

Hussein, Mona Wagdy Abdelghaffar (2023)

Dynamic Capabilities and Expansion Opportunities in a Development Context: A Firm-level Perspective

PhD thesis. SOAS University of London

DOI: <https://doi.org/10.25501/SOAS.00039888>

<https://eprints.soas.ac.uk/39888/>

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# **Dynamic Capabilities and Expansion Opportunities in a Development Context: A Firm-level Perspective**

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Thesis submitted for the degree of PhD/MPhil

2022

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## Abstract

Firms are the engine of economic development. Extant literature shows that firms are heterogeneous in learning and capability building, and more so in their growth orientation and strategic capabilities to sense and exploit opportunities. Using the dynamic capabilities approach, particularly the framework set out by Teece (2007, 2012, 2014, 2019), this study examines how firms address expansion opportunities of scale and scope in Egypt's development context. Employing an inductive theory building from cases method (Eisenhardt, 1989; Eisenhardt & Graebner, 2007), findings show that firms' differential behaviour concerns three areas: action orientation, learning, and engaging with uncertainty. Based on three influential theories of psychology: the approach-avoidance theory, the goal orientation theory, and the attachment theory, the thesis advances four propositions. The first proposition aims to disentangle dynamic capabilities from the willingness to act under uncertainty. Dynamic capabilities are concerned more with what makes the action effective. The second proposition introduces a new construct, 'belief-enhanced capabilities', to help distinguish dynamic from 'practice-enhanced' operational capabilities. The third proposition identifies the belief in knowing, as opposed to a belief in possessing knowledge, as an important factor that drives deliberate and effective learning. The fourth proposition identifies the belief in exploring, as opposed to a belief in controlling, as an important factor that drives extensive exploration of novel alternatives. The advanced argument is that those two beliefs (in knowing and exploring) represent antecedents of dynamic capabilities. The thesis concludes by identifying four belief-based behavioural profiles that arguably explain decision-makers' differential attitudes in addressing expansion opportunities in a development context. This profiling helps set the stage for designing policy interventions that encompass a behavioural dimension.

## Acknowledgments

Firstly, I must acknowledge the gracious financial support from SOAS to pursue my PhD research in the School of Finance and Management. I would like to extend my gratitude to my supervisor Professor Christine Oughton for her constant support and intellectual insight, which guided this thesis from a stage of abstraction to the stage of concrete results. Her critical remarks have been extremely valuable. I am also greatly indebted to Professor Gary Schwarz for his support. I am grateful to Mariam El Abd and my friends Nancy Bassiouny, Karim Shalaby, and Sherif Shawky for their support. Last but not least, without the encouragement of my family, their patience and generosity, I would have not been able to complete my studies. My mother provided me with the courage to venture towards a PhD and pull through. For this, I am greatly indebted to her. It is to Dawlat ElBadawy that this thesis is dedicated.

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## Abbreviations and Acronyms

ABF	Air-Blown Fibre
ADSL	Asymmetric Digital Subscriber Line
AfCFTA	African Continental Free Trade Area
B2B	Business-to-Business
BASEC	British Approvals Service for Cables
CAGR	Compound Annual Growth Rate
CAPMAS	Central Agency for Public Mobilization and Statistics
CIP	Competitive Industrial Performance
COMESA	Common Market for Eastern and Southern Africa
CAPEX	Capital Expenditures
CBE	Central Bank of Egypt
COVID	Coronavirus Disease
EBRD	European Bank for Reconstruction and Development
ECI	Economic Complexity Index
EEHC	Egyptian Electricity Holding Company
EFTA	European Free Trade Association
EGP	Egyptian Pound
EHV	Extra High Voltage
EO	Entrepreneurial Orientation
ETI	Egyptian Telecom Incumbent
EU	European Union
FDI	Foreign Direct Investment
FiT	Feed-in-Tariff
FO	Fibre Optic
FTA	Free Trade Agreement
FTTH	Fibre-to-the-Home
GDP	Gross Domestic Product
HV	High Voltage
IFC	International Finance Corporation

IPO	Initial Public Offering
ISIC	International Standard Industrial Classification
kV	Kilovolt
LCOE	Levelized Cost of Energy
LV	Low Voltage
MFN	Most-Favoured Nation
MoEE	Ministry of Electricity and Renewable Energy
MV	Medium Voltage
MVA	Manufacturing Value Added
MW	Mega Watt
NREA	New and Renewable Energy Authority
OECD	Organisation for Economic Cooperation and Development
OEM	Original Equipment Manufacturer
PPA	Power Purchase Agreement
QDA	Qualitative Data Analysis
RE	Renewable Energy
ROO	Rule of Origin
SCP	Structure-Conduct-Performance
PV	Photovoltaic

# 1 Introduction

The business enterprise is a core engine of economic development. Decisions critical for development, such as resource allocation, expansions in scale and scope, learning, and innovation take place inside firms. If we want to understand economic development better, we need a better understanding of firms' decision-making behaviour influencing outcomes in these areas on a firm level. This study focuses on the internal workings of an emerging-market enterprise in addressing opportunities to expand scale and scope, aiming to reach a better understanding of what shapes this behaviour and how this behaviour, in turn, impacts the seizing of expansion opportunities in a development context.

The literature review starts by surveying theories concerned with what stands behind the pervasive inter-firm heterogeneity observed in almost all aspects of firm performance, including growth, profitability, and productivity. While the heterogeneity of firms was highlighted as early as Penrose (1959), a large body of research aiming to identify factors behind such heterogeneity was largely inconclusive (e.g., Coad, 2007, 2009). In researching the potential "carrier of this persistent firm-level heterogeneity" (Gavetti & Levinthal, 2004, p. 1313), scholars, broadly speaking, adopt one of two perspectives. First, an economic perspective of capabilities emphasises the role of the initial stock of resources and productive capabilities and their path-dependent evolution in driving the growth of firms. According to this perspective, the area for firms' strategic actions and policy interventions is how to accelerate learning and capability accumulation along this path-dependent trajectory. The evolutionary theory that underpins this perspective identifies "memory" and history embedded in organisational routines as the carrier of heterogeneity (Nelson & Winter, 1982, p. 115). The authors argue that, in figuring their way out of uncertainty, decision-makers rely on

memory and previous experience embedded in routines more than exploration and imagination. However, reviewed literature on productive capabilities and firms' heterogeneous growth performance shows two key puzzling phenomena: The first phenomenon is the observed incidents of unrelated capability building that are unexplained according to the path-dependence model and documented in multiple empirical studies (e.g., Coniglio