; Volberda et al., 2010; Yildiz et al., 2021). Exploratory research, according to xx focuses not on the outcomes, but on the “causal mechanisms that underlie and produce social phenomena”, thus allowing the researcher to learn about the “how” and “why”. Furthermore, exploratory research specifically addresses the micro-foundational and individual aspects: “A commitment to micro foundations here means to trace back social phenomena and structural forces to individual behaviour and the motivations and cultural context producing it” (Reiter, 2017,p. 140). There was further impetus to use a qualitative, exploratory method, as leading AC research has been primarily conducted within developed markets (Apriliyanti & Alon, 2017) or geographies that invariably avoided Africa (Cuervo-Cazurra & Rui, 2017; Distel, 2019; Flatten et al., 2015; Latukha & Veselova, 2018; Nguyen & Diez, 2019; Schubert, Baier, & Rammer, 2017; Sjödin et al., 2019; Yildiz et al., 2021). Finally, with the insight that technology plays a significant in its ability to direct and influence individuals and managers in new ways



(Choudhury et al., 2020), it was important to understand how technology affected AC, given its relevance in intra-organisational learning and dynamic capabilities of firms (Apriliyanti & Alon, 2017). Given the above three reasons, an exploratory design philosophy was used specifically because it allowed for the AC theory to be assessed “in a new light” (Saunders & Lewis, 2018, p. 115), and would broaden the understanding of micro-foundational aspects, within the current, African and 4IR contexts. Responding to criticisms of the exploratory approach that imply a lack of rigour and factual depth, it is worth noting that there no absolute truth exists and that a researcher needs to acknowledge provisionality to personal and context biases (Reiter, 2017). Reiter (2017) demonstrates that by practicing research in a “transparent, honest and strongly self-reflexive way” according to set guidelines will increase its reliability.

Regarding the philosophy of the design, an interpretivist approach was taken, as it allowed the researcher to “study [of] social phenomena in their natural environment” (Saunders & Lewis, 2018, p. 109), and is well suited to qualitative research (Saunders & Lewis, 2018). Huberman and Miles (2002) indicate that interpretivism lays the groundwork for understanding. Furthermore, by “deconstructing , capturing, bracketing, constructing and contextualising the phenomena under investigation, the researcher brings it into sharper focus” (Huberman & Miles, 2002, p. 351). This approach is thus well suited to address the call from literature to understand and operationalise that AC framework and dimensions.

Concerning the methodological approach, a mono-method, consisting of semi-structured interviews, aligning with the interpretivist approach, was selected (Saunders & Lewis, 2018). A mixed method approach involving conducting interviews to gain insights beyond the literature, followed by surveys was considered the ideal approach (Kotabe, Jiang, & Murray, 2016). However, considering the time constraints of the Intensive MBA and the physical constraints that the Covid-19 situation posed, a mono method was followed. Despite its limitations, conducting and analysing 16 interviews across various geographies, firm sizes, levels and industries, aimed to reduce the lack of richness that remains a critique of the mono-method (Saunders, Thornhill, & Lewis, 2019).

The time dimension of the study was cross-sectional in nature, partially due to the time constraints of the research, and partially due to interview participants being those who have already implemented technology or work within firms that have proven themselves to be adopters of technology (Neuman, 2014). The interviews were conducted using a

semi-structured guideline, to allow the researcher the necessary flexibility to accommodate additional questions based on answers from the participant (Zhang, 2017). To aim for consistency across the interviews, the questions were asked in sequence by the researcher from the interview guide, but at times, were adapted if answers were invertedly provided.

## **4.2 Population**

The population identified as being relevant for the research included senior technology, project or business development managers and operational workers that made use of technology to produce new or existing products or services in Africa. Additionally, the organisations selected formed part of the top private, innovation or technology companies in each country that made extensive use of 4IR technology for business activities.

## **4.3 Unit of Analysis**

The research was conducted at both the managerial/organisational and individual level, following the multi-level approach necessary to further understand the theory's applicability (Volberda et al., 2010) and to offer data triangulation. The group of senior managers within the sample was constructed purposively and comprised participants from organisations that were in the top technology or innovation sector within their country. Extensive effort was made to find the relevant and suitable Participants. This was done by locating these senior managers (comprising CTO's, Business Development Officers, Vice Presidents of Engineering) via LinkedIn, using the filters of company, country, and position, to ensure Participants were from companies of a high calibre. Once Participants agreed and the interview was deemed successful, they then nominated operational workers within the same organisation and country. This multi-level approach served a two-fold purpose: it shed light on the dyadic nature of the research constructs, and secondly, it offered triangulation of data.

## **4.4 Sampling Method and Size**

A combination of non-probability, purposive sampling as well as snowball sampling was used for this study. Non-probability, purposive sampling was used to select the senior manager, as the participating firms were selected in a strategic way to ensure relevance to the research questions (Bell, Bryman, & Harley, 2019). Heterogenous purposive

sampling was employed, in order to understand the constructs in greater detail, across a number of successful firms that have applied new technology, across multiple levels (Saunders & Lewis, 2018). In order to select firms to form the sample, analysis was done to ensure that the African countries with the largest economies were selected, and a widespread across the “Digital Intelligence Index”, shown in Figure 6 was selected. This index is a function of the current state of digitisation (on the vertical axis) and its pace of digitisation over time (on the horizontal axis). It is worth noting that no African country fell in the “stall out” or “stand out” zones. The countries selected were: Ethiopia, Ghana, Kenya, Nigeria, Rwanda, South Africa.



Figure 6. Digital Intelligence Index showing six countries selected for the study.

Source: The Fletcher School of Business (2020). Digital Intelligence Index. Retrieved September 23, 2020, from <https://digitalintelligence.fletcher.tufts.edu/trajectory>

In order to cater for the differences displayed in different levels of the organisation (Distel, 2019), one operational knowledge worker and one senior/executive/human resources manager was interviewed, thereby applying the critical cases of knowledge workers in their capacity, and of senior managers in terms of their organisational capacity as manager and capacity as employee.

16 African technology workers and senior managers, across six different African countries, were interviewed, to further understand technology transfer in Africa. Of the interviews, 16 spanned for-profit businesses with the last two incorporating the non-profit sector, which

were subsequently removed, due to the possible additional non-heterogeneity in the sample. Nine of the participants were formally qualified in the areas of computer science, engineering, and additionally, held business degrees. The remaining seven participants were operational workers relative to their senior counterparts, and themselves held computer science, engineering or science qualifications. Two participants occupied positions in a non-profit organisation, that focused on transferring technology-related skills to vulnerable citizens, that were later excluded. Further details of the participants are included in the Table 2.

Table 2. Summary of sample

Organisation	Country	Respondent position	No. of respondents	Sector	Code name
1	Ethiopia	Senior Manager	1	Financial Services	A1
		Operational knowledge worker	1		A2
2	Ghana	Senior Manager	1	Information Technology & Services	B1
		Operational knowledge worker	1		B2
3	Kenya	Senior Manager	1	Retail	C1
		Operational knowledge worker	1		C2
4	Nigeria	Senior Manager	1	Information Technology & Services	D1
		Operational knowledge worker	1		D2
5	Rwanda	Senior Manager	1	Consumer Electronics	D1
		Operational knowledge worker	1		D2
6	South Africa	Senior Manager	1	Mining & Metals	E1
		Operational knowledge worker	1		E2
<b>Additional</b>					
7	Ethiopia	Senior Manager	1	Information Technology & Services	A3
8	Kenya	Senior Manager	1	Information Technology & Services	C3
9	South Africa	Senior Manager	1	Food & Beverages	F3
		Operational knowledge worker	1		F4
<b>TOTAL</b>			<b>16</b>		

Source: Author's own.

In total the 16 interviews increased the reliability of the research through data saturation, which ensured the majority of relevant codes were revealed, and allowed for the development of the AC model (Guest, Bunce, & Johnson, 2006).

All of the participants were interviewed via the Zoom meeting platform, partly due to the Covid-19 restrictions. Additionally, the digital meeting platform offered the benefit of consistency across representations from various countries and organisations. The prior research on micro-foundational absorptive capacity provided the structure for the interview, revealing understudied areas as well as previous theoretical constructs for study. The interviews were conducted using the interview schedule and guide, and due to the semi-structured nature, allowed for additional input to be provided by the participant and probing to be done by the researcher. The interview concluded with an open-ended question providing the opportunity for the participant to share any supplementary information on technology transfer within their persona, organisational or African perspective. The interview schedule is provided in Appendix 3 - Interview Schedule.

## **4.5 Primary Data Collection**

### **4.5.1. Measurement Instrument**

Given that the research was qualitative and exploratory in nature, primary data was gathered through semi-structured interviews (Quinlan et al., 2019). Semi-structured interviews were conducted to allow both the participants and researcher the freedom and flexibility to express the factors and constructs that affected AC at the time of writing within the African and 4IR contexts (Quinlan et al., 2019).

An interview guide was developed and was supplemented by a consent statement for all participants and is presented in Appendix 3 - Interview Schedule. The interview guide was developed after conducting a literature review and discovering the knowledge gaps, as presented in Chapter 2. The Research Questions were constructed based on the knowledge gaps, as per Chapter 3. The underpinning theory to the interview guide was that of micro-foundational AC. The interview guide included a personal introduction, the purpose of the study, the affirmation that the confidentiality of the participant would be upheld, an estimation of the time required for each interview, and the confirmation that participants may withdraw from the interview at any stage without penalties (section 1). Participants were also asked to give their informed consent to the interviews being conducted and recorded via audio transmission. This synchronous interview format accommodated participants who operated in countries other than South Africa. It also ensured that consistency throughout the interview process was maintained. Two pilot interviews were conducted prior to the commencement of the research to establish

whether the semi-structured interview guide could answer the posed research questions, whether the questions were easy to understand, and whether they followed a logical process. The consent statement and interview guide were pre-approved by the GIBS Ethical Clearance Committee.

The researcher identified countries, then organisations that would meet the study's requirements and connected with senior technology, project or business development managers via LinkedIn. Once they accepted to be part of the research, the consent form was sent to them and interviews were set up. The interview commenced with questions from the interview guide, starting from simpler questions building up to more difficult questions. These included the background questions (section 1), followed by three sets (pertaining to the research questions) of four questions, to build on the work of other authors and their models, and to discover insights that addressed the knowledge gaps (section 2). Finally, an open-ended question was asked to capture any constructs or ideas that had not been considered by the researcher (section 3). The interview process was then closed off, thanking the participants for their contributions.

Interview biases, including “intentional subversion by the interviewer and influence due to interview’s expectation’s” (Neuman, 2014, p. 355) was mitigated by the recording of the interviews and the researcher attempting to guard against any prejudice or pre-conceived concepts as far as possible. The researcher was alert as to when to probe the participants and avoided prompting of any potential responses. On occasion, the researcher had to explain an interview question. At all times, the researcher had to guard against proving previously held opinions or other findings, and instead, look for new insights. Transcripts of the interviews were generated and will be provided to the participants, if they so choose. A summary of the findings from the report will be provided to all participants that requested it, after completion and submission of the report to GIBS, to allow for the findings to be potentially implemented within their organisations.

#### **4.5.2 Quality Controls**

All research is guided by validity and reliability means (Quinlan et al., 2019, p. 25), with validity referring to “how logical, robust, sound, reasonable, meaningful and useful” (Quinlan et al., 2019) the research is. For validity, the researcher focused on ensuring that

the relevance and appropriateness of the methodology, the data gathering tool (the interview questions) and the analysis tool (Atlas.ti and the codes produced).

Reliability is defined as “an indicator of the dependability of the research, to the degree to which the research can be repeated while obtaining consistent results (Quinlan et al., 2019, p. 25). The researcher conducted audio recordings, that were then transformed into transcriptions, and these were then systematically coded. In addition, data triangulation was inherent in the sample chosen, with both the heterogeneity across countries and across hierarchical levels. Data collection and analysis were done across six different countries and at two organisational hierarchy levels, to aim for data triangulation of the findings and with the aim to lead to credible conclusions (Patton, 2002).

Qualitative research has long been criticised for not containing sufficient credibility and validity, due to its non-standard approach (Huberman & Miles, 2002). Therefore the means employed to ensure the quality and credibility of the research included, to the best of the researcher’s ability, accuracy in recording accounts by Participants (descriptive validity), providing interpretations (interpretative validity) and in the application to theory (theoretical validity) (Huberman & Miles, 2002).

In conclusion, a summary of the quality controls is provided in Table 3.

*Table 3. Summary of quality controls*

<b>Credibility (internal validity)</b>	Triangulation, coding quality
<b>Transferability (external validity)</b>	Detailed descriptions with verbatim quotes from the interviews
<b>Dependability (reliability)</b>	Triangulation
<b>Confirmability (bias)</b>	Triangulation, reflexivity

*Source: Author’s own*

#### **4.5.3 Data Gathering Process**

Primary data was collected from the transcribed, semi-structured interviews. The average duration of the interviews was 46 minutes, with the variation being 1 hour 9 minutes for the maximum and 25 minutes for the minimum. All interviews were recorded via the Zoom recording function, after obtaining permission from the participant. The interviews were thereafter transcribed using the Microsoft Word transcribe feature. A large amount of editing was subsequently performed with the first 50% of the transcriptions performed by the researcher. The second 50% of the transcription was conducted by a professional

transcriber, after an initial edit to remove identifiers. The full editing included removing all identifiers, including personal and organisational identities and products, that could jeopardise the confidentiality commitment that the researcher had provided to the participant. All identifiers were replaced with “X”. Furthermore, the transcriptions were edited to ensure sensible sentences, but to allow for the natural discourse to be captured.

Ahead of the participant interviews, the interview schedule was trialled through pilot interviews, and minor changes were introduced to the questions. For the participant interviews, the schedule provided for the effective confirmation of certain constructs, as well as the revealing of additional constructs. The semi-structured nature allowed for the researcher to adapt or rephrase the questions pertaining to each of the research questions, when participants asked for clarity or where the researcher required additional information. Given the difficulty of understanding micro-foundational constructs as experienced in prior international research, the participants found the questions that pertained to the development of capabilities the most challenging (Research Question 3).

#### **4.5.4 Analysis Approach**

The most recent review of thematic analysis by Braun and Clarke (2020) was used as a starting point. Due to its applicability to qualitative analysis, the process recommended by them aimed to transform the “craft” of qualitative analysis into a procedure, minimising subjectivity (Braun & Clarke, 2020). Following this procedure, the researcher made herself familiar with the data by reviewing the interview transcriptions. The transcriptions provided the canvas from which codes were systematically extracted. Coding was performed using the computer-aided qualitative data analysis software, Atlas.ti. Coding was followed by categorising codes and data to initial themes. These themes were subsequently developed and reviewed, still following the procedure defined by Braun and Clarke (2020). These themes were then refined and named and formed the basis on which Chapter 5 and 6 were based. Frequency tables were included in Chapter 5, and were used to illustrate depth of results, where applicable. A summary of the main findings is presented after the presentation of results for each Research Question.

#### **4.6 Ethics**

Ethics in business research is essential and ethical behaviour extends beyond the interviews, to the entire research process, including data coding and presentation



(Cassell, 2015). To ensure ethics were maintained in the interviews, before the Participant interviews were conducted, ethical clearance from GIBS' Ethics Committee was obtained. Proof hereof is contained in Appendix 4. This process involved the submission of the consent form and the interview questions that were intended for Participants, as well as a synopsis of the research. Based on this, the Ethics Committee reviewed the application and provided approval. Before Participant interviews commenced, Participants were required to sign the consent form, which allowed them to withdraw from the interview process at any stage. Additionally, permission was granted by Participants to the researcher to record an audio transmission of the interview, for transcription purposes. The researcher also assured Participants that no identifiers would be used in the storage of data nor in the research report.

#### **4.7 Limitations**

The proposed research experienced several limitations, which are explained below. Whilst qualitative research offers more detail in order to understand complex issues, it is difficult to analyse and the findings do not fit into neat categories (Saunders & Lewis, 2018). Additionally, the sample size was relatively small, as only six countries were used as proxies for Africa, despite meeting the criteria specified for data saturation (Guest et al., 2006). Triangulation acts as a way to investigate phenomena from other angles, thus contributing towards more accurate descriptions of phenomena, and thus in this research, data triangulation was employed (Quinlan et al., 2019), by sampling over several countries and across two hierarchical levels. However, there is also criticism for triangulation, in that once employed, it can result in a "naïve realist position" (Quinlan et al., 2019, p. 25), in that there is an absolute truth created, that is not aligned to qualitative research.

With interpretivism as an epistemological position, it maintains that all knowledge is subjective and is based on interpretation and relations (Quinlan et al., 2019). Whilst interpretivism allows for the development of knowledge within social science (Quinlan et al., 2019), it has come under critique. Interpretivism has been criticised for its subjective nature, allowing room for researcher bias. To counter this, instead of focusing on validity of the outcome, Leitch, Hill, and Harrison (2009) recommends to focus on a rigorous research and data gathering and interpretation process.

Two types of non-probably sampling were used. Purposive sampling was used to select the Participants to ensure that a representative sample was selected for data (Saunders & Lewis, 2018) and it was deemed a time-effective way in which to conduct research. However, purposive sampling has its drawbacks, including exposure to errors by the researcher, low levels of reliability high levels of bias, and there is a constraint on the generalisability of the findings (Saunders & Lewis, 2012). Whilst snowball sampling ensured that at least two levels within one organisation were interviewed, and was used in recent AC research for this (Sjödín et al., 2019) it offered disadvantages. These include a sampling bias and a margin of error, since people refer those whom they know, and this could skew the data. This was however countered somewhat with the researcher specifying the make-up of the operational level worker.

## **5. Results**

### **5.1 Introduction**

This chapter provides a synopsis of the findings generated from the semi-structured interviews conducted. The RQ were developed as a response to the calls for additional research in micro-foundational absorptive capacity research and were incorporated in the interview schedule. The chapter presents the main findings arranged according to the RQ, and additionally incorporates new data that surfaced during the interviews. Where relevant, frequency tables are used to indicate the relative importance of factors raised by Participants. A summary of responses is provided at the end of each sub-section. All data codes are contained within Appendix 6.

### **5.2 Results for Research Question 1**

#### ***How does technology absorption at an individual level influence an organisation's micro-foundational AC?***

The criticality of the individual within the absorptive capacity framework is well recognised. There remains however a lack of clarity on the process by which individuals incorporate AC and the factors that play a role within this framework. Additionally, the impact of more recent contextual factors, particularly the impact of more complex and dynamic business contexts and the impact of 4IR technology, need to be factored in. Thus, purpose of the question was to expand the incomplete understanding of the critical role that the individual plays in absorptive capacity, within the current reality.

#### **5.2.1 How does your organisation identify and explore new knowledge?**

##### **5.2.1.1 Sources of New Knowledge**

In the first interview question, Participants revealed several existent sources by which new knowledge is identified and explored, totalling to 97 codes. These were subsequently thematically coded into individual and organisational sources. Whilst themed as organisational sources, it is in fact at the individual level that these sources are explored and made use of. Literature shows that at an individual level, the individuals who connect external search effort and assimilation are known as gatekeepers (Ter Wal et al., 2017), and are referred to chapters 2 and 6. Whilst there is a large degree of overlap between individual and organisational groupings, for clarity, they are kept separate. The frequency of these sources is summarised below in Table 4.

*Table 4. Summary of codes for RQ 1.1*

Rank	Theme	Grouping	Frequency
1	Formal structures and functions	Organisational	23
2	Customer-centricity	Organisational	17
3	External third parties	Individual	15
4	Culture	Organisational	12
5	Exploring and problem-solving	Individual	10
6	In connection with competition	Individual	5
7	Ideas from CEO/senior management	Organisational	5
8	Internal activities (formal and informal discussions, projects)	Individual	5
9	Recruitment	Organisational	3
10	Multi-faceted	Individual	2

### **Formal structures and functions**

The majority of participants (Participants A1, A3, B1, B2, C2, C3, D2, E1, E2, F1, F2, F3, F4) stated that there existed within their organisation formal structures and functions that were responsible for seeking and exploring new technological ideas and knowledge. These consisted of dedicated technology, business development or R&D departments that existed at a global or group level (Participants A1, B1, C3, D2, E1, E2, F2, F3, F4) or at a local level (Participants A1, A3, F1, F3).

*“We also have technological innovation across our supply chain which to new technologies in packaging, new technologies in X. So, we have a number of, I would call them, institutions within the organisation that have a dedicated role in identifying new knowledge and information for us to capitalise on.”* (Participant F3)

Additionally, Participants made reference to internal business intelligence units that were responsible for understanding trends and provided market insights (Participants B1, C2). Most participants (Participants A1, A3, B2, E2, F3) mentioned that new technological ideas and knowledge flowed and were shared throughout the organisation, whilst other participants (Participants A3, E1, F3). mentioned that these were actively cascaded down from the headquarters, located in another country with the expectation to implement.

### **Customer Centricity**

The second most frequently cited theme was that to do with the customer or consumer (Participants A1, A2, B1, B2, C1, C2, D2, E2, F3). Participants cited that attempting to resolve problems for customers or alternatively, anticipating what customers needed or wanted, served as motivation for their development of new knowledge or ideas (Participant A1, A2, B2, C1, F3). This insight was gathered through informal discussions

or reference material (emails and WhatsApp application messages) (Participant C2) or through formal means (customer surveys and marketing companies) (Participants D2, E2) or through predictive analytics (Participant C1). Several participants mentioned the importance of understanding the customer or consumer (Participant B2, C2) in order to know what adds value. Participants also mentioned that they sought to provide additional value to their customers, which generated the need to look for new knowledge: “So we need to actually offer them enough value that they would say you know what, with you guys I don't want to change. So, for us to get that we need to offer something that you know goes on to the next level.” (Participant C1). Participant D2 mentioned the development of a minimum viable product that allowed for the exploration of new knowledge within the market, that involved iterative development: “And sometimes we would make minimum viable products and then go back to our partners”. (Participant D2).

### **External third parties**

The use of external third parties was the third most frequently cited theme indicated by Participants (Participants A1, A3, B1, C2, E2, F1, F3, F4). Participants from the more established companies and those at the relative operational level highlighted the reliance on external third parties to identify new knowledge. These sources included the announcement of new technology in news stories (Participant B1), the engagement at international conferences, trade shows and industry bodies (Participants A3, F1), partnering with suppliers (Participants A1, C2, C1, E2, F3). The point of collaboration with third parties was stated explicitly by Participant F3. Two participants made reference to the importance of actively engaging in online platforms: in other words, YouTube and the internet to garner new ideas (Participant A1) and following technology leaders and influencers on online platforms such as Twitter (Participant A3). Participant A2 raised indicated that academic papers serve as a source of idea generation for their organisation.

### **Culture**

According to several participants (Participants A1, A2, C2, C3, D1, F1, F2), the culture curated by the organisation or environment served as the trigger or platform for the identification and exploration of new knowledge. Participants mentioned that by curating a culture that involved experimentation and being receptive and seeking new ideas (Participant D1), the sharing of new knowledge within the organisation (Participants F2), expecting employees to come up with new ideas (Participant A1) and allowing employees to problem-solve (Participant F1), new knowledge was identified and explored. As one

participant indicated: “Experimentation is just part and parcel of our culture” (Participant D1). Furthermore, Participants mentioned that actively dedicating or creating the time for reading, researching and experimenting was key (Participants A1, A2,). Participants highlighted the importance of including ideas from all employees, and this was done through crowdsourcing internally (Participant C3) and soliciting ideas from employees at all levels (Participant C2).

### **Exploring and Problem-solving**

Several participants indicated that new knowledge was identified through exploring and problem-solving (Participants A2, B1, C1, C3, E2, F1): “There's been some great ideas that come from trying, trying to solve a problem.” (Participant C3.) This involved a problem that arose or that was presented, and that required resolution, when existing systems or solutions did not suffice.

*“So there's a lot of OK, we have a problem, can we call somebody to find out if there are solutions out there...but it's very, very much reliant on individuals and problems that they're trying to solve, so I think that's really how people go looking for knowledge or go looking for the latest trends or go looking for what are our peers doing. But I still feel like a lot of it is push pull, so ... going out and finding solutions to problems that they have.”* (Participant F1).

Much of the prompting came about through the application of thinking of how to improve current systems: “It's more of thinking how can we—how do we need to evolve—how do we need to evolve our application portfolio right?” (Participant C1).

### **Competition-oriented**

Participants A1, C2, C3, F1 highlighted that competitors or competition triggered the generation of new knowledge and ideas. Two distinct mechanisms were identified, with the first being the comparison of the current organisation or product with the competitor, in order to gain the motivation for new ideas or new ideas or knowledge itself (Participants A1, C2, F1).

*“...learn behaviours around our particular industry and how that compares to other industries. And you know, just identify things like competitive advantage or how to leverage operational efficiency or how to improve performance generally”.* (Participant C3).

The second mechanism was to share knowledge or ideas with competitors, and in return share new knowledge and ideas from their side (Participant A1).

### **Direction and Ideas from the CEO or Senior Management**

Participants A2, A3, B2, D1 indicated that new knowledge and ideas originated from their Chief Executive Officer or senior management. These participants worked in organisations where the founding member/s were (still) part of the executive board or CEO and were one of the main proponents in business development. Specifically, new knowledge and ideas originated from the C-suite executives who scouted for knowledge and ideas at an international level (B2), or the CEO identified new ideas for products and this knowledge was then cascaded to the various functions to investigate or implement (Participants A2, A3, D1). Participant D1 also mentioned that in the initial years of the organisation, idea and knowledge generation was more inclusive, but as the organisation has grown, most ideas originate from the senior management or executive level.

### **Internal activities (formal and informal discussions, projects)**

Participants A1, A2, B1, F3 highlighted that knowledge generation, or the need for it, was brought about through internal activities, that included discussions at both an informal and formal level, or through projects, or through connecting remote teams or through training. Specifically, through the discussion mechanism:

*“So we have regular discussion groups or sort of internal discussion forums where some of these new concepts and things are actively described by the team. And then basically they are broken down and dealt with as a group, so we would usually look at the benefits to the organisation and whether it adds value to our product profile and discuss how it would affect the ecosystem.”* (Participant B1)

Additionally, Participant A2 emphasised that new knowledge was generated through projects:

*“Currently we are more focused on a project-based knowledge acquiring mechanism. If I take one of the projects I'm working on which is X, we're using IOT, which is any new and emerging technology and the question we ask first is how can we enhance our current product with this new emerging technologies?”* (Participant A2).

Another participant indicated that by the combination of teams, and essentially ideas, new knowledge was identified, through collaboration: “So by combining all these teams, you can discover new knowledge”. (Participant A1).

### **Recruitment**

Participants A1, A2, B2 revealed that the manner in which their organisation identified and explored new knowledge was through the recruitment of people that possessed sought-after knowledge or skill sets: “We try to acquire that knowledge or bring individuals with that knowledge or capacity to our team so that we can acquire it or maybe work around how we can use that technology specifically.” (Participant A2). Another strategy highlighted was that of specifically targeting younger people, with inherent more recent knowledge: “I guess that's why you've always got to employ younger and younger people so you can get not just the pipeline, but new ideas.” (Participant B2).

### **Multi-faceted**

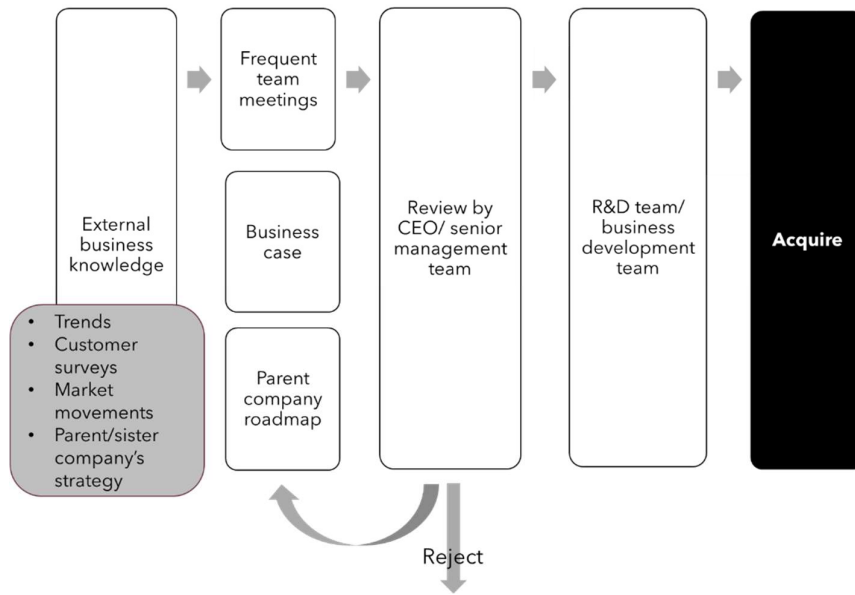
Finally, two participants explicitly mentioned that the identification and exploration of new knowledge was a multifaceted approach (Participants C3, F3): “I'd say it's a multifaceted approach to just figuring out what knowledge the organisation needs to adopt at different points.” (Participant C3).

#### **5.2.1.2 Processes used to explore new knowledge**

In addition to the above questions, several Participants described processes by which new knowledge is identified and explored within their organisations (Participants A1, B1, C3, F1, F3). It involves the identification of external business knowledge, that are identified and then processed through various means (i.e., discussed in various team meetings or run through a business case or compared to the parent company roadmap). After passing the requirements of this stage, there is a review by the CEO or senior management team. If the knowledge passes this stage, it is passed to the R&D or business development team, who develops it and it then essentially becomes useful, valuable knowledge for the



organisation. Otherwise, it is passed back to the previous stage or rejected. This is



depicted in

Figure 7 below.

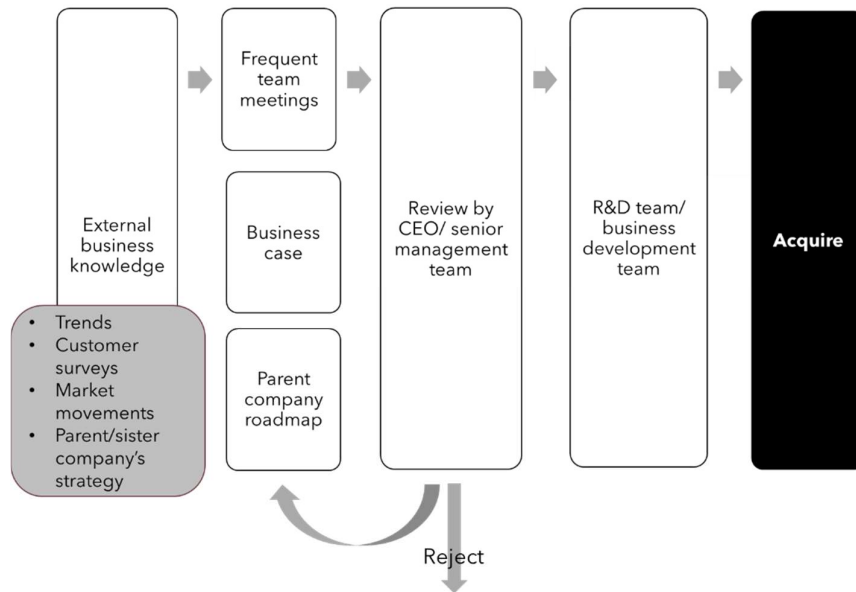


Figure 7. Process flow showing how new knowledge is explored, as described by Participants.

Source: Author's own.

### 5.2.2 Employee-level factors that influence AC

In the second interview question, Participants were highly engaged in the response to the interview question, providing a total of 105, by all participants. These codes were subsequently grouped into themes, according to the definitions of human capital and

social capital, provided by Adner and Helfat (2003) and bisociative and associative cognition, defined by Lowik et al. (2017). The definition of non-cognitive stems from AC research conducted by Ployhart and Moliterno (2011). The final theme was that of 'inherent', which referred to those nomological characteristic (i.e., age and gender). A summary of the codes, with their associated rankings and frequency is shown in Table 5.

*Table 5. Summary of codes for RQ 1.2*

<b>Rank</b>	<b>Theme</b>	<b>Frequency</b>
1	Non-cognitive skills	47
2	Human capital	25
3	Social capital	11
4	Bisociative cognition	10
5	Inherent	5
6	Associative cognition	5
7	Civic virtue	2

The most frequently cited theme by all participants besides Participant F2, was that of non-cognitive skills, which included inter alia the ability to generate value (Participant B1); the ability to seek new opportunities (Participant F3), the ability to be comfortable with ambiguity (Participants D1 & E2), a hunger and willingness to learn (Participants B1, C3, D1 & F4). Thereafter human capital aspects were deemed to be the most frequently referred to by participants (Participants A1, A2, A3, B1, C2, C3, D2, E2, F2 and F4). These included the relevant skills (Participants A2, A3, C3, E1, E2, F4), the relevant experience (Participants A2, A3, C2, D1, D2, E1, E2, F4) and the relevant education (Participants C2, E1, F2 & F4). Social capital was the next most prevalent theme referred to by participants (Participants A1, A3, D1, D2, E2, F3 & F4). These codes included the ability to have a meaningful conversation with anyone (Participant F3), the desire to be faster and more efficient for clients (Participant D1) and to be part of a collaborative culture (Participant D1). Bisociative cognition also formed a significant theme, mentioned by Participants A1, B1, B2, C2, D1, D2, E2, F3 and F4. The specific codes included the ability to anticipate the future (Participant C2), being creative (Participants A1 & B2), and an entrepreneurial mindset (Participant F3). There were some inherent aspects mentioned by participants, such as age (Participants B2, C2, F1 and F2) and gender (Participant F2). Associative cognition was cited by Participants A2, A3, B1 and D2, and included the ability to be systematic (Participant A2) and the ability to be challenged and to challenge (Participant B1). The final category was that of civic virtue mentioned by Participants B2 and F3.

### **5.2.3 The role of leadership in AC**

In the third interview question, all Participants referred to the leadership aspect, producing a total of 73 codes. Participants A3, E2, F1 and F2 stated that the role of leadership within the absorptive capacity process was significant and important: “Oh, huge, and I cannot emphasise that more importantly. It is paramount. Oh, my goodness... I think it will completely fail if you do not have the leadership visibility and the leadership buy in to it” (Participant F1).

Considering the codes through the three leadership styles considered in chapter 2, a summary of the codes, with their associated rankings and frequency is shown in Table 6.

*Table 6. Summary of codes for RQ 1.3*

<b>Rank</b>	<b>Theme</b>	<b>Frequency</b>
1	Transactional leadership	31
2	Transformational leadership	19
3	Empowering leadership	2

A participant made reference to the aspect of the support of new technology: “If the workforce does not feel that [their] leadership appreciates or doesn't support new technology, they are not going to be inspired or motivated to welcome new technology into their jobs” (Participant F2). Another participant also pointed to the pragmatic advisory and collaborative functions that leadership plays within the AC process: “instrumental in guiding and advising how we use tech to solve problems” (Participant C2); “ensuring the use of the new technology cuts across departments” (Participant D2); “ensuring the right thing is being solved for” (Participant D1). Participants also mentioned the importance of leaders in providing the platform for experimentation: “generation of new ideas, providing direction for experimentation” (Participant D1); “I think it's just leadership's role to provide the environment for constant experimentation, room for failure.” (Participant C3).

#### **5.2.4 Additional factors that influence AC**

In the fourth interview question, Participants mentioned a myriad of factors and generated 91 codes in total (Participants A1, A2, A3, B1, B2, C1, C2, C3, D1, D2, E1, E2, F1, F2, F3, F4), that were subsequently grouped into internal and external factors, with certain factors straddling both locations. As shown in Figure 8, the theme consisting of factors that were classified as both external and internal occurred most frequently (Participants A1, A2, A3, B1, B2, C1, C2, C3, D1, D2, E1, F1, F2, F4) followed by internal (Participants

A1, A3, B1, B2, C1, C3, D1, D2, E1, F1, F2, F3, F4) and then external factors (Participants A1, A2, A3, C1, C2, D2, E1, E2, F2, F3, F4).

Table 7. Summary of codes for RQ 1.4

Rank	Theme	Frequency
1	Both external and internal	35
2	Internal	32
3	External	23

Additionally, Figure 8 depicts a summary of the factors uncovered by Participants.

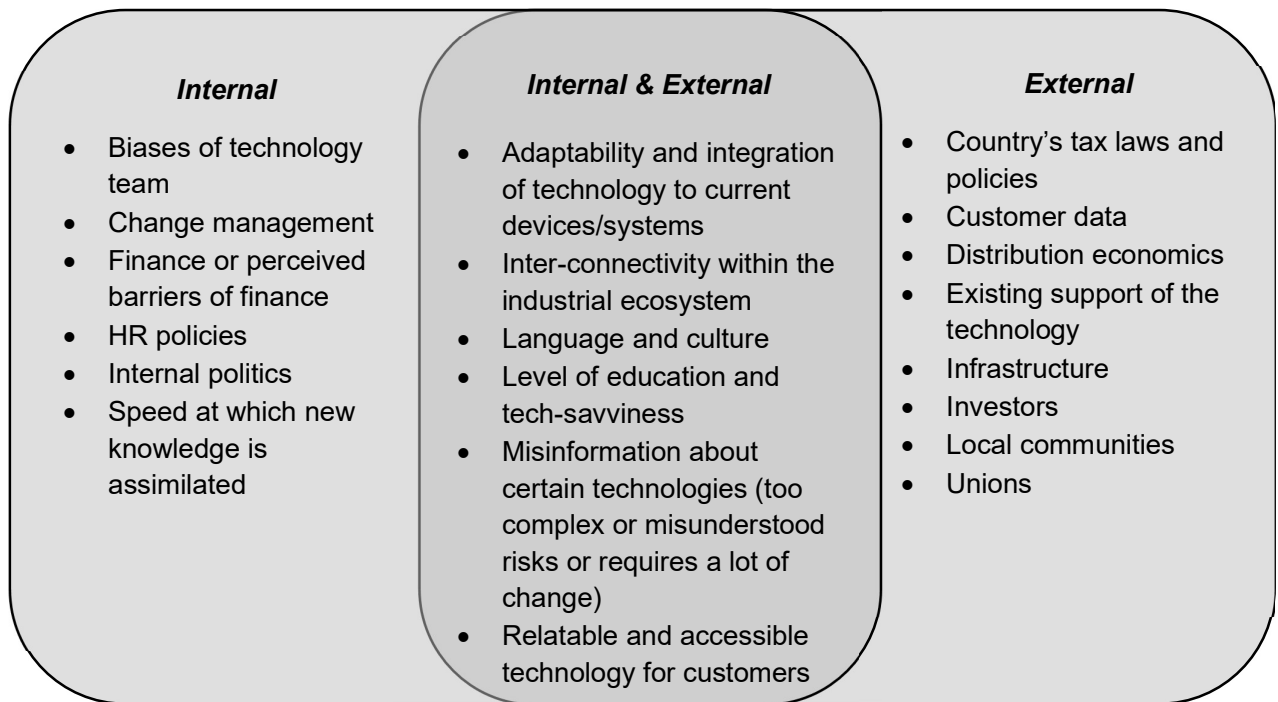


Figure 8. Summary of internal and external factors

### 5.2.5 Summary

Table 8. Summary of RQ 1

Research Question	Theme – Level 2	Theme – Level 1	Participants
1.1	Sources of New Knowledge	Formal structures and functions	A1, A3, B1, B2, C2, C3, D2, E1, E2, F1, F2, F3, F4
1.1	Sources of New Knowledge	Customer-centricity	A1, A2, B1, B2, C1, C2, D2, E2, F3
1.1	Sources of New Knowledge	External third parties	A1, A3, B1, C2, E2, F1, F3, F4

1.1	Sources of New Knowledge	Culture	A1, A2, C2, C3, D1, F1, F2
1.1	Sources of New Knowledge	Exploring and problem-solving	A2, B1, C1, C3, E2, F1
1.1	Sources of New Knowledge	In connection with competition	A1, C2, C3,
1.1	Sources of New Knowledge	Ideas from CEO/senior management	A2, A3, B2, D1
1.1	Sources of New Knowledge	Internal activities (formal and informal discussions, projects)	A1, A2, B1, F3
1.1	Sources of New Knowledge	Recruitment	A1, A2, B2
1.1	Sources of New Knowledge	Multi-faceted	C3, F3
1.2	Employee-level factors that influence AC	-	A1, A2, A3, B1, B2, C1, C2, C3, D1, D2, E1, E2, F1, F2, F3, F4
1.3	The role of leadership in AC	-	A1, A2, A3, B1, B2, C1, C2, C3, D1, D2, E1, E2, F1, F2, F3, F4
1.4	Additional factors that influence AC	Internal factors	A1, A3, B1, B2, C1, C3, D1, D2, E1, F1, F2, F3, F4
1.4	Additional factors that influence AC	External factors	A1, A2, A3, C1, C2, D2, E1, E2, F2, F3, F4
1.4	Additional factors that influence AC	External and internal factors	A1, A2, A3, B1, B2, C1, C2, C3, D1, D2, E1, F1, F2, F4

### 5.3 Results for Research Question 2

#### ***How is new knowledge acquired, assimilated and transformed inside the organisation?***

This research question sought to understand the micro-foundations of the assimilation process within the AC framework. Considered a black box in literature, the question aimed to establish the processes used by organisations to determine the importance of new knowledge. Following this, the next interview question considered the mechanisms and processes used to assimilate the knowledge, of which there is still much to be understood. Literature has, however, revealed certain hindering factors, of which the next question sought to either confirm or understand additional factors. Finally, assimilating this new, important knowledge is the translation or new knowledge into organisational benefit, and this was asked of participants.

#### **5.3.1 Determining Whether New Knowledge is Important**

The fifth interview question aimed to establish how an organisation determines whether new knowledge is sufficiently important to bring in and expend resources on. This question is part of unpacking the black box of micro-foundational AC that is repeatedly referred to in the literature. Research by Yang and Tsai (2019) and Zobel (2017) provided guidance on how measurement has recently taken place, with the following categories being defined in the strategic evaluation of new knowledge, as shown in Table 9.

Table 9. Summary of codes for RQ 2.1

Rank	Theme	Frequency
1	Innovation performance	14
2	Potential strategic advantages for business	9
3	Customer orientation	6
4	Fit with internal competencies	6
5	Outsourcing - decision-makers & business intelligence	6
6	Financial contribution	5
7	Cross-functional integration	1
8	For voluntary idea generation	1

Participants revealed that there were a variety of strategic considerations by which the importance of new knowledge was assessed, with the most frequently occurring being that of innovation performance (Participants A2, B1, B2, E2, F1, F3 & F4), with one participant stating:

*“So when we look at a new knowledge, the first question we ask is what value would this add to our product and what value would that product add to the consumer’s life or usage of the devices. If there is a potential to that, then we will incorporate it as new knowledge. If not, then it is parked aside as noise for the time being”* (Participant E2).

The second most frequently cited consideration was made by Participants B1, C3, F3 and F4 and referred to the potential strategic advantage that the knowledge may bring to the organisation:

*“Well, we determine if it's important if we analyse and define a very clear value addition. Value addition here could be reduced costs, improved processes, improved product or improved outcomes. So we compare it to the existing systems or structure and if it adds value to the point where we can see a significant change in any of the areas I mentioned earlier, then it represents something that triggers a resolution to adopt”* (Participant B1).

The third most frequently cited construct was that of the potential value to the customer that was anticipated from utilising the new knowledge (Participants C2, D2, E2, F3 & F4), and is illustrated by Participant C2: “Does it solve an active problem, or does it improve the current process flows of the customer journey?”.

The fourth most frequently occurring construct was whether the new knowledge fitted with existing internal competencies (Participants A2, D1, D2, E2). Participant D1 made reference to ‘idea charter documents’ as part of the formal documents used: “Which is how do we test ideas and then which ideas then get formulated into an experiment. And so that engine is sort of well known. Then there's sort of the frame in which we create the project or the idea charters” (Participant D1).

The next most frequently cited category involved basing the assessment on decision-makers’ preferences and the business intelligence function within the business (Participants A1, A2, D1, E1, F2). Evidently, one operational-level worker conveyed that the determination was independent of their input, in that it was left to senior management to decide which technology was valuable: “It is not a choice. It is not a choice. It is if the company believes that it's a must” (Participant A1).

This is juxtaposed with a participant who mentioned that senior management and leadership consult and solicit input from employees when considering the importance of new technology:

*“...leadership will talk about some of these technologies and in front of...a panel of 500 people. And after they have spoken about...the why of that technology, how [we're] going to implement it, what is...the cost, what is some of that data that's leading to us making the decision to get this technology in, then [we] have an option where we would have...ask me anything questions”* (Participant D2).

The same participant highlighted the practice where new knowledge is openly and easily discussed, as part of the culture and approach:

*“So I think the culture that we've had [has] been so open in terms of [an] open door policy and anybody can ask anything and question. And if you don't have any answers, you can be able to...escalate, so that has been one of the ways to test the importance of new knowledge”* (Participant D2).

The other most significant category was that of assessing the financial implications of the new knowledge (Participants C1, C2, F3), and included the impact on the bottom line (Participant C1), the impact on operational costs (Participant C2) and the cost versus benefit impact (Participant F3).

Additional insights include participants highlighting the importance and necessity of ascertaining technological feasibility, through trialling the new technology (Participants F1 & F3). Through the incorporation into existing products or services, Participants explained that it would allow the assessment of the specific value that it is anticipated to bring to their customer base or organisation: “We've trialled a lot of them and it's really based on the trial results that there is a close out report that comes and everybody signs off and says that's it, that's definitely good information” (Participant F1). Another participant highlighted the potential legal implications that need to be considered: “The first step is, I guess, where we will look to the legislation and the laws around the technology we are using” (Participant A2).

Finally, reference by Participant F3 to more formalised decision-making tools and processes were used, including the establishment of business cases, backed by data-driven decisions. Certain questions involved within these processes included the following:

*“When was it effective, when wasn't it, which seasons did it work? What was the cost of installation? What was the cost of the support and the maintenance, what was happening to those units? And then that data begins to drive those decisions for us so that we can make more, more concrete decisions about where to go” (Participant F3).*

This participant explained further that showing the potential benefits to the business was crucial: “This new technology will lead to short, medium to long term business benefits and can make a strong case for it, back it with data, then the organisation will adopt whatever it is you're trying to propose” (Participant F3).

### **5.3.2 Mechanisms and Processes Used to Assimilate New, Important Knowledge**

The sixth interview question aimed to understand the mechanisms and processes used to assimilate new knowledge, with the prerequisite that the knowledge was deemed to be sufficiently important. Additionally, it aimed to test the existing integrating micro-level variables, by using the two themes identified in Chapter 2 – social integration and coordination mechanisms. When asked the question, participants deliberated their



responses but however, in the end, 67 codes were generated. Several ideas and current means of assimilation were brought forth by all participants. The responses were themed into coordination mechanisms, social integration mechanisms and “a combination of formal and informal processes”. The relative frequency of each of these themes is shown in Table 10.

Table 10. Summary of codes for RQ 2.2

Rank	Theme	Frequency
1	Coordination mechanisms	47
2	Social integration mechanisms	18
3	Combination of formal and informal processes	2

Coordination mechanisms were referenced by all Participants, and included the processes planning development roadmaps (Participant E1), following formal checklists (Participant B1), deploying projects (Participants C2, F2, F3, F4, and following change management procedures, that also included stakeholder engagement:

*“So we follow a change management process and that basically goes from discussing knowledge [with] management, from management will be union engagements. Once unions have approved we then introduce it to employees. At the employee level, it's now talking about training. So yes, it's involves training, development of risk assessment procedures, training documentation”* (Participant F2).

Participants A2, D2, F1 mentioned that the coordination mechanism successfully used to assimilate new technology within their organisations was the development of a minimum viable product:

*“After understanding technology, we will start with a minimum viable product so in which we will try to build out a simple product such as X technology. After building out that simple product that's right, adding new features on top of all the products we do have a new product, so it is a step-by-step process in which we will start with the meaning of the product and we will move”.* (Participant A2).

The social integration mechanisms were referred to by Participants A1, A3, B1, C3, D1, D2, E1, E2, F1, F3, F4) and included the identification of technology champions, who would take the lead on understanding the technology and ownership at an operational level and then transfer the knowledge:

*“So if we’re implementing, a lot of times what we do is we choose what we call site champions, so each champion, ideally, what CEO says and I agree with him, is you need almost what he calls like a chief absorber. You need someone at each site who’s going to absorb all this information around the new technologies, this is the path we’re following, these is the new stuff that we want to implement, this is the approach that we want to take” (Participant F1).*

Another example of a social integration mechanism included the appointment of an employee as an understudy, that then mentors another employee, and so the cycle of assimilation occurs.

*“One person becomes the main understudy of whatever new knowledge it is and then that main understudy will get to do all the required knowledge work and then nominate another person who would be an understudy to him or her to be able to pass on a bit of that knowledge to. So it’s almost like a mentoring system or...a domain knowledge owner and then someone who becomes basically almost like a technical analyst (TA) or something like that who also gets that information. So basically, you are looking at this situation where not one only one person has knowledge” (Participant B1).*

Participant E1 highlighted the importance of the development of technology in the Indian and Chinese markets, and the assimilation that occurred as the technological employees transferred technology knowledge to local employees, within their own environment.

*“So with X, we will go to a manufacturer in China, we’ll build the phone with them and tell them...the spec we want on it. So it’s almost like a clone of a phone. ...We bring that device back here, we go to factory, we get everything sorted out at factory. We then disassemble that device, show the factory workers how it’s all put together and then we pull raw materials from China, Korea, South America and we bring out to factory and then that’s driven through the factory where you will have a top end guy that just makes sure that every level is run through the process of the factory” (Participant E1).*

Elaborating on the social integration mechanisms used, Participant C3 referred to creating the environment for these natural learning and knowledge-transfer processes to take place:

*“It’s enough to say that we want to keep learning, but if you’re not providing opportunities for your team to actually learn and teach each other then you’re not*

*empowering them or enabling them to continue learning. So a thing I've seen us do is just be very deliberate about carving out time just dedicated to learning or teaching each other. That's one way I think organisations should adopt in order to ensure that there's a steady stream of knowledge that's coming in, but also being passed along” (Participant C3).*

Participants D2 and F1 made evident that a combination of formal and informal processes was used to assimilate technology knowledge into their firm. Participants indicated that the assimilation of new technology was dependent on both their research and development function, where there was more structure in terms of the timings and expectations, and their development function:

*“But research and discovering new things, acquiring new knowledge is not part of the day-to-day process. It should be completely different, like for example, our development is agile development where every 15 days there is a new Sprint would be created for each team.” (Participant A1).*

Participant D1 indicated that due to the Covid-19 pandemic, there was an interesting shift taking place in their organisation, noting that “Before [Covid-19] it was super formal with templates and how it was that we would run these things and were very belaboured. But now that people have a lot less time, and because we've been preaching that we are remote first, we're trying to get better at this”.

### **5.3.3 Hindering Factors on Assimilation Mechanisms and Processes**

The seventh interview question aimed to determine the factors within the context of this study that hinder these assimilation mechanisms and processes. Additionally, these factors would be used to compare to the factors uncovered in past studies, across other geographies and economies. 63 codes were generated, with most participants listing several factors and consequentially, brought to the fore an array of factors that hinder the mechanisms and processes used for assimilation. This wide array of factors has subsequently been grouped into internal and external factors, relative to the organisational boundary. It was interesting to note that in some cases, it was clear from participants (Participants A2, C2, E1, E2, F1, F3, F4) that these processes were well-established within the organisation, and in other cases, participants (Participants B1, B2, C3, D1) hesitated and deliberated, and eventually surmised what they believed would add value, thus indicating that these assimilation means were not well developed, understood, formalised or even existent. A summary of the categorised codes is shown in Table 11.

Table 11. Summary of codes for RQ 2.3

Rank	Theme	Frequency
1	Internal - Strategic/leadership	25
2	Internal - People	14
3	Internal - Technical	12
4	Internal - Systems/ processes	8
5	External	4

### Internal Factors

The internal organisational aspects constituted the larger of the two groupings, with the organisation and individuals within the organisation, constituting the largest proponents of internal factors. The strategic and leadership factors composed 25 codes and included a lack of funding (Participants B2, E1, F3 & F4), the difficulty of presenting or receiving support for an idea (Participants B2, D1, C2, & C3), a lack of an aligned vision (Participant F1 & F4), not correctly allocating or finding suitable resources (Participant B1, B2, E2 & F4), geographical distance (Participants C1 & E2), thinking short-term costs instead of long-term benefits (Participant C3), all which constituted as barriers for the assimilation of new technology.

The people-related barriers for assimilation were the second most prevalent factor, with 14 codes including a lack of communication (Participants E2 & F1), people's reluctance to change (Participant D2), a lack of seamless collaboration (Participant E2), a fear of new technology (Participant A2), dealing with change fatigue (Participant D1) and the daily rat race (Participant C3), and having a lack of time resource (Participant B2, C1, F1). The technical aspects were the third most predominant group, with 12 codes consisting of ideas not being supported by data or not formed sufficiently (Participant F3), many software 'bugs' (Participant D1), and not being clear about what is being solved for (Participant D1). Lastly, internal systems and processes accounted for eight codes, including the lack of visibility on current projects (Participant F1), the need to show payback on new technology (Participant F2), and a lack of human resources (Participants B2 & F4).

### External Factors

The final four factors that were identified by participants as hindering factors to the conversion of organisational capabilities through assimilation included those endemics the current context of Africa, in the current pandemic. These included unions (Participant F2),

tiredness and fatigue due to Covid-19 (Participant D1), enabling the technology to work with existing infrastructure (Participant B2), and external political corruption (Participant D2).

#### **5.3.4 How New, Valuable Knowledge is Converted into Organisational Capabilities**

The eighth interview question sought to understand how this new knowledge was converted into organisational capabilities. Despite participants initially hesitating to consider the question, a total of 48 codes were generated, providing solid insight into the micro-foundational routines consciously, or unconsciously, employed when converting new knowledge into tangible organisational benefit.

Participant C3 highlighted the importance of collaboration in the co-creation of individual and organisational capabilities, which mirrored the insights garnered from other participants:

*“Get lots of feedback from people so that we're always iterating and making it better. So, it's a yes, the collaborative effort, but also word of mouth just making sure that people are aware of what we've rolled out but are also giving us consistent feedback so that we know where we should be focusing our attentions”* (Participant C3)

Many participants referred to the benefit new technology brings to an organisation, through the solving of a customer or organisational problems. The lessons learnt from solving these problems are then captured in internal processes, so that lessons do not have to be repeated.

*“So over a time when you use this new knowledge, you learn about things that you should not do with it. So, what you try to do is that we try to make it easy for any new people that will come in that use the same technology, so they don't do the same mistakes that you did when you were in the first stage, like learning, trying it out and stuff. So, what you do is that management or whoever is maybe the tech lead or the CTO, whatever will try to create some processes, internal processes to make sure that you don't get into doing these mistakes again”* (Participant A3).

Participant F1 highlighted the importance of building capabilities dynamically, through the in-situ learning and upskilling through implementing pilot projects: “Let's not wait around. If we think an idea is great, quickly scope it, put it into a short stint pilot and then, you know, get the insights from that.”

Interestingly, some participants were detailed in their response, stressing the multi-pronged approaches that are used, whilst other participants seemed to highlight the relaxed approach to the conversion of this knowledge into organisational capabilities, as per Participant C3: “And we try to be personal evangelists for whatever it is we’re pushing out. So, if you worked on the product, first of all, use the product, but also speak about it to others.” Alternatively, Participant B1 pinned it to the straightforward approach of incorporating the new knowledge into a policy: “Basically it just becomes a matter of amending some policy or some process to be able to get there.” Participants also mentioned enabling factors for the successful conversion of new valuable knowledge into organisational capabilities, including full support from leadership.

Participant C1 emphasised the challenge of providing immediate, current knowledge to employees, and also highlighted the use of incentives for employees, in order to equip them in their decision-making and building of capabilities:

*“So the question is how can we push this knowledge to you in real time? So that was, you know, meant in investing tools like X which are pushing that information at just implementing modern learning techniques, so it is about maybe just pushing the material ...pass[ing] that knowledge though a technique...So we kind of start thinking through how do people learn and then [work] through that. Of course the biggest thing is alignment of incentives, if we can align incentives then other things just tend to solve themselves out.”* (Participant C1).

#### **5.4 Results for Research Question 3**

##### ***How are the developed capabilities leveraged to deliver competitive advantage for the organisation?***

This research question sought to understand how the capabilities developed through the application of AC are leveraged in order to deliver competitive advantage to the organisation. The results within each research sub-question are presented according to the themes that were discovered.

##### **5.4.1 The Deployment of Capabilities into the Marketplace**

In the ninth interview question, Participants highlighted the exploitation component of AC, by citing its application in delivering improvements through a product or services that their organisation provided (Participants A1, A2, A3, B1, B2, C1, C2, D1, D2, E1, E2, F2, F4): “So for us the way we exploit our new knowledge is really in terms of innovative products,

so we better our products, we better our devices and we deliver them even at a better price to the market.” (Participant E2).

In addition to the betterment of the product, as a result of AC participants explained that external knowledge brings about new product development: “Cascading it from the point of a theory into a product where it delivers value to a consumer” (Participant B1). Further to contributing towards the product or services offered by an organisation, there was organisational enhancement, that included building internal knowledge and expertise: “We took the knowledge that we learned within the market, fed that back to our product development team. And now the new devices that we have in the market in terms of specs are cutting edge in their ranges.” (Participant E2). Another organisational benefit was that of internal process improvement: “It just brings in more efficiency to an existing process.” (Participant E2).

Also, a participant explained, as an organisation produces innovative products and services, they become seen as technology or industry leaders and collaborators:

*“So, if everybody is having problem, hey, you create a video about problem and say this is how you solve it. OK, and all these companies that are having that problem will come and say, Oh yeah, OK. We’ve been having this problem. Thank you. And by the way we don’t mind paying for this.” (Participant A3).*

Participants indicated that there were personal benefits to employees that were at a company where new knowledge was being absorbed:

*“There is an indirect way when an employee leaves us that he will certainly join another company with the capability and experience that he got from us.” Participant A2.*

#### **5.4.2 External Features of Competitive Landscape that Affect Deployment**

In the tenth interview question, Participants were generous with citing external features, providing in total 55 codes, which were then categorised into 10 themes. The most frequently occurring theme cited competition as being the most influential factor, as mentioned 13 times in various contexts, by 8 Participants (A1, B1, C3, D1, E1, E2, F3, F4). How competition affects the competitive landscape is explained by one participant:

*So basically it’s you trying to analyse what your competitor has to offer in terms of what is similar to yours and what isn’t similar to yours. And then finally now how to*

*either match that or over add much more value than they do in terms of deploying that that product. (Participant B1)*

According to Participant 7, using the market share of competitors as a target to chase becomes an influencing factor:

*We're trying to transform faster because the local, I think the local products like X are gaining market share rapidly so we are investing a lot more to transform that environment to give us a competitive edge using technology where we want to be faster with our invoicing, we're going to be better with our credit management, we want to be better with our sales. (Participant F4).*

Participant A1 had a slightly different perspective about competitors, in that they can be seen as a positive force, in that if your organisation accomplishes a novel adaption of the technology, you can partner with the competitor to boost your competitive advantages relative to the market. This is juxtaposed with Participant C1 who indicated that at times, the competition just mimics designs and there is no differentiation in the market.

The theme that occurred most significantly thereafter was that of the state of connectivity/technology/economy of country, mentioned by several participants (B1, B2, D2, F1, F3, F4). A commonly occurring argument on the state of infrastructure within African was articulated by a participant:

*Many of our markets in Africa, our production facilities, they need to generate their own power fully. They're run on massive gas turbines and that sort of stuff. So, the local infrastructure in the market also has a really big impact on the types of capabilities you can deploy." Participant F3.*

Building on to the state of country theme, participant B2 mentioned several other occurring influencing factors, including high data and connectivity costs, and that the technology infrastructure is aged in Africa. Other factors grouped under this theme included the rate of technological adoption within the country, the economic situation of the market, and the level of national cyber security (Participants F3, B1, B2) that all affect how AC capabilities are deployed in the marketplace.

Customers as an overarching influencing factor on capability deployment was discussed by Participants B1, B2, C1, C2, F1, F2, F3. The ability to deploy capabilities into the marketplace was affected by customer's perception of technology, and whether they believed it offered benefit to their lives (Participant B2). Furthermore, the ability of



customers to enter the learning curve of new technology (Participant C1) and the ability to actually use new technology or product features (Participant C2) were influential. Participants B2 highlighted the importance that the wealth of individuals plays in the take-up of new technology or choice of technology. The maturity of the market (Participant F2) largely influences the capability deployment of the organisation, in that it needs to understand how to position its strategy. The performance within the market, driven by customer behaviour and demand, largely affects the financial and human resources allocated towards technology development and deployment (Participant F2, F3).

Participant D4 mentioned that a country's government systems played a significant role in deployment of AC capabilities:

*“You just need to understand each of the different countries and what are their regulations, and it would be good to work with legal experts to understand from a technological perspective where your technology can work and where it can be sort of like supported and what you need to do that.” (Participant D4).*

Participants B1, D2, F2, F4 concurred with the influence that government and regulatory bodies have on an organisation's ability to exploit capabilities, including the restrictions of certain technologies within countries (Participant D2). Another participant highlights the darker side of the government's influence:

*“I guess you and I know in Africa it could be political to the aspect of whether it could be like corruption is involved and certain parts of the team don't want to do, and I've seen this a lot in government where some technology even adoption of that is completely, um, I would say people really hesitant in terms of taking that because of the implications or impact it will have on them.” (Participant D2.)*

Several other factors were mentioned by participants, including the geographical location (Participants B2, D2, F3, F4), the quality and types of partnerships (Participants A2, C2, F3, F4), the differences in skills and working cultures within countries (Participants A3, F3, F4), the degree to which an organisation understand its consumer (Participants A3, E2, F3), the compatibility of technology with other existing technologies (Participant D2), and finally the existent or impact of external trends and events (Participant B1).

### **5.4.3 Measurement and Monitoring of Capabilities**

In the 11<sup>th</sup> interview question, the aim of the research question was to understand how the capabilities that were developed and deployed were measured or monitored. In total, 45

codes were gathered from participants, and were grouped into 7 themes, namely: connectedness, cross-functional interfaces, formalisation, participation, rotation, routinisation, socialisation (Jansen et al., 2005).

The most frequently occurring theme was that of routinisation, cited by Participants A1, A2, B2, C2, C3, D2, E2, F1, F3 F4. Routinisation was described mostly by participants to include the establishment of indices, to determine whether inputs were being successfully transformed into outputs. Participant F3 calls articulates the reality that all measures tie back to the organisation's financial metrics:

*“So, we're very much an income statement driven business. So, I mean, almost everything we do somehow is revenue growth oriented is EBITDA oriented... We measure very strictly on top line growth and bottom-line efficiencies. We seldom do technology for the sake of technology. We do it because it's going to further the growth and the profitability and the sustainability of our business and the ecosystem of our business and everything is measured that way. We're very much about value creation all the way through the line.*

Participant F4 lists some of the measurements and measures that their organisation uses to assess the capabilities that are developed:

*“How much of our user base is using the new technology and then it's around the core products that we're enabling, which is sales. So, how much of our sales has moved from coming through our call centre versus the volume that is coming through our e-commerce platform and that is a measure of the success of our technology. Trucks, our efficiency. We would measure, then you know before how many trucks were dispatched in a day versus you know how efficient we got in terms of after implementing the technology. So, fewer trucks out but more optimised routes and load. So essentially the technology itself is not measured but really what the technology was planned to enable. So, does it enable sales through e-commerce? We see what the volume is. Does it enable more efficient logistics? We understand the trips of our trucks as an example and efficiency of getting the order to the customer.”*

Several participants highlighted that the capabilities were assessed according to the number of sales, or additional products or increased services that were generated after the implementation (Participants A2, C2, D2, E2, F4).

The degree of connectedness was the next most prominent theme, with participants A1, A2, A3, B2, C3, D1, D2, E2, F1, F3) providing explanations of how linkages and connections serve as a governing mechanism:

*“There’s a lot of on the ground talking to people that really that happens on the operational front, you know, just going out and talking to the market and seeing why they’re repeat customers, what they like about our platform, what they don’t like about our platform, what they wish could be done differently, what could be improved. We also have our customer experience department that actually does this proactive calling to find out what exactly our users love about our platforms, and that’s how we collect this data on a weekly basis”. Participant C3.*

Participant E2 highlights several mechanisms by which feedback is garnered, including internal metrics of sales and stakeholder management, as well as external industry reviews:

*“So it’s numbers, so we measure how many smart devices we get through into the market. But we also measure in terms of our stakeholder relationship management setup. We give access to other parties. So for myself, I’ll give access to our group CEO, to key stakeholders, so that he can get in person feedback. With my team who are dealing directly with their customer, every now and then I will join them in their meetings to try to assess effectiveness within the market. But at the end of the day we measure the performance of our innovation through take up within the market. So you’ve got key industry magazines and new rooms within our sector we also assess what they’re reporting on of our devices.”*

The third thematic grouping was that of formalisation, and was mentioned by Participants A2, B2, C1, C3, D2, F2, F3. Several examples were highlighted as means that were currently employed to assess the developed capabilities, including seeking official certification or compliance through International Organisation for Standardisation (Participant D2); the calculation of value-generation calculations (Participant F2); through a testing team that runs through series of processes (Participant B2); the measurement of protocol compliance (Participant C1).

The fourth thematic grouping entailed cross-functional interfacing, with examples highlighted by Participants A1, D1, F1, F4. These included the measurement from the various angles excluding the performance of the technology, but also the impact on people, safety and productivity (Participant F1) and the coupling and collaboration at a

team management level across the different departments (Participant A1). Participant F4 argued that assessing one’s performance relative to the competitor also provided an assessment of the capabilities developed and deployed, with Participant D1 arguing that it should add value to the client and to the organisation and being cognisant of measuring both trackers was important.

Explanation of socialisation capabilities, that affect interpersonal relationships and lead to the merging of behaviours were mentioned Participants D1, E2, F1. Participant F1 mentioned that as new technology was introduced and employees were expected to make use of smart devices, their morale was positively affected, and uptake was increased, and thus capabilities developed. Participant E1 mentioned that by measuring stakeholder engagement metrics, and for that to be monitored by all employees, including the CEO, created a norm within the organisation.

Lastly, Participants A1 and A2 and were perplexed with the question and indicated a lack of understanding of the routine, claiming that it did not take place: “I think they are measured through our products or, or the services we give so I, I don't think we have metrics around it so yeah, yeah.” (Participant A2.)

#### **5.4.4 How Capabilities are Reviewed or Continually Evaluated**

In the 12<sup>th</sup> interview question, Participants provided 33 codes (Participants A3, B1, B2, C2, C3, D2, E1, E2, F2, F3, F4. These codes were subsequently grouped into five themes, which are shown below, with their respective frequencies, in Table 12.

*Table 12. Summary of codes for RQ 3.4*

<b>Rank</b>	<b>Theme</b>	<b>Frequency</b>
1	Aligned to business process/cycle	13
2	Linked to customer	11
3	Other	4
4	Continuous improvement mindset	3
5	Data analysis	2

Most Participants indicated that the manner in which the developed capabilities are reviewed or continually evaluated is through the recognised business cycles or processes (Participants B1, C3, D2, E1, E2, F2, F3). These included through a balanced scorecard (Participant F3), internal assessments (Participant E2), IT refresh cycles (Participant D2), rigorous testing and performance routines (Participants B1, F3).

Thereafter, measures linked to the customer were the most frequently cited (Participants B2, C2, C3, E1, F2, F4). These involved engaging frequently with customers to understand their feedback (Participants B2, C2, C3, F2, F4) and ensuring that the technology is the latest (Participants C3, E1). The “Other” category contained some unique suggestions: seeking feedback from employees (Participant C2), that the product manager needs to “live, breathe, lead the product” (Participant C3), and that the new product is run like a separate business (Participant F3). Possessing a continuous improvement mindset is what Participants A3 and F4 referred to, “it’s part of the culture to want to always do better” (Participant F4). In the final theme, Participants B2 and F3 referred to data analysis to ensure that capabilities were kept relevant.

## **6. Discussion of Results**

### **6.1 Introduction**

This chapter discusses the results from the semi-structured interviews presented in chapter 5, against the backdrop of the literature review presented in chapter 2. The chapter follows the order of the three main research questions and the sub-questions, with the intent to offer insights to contribute towards the micro-foundational AC body of knowledge.

### **6.2 Discussion of Results for Research Question 1**

***How does technology absorption at an individual level influence an organisation's micro-foundational AC?***

#### **6.2.1 How does your organisation identify and explore new knowledge?**

##### **6.2.1.1 Sources of new knowledge**

This research has unearthed several additional sources of new knowledge, contributing to a potentially more robust and inclusive AC framework. Furthermore, whilst these sources were subsequently classified as either being of an individual or organisational origin, it is clear that most of the identification, exploration, assimilation and exploitation of new knowledge takes place at an individual level, confirming both the long-standing and recent assertions made by literature (Andersson et al., 2016; Apriliyanti & Alon, 2017; Cohen & Levinthal, 1990; Distel, 2019; Felin et al., 2015; Ter Wal et al., 2017; Volberda et al., 2010; Zahra & George, 2002).

This research, however, shows a variation in who the proponents are, in that the gatekeepers comprise the likes of in-house technology managers, chief technology officers and business development managers, who act as key sources and carriers of new knowledge, as opposed to “inhouse R&D scientists” (Ter Wal et al., 2017) or to be situated within dedicated scouting units (Monteiro & Birkinshaw, 2017). Therefore, the findings indicate the need to revert to the essence of a ‘gatekeeper’ and not be concerned about the gatekeeper’s location insomuch as their function. Furthermore, Participants C2 and C3 argued that new knowledge stems from all levels of the organisation, and this diverse idea-generation is encouraged, and in some cases, is part of the culture. The researcher hypothesises several reasons for this departure from current literature: this may be either due to evolvment of the fast-changing world of technological advance where everyone is

expected to be an integrator; it may be due to the disruption and readjustment that the Covid-19 pandemic has caused; or it may be unique to the African context.

In an attempt to disentangle the black box of micro-foundational AC, the organisational features that influence micro-foundational AC were examined. This research indicates that there are several levers that organisations can exercise in order to generate new knowledge. The first is to establish dedicated structures and functions that are responsible for the identification and exploration of new knowledge. In the absence thereof, it was found that the function is either outsourced to third parties, fully, or to enhance the in-house functions. In some cases, additional onus is placed on all employees to act as gatekeepers, either as the primary identification means or as supplementary to the current functions.

The literature highlighted the roles that exploration and exploitation play in AC theory, with exploration involving new knowledge or a departure from prevailing knowledge, to create new technologies, products or services (Solís-Molina et al., 2018). Exploitation, is built on searching within the surrounding landscape and reinforcing current knowledge, thereby improving efficiencies or products (Enkel et al., 2017). Both the explorative and exploitative strategies are employed within the organisations researched, thereby resonating with the research that argues the need for ambidexterity in the acquisition stage of AC (Solís-Molina et al., 2018).

Additionally, given the 4IR context, literature shows that traditional organisational functions (such as information technologies (IT), manufacturing, product development) are being reconsidered, and that the interconnectivity between functions is intensifying (Porter & Heppelmann, 2015). This is observed in the participants' feedback, in that there is firstly no strict territories of exploration, and secondly, that collaboration across departments is significant.

#### **6.2.1.1 Processes Used to Explore New Knowledge**

Whilst micro-foundational AC literature has been widely recognised to be implemented on an individual level, there remained little understanding on the systematic contribution of individuals (Enkel et al., 2017; Sjödin et al., 2019). In particular, the literature indicates that individual antecedents of AC are being progressively understood, but how individuals identify, assess and select new valuable knowledge still requires investigation (Enkel et al., 2017; Sjödin et al., 2019).

### **6.2.2 Research Question 1.2 What employee-level factors influence how your organisation deals with new knowledge?**

The critical role that individuals play in their capacity as employees is well documented (Sjödín et al., 2019; Yildiz et al., 2021). The aim of Research Question 1.2 was to respond to calls in literature to understand what employee-level factors influenced AC. Participants were highly engaged during this interview question and cited over 105 codes in total. Using a combination of literature definitions to theme the codes, 'non-cognitive skills' was cited the most frequently. Non-cognitive skills are defined as those attributes that include personality, values and interests (Ployhart & Moliterno, 2011). The researcher struggled to find mention of these in current AC literature and hypothesised that either this set of skills has become more prominent in the recent few years, as the world has undergone rapid change, or that these are more prevalent within the context of Africa, or there was bias shown during the coding process by the researcher.

The 'human capital' theme emerged as the next most frequent category, with a relative significance that corroborates with the findings by Lowik et al. (2017), that posit the important effect human capital has on knowledge identification in AC, with human capital being a proxy for prior knowledge diversity. 'Social capital' was the next most prevalent theme, indicating the importance of network diversity. According to Larson and DeChurch (2020), 'social capital' is also one of the key functions for leadership to build within the digital age. The other themes (inherent, associative cognition and civic virtue) were present but were not relatively significant and were therefore not discussed. In addition to the aforementioned categories, there was demonstration of NAC, by the referral of Participants A1, E2, F3 and F4 to traits that demonstrate the cognisance of the customer, indicating the importance to employees and organisations of this individual trait within AC.

### **6.2.3 Research Question 1.3: What role does leadership play in technology absorption in your organisation?**

Participants were unanimous in their description of the importance of leadership in the technological AC of an organisation. This is in line with previous findings, in that leadership is crucial for the cultivation of new knowledge exploration and exploitation (Flatten et al., 2015) and for the current 4IR (Larson & DeChurch, 2020). Transactional leadership (i.e., goal-oriented, consequence-based exchanges) was cited by all participants besides B1 and B2. Elements such as the leader's ability to create synergies across departments to drive implementation of new technology (Participant D2), pushing and holding employees



accountable (Participant F1), understanding what technologies are need for the organisation (Participant F2) and challenging employees to make use of technology tools (Participant C1) are examples of the transactional style of leadership as defined by literature. Transformational leadership (i.e., inspiration of subordinates to change) was cited by Participants A1, B1, B2, C3, D1, D2, E1, F1, F2, F3 and F4. Participants referred to transformational leadership that included the leader creating the freedom and space for learning (Participant C3), fostering the culture (Participant F3), and being a sounding board and enabler (Participant D2).

Whilst both transactional and transformational leadership styles have been proven to facilitate AC, transformational leadership has a greater positive effect than transactional leadership (Flatten et al., 2015). Based on the number of responses from participants, transactional leadership (31) was more prevalent in the interviews than transformational leadership (19). Given that these were successful and innovative firms, mostly being led by relatively young leaders, and in some cases, founders, this finding is unexpected. However, research has highlighted the need to culturally contextualise the leadership style for the successful implementation of AC (Flatten et al., 2015).

This research has shed light on the influence of micro-foundational elements of leadership was being sought (Apriliyanti & Alon, 2017), in that it provided insight into the role and the “how-to” of leadership within the AC process and relative to organisational learning. As confirmed by research participants, leaders encourage and promote research (Participant A1), aligning to literature’s view that leaders play an important role in setting the search agenda (Dahlander, O’Mahony, & Gann, 2014). Whilst the value of incorporating external information is well-appreciated, explorative activities are resource-intensive (Dahlander et al., 2014) and therefore co-ordination, a key feature of leadership, is required. Certain participants alluded to the potential impact should leaders not be supportive of internalising new knowledge, which included having to defend one’s decision and the workforce not supporting new technology if they believe the leader does not believe in new technology. This resonates with literature, in that managerial biases (and in this study were understood to be interchangeable with leadership biases), are classified as internal barriers to successful AC (Cuervo-Cazurra & Rui, 2017). The managerial biases identified included cognitive biases, in the processing of knowledge and the identification of knowledge sources. For many participants, there was a non-hierarchical relationship with leadership, and mention was made several times of an open-door policy for discussion, idea generation, communication and feedback. Whilst the range of activities that leaders

take part in differed across the organisations and countries, Participants indicated that leaders were inextricably part of the technology absorption with their respective organisations.

### 6.2.5 Conclusion

The first research question uncovered several micro-foundational AC aspects, particularly through the role of the individual. Within this study, the individual identifies and explores new knowledge through nine means. Furthermore, in most cases, a process is followed by which new knowledge is identified and explored, therefore emulating the first part of the AC process. Returning to the individual as a key proponent, there are 16 employee-level factors that influence AC within an organisation, of varying frequency. The key construct of leadership and its role within AC was examined in isolation and was reiterated as a highly influential factor. Lastly, the list of influential factors was broadened to include the latest factors that influence AC.

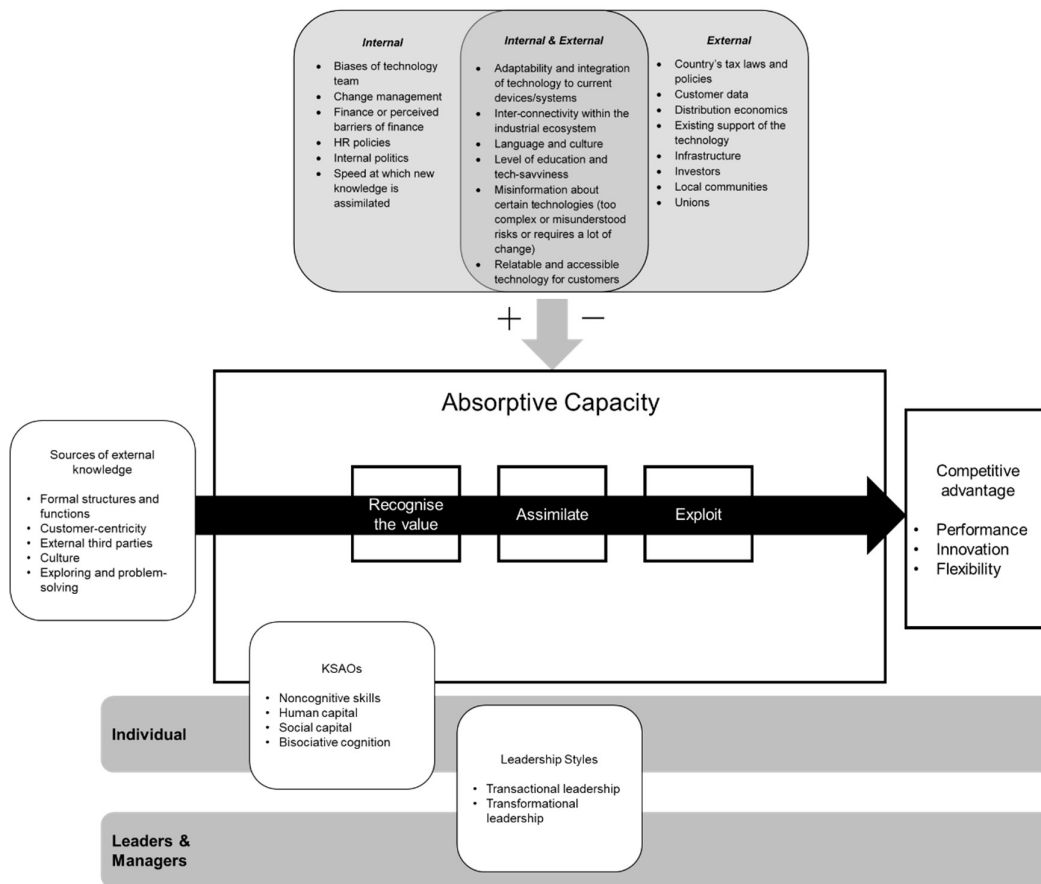


Figure 9. Summary of results for Research Question 1

Source: Adapted from Todorova, G., & Durisin, B. (2007). Absorptive capacity: Valuing a reconceptualisation. *Academy of Management Review*, 32, 774–786. doi:10.5465/AMR.2007.25275513

### **6.3 Discussion of Results for Research Question 2**

#### ***How is new knowledge acquired, assimilated and transformed inside the organisation?***

Research question 2 sought to understand the routines undertaken by organisations and individuals in the recognition phase of AC by firstly seeking to understand the methods used to evaluate the importance of new knowledge. Since there is little understanding in the literature on the practices and procedures used to assimilate new, external knowledge, this too was asked for participants to explain. The research question further sought to recognise the factors that hinder these processes, and to confirm the factors identified in the literature. These include managerial biases, weak social integration mechanisms, and specific emerging market influences (Cuervo-Cazurra & Rui, 2017), and more recently perspective-taking and creative behaviour (Distel, 2019).

#### **6.3.1 Determining Whether New Knowledge is Important**

Within the first stage of AC, the recognition of new, valuable knowledge involves micro-foundational aspects and was determined to include measurements by prior literature and newly constructed aspects. These included: innovation performance (Yang & Tsai, 2019), potential strategic advantages for business (Zobel, 2017), customer orientation (Yang & Tsai, 2019; Zobel, 2017), fit with internal competencies (Zobel, 2017), outsourcing to decision-makers & business intelligence (author's own), financial contribution (Dabic et al., 2020), cross-functional integration (Yang & Tsai, 2019), for voluntary idea generation (Zobel, 2017).

The most common construct indicated by participants (Participants A2, B1, B2, E2, F1, F3 & F4) when considering whether the new knowledge was important was that of 'innovation performance', which is verified by literature as being the main contribution of external knowledge in the AC process (Yang & Tsai, 2019; Zobel, 2017). The access to new, external information enables new combinations of technologies, which in turn leads to innovation performance, with technology-oriented capabilities acting as mediating variables (Zobel, 2017).

Participants B1, C3, F3 and F4 considered the potential benefit that the new knowledge could bring to the organisation, recognising that value may translate into refinement, optimisations or cost savings across products, services or processes. This ability to value knowledge potential has been deemed a critical first building block in recent work, with certain individual antecedents being essential for the success thereof (Sjödén et al., 2019),

which were discussed in section 6.2.2. Furthermore, Participants A2 and D2 mentioned that there existed two-way communication regarding new technology and the development of ideas, stating that senior leadership and management initiate and expect such open communication. This confirms the second building block of corroborating knowledge value, in which individuals engage in generating group agreement and develop ideas, knowledge or technology (Sjödín et al., 2019)

The third consideration is whether it would deliver value for the client, consumer or customer, argued by Participants C2, D2, E2, F3 and F4. This finding reinforces the importance of 'need knowledge' as a key component of innovation through AC, by incorporating user-related problems, unmet requirements, and anticipating future customers, in order to develop innovative solutions that serve as the basis for future competitive advantage (Schweisfurth & Raasch, 2018).

The next most significant construct made reference to the assessment of technological feasibility through understanding the fit with internal competencies. Participants specifically mentioned the incorporation of the new technology into existing products or services, through trials or pilot projects (Participants D1, F1, F2, F3 & F4). This approach is not commonly referred to in literature, and participants made it clear that this approach allows them data to present, in order to improve the case for a particular new technology. Although not specifically referred to in chapter 5, the above approach also corroborated the activities involved with both exploratory and exploitative innovation strategies, as it involved experimentation, improvements and optimisation of current business offerings (Müller, Buliga, & Voigt, 2020).

The mention of assessing the financial implications by Participants C1, C2 and F3, supported the views of Dabic et al. (2020) inter alia, in that financial performance is one of the key methods of evaluating knowledge management. (Zou et al., 2018)

An important consideration in determining whether knowledge is important is the existence of biases (Todorova & Durisin, 2007). Although no participant explicitly mentioned awareness of these, past research has shown several biases exist, including individual cognitive and capability biases, but also the value placed on new knowledge by stakeholders (Todorova & Durisin, 2007). Thus, the reference by participants to formal decision-making tools, including the charter documents, data-driven decisions and the establishment of business cases, are critical to reduce individual and organisational biases.

### **6.3.2 Assuming that the knowledge is considered important, by what mechanisms or processes is it assimilated into your organisation?**

All the participants that were interviewed shed light on the process described as: “the assimilation of external knowledge entails routines and procedures for analysing, processing, interpreting, and understanding information gained from outside the organisation” (Müller et al., 2020), p3.). Previous literature has posited that assimilation involves the individual linking the external knowledge to the wider organisation, and the roles that the team, and the individual in the team play (Sjodin et al., 2019). Although the past focus in literature has been at the organisational level, all participants clearly articulated these assimilation mechanisms (at least once) at an individual level, in line with nascent research interest (Yildiz et al., 2021).

The well-researched themes of internal coordination mechanisms (i.e., those activities that encourage knowledge sharing and acceptance of new knowledge) and social coordination (i.e., those activities that promote developing knowledge with others) (Ruiz et al., 2020) were used as themes. A third theme, ‘combination of formal and informal processes’ was added by the researcher since there were codes generated by participants that did not fit either of internal coordination or social integration mechanisms. Despite recent literature pointing to the increasingly important construct of social integration (Von Briel et al., 2019) participants indicated that internal coordination mechanisms were (still) the dominant mechanism currently in use. The confirmation of the themes confirms the research by Distel (2019) which demonstrated that both formal and informal integration mechanisms are highly correlated to all aspects of the AC process. Additionally, Distel (2019) posited that complementarity exists between formal and informal mechanisms (which was not tested in this study).

To offer specific pieces to the puzzle of micro-foundational AC mechanisms, coordination mechanisms cited by participants mostly included activities and procedures generated from the organisation’s side: a dedicated technology research team, the development and implementation of management of change procedures and checklists, stakeholder engagement processes, risk assessments and training, development of pilot projects, development of minimum viable product. However, it is worth noting that these mechanisms, are still affected at an individual level, correlating with the findings in chapter 2. Social integration mechanisms cited by participants included conducting “sprint” sessions, identification of a ‘technology champion’, creating freedom for teams and development functions.

Out of the 16 participants interviewed, six specifically stated that most of their knowledge was cascaded down from their head office or parent company (Participants E1, E2, F1, F2, F3, F4), through well-developed communication and change structures. Participants E1 and E2 specifically mentioned that the technology was developed in India, the product manufactured in China, and Chinese factory workers spent time in the African-based factory, upskilling and transferring knowledge to the local employees. This is knowledge-transfer aspect is dealt with in great depth in the literature of micro-foundational AC within multinational organisations, which is not in scope of this study (Apriliyanti & Alon, 2017).

### **6.3.3 Which factors hinder these mechanisms or processes?**

Current literature has highlighted several barriers and hindering factors of the assimilation process, including communication and power distance (Soo et al., 2017), managerial biases and weak social integration, muted activation triggers, conflicting source relationships and feeble appropriability regimes (Cuervo-Cazurra & Rui, 2017). From an EM perspective, (Nguyen & Diez, 2019) argued that geographical distance, education levels, industrial sectors and cultural differences influence AC. In the seventh interview question, the participants confirmed several of the barriers indicated in literature, and uncovered current barriers, with 63 codes in total, that were subsequently themed into 4 main categories, in order of relative size: internal - strategic/leadership, internal - people, internal - systems and processes, and external.

These barriers act to prevent organisations from achieving successful AC (Cuervo-Cazurra & Rui, 2017) and thus it is critical to understand them, in order to overcome them. Interestingly, and perhaps fortunately, most of the barriers cited by participants were internal, with all participants mentioning at least one internal barrier. There thus exists a degree of influence or control that organisations or leaders can apply.

#### **Internal Barriers**

Participants extended the literature from the two main internal barriers that are referred to in chapter two – managerial biases and weak social integration mechanisms – to include a host of nascent and current barriers. (Cuervo-Cazurra & Rui, 2017) argue that managerial biases exist when there is prejudice shown towards sources of knowledge and this hampers the ability of organisations to integrate new, external knowledge. This research refutes this identified barrier, with this factor not appearing in participants' responses. A participant did however argue that the ability of the agent (in this case the person who brought forth the new knowledge) to negotiate and garner support from the

principal (in this case, their manager or organisation) for their idea was essential (Participant B2). It was further argued by Participant B2 that this was due to the constraint of limited funds for new ideas and technology. Participants B2, E1, F3 & F4 raised funding as a barrier, with Participant F1 raising the point that it was more the perception around funding, as not all new technology (or knowledge) was expensive. Participant F1 also pointed out the level of funding and commitment to innovation through funding, was dependent on the culture of the organisation. (Sjödín et al., 2019) contend that once an individual has communicated the idea, the next barrier to overcome is that of gaining acceptance of the idea. Furthermore, their legitimacy as an individual acts as a filter to the organisation's support of the idea (Sjödín et al., 2019). Participants B2, D1, C2, and C3 corroborated these views, citing that this was dependent on the ability to influence decision-makers or on the proponent's reputation. This proves a particularly difficult barrier to overcome, with (Sjödín et al., 2019) proposing that these individuals can seek support from those within their network that have higher internal legitimacy. Participants F1 and F2 referred to the lack of an aligned vision from a senior management or organisational perspective constituting as a barrier, which is yet to be raised by literature as a significant contingency.

Weak social integration mechanisms are those barriers that pertain to limitations of the processes and mechanisms within the organisation that enable the coordination of actions and activities between employees (Cuervo-Cazurra & Rui, 2017). The importance of social integration mechanisms within the AC framework was underscored by Von Briel et al. (2019), and are detailed in Chapter 2. Participants concurred that weak social integration mechanisms act as barriers towards successful AC, firstly, with Participants B2, D1, C2, and C3 citing the difficulty in presenting and receiving support from colleagues for a new idea that has been generated. Secondly, Participants D2, F1, E2 and F3 cited poor communication, internal (negative) politics and weak collaborators as specific barriers. Thirdly, Participants offered insights specifically into the people-related barriers: at times people offered a resistance to change (Participant D2), there was a sense of fear with regards to new ideas and technology (Participant A2), and that time was a limiting factor (Participants B2, C1, C3 and F1). Furthermore, Participants offered the insight that a lack of people or human resources to carry out new ideas was a limiting factor pertaining to weak social integration mechanisms (Participants B2 & F4).

Several other barriers existed in literature, that were not raised by participants, with the first being the existence of power distance relationships (Soo et al., 2017). This was a

surprising result, since power distance in Africa countries is generally remarkably high, especially in Ethiopia, Ghana, Kenya and Nigeria (Hofstede Insights, 2021).

Whilst the barriers were grouped in order to provide clarity within a model, there are several interdependencies, as highlighted above.

## **External**

Cuervo-Cazurra and Rui (2017) and Von Briel et al. (2019) highlight the need to distinguish external barriers from internal barriers, the literature presented in Chapter 2 presenting several external barriers, including muted activation triggers, conflicting source relationships and feeble appropriability regimes (Cuervo-Cazurra & Rui, 2017). Not any of the four codes identified by Participants supported these barriers. The researcher hypothesises that it may be her bias during the coding stage that resulted in only four codes being identified, and that through researcher-triangulation, future work may produce additional external factors.

However, what is deduced from the literature is that these external barriers have underlying agency problems, they require managers and employees to manage them differently from internal barriers (Cuervo-Cazurra & Rui, 2017). A Participant indicated that external political corruption was rife in Africa, and that this impacted the technological adoption by agents, in fear of what the consequences for the individual may be (Participant D2). This resonates with the findings from literature in chapter 2 that indicate that governments in emerging markets are inclined to have a large influence in the economic activity in countries. As a result of this constraint on incentives derived from market relationships, there is less focus on profit maximisation. Instead of focusing on building capabilities to increase competitive advantage, managers and organisations invest in relationships with governments, aiming to influence policy that will benefit the organisation or industry, often through retarding the ability of foreign firms and imports to compete. Furthermore, inferring from the findings with the need to contextualise AC studies (Schweisfurth & Raasch, 2018), there are unique features to Africa, that organisations need to be aware of and manage effectively, to (still) generate value from the AC process. These include the presence of unions mentioned by Participant F2, that occupy an influential role in the South Africa landscape (International Labour Organisation, 2019); tiredness and fatigue due to the pressure that the Covid-19 pandemic has placed on business (McKinsey & Company, 2020) mentioned by Participant D1; and the lack of



digital infrastructure in Africa (Organisation for Economic Co-operation and Development, 2021) referred to by Participant B2.

### 6.3.4 How is new, valuable knowledge converted into organisational capabilities?

Heil and Enkel (2015) highlight that purposeful integration mechanisms and collaborative absorbing activities within organisations enhance innovation through potential absorptive capacity. Further, Enkel et al. (2017) identify the importance of individual efforts on the technology absorption process. The endeavours of individuals to assimilate external knowledge activate both exploratory and exploitative innovation, which are shown to contribute to either radical or incremental innovation. The research findings confirm this, as participants posit that the mechanism knowledge is converted into organisational capabilities is driven mostly through individual efforts (Participants C3, A3, B1, D2, A2, E1, C1).

### 6.3.5 Conclusion

The results pertaining to Research Question 2 and the subsequent discussion are show below in **Error! Reference source not found..**

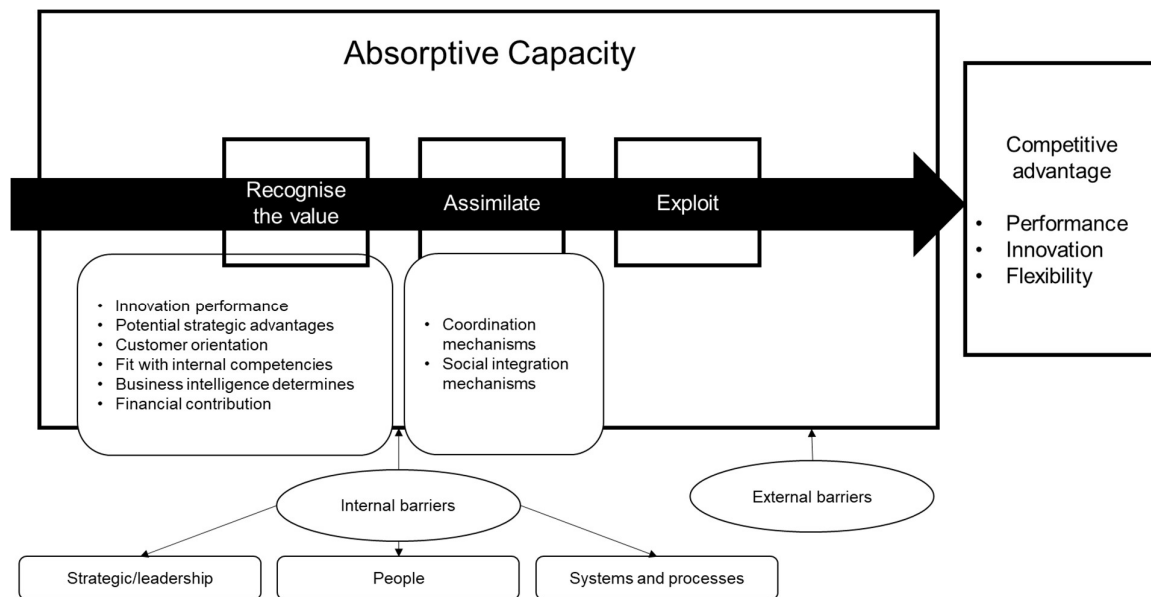


Figure 10. Summary of results for Research Question 2

Source: Adapted from Todorova, G., & Durisin, B. (2007). Absorptive capacity: Valuing a reconceptualisation. *Academy of Management Review*, 32, 774–786. doi:10.5465/AMR.2007.25275513

## **6.4 Discussion of Results for Research Question 3**

*How are these factors externally leveraged to improve the competitive advantage of the firm?*

### **6.4.1 The Deployment of Capabilities into the Marketplace**

### **6.4.2 External Features of Competitive Landscape that Affect Deployment**

### **6.4.3 Measurement and Monitoring of Capabilities**

Exploitation is the final stage of the AC process, delivering value through the implementation, usage and application of customer products and services (Cohen & Levinthal, 1990; Dabic et al., 2020). Exploitation involves the development of capabilities through the application of external knowledge that has been acquired and then assimilated. To structure the analysis, seven themes for the measurement of these capabilities were drawn upon: connectedness, cross-functional interfaces, formalisation, participation, rotation, routinisation, socialisation (Jansen et al., 2005).

These themes were subsequently grouped into three categories of combinative capabilities: coordination capabilities, systems capabilities, socialisation capabilities (Teece, 2007), more recently used by Sheng (2017). The results indicated that both systems and socialisation capabilities are heavily relied upon for the measurement of the developed capabilities within the sample, whilst coordination capabilities were significantly under-represented.

Systems capabilities consist of formalisation and routinisation capabilities (Jansen et al., 2005). Routinisation is defined as the development of tasks such that they eliminate the need for much attention (Galunic & Rodan, 1998) and to ensure that inputs are converted into outputs (Perrow, 1967). Most participants referred to routinisation whereby their organisation had established internal measures to assess the impact in the market, in terms of how the capabilities increased the sales of product or services. Formalisation is explained as the extent to which documents, processes, exchanges are formalised or captured in writing (Khandwalla, 1977).

Coordination capabilities, especially regarding the “rotation” aspect, which is the lateral transfer of employees, recently suggested by Lowik et al. (2017) participants. Whilst it could be argued that Participants only relayed processes and practices that actually took place at their current and past organisations, Participants at times did imagine what would work well.

## **7. Conclusion**

The previous chapter discussed the findings from Chapter 5 in relation to the Research Questions presented in Chapter 3, that were generated as a result of the literature review conducted in Chapter 2. This chapter consolidates the findings from the study of leveraging AC in Africa, for technology transfer, and ultimately economic development, with a touch of science (see mention of Newton's Laws). The principal findings are followed by the implications for practice, that entail both managerial and other stakeholders. The chapter is concluded with a description of the limitations that pertain to this qualitative study conducted in Africa.

### **7.1 Presentation of the Model**

The intent of the study was to leverage technology absorption, in order to create and sustain competitive advantage for African firms, within the current 4IR age. More specifically, the objective was to understand how technology absorption and technology transfer take place through the theoretical AC framework. Once understood, the target was to create a framework, highlighting key levers, to operationalise it for application in practice, to generate real-life outcomes and benefits. An underlying objective is keep the framework simple, in order to make it widely accessible and applicable, with the words of Einstein serving as guidance: "Everything should be made as simple as possible, but not simpler" (Quote Investigator, 2021). The model derived from the research undertaken is

presented below in

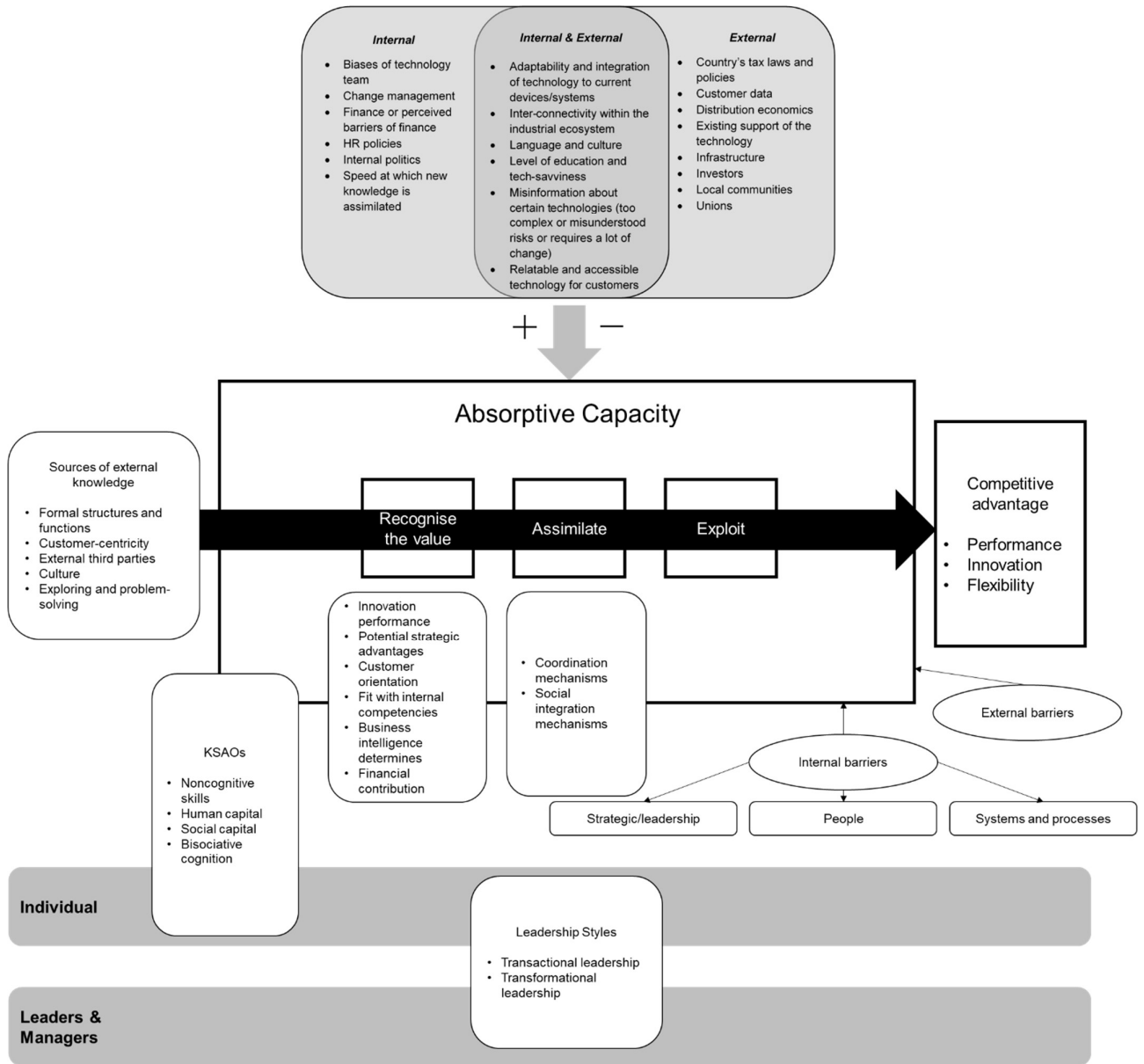


Figure 11, and explained the sections that follow.

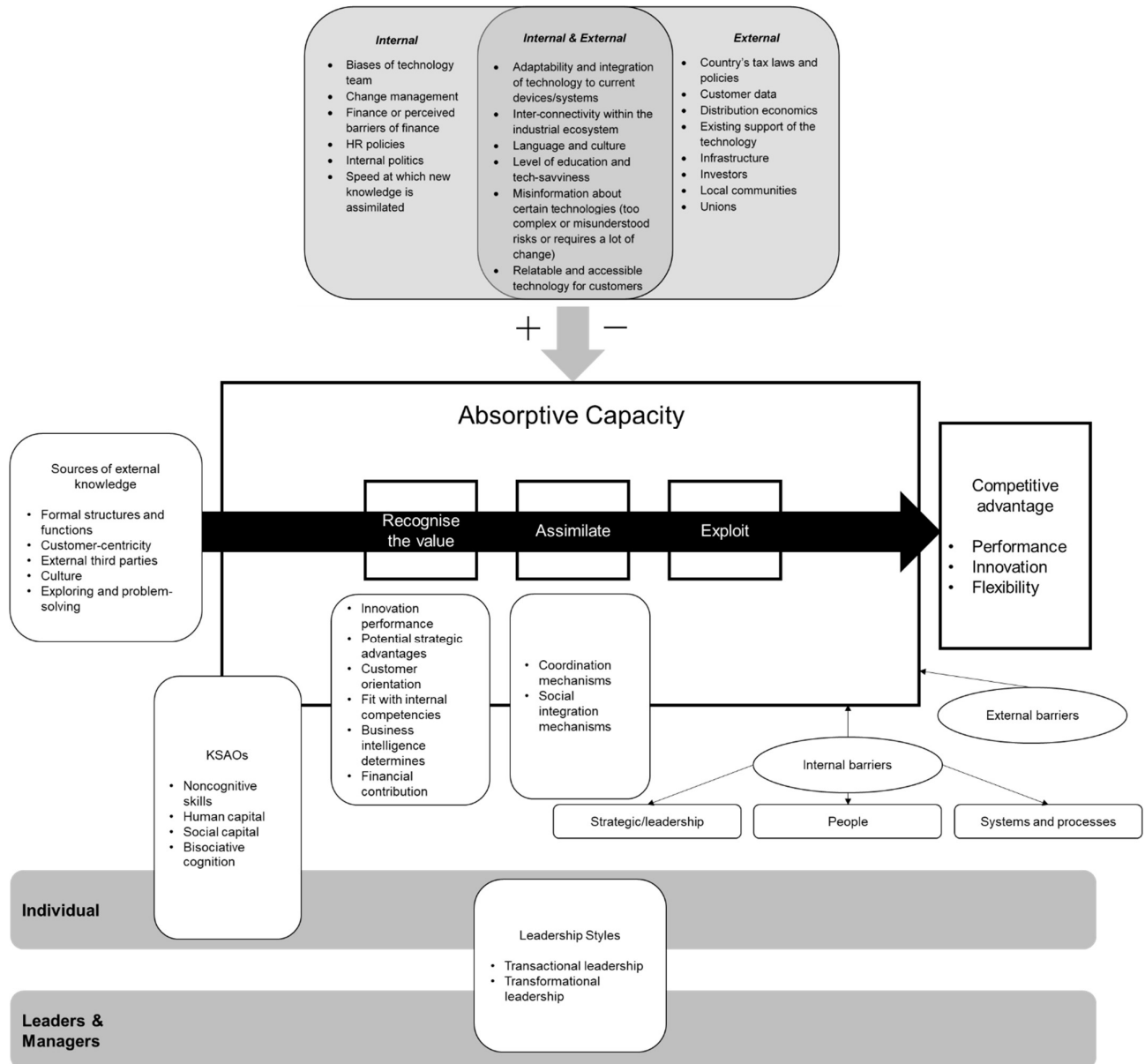


Figure 11. AC model for African firms

Source: Adapted from Todorova, G., & Durisin, B. (2007). Absorptive capacity: Valuing a reconceptualisation. *Academy of Management Review*, 32, 774–786. doi:10.5465/AMR.2007.25275513

## 7.2 Principal Findings

### 7.2.1 Research Question 1: How does technology absorption at an individual level influence an organisation's micro-foundational AC?

Since the origin of the AC concept to recent research, individuals have been recognised as a key proponent to AC success (Cohen & Levinthal, 1990; Ruiz et al., 2020; Sjödin et

al., 2019; Yildiz et al., 2021), yet there remains calls to understand the individual's relative importance (Apriliyanti & Alon, 2017). Through the literature study and confirmed in the findings, the role of the individual in AC success was deemed to be crucial. (The prominent role that is indicated as an underpinning support to AC, as shown in

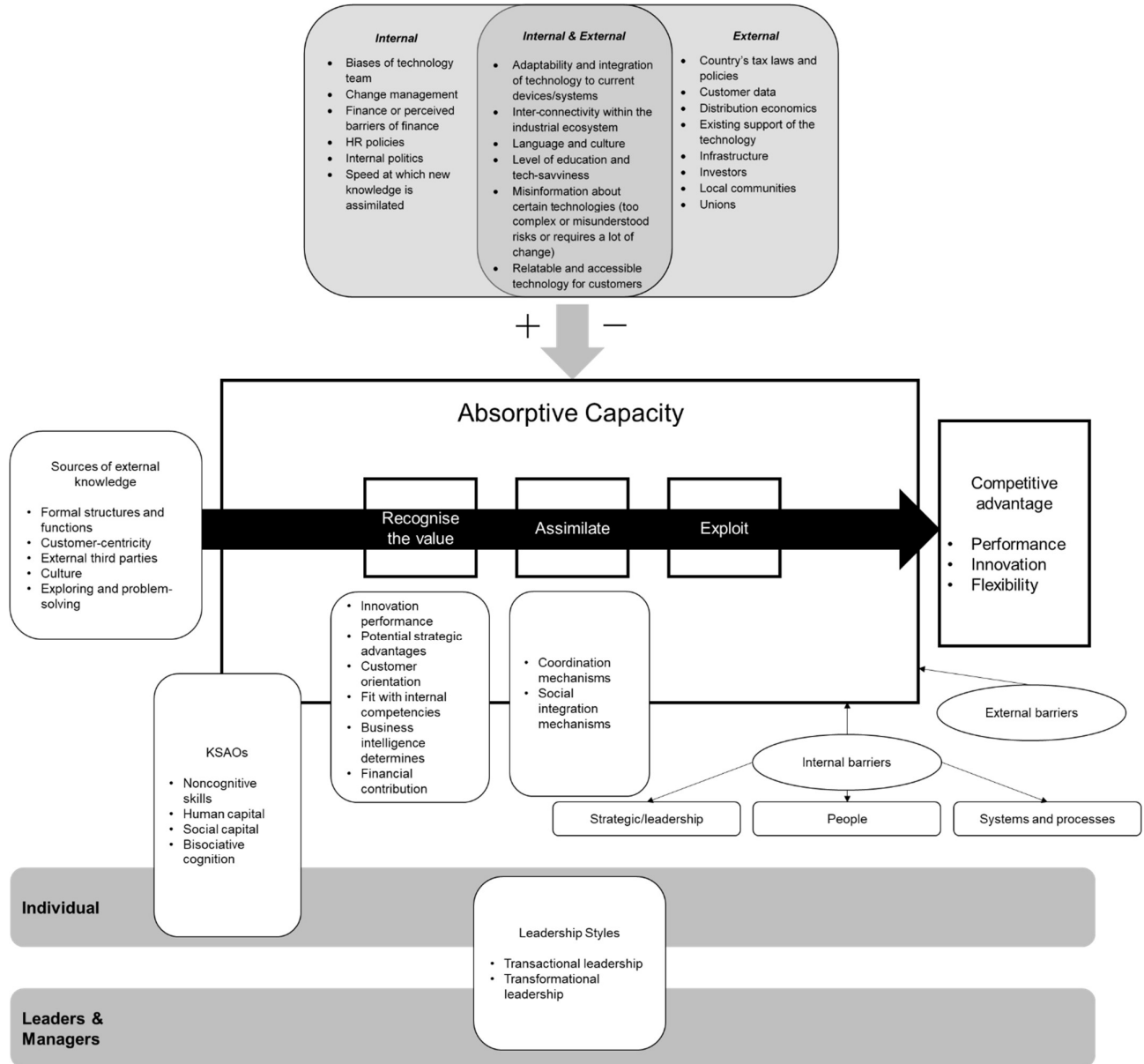


Figure 11). The research established that it was individuals that are on the boundary between the external environment and organisation, seeking new knowledge. The results from the interviews generated insight into the micro-foundational actions and processes that individuals follow to enact AC. Currently, the existence of formal structures and functions largely facilitates AC, indicating the role that these (still) play within industry in the exploratory stage of AC. This highlights the need to ensure that the design of these

processes is optimal for the type of employees, the industry, the country, and other contextual factors. Another key trigger for searching for new knowledge was that of 'solving for the customer', which resonates with trends to increasingly put the customer at the centre of the innovation process. Liaising with third parties remains an important input to maintain a competitive edge in business, and given the rapid rise in complexity, is essential. Insights are also provided on the process that is followed in the first stage of AC (refer to Figure 1).

The research established that there are several significant factors that positively influence the ability of individuals to facilitate the AC process. These include, in order of importance raised by this study: non-cognitive skills (i.e., personality, values and interests), human capital (i.e., prior knowledge diversity), social capital (i.e., network diversity) and bisociative cognition (i.e., a decision-making style in which individuals use imagination and intuition to seek solutions outside disciplinary boundaries to discover connections that are not readily apparent) (Adner & Helfat, 2003; Lowik et al., 2017; Ployhart & Moliterno, 2011). This implies that a large part of the individual's influence in the AC process is controllable. Through the application of Newton's third law, one body cannot exert a force on another without experiencing a force itself (Massachusetts Institute of Technology, 2021), the individual is subsequently changed in their involvement in the AC process, and can thereafter apply themselves within their context.

The role of leadership within the modern era is becoming more complex, with team members being reclassified (Larson & DeChurch, 2020) and the increase in the machine-human interface (Choudhury et al., 2020). The research confirmed the importance of leadership within the AC construct, however showed that in Africa, the most frequently applied leadership style was that of transactional leadership. There exist two other styles that are more suitable and beneficial for successful AC: transformational leadership (i.e., inspiring and changing employees to deliver improved performance) and empowering leadership (i.e., leaders that encourage their employees to build knowledge-based external communities that foster the exchange of knowledge). This understanding specifically contributes to the call from literature to understand leadership styles better (Apriliyanti & Alon, 2017).

Finally, as an addendum to the individual perspective, a step was taken back to understand what other factors influence the AC process. The research established three sets of factors: internal, external and those that resided in both categorisations. Certain of these factors were confirmed in the literature (i.e., funding, biases of technology team,

ability of technology to integrate with other technology; tech-savviness of customer) through studies in international contexts, other factors were unique to Africa and to the present time (i.e., unions, a lack of infrastructure, Covid-19-induced fatigue, country's tax and technology laws). A significant portion of these factors were deemed internal, which bodes well for what can be controlled or at least influenced. Whilst it was not within scope of the exploratory research that was undertaken, there was some degree of significance indicated by the frequency mentioned by participants. The strength and thus relevance of these factors can be tested in subsequent studies in Africa, to update the model or to offer guidance on what to manage in the process of ensuring successful AC.

### **7.2.2 Research Question 2: How is new knowledge acquired, assimilated and transformed inside the organisation?**

The first stage of AC, 'Recognising the value', entails searching for new, external knowledge. Resources are expensive, and therefore those spent searching for external knowledge need to be efficiently spent. The research revealed the mechanisms used by individuals, which differ from structured, output-based assessments to those that are more intuitive, or in some cases, non-existent. For those who used strategic assessment involved evaluating the importance of the new, external knowledge according to the following, in order of frequency: (potential) impact on innovation performance, strategic advantage for business, impact on customer, fit with internal competencies or simply what the managers or business determines.

The research revealed the nascent mechanisms and processes that were in use by the sample firms in Africa, therefore responding to the call from literature to unpack the 'black box' of micro-foundational AC. Despite the trend to refer to the need of social skills to survive and advance in the current labour market (Deming, 2017; Von Briel et al., 2019), participants indicated that in Africa, it was still coordination mechanisms (those activities that encourage knowledge sharing and acceptance of new knowledge) versus social integration mechanisms (those activities associated with social interaction, a shared vision, and trust are shown to contribute towards developing knowledge together).

Understanding and overcoming barriers is key to enabling successful AC (Schweisfurth & Raasch, 2018). Several barriers have been identified by literature, including EM-specific barriers. This research extended the barriers in Africa and included mostly strategic or leadership-related barriers. What was remarkable however, was that most of the barriers were internal, relative to the organisational boundary, pointing to the possibility of being



able to influence or control these, in order to achieve the desired level of AC. Worth noting is that not all barriers are harmful, with certain barriers acting as insulators against irrelevant information (Schweisfurth & Raasch, 2018) or unwanted leaking of confidential knowledge (also known as 'knowledge spill overs') (Ugur et al., 2020).

### **7.2.3 Research Question 3: How are these factors externally leveraged to improve the competitive advantage of the firm?**

- Understand how knowledge is deemed important
- Verification of individual's role within the context, and how organisation's should recognise their AC depends largely what takes place on the individual level. "links across a mosaic of individual capabilities" (Cohen & Levinthal, 1990, p. 133)
- Aware of the unique hindering factors within context
- Recognition of the social skills in addition to technical required for securing competitive advantage
- Measuring and monitoring (?)
- Progressing beyond the original concept where AC was considered largely a function of prior knowledge, in a world that has become more dynamic and complex.
- Since a considerable amount of AC
- R&D spend is not the only proxy for the measurement of AC
- Leadership – Larson (2020)

### **7.3 Implications for management and other relevant stakeholders**

In addition to the extension of the AC body of knowledge, there exists valuable insights for managers and other stakeholders. These include:

- Insight into the routines, mechanisms and processes used to source new, external knowledge for the firm and individual's benefit.
- 

### **7.4 Limitations and Suggestions for Future Research**

Whilst the study had real and concrete objectives, it does indeed have limitations, which may open up avenues for further research. The research concentrated only on technology-intensive industries, as the AC construct was initially intended for use within technology transfer contexts and has continued to apply to the technology context (Cohen & Levinthal, 1990; Distel, 2019).

Firstly, the sample covered six different African countries, with one to two organisations representing each country. Additionally, only highly-innovative or technology-intensive organisations, with a focus on IT, were part of the sample. The sample was constructed from successful firms, with varying size. All of these contextual factors influence the environment in which external knowledge is found and well as the operationalisation of the AC framework. To aggregate findings from this small sample to represent Africa would be erroneous. Therefore, further research could involve increasing the size and heterogeneity of the sample, that would aid in understanding AC through the lens of Africa, and also offer the ability to compare, through moderating controls (such as firm age, firm size, number of employees). Furthermore, this would be beneficial in building robustness into AC theory, as deeper insight into the nascent processes and thinking of individuals could be gained. Secondly, the study was a cross-sectional study, thereby providing insights at a moment in time. Since technology itself and mechanisms to transfer it are (possibly) fast-changing, benefit could be gained if a longitudinal study was undertaken, offering the ability to compare micro-foundational routines. Third, a comparative method could be employed to understand the interaction and relationship between the factors that have been extended in this study, making use of a quantitative method. Fourth, in order to understand the sequential processes that are employed within practice, individuals could be engaged to describe each AC concept in more detail, through process-mapping. Fifth, this study was undertaken in the specific context of Africa. Since the researcher struggled to find micro-foundational AC research conducted amongst firms in Africa, there was little to compare to. Sixth, since the definition of individuals is evolving in response to the 4IR developments, with AI and robots constituting as autonomous team members (Larson & DeChurch, 2020), the AC may need to be revisited as technology matures.

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## Appendix 1 - Journals

Research Problem & Literature				
CBS rating	Journal	Year	Title	Author/s
4	Journal of World Business	2020	Fostering integration through HRM practices: An empirical examination of absorptive capacity and knowledge transfer in cross-border M&As	Zhou, Fey, & Yildiz
4*	Strategic Management Journal	2020	Machine learning and human capital complementarities	Choudhury, Starr & Agarwal
4*	Research Policy	2019	Knowledge integration in the shadow of tacit spill overs: Empirical evidence from U.S. R&D labs	Venturini, Ceccagnoli & van Zeebroeck
4*	Journal of Management	2019	Unveiling the micro-foundations of absorptive capacity: A study of Coleman's bathtub model	Distel
4	Journal of Product Innovation Management	2019	How individuals engage in the absorption of new external knowledge: A process model of absorptive capacity	Sjödin, Frishammar & Thorgren
4	Human Resource Management	2019	Talent management, absorptive capacity, and firm performance: Does it work in China and Russia?	Latukha & Veselova
4*	Research Policy	2019	Less than expected - The minor role of foreign firms in upgrading domestic suppliers - The case of Vietnam	Nguyen & Diez
4*	Research Policy	2018	Absorptive capacity for need knowledge: Antecedents and	Schweisfurth & Raasch

			effects for employee innovativeness	
4	Journal of World Business	2017	Barriers to absorptive capacity in emerging market firms	Cuervo-Cazurra & Rui
3	International Business Review,	2017	Bibliometric analysis of absorptive capacity	Apriliyanti & Alon
4*	Journal of Management	2017	Examining the complementary effect of political networking capability with absorptive capacity on the innovative performance of emerging market firms	Kotabe, Jiang & Murray
4	Human Resource Management	2017	Intellectual capital – Enhancing HR, absorptive capacity, and innovation	Soo, Tian, Teo & Cordery
4*	Management Information Systems Quarterly	2017	Technology: Implications for process innovation performance	Trantopoulos, von Krogh, Wallin & Woerter
4*	Research Policy	2017	Making a marriage of materials: The role of gatekeepers and shepherds in the absorption of external knowledge and innovation --performance	Ter Wal, Criscuolo & Salter
4*	Management Information Systems Quarterly	2017	Knowledge management system use and job performance: A multilevel contingency model	Zhang
4*	Strategic Management Journal	2017	Emerging market firms' internationalization: How do firms' inward activities affect their outward activities?	Li, Yi & Cui

4*	The Quarterly Journal of Economics	2017	The growing importance of social skills in the labour market	Deming
4	Journal of World Business	2016	Technology, innovation and knowledge: The importance of ideas and international connectivity	Andersson, Dasi, Mudambi & Pederson
4	Journal of World Business	2015	Fostering absorptive capacity through leadership: A cross-cultural analysis	Flatten, Adams & Brettel
4	The Academy of Management Annals	2015	The micro-foundations movement in strategy and organization theory	Felin, Foss & Ployhart

## Appendix 2 - Consistency Matrix

<b>Research questions</b>	<b>Literature review sections</b>	<b>Data collection tool</b>	<b>Analysis</b>
<b>RQ 1:</b> How does technology absorption at an individual level influence an organisation's micro-foundational AC?	Section 2.4 Section 2.6 Section 2.7	Semi-structured survey	Thematic Content Analysis
<b>RQ 2:</b> How is new knowledge acquired, assimilated and transformed inside the organisation?	Section 2.3 Section 2.5 Section 2.7	Semi-structured survey	Thematic Content Analysis
<b>RQ 3:</b> How are these (developed) capabilities externally leveraged to improve the competitive advantage of the firm?	Section 2.6 Section 2.7	Semi-structured survey	Thematic Content Analysis

## **Appendix 3 - Interview Schedule and Guide**

### **1. Introduction**

#### *Personal introduction*

“Hi, my name is Tamaryn Whittal-Steynberg, and I am currently conducting research in partial fulfilment of my MBA through the Gordon Institute of Business Science. Thank you for being willing to participate in my study.”

#### *Purpose of the study*

“The interview that we are about to embark upon will contribute towards research in the field of technology transfer, through a concept known as “absorptive capacity”. Your experience and role make you well-positioned to assist. The data collected during the interview will help understand and build the concept through an African/emerging market perspective.”

#### *Interview Process*

“As per the informed consent statement that you have signed, thank you, your confidentiality will be maintained from the interview through to the data reporting stages. The first set of questions are background questions and are followed by more in-depth questions.”

### **2. Interview Guide**

#### *Section 1: Background questions*

Please may you provide the following data:

1. What is your age, gender and which cultural group do you identify with?
2. What is your educational background and your previous employment history (sector, position and tenure)
3. What is your current position and what are your responsibilities?

#### *Section 2: In-depth questions*



RESEARCH QUESTIONS	INTERVIEW SCHEDULE QUESTIONS (RESEARCH INSTRUMENT)	NOTES TO THE INTERVIEWER	KNOWLEDGE GAPS
<p><b>RQ 1</b> How does technology absorption at an individual level influence an organisation's micro-foundational Absorptive Capacity?</p>	<p><b>ISQ 1.1:</b> How does your organisation identify and explore new knowledge?</p> <p><b>ISQ 1.2:</b> What employee-level factors influence how your organisation deals with new knowledge?</p> <p><b>ISQ 1.3:</b> What role does leadership play in technology absorption in your organisation?</p> <p><b>ISQ 1.4:</b> What other factors play influence how technology absorption takes place in your organisation?</p>	<p><b>NB. These notes refer to ISQ 1.1 to 1.3. The remaining questions should be self-evident to respondents.</b></p> <ul style="list-style-type: none"> <li><b>RQ 1:</b> "Individual level" for the purposes of the study refers to a two-tier Unit of Analysis. Level 1 = Front-line workers &amp; Level 2 = Managers/leaders.</li> <li><b>ISQ 1.1:</b> "New knowledge" specifically refers to technological advancement pertaining to 4IR.</li> <li><b>ISQ 1.2:</b> "Employee-level factors" are likely to include individual knowledge, skills, and attributes. Pay special attention to cognitive functions (brain-based skills needed in the acquisition of knowledge, manipulation of information &amp; reasoning). Also, non-cognitive functions which could be skills or attributes (e.g. personal motivation, integrity, interpersonal interaction &amp; teamwork). <b>But avoid steering the discussion. Bear in mind that managers/leaders are also employees.</b></li> <li><b>ISQ 1.3:</b> The "role of leadership" could be active supportive, active undermining, passive (laissez-faire) or neutral. Possible managerial biases may emerge. <b>But avoid steering the discussion.</b></li> </ul>	<ul style="list-style-type: none"> <li>Micro-foundational AC processes and capabilities (Apriliyanti &amp; Alon, 2017)</li> <li>Individual traits and dispositions (Yildiz et al., 2021)</li> <li>Deep insights into how individuals engage AC, their interactions with others, and how they overcome barriers during implementation (Sjodin et al., 2019)</li> <li>Impact of leadership styles on AC (Flatten et al., 2015)</li> </ul>
<p><b>RQ 2</b> How is new knowledge acquired, assimilated and transformed inside the organisation?</p>	<p><b>ISQ 2.1:</b> How does your organisation determine whether new knowledge is important?</p> <p><b>ISQ 2.2:</b> Assuming that the knowledge is considered important, by what mechanisms or processes is it assimilated into your organisation?</p> <p><b>ISQ 2.3:</b> Which factors hinder these mechanisms or processes?</p> <p><b>ISQ 2.4:</b> How is new, valuable knowledge converted into organisational capabilities?</p>		<ul style="list-style-type: none"> <li>Micro-foundational AC processes and capabilities (Apriliyanti &amp; Alon, 2017).</li> <li>Micro-level variables and the mediating relationship between integration mechanisms and AC (Distel, 2019).</li> <li>Contextual factors (Ugur et al., 2020)</li> <li>Call to understand AC barriers within service industries (Cuervo-Cazurra &amp; Rui, 2017)</li> <li>(Yang &amp; Tsai, 2019)</li> </ul>
<p><b>RQ 3</b> How are these factors <u>externally</u> leveraged to improve the competitive advantage of the firm?</p>	<p><b>ISQ 3.1:</b> How does your organisation deploy these capabilities into the marketplace?</p> <p><b>ISQ 3.2:</b> What external features of your organisation's competitive landscape affect this deployment?</p> <p><b>ISQ 3.3:</b> How are these capabilities measured and monitored?</p> <p><b>ISQ 3.4:</b> How are these capabilities reviewed or continually evaluated to ensure they are fit-for-purpose, or to meet changing circumstances?</p>		<ul style="list-style-type: none"> <li>Micro-foundational AC processes and capabilities (Apriliyanti &amp; Alon, 2017).</li> <li>Contextual factors (Ugur et al., 2020)</li> <li>Internal routines (Khan et al., 2019)</li> <li>Cross-level studies (Lowik et al., 2017)</li> <li>Examine internal capabilities (Sheng, 2017)</li> </ul>
<p><b>Final Question</b> (open-ended)</p>	<p>Is there anything you would like to add on technology transfer within your organisation, from your perspective, or within Africa?</p>		

### 3. Conclusion

"Thank you for your insights and time today. Is there any additional information that you would like to share that may benefit this study? Are you willing to assist should additional information be required?"

Thank you for your contribution towards this research." Close interview.

## Appendix 4 - Proof of Ethical Clearance

24051162@mygibs.co.za

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**From:** MastersResearch2020 <MastersResearch2020@gibs.co.za>  
**Sent:** Wednesday, 11 November 2020 15:12  
**To:** 24051162@mygibs.co.za  
**Cc:** MastersResearch2020  
**Subject:** Ethical Clearance Approved  
**Attachments:** EthicalClearanceReport.pdf

**Gordon Institute  
of Business Science**  
University of Pretoria

**Ethical Clearance  
Approved**

Dear Tamaryn Whittal-Steynberg,

Please be advised that your application for Ethical Clearance has been approved.  
You are therefore allowed to continue collecting your data.  
We wish you everything of the best for the rest of the project.

[Ethical Clearance Form](#)

Kind Regards

This email has been sent from an unmonitored email account. If you have any comments or concerns, please contact the GIBS Research Admin team.

## Appendix 5 - Consent forms

Participants provided either consent forms or verbal consent, contained within the audio recordings.



### *Informed Consent Letter*

I am currently a student at the University of Pretoria's Gordon Institute of Business Science and completing my research in partial fulfilment of an MBA.

I am conducting research on new technology transfer to find out more about how technology transfer takes place within and across African firms, and the factors that contribute towards this transfer of knowledge. The study examines whether such transfer ultimately results in competitive advantage for an organisation. With your background, I would appreciate your insights to build on this research and offer practical insights for managers and businesses.

The in-depth interview consists of a series of questions and is expected to last not more than one hour. **Your participation is voluntary, and you can withdraw at any time without penalty.** The interview will be recorded, and I will be taking notes. Please note that our interview will be transcribed for purposes of academic analysis.

All data will be reported and stored without identifiers. As such, the interview will be kept strictly confidential and no source, individual or organisation will be identified by name in the text of the final report. Upon request, a copy of the research report will be made available to you.

Please indicate your consent to participate and contribute towards this research by signing below. If you have any questions or concerns, please contact my supervisor or myself. Our details are provided below.

Researcher name: Tamaryn Whittal-Steynberg

Research Supervisor: Colin Rowley

Email: 24051162@mygibs.co.za

Email: colinrowley@vodamail.co.za

Phone: + 27 84 657 3028

Signature of participant: \_\_\_\_\_ 

Date: 13/12/2020

Signature of researcher: \_\_\_\_\_ 

Date: \_\_\_\_\_

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I am currently a student at the University of Pretoria's Gordon Institute of Business Science and completing my research in partial fulfilment of an MBA.

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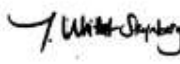
Email: 24051162@mygibs.co.za

Email: colinrowley@vodamail.co.za

Phone: + 27 84 657 3028

Signature of participant:  \_\_\_\_\_

Date: 04/01/2021

Signature of researcher:  \_\_\_\_\_

Date: \_\_\_\_\_

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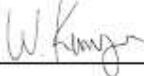
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Email: 24051162@mygibs.co.za

Email: colinrowley@vodamail.co.za

Phone: + 27 84 657 3028

Signature of participant:  \_\_\_\_\_

Date: 23 November 2020

Signature of researcher: 

Date: \_\_\_\_\_

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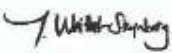
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Email: 24051162@mygibs.co.za

Email: colinrowley@vodamail.co.za

Phone: + 27 84 657 3028

Signature of participant: Prianka Padayachee

Date: 04-December 2020

Signature of researcher: T. Whittal-Steynberg

Date: \_\_\_\_\_

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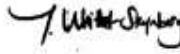
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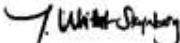
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Email: colinrowley@vodamail.co.za

Phone: + 27 84 657 3028

Signature of participant:  \_\_\_\_\_

Date: \_\_\_\_\_ 2020/11/20 \_\_\_\_\_

Signature of researcher:  \_\_\_\_\_

Date: \_\_\_\_\_

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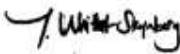
Email: 24051162@mygibs.co.za

Email: colinrowley@vodamail.co.za

Phone: + 27 84 657 3028

Signature of participant: \_\_\_\_\_

Date: 23 November 2020

Signature of researcher: 

Date: \_\_\_\_\_

## Appendix 6 - List of Codes

Capability deployment - affects attitude, processes, product
Capability deployment - allocate resource to demand and then incorporate it into existing features
Capability deployment - being a speaker at a technology conference
Capability deployment - bringing more efficiency to an existing process
Capability deployment - cascading it from the point of theory and customer demand to where it adds value to the customer
Capability deployment - commercial team identifies a problem to be solved
Capability deployment - create a super user group
Capability deployment - develop videos of solving/using technology and people come to you
Capability deployment - developers develop solutions
Capability deployment - driven by demand
Capability deployment - ensuring that it offers competitive advantage over your competitor
Capability deployment - feedback to product development teams, used it to create more innovative products, at a lower cost
Capability deployment - make changes and then do a small launch
Capability deployment - marketing to position yourself as the go-to company
Capability deployment - moving products to cutting-edge
Capability deployment - once developed slowly release to mid-market and then to enterprise (put feature flags)
Capability deployment - partnering with main service providers
Capability deployment - roll out to a larger focus group
Capability deployment - run pilot and fix all bugs and implement recommendations
Capability deployment - sell products (you test, improve, drive value for customers and partners)
Capability deployment - technology team to understand it, then take it to sites to understand need, then deploy if potentially beneficial, then set up KPI's to measure it
Capability deployment - test is across managerial functions
Capability deployment - test the solution internally
Capability deployment - testing is done
Capability deployment - then take the solution to a focus group (champions)
Capability deployment - through new products/features
Capability deployment - through positive impact to operational and production teams
Capability deployment - through product releases (customer and investor updates)
Capability deployment - through run-of-the-mill improvements
Capability deployment - through social media, human connections, newspapers
Capability deployment - training of employees that leave
Capability deployment - understand technology
Capability deployment - well-oiled PR machinery
Employee-level factors - a balance of researchers and developers
Employee-level factors - ability of individual to learn
Employee-level factors - ability to absorb new technologies
Employee-level factors - ability to anticipate the future
Employee-level factors - ability to be part of a greater whole
Employee-level factors - ability to be systematic
Employee-level factors - ability to become subject matter experts or create knowledge bases
Employee-level factors - ability to challenge and be challenged
Employee-level factors - ability to deal with ambiguity
Employee-level factors - ability to generate something value
Employee-level factors - ability to have a meaningful conversation with anyone

Employee-level factors - ability to have information at fingertips
Employee-level factors - ability to integrate new ideas into work
Employee-level factors - ability to move beyond just identifying an opportunity
Employee-level factors - ability to quickly grasp concepts
Employee-level factors - ability to reflect on knowledge gaps
Employee-level factors - ability to seek new opportunities
Employee-level factors - ability to understand organisational landscape
Employee-level factors - ability to work incredibly hard
Employee-level factors - able to handle the duality of organisational and client priorities
Employee-level factors - accepting and adapting to new knowledge
Employee-level factors - age
Employee-level factors - age and age distribution of workforce
Employee-level factors - aptitude towards learning from and communicating with technology experts
Employee-level factors - aptitude towards planning
Employee-level factors - asking questions that forces one to think differently
Employee-level factors - be attuned to customer needs
Employee-level factors - be excited about organisation's goals
Employee-level factors - big dreamers
Employee-level factors - capacity (to take on new ideas)
Employee-level factors - collaborative culture
Employee-level factors - comfort in ambiguity
Employee-level factors - competence
Employee-level factors - considering areas to innovate
Employee-level factors - consistent
Employee-level factors - constantly thinking of how to improve
Employee-level factors - creative
Employee-level factors - creative by nature
Employee-level factors - culture of learning and being out of comfort-zone
Employee-level factors - curious and ambitious
Employee-level factors - curious and lifelong learners
Employee-level factors - degree of current comfort
Employee-level factors - desire to be faster, more efficient for clients
Employee-level factors - desire to be innovative
Employee-level factors - different career backgrounds
Employee-level factors - diversity (educational backgrounds)
Employee-level factors - do they question things and tinker around
Employee-level factors - education level
Employee-level factors - educational background
Employee-level factors - either generalist or specialist skills
Employee-level factors - entrepreneurial mindset
Employee-level factors - experience
Employee-level factors - experience (2)
Employee-level factors - exploration
Employee-level factors - exposure to different technologies in past experience
Employee-level factors - flexible and adaptable to customer's needs
Employee-level factors - flexibility

Employee-level factors - fundamental educational background and their ability to diversify
Employee-level factors - have a passion/fire
Employee-level factors - high potential not necessarily experience
Employee-level factors - how you talk, how you explain things
Employee-level factors - HR involvement - identifying new skills
Employee-level factors - HR involvement - training
Employee-level factors - hunger and willingness to learn
Employee-level factors - identify champions
Employee-level factors - improvise and augment new ideas with what they know
Employee-level factors - inability to change familiar technology
Employee-level factors - it's all about the people and their energy
Employee-level factors - length of service to organisation
Employee-level factors - level of technical expertise
Employee-level factors - level on ambition
Employee-level factors - male to female ratios
Employee-level factors - mindset of people
Employee-level factors - needs to know the customer
Employee-level factors - non-cognitive skills
Employee-level factors - open-mindedness
Employee-level factors - passionate
Employee-level factors - past technological experience
Employee-level factors - previous performance/value-add to the business
Employee-level factors - proactive
Employee-level factors - proactive in researching and providing recommendations and
Employee-level factors - questioning, curious
Employee-level factors - quick to respond
Employee-level factors - relevant background
Employee-level factors - relevant skill and capacity
Employee-level factors - relevant technical experience
Employee-level factors - right mindset, teachable
Employee-level factors - self-development
Employee-level factors - skill level
Employee-level factors - skills
Employee-level factors - specific technological knowledge
Employee-level factors - speed of getting involved
Employee-level factors - technical curiosity
Employee-level factors - technological skill
Employee-level factors - the desire to want to do things better
Employee-level factors - to do incredibly well
Employee-level factors - trainable and open to new ideas
Employee-level factors - understand what the organisation has tried in the past
Employee-level factors - understanding how it works
Employee-level factors - want to create novel ideas
Employee-level factors - wanting to be improve the company
Employee-level factors - wanting to be on top of one's game
Employee-level factors - wanting to be the best

Employee-level factors - whether employees have IT/developer backgrounds
Employee-level factors - whether management has confidence in you
Employee-level factors - which generation you fall in
Employee-level factors - willingness to acquire new knowledge and skills
Employee-level factors - willingness to invest own time
Employee-level factors - willingness to learn
Employee-level factors - young
External features - ability for other technologies to connect to it (open versus closed system)
External features - ability of customers to use technology or product feature
External features - ability to partner with government
External features - channels and industry
External features - competition
External features - competition is alive and present
External features - competitor activity
External features - competitors
External features - competitor's ability to collaborate
External features - connections with your markets
External features - consumer behaviour
External features - country's government systems
External features - data/connectivity costs
External features - difference in corporate offices across countries
External features - economic situation of market
External features - especially in African humans missing a human touch
External features - establishing position relative to competitor
External features - expectation of compatibility and maintenance
External features - geographical location
External features - industry legislation
External features - intelligence on competitor
External features - lack of regulatory approval
External features - legal compliance
External features - level of competitor scrutiny
External features - local infrastructure in the market
External features - local or national cyber security
External features - market and prices (determines how much is spent on technology and innovation)
External features - market maturity
External features - markets and company performance
External features - mobile network providers
External features - mobile phones currently being used by customers
External features - not really applicable
External features - number of rural dwellers with mobile phones
External features - organisation just copying one another, instead of differentiating
External features - pandemic created opportunity to build new products when others' weren't
External features - people's hesitancy to enter a learning curve
External features - perception of benefit of technology
External features - politics
External features - reliability of power supply/infrastructure

External features - reviews from your customers
External features - service provider footprint in Africa
External features - sharing of knowledge within the community
External features - size of competitor's market share
External features - skills available in market
External features - skills in market (ability to recruit and retain good talent)
External features - technological adoption (smartphone, internet or data penetration and data costs)
External features - technology enablement/infrastructure of competitor
External features - the capabilities of your suppliers (infrastructure level)
External features - the use of old technology in the market place
External features - trends or events that are happening
External features - urban versus rural
External features - variation in quality of infrastructure in countries
External features - wealth of individuals
External features - whether competition is deploying similar features
External features - your popularity within the community
External features - your value-add as perceived by other companies
Hindering mechanisms and processes - ability of idea generators to influence and negotiate support for their idea
Hindering mechanisms and processes - alignment with business strategy
Hindering mechanisms and processes - availability of data
Hindering mechanisms and processes - availability of human resources, project managers
Hindering mechanisms and processes - change fatigue
Hindering mechanisms and processes - checklist updated
Hindering mechanisms and processes - correctly experienced employees/recruits
Hindering mechanisms and processes - cultural trend to not make use of expatriates
Hindering mechanisms and processes - daily rat race
Hindering mechanisms and processes - developing the right skills and experience
Hindering mechanisms and processes - external political corruption
Hindering mechanisms and processes - fear of new technology
Hindering mechanisms and processes - finding suitable candidate for new technology
Hindering mechanisms and processes - finding suitably-qualified employees
Hindering mechanisms and processes - funding
Hindering mechanisms and processes - geographical dispersion
Hindering mechanisms and processes - geographical distance between product developer and factory
Hindering mechanisms and processes - getting technology working in country
Hindering mechanisms and processes - ideas not supported by meaningful data
Hindering mechanisms and processes - ideas not well formed
Hindering mechanisms and processes - if the why is not clear
Hindering mechanisms and processes - if there are many software "bugs"
Hindering mechanisms and processes - if you bring in the knowledge, needing to have all the details
Hindering mechanisms and processes - inadequate training
Hindering mechanisms and processes - insufficient research
Hindering mechanisms and processes - interference from head office
Hindering mechanisms and processes - internal politics
Hindering mechanisms and processes - irrelevant or inappropriate delivery method of new technology
Hindering mechanisms and processes - lack of aligned vision

Hindering mechanisms and processes - lack of communication (results in duplication effort)
Hindering mechanisms and processes - lack of exploration activities
Hindering mechanisms and processes - lack of human resources
Hindering mechanisms and processes - lack of seamless collaboration between cultures
Hindering mechanisms and processes - lack of visibility on projects and initiatives
Hindering mechanisms and processes - listening to the loudest person in the room
Hindering mechanisms and processes - not being clear about who you are solving for
Hindering mechanisms and processes - not enough focus on development (lumped together with operational projects)
Hindering mechanisms and processes - not having sufficient people to work on new technology
Hindering mechanisms and processes - not sufficient capabilities deployed to act
Hindering mechanisms and processes - not sufficiently sized business
Hindering mechanisms and processes - not sufficiently strong product development function
Hindering mechanisms and processes - not understanding the technology
Hindering mechanisms and processes - overwhelmed by work schedules
Hindering mechanisms and processes - people not wanting to change
Hindering mechanisms and processes - people's reluctance to change
Hindering mechanisms and processes - poor communicators within network
Hindering mechanisms and processes - poor flow of information
Hindering mechanisms and processes - rigorous evaluation
Hindering mechanisms and processes - size of Capex or OpEx
Hindering mechanisms and processes - takes time for technology to solve some problems
Hindering mechanisms and processes - the expectation that a woman can't do STEM
Hindering mechanisms and processes - the need to show payback on the technology
Hindering mechanisms and processes - thinking short term survival with long-term innovation
Hindering mechanisms and processes - time constraints with other responsibilities
Hindering mechanisms and processes - time-pressure to come up with new ideas
Hindering mechanisms and processes - tiredness and fatigue (Covid)
Hindering mechanisms and processes - trust issues
Hindering mechanisms and processes - unions
Hindering mechanisms and processes - unwillingness to work with new technology
Hindering mechanisms and processes - wanting the cheapest option
Hindering mechanisms and processes - weak collaborators within network
Hindering mechanisms and processes - when change is not adequately communicated
Hindering mechanisms and processes - willingness to let go of what we thought was right and adapt to market needs
Hindering mechanisms and processes - your ability to influence and charm decision-makers
Hindering mechanisms and processes - your reputation if you bring a poor idea
Identification and exploration - academic papers
Identification and exploration - acquiring human resources from other companies
Identification and exploration - analyse whether it presents an opportunity or challenge
Identification and exploration - analysing issues from competitor's products
Identification and exploration - analysis of ideas to see how it affects product/business/ecosystem
Identification and exploration - announcement of new technology in news stories or events
Identification and exploration - anticipating what adda value for our customers (predictive analytics)
Identification and exploration - being customer-centric, drives the hunger for information
Identification and exploration - brand development teams gather data and then send to research and development team to propose solutions
Identification and exploration - build a product on a global level and cascade down



Identification and exploration - business development team
Identification and exploration - by service providers outside of the country
Identification and exploration - CEO brings in international ideas
Identification and exploration - CEO looking for ideas and reshaping them
Identification and exploration - clients
Identification and exploration - collaboration with external parties
Identification and exploration - combining remote teams and people
Identification and exploration - competitors
Identification and exploration - conferences and trade shows
Identification and exploration - consider technology base of people
Identification and exploration - crowd-sourcing from employees
Identification and exploration - C-suite and then extrapolated to different departments
Identification and exploration - customer (through marketing company)
Identification and exploration - customer and employee surveys
Identification and exploration - customer centricity
Identification and exploration - Customer-centricity - enhance product with new technology
Identification and exploration - customers
Identification and exploration - dedicated functions - technology and product teams
Identification and exploration - depends firstly on management's technological preferences
Identification and exploration - develop minimum viable products and get feedback
Identification and exploration - employ younger and younger people
Identification and exploration - employees (all levels)
Identification and exploration - engaging in international conferences and articles
Identification and exploration - evolved from being inclusive to ideas from senior level
Identification and exploration - expectation of employees to come up with something
Identification and exploration - experimentation
Identification and exploration - figuring out what the organisation needs to adopt at different points
Identification and exploration - following tech leaders/influencers
Identification and exploration - formal structures to identify new technologies
Identification and exploration - give employees time for research
Identification and exploration - global
Identification and exploration - individuals research and present findings to CEO
Identification and exploration - informal structures to identify new technology
Identification and exploration - innovating adding value to customer
Identification and exploration - innovation centres
Identification and exploration - internal discussion forums
Identification and exploration - key partners
Identification and exploration - know your customer
Identification and exploration - learn behaviours of particular industries
Identification and exploration - leveraging the internal R&D department
Identification and exploration - local and Indian development team
Identification and exploration - local developer groups
Identification and exploration - local technology team
Identification and exploration - looking at trends or what peers are doing
Identification and exploration - looking at what the Group is doing
Identification and exploration - looking to add more value than an ERP system

Identification and exploration - market intelligence
Identification and exploration - more mature markets
Identification and exploration - multifaceted
Identification and exploration - multi-faceted
Identification and exploration - no dedication to technology, we have product innovation (customer needs)
Identification and exploration - observing trends
Identification and exploration - online (internet and YouTube)
Identification and exploration - partnerships with Microsoft
Identification and exploration - practically, through individuals trying to solve problems
Identification and exploration - proactively invite developers and supplier teams
Identification and exploration - product development team
Identification and exploration - project-based
Identification and exploration - reading and researching
Identification and exploration - receptive and always seeking new ideas
Identification and exploration - recruitment - bringing in employees that have the knowledge
Identification and exploration - reporting system for capturing market insights
Identification and exploration - research by IT and programmers
Identification and exploration - research is part of the job
Identification and exploration - robust business intelligence team
Identification and exploration - share information from global across matrix organisation
Identification and exploration - sharing of knowledge leads to new technology and innovation
Identification and exploration - sharing with competitors and they share in return
Identification and exploration - solicit feedback form customers
Identification and exploration - sprints
Identification and exploration - strategically, through a technology department
Identification and exploration - suppliers
Identification and exploration - suppliers (know trends)
Identification and exploration - team that actively analyses all data gathered
Identification and exploration - test in the market
Identification and exploration - thinking how do we evolve, how do we evolve our product right
Identification and exploration - through industry bodies
Identification and exploration - through management's direction/ideas
Identification and exploration - time to experiment
Identification and exploration - top-down from Indian head office
Identification and exploration - training
Identification and exploration - understanding what government or country needs
Identification and exploration - use known technologies
Identification and exploration - wanting to offer something next-level to potential customers
Identification and exploration - when our in-house solutions are not enough
Identification and exploration - when solving a problem
Identification and exploration - with the matrix organisation, we build a lot of internal capabilities
Identification and exploration - working in partnership with suppliers
Leadership - a huge, huge, huge role
Leadership - ability to sell an idea to the organisation
Leadership - ability to work in remote and diverse teams
Leadership - aligning organisational and personal goals

Leadership - appreciate and support new technology (to inspire work force)
Leadership - be a sounding board and enabler
Leadership - believe in new technology
Leadership - bring perspective
Leadership - building the departments and skills to capitalise on new technologies
Leadership - CEO is chief product officer
Leadership - CEO is very creative and innovative
Leadership - CEO knows that the country needs
Leadership - co-ordination
Leadership - creating synergies across departments to drive implementation of new technology
Leadership - creating the environment and space for learning
Leadership - critical to change management
Leadership - develop thinking of employees
Leadership - doing user experience research
Leadership - drive a culture of candour
Leadership - driving the mandate and strategy
Leadership - eagerness for new technology
Leadership - employee acquisition
Leadership - enabling technology transfer to happen
Leadership - encouraging and promoting research
Leadership - ensure external buy-in from stakeholders
Leadership - ensure right financial decision is made
Leadership - essential for selling new technology to others
Leadership - establishing KPI's and reward policies for using new technology
Leadership - fostering the right culture
Leadership - fundamental role if the buy-in is present
Leadership - getting out the way, trusting the team
Leadership - got to drive technology with their employees
Leadership - have to understand the core problem and how technology will fix this
Leadership - having a long-term vision
Leadership - idea generation and cascading it to different departments
Leadership - identification of new technologies
Leadership - influence how products are consumed
Leadership - knowing where the main business-improvement levers are
Leadership - leadership is incredibly important in everything
Leadership - lining up the organisation to be able to act of digital opportunities
Leadership - living by organisational principles
Leadership - make it very easy for the user/customer
Leadership - massive, massive - they advocate for change
Leadership - need to inculcate new technological knowledge
Leadership - need to understand what technologies are available
Leadership - needs to drive and have buy-in from organisation
Leadership - not to focus initially only on making money
Leadership - open-minded and willing to drive the task to get it done
Leadership - plays a critical role in decision-making
Leadership - provide for "financial room" for technology transfer

Leadership - provide the environment for constant experimentation
Leadership - provide the resources and empowering the employees
Leadership - provides frameworks and priorities
Leadership - providing space and direction for experimentation
Leadership - pushing and holding accountable
Leadership - recognises the need to bring in new knowledge to advance the firm
Leadership - recognising the importance of technology
Leadership - solve and anticipate problems for customers
Leadership - strategise
Leadership - support chief technology officers (communicate plans to wide audience)
Leadership - supporting from a financial perspective
Leadership - to challenge their people to make use of technology tools
Leadership - to drive the culture of seeing/delivering value
Leadership - to ensure that there is buy-in from internal stakeholders
Leadership - to get their people to see technology as a partner
Leadership - understand the competition
Leadership - understand the problems your organisation is facing
Leadership - understand what technologies are needed for your operation
Leadership - understanding customer trends well
Leadership - understanding key competitive advantages or value proposition
Leadership - understanding what is needed and then fixing it to help everybody
Leadership - very important role
Leadership - very, very important
Measurement and monitoring of capabilities - agile framework
Measurement and monitoring of capabilities - analyse usage (first time users and general usage)
Measurement and monitoring of capabilities - asking whether it serves clients and organisation
Measurement and monitoring of capabilities - balance iterating or building something new
Measurement and monitoring of capabilities - building in measurable items
Measurement and monitoring of capabilities - constant data analytics to improve customer experience and service
Measurement and monitoring of capabilities - coupling program and project management
Measurement and monitoring of capabilities - currently not done
Measurement and monitoring of capabilities - customer experience department proactively gets feedback
Measurement and monitoring of capabilities - data logs of what is being used
Measurement and monitoring of capabilities - data-driven assessment of performance
Measurement and monitoring of capabilities - data-driven reporting
Measurement and monitoring of capabilities - discover new things and do research
Measurement and monitoring of capabilities - documentation
Measurement and monitoring of capabilities - duration of time for value-creation for customer
Measurement and monitoring of capabilities - duration of time to assimilate technology
Measurement and monitoring of capabilities - feedback sessions on products and technologies
Measurement and monitoring of capabilities - get as much information as possible to analyse
Measurement and monitoring of capabilities - ideally, a scientific measurement
Measurement and monitoring of capabilities - impact on people (safety, fatigue levels)
Measurement and monitoring of capabilities - impact on sustainability
Measurement and monitoring of capabilities - income statement driven business
Measurement and monitoring of capabilities - integrated dashboards

Measurement and monitoring of capabilities - internal departments looking at their trends
Measurement and monitoring of capabilities - level of adoption
Measurement and monitoring of capabilities - level of innovation through key industry magazines and newsrooms
Measurement and monitoring of capabilities - looking at demand
Measurement and monitoring of capabilities - measure protocol compliance
Measurement and monitoring of capabilities - measuring morale
Measurement and monitoring of capabilities - more efficient logistics
Measurement and monitoring of capabilities - no metrics
Measurement and monitoring of capabilities - number of products sold
Measurement and monitoring of capabilities - product managers ensure engineering are building for impact metric
Measurement and monitoring of capabilities - productivity improvements
Measurement and monitoring of capabilities - products and services provided
Measurement and monitoring of capabilities - sales (through monitoring of core products)
Measurement and monitoring of capabilities - sales, an indication of how competitive your product is relative to your competitor
Measurement and monitoring of capabilities - seek official certification (ISO)
Measurement and monitoring of capabilities - split between call centres versus online platforms
Measurement and monitoring of capabilities - test in international markets
Measurement and monitoring of capabilities - test products
Measurement and monitoring of capabilities - through data (improved days)
Measurement and monitoring of capabilities - timing
Measurement and monitoring of capabilities - top line growth and bottom line efficiencies
Measurement and monitoring of capabilities - track stakeholder relationship management
Measurement and monitoring of capabilities - value generation calculations
Measurement and monitoring of capabilities - very subjective
Mechanisms and processes - adding new features to existing products
Mechanisms and processes - adjustments implemented
Mechanisms and processes - advocacy and agency
Mechanisms and processes - appoint understudy
Mechanisms and processes - balance of informal and informal processes
Mechanisms and processes - best practice sharing and champion initiatives
Mechanisms and processes - bi-monthly sprints
Mechanisms and processes - build in feedback from customers, users and staff
Mechanisms and processes - build squads
Mechanisms and processes - Capex submission and approval (with business case)
Mechanisms and processes - carving out dedicated time to learn
Mechanisms and processes - champion team working on that technology
Mechanisms and processes - chief absorber (champion)
Mechanisms and processes - communication and information sessions
Mechanisms and processes - connecting with local organisation, global function, peers in similar role
Mechanisms and processes - creating opportunities to learn and teach each other
Mechanisms and processes - dedicated development team
Mechanisms and processes - design, implement, test, pilot
Mechanisms and processes - develop a minimum viable product
Mechanisms and processes - developing elsewhere and then learning from mimicry
Mechanisms and processes - development team have freedom
Mechanisms and processes - driven from a global strategy

Mechanisms and processes - enablement sessions
Mechanisms and processes - finally roll out to main product
Mechanisms and processes - following a change management process (management, unions, employees)
Mechanisms and processes - formal checklist
Mechanisms and processes - formal document
Mechanisms and processes - formal documentation (risk assessments, training)
Mechanisms and processes - fully understand technology
Mechanisms and processes - go to manufacturer in China, develop product, bring back to Africa, get Indians to teach factory workers how to manufacture
Mechanisms and processes - governance process (trial, leadership sign-off, standardise)
Mechanisms and processes - if it is a key strategy for the year, then Capex is applied for
Mechanisms and processes - implement and see how it performs there
Mechanisms and processes - improve with small clients
Mechanisms and processes - included in on-boarding documentation and learning management systems
Mechanisms and processes - informal: using email present idea (need to understand all details)
Mechanisms and processes - intentional about creating avenues
Mechanisms and processes - internal testing to see how it works
Mechanisms and processes - mentoring or back-up system
Mechanisms and processes - minimum viable product
Mechanisms and processes - new information has to be validated by business intelligence team
Mechanisms and processes - not part of the day-to-day
Mechanisms and processes - once it has passed first stage, it is escalated to country ExCo level and then it's assimilated by product development team
Mechanisms and processes - once standardised, it is cascaded to operational leads
Mechanisms and processes - online tools for presentation of ideas
Mechanisms and processes - outsource certain aspects
Mechanisms and processes - pair projects with product owners
Mechanisms and processes - pilot projects
Mechanisms and processes - piloting one section, allowing momentum to develop, getting buy-in
Mechanisms and processes - plan a development roadmap
Mechanisms and processes - policies
Mechanisms and processes - present to bigger clients
Mechanisms and processes - presented research to CEO/CTO
Mechanisms and processes - proven in a more mature market and then rolled out to Africa
Mechanisms and processes - R&D team does their research and passes it on
Mechanisms and processes - reorganising resources
Mechanisms and processes - run experiments, assess success, drive accountability
Mechanisms and processes - run pilots, which are then analysed
Mechanisms and processes - scaling
Mechanisms and processes - select quick solution, match it to the problem, trial it
Mechanisms and processes - shift from formal to informal (Covid)
Mechanisms and processes - sprints (set expectations), then roll-out plan
Mechanisms and processes - squads drive the change
Mechanisms and processes - start with "hot areas" (areas of much feedback)
Mechanisms and processes - trial it with smaller clients
Mechanisms and processes - use implementation methodology to optimise squads
Mechanisms and processes - weekly meeting where ideas, technology or knowledge is discussed

New knowledge importance - addresses a customer gap
New knowledge importance - alignment with strategic organisational goals
New knowledge importance - all knowledge is important (no formal distinguishing between different types)
New knowledge importance - applicability or usability
New knowledge importance - asking what value it would add to product
New knowledge importance - asking whether it would add value to the customer's life
New knowledge importance - business intelligence
New knowledge importance - by having the right experts on the decision-making leadership team
New knowledge importance - confidence in switching users to it
New knowledge importance - considered within a function
New knowledge importance - cost versus benefit
New knowledge importance - data-driven decision making
New knowledge importance - determining when it was effective
New knowledge importance - does it add value to the overall value of product or services
New knowledge importance - does it align to business strategy?
New knowledge importance - does it bring down operational costs
New knowledge importance - does it enable organisation to reach more customers
New knowledge importance - does it follow the trends in the market?
New knowledge importance - does it give us a competitive edge?
New knowledge importance - does it offer benefit
New knowledge importance - does it solve an active problem or improve the current process flow or customer journey
New knowledge importance - doing proof concept, after trials
New knowledge importance - financial planning and analysis
New knowledge importance - if company believes it's important
New knowledge importance - impact on bottom line
New knowledge importance - insight*
New knowledge importance - legal aspect
New knowledge importance - level of discussion held amongst employees
New knowledge importance - life cycle cost
New knowledge importance - not being interested in the technology first, but rather the problem to solve
New knowledge importance - product enhancement
New knowledge importance - product-centred
New knowledge importance - proven technologies
New knowledge importance - reading and staying connected with the world
New knowledge importance - reason for creating that technology
New knowledge importance - relying on young, knowledgeable employees
New knowledge importance - scanning, doing audits to understand critical issues, see if it's common, and then look into how technology may solve it
New knowledge importance - small trials
New knowledge importance - structures (idea charters)
New knowledge importance - trialed the new technology and seen results in close-out reports
New knowledge importance - trying it out ourselves (not relying on case studies)
New knowledge importance - trying to solve problems of consumers, customers, operations
New knowledge importance - understand impact on systems, tools, processes or people
New knowledge importance - value add equals reduced costs, improved processes, improved product, improved outcome
New knowledge importance - very clear value addition
New knowledge importance - what does it support/drive?

New knowledge importance - what employees think
New knowledge importance - whether it's needed
New knowledge importance - will it lead to short, medium and long term business benefits
New knowledge importance - working somewhere else
Organisational capabilities - 10% days, where employees are given time to build capabilities and then present
Organisational capabilities - a diverse internal team that works on pilot projects
Organisational capabilities - actually using the technologies
Organisational capabilities - align it to specific product tower
Organisational capabilities - amending a policy or process
Organisational capabilities - analyse, first through the manual code review
Organisational capabilities - analyse, second through the automatic code review
Organisational capabilities - be a personal evangelist
Organisational capabilities - building a learning environment
Organisational capabilities - change product offering
Organisational capabilities - creating a central source of documentation
Organisational capabilities - demonstrated in the product
Organisational capabilities - depending on size of change, allocate resources, user training, change management
Organisational capabilities - difficult now that it's a large firm
Organisational capabilities - easy collaboration
Organisational capabilities - embedded frameworks
Organisational capabilities - freeing up time so that employees can work on it
Organisational capabilities - full communication, align to strategies, and just action
Organisational capabilities - fully supported by leadership
Organisational capabilities - get feedback from people to improve product
Organisational capabilities - ideally, through manuals. Now thinking how to push technology to you in real time
Organisational capabilities - identification of problem/opportunity, development and partnership to deploy
Organisational capabilities - including learnt skills in on-boarding documentation
Organisational capabilities - integrate operational and leadership team's roadmap
Organisational capabilities - internships
Organisational capabilities - involving other team members
Organisational capabilities - learning how to build cases that will deliver in the long term
Organisational capabilities - liaison with technology department as it goes from leadership through all the levels
Organisational capabilities - linked KPI's that are cascaded
Organisational capabilities - make a map/plan
Organisational capabilities - more product enhancement, at lower cost
Organisational capabilities - piloting in smaller segments and then rolling out
Organisational capabilities - product enhancement
Organisational capabilities - providing your employees problems to solve
Organisational capabilities - really looking into how people learn
Organisational capabilities - starting point is to solve for something
Organisational capabilities - storytelling
Organisational capabilities - takes time
Organisational capabilities - teamwork to extract value from new technology
Organisational capabilities - technology is categorised through to right department
Organisational capabilities - top-down approach
Organisational capabilities - treated as a project



Organisational capabilities - trial and implement
Organisational capabilities - very collaborative effort to roll out marketing - how to use products/services
Organisational capabilities - very collaborative effort to roll out marketing - update on new products/features/services
Organisational capabilities - very open communication policy
Organisational capabilities - with support from the People team as gatekeepers
Organisational capabilities - you learn, experiment and then create new internal processes
Other factors - a mismatch between expectations and reality
Other factors - ability for current infrastructure to handle online traffic
Other factors - ability to gather information (if new technology is mentioned)
Other factors - agility and remote working
Other factors - amount of research taking place
Other factors - being part of an industrial ecosystem
Other factors - belief in the technology
Other factors - bias towards popular, existing technology
Other factors - change management
Other factors - complexity of technology
Other factors - concern around that new technology equals automation (and job loss)
Other factors - concern that if I transfer technological knowledge, I am no longer needed
Other factors - cost
Other factors - cost of technology developers
Other factors - cost-constraints
Other factors - culture (of Indian and Chinese)
Other factors - current software infrastructure
Other factors - customers
Other factors - data
Other factors - degree of capital investment allowed
Other factors - degree of collaboration
Other factors - degree of marketing of new technology
Other factors - degree of ownership to learn new technology
Other factors - development weather
Other factors - disposable income of consumers
Other factors - does it serve the customer?
Other factors - employee skill learnership
Other factors - every person of the value chain
Other factors - existing infrastructure
Other factors - expected growth of geographical zone
Other factors - fear of technology within country
Other factors - first mover advantage
Other factors - flat structure
Other factors - gender
Other factors - geographical legal and compliance aspects
Other factors - government
Other factors - growing complexity in business
Other factors - historically low technology skill base in country
Other factors - how you structure goals
Other factors - HR polices and systems (internal and external)

Other factors - infrastructure and connectivity constraints
Other factors - internal politics (who brought in the last technology)
Other factors - investors
Other factors - iterative development of existing systems
Other factors - lack of understanding of digital technologies
Other factors - legacy systems
Other factors - legal aspect
Other factors - level of communication
Other factors - level of complexity
Other factors - level of education
Other factors - level of financing provided to research
Other factors - level of tech-savviness
Other factors - local communities
Other factors - location of technology development
Other factors - misinformation and people's understanding of new technology
Other factors - new employees that bring with them understanding of working technologies
Other factors - opportunities being dependent on economic growth of geographical zone
Other factors - organisation's motivational strategies
Other factors - P&L benefit
Other factors - people
Other factors - people's fascination with new technology
Other factors - perception that technology is complex
Other factors - perception that technology is expensive
Other factors - personal relationships with decision-makers and customer
Other factors - pricing of new technology
Other factors - provision of well-educated, very cost-effective labour
Other factors - relative costs in each market/country
Other factors - relevance of technology
Other factors - right person connections/networks
Other factors - salary (so to be able to focus and learn opposed to earning double-income)
Other factors - speed to recognise, assimilate and implement - both businesses and individuals need to be up-to-date with new stuff
Other factors - strategic direction of business
Other factors - strong meritocratic remuneration culture
Other factors - suppliers
Other factors - teamwork
Other factors - technology becoming more affordable
Other factors - that new technology takes long and requires a lot of change
Other factors - the current, common applications that people are using
Other factors - the extent of organisation's learning platforms
Other factors - the generation of customers and in country
Other factors - the interconnectivity of the world/ability to work and co-ordinate remotely
Other factors - the level of innovativeness expected within an organisational culture
Other factors - the level of support for the new technology
Other factors - the speed at which technology generates value
Other factors - the time-to-market improvement that the technology offers
Other factors - translation and language barrier

Other factors - unions
Other factors - use of open source software
Other factors - wealth of geographical zone that you're in
Other factors - weighting of capital spend on expansion projects versus digital transformation
Other factors - workload
Review and evaluation of capabilities - actively seek customer feedback
Review and evaluation of capabilities - alignment to IT refresh cycle (in-house or outsourced)
Review and evaluation of capabilities - always try new things
Review and evaluation of capabilities - analyse real time data
Review and evaluation of capabilities - audits of technology
Review and evaluation of capabilities - balanced scorecard
Review and evaluation of capabilities - consistently talk to users to get feedback
Review and evaluation of capabilities - constant monitoring of data and KPI's
Review and evaluation of capabilities - continually analyse usage number
Review and evaluation of capabilities - customers inform of errors and required improvements
Review and evaluation of capabilities - departmental ownership where they update their policies
Review and evaluation of capabilities - develop and track development roadmap
Review and evaluation of capabilities - diverse departmental decision-making
Review and evaluation of capabilities - engagements with vendors, customers
Review and evaluation of capabilities - ensure you have the latest technology and that time-to-market is short
Review and evaluation of capabilities - expectation/responsibility to make sure it remains relevant
Review and evaluation of capabilities - external company that asses comparative prices and specifications
Review and evaluation of capabilities - follow big entities to ensure you don't fall behind
Review and evaluation of capabilities - frequent check-ins of technology
Review and evaluation of capabilities - incorporate feedback into product
Review and evaluation of capabilities - internal assessments
Review and evaluation of capabilities - it's part of the culture to always want to be better
Review and evaluation of capabilities - licencing model to allow for constant enhancements
Review and evaluation of capabilities - limited deployments that are followed by extensive deployments
Review and evaluation of capabilities - making sure it always benefits changing customer needs
Review and evaluation of capabilities - monthly review cycles
Review and evaluation of capabilities - natural evolution of technology, as more people use it and give feedback
Review and evaluation of capabilities - new capability run like a separate business
Review and evaluation of capabilities - partnering with leading technology firms
Review and evaluation of capabilities - product manager needs to live, breathe, lead the product
Review and evaluation of capabilities - refresh policies
Review and evaluation of capabilities - rigorous performance routines across organisation
Review and evaluation of capabilities - rigorous testing
Review and evaluation of capabilities - seek feedback from employees
Review and evaluation of capabilities - sometimes one stakeholder with veto power
Review and evaluation of capabilities - speak with users (not management)
Review and evaluation of capabilities - update product in real-time
Total: 775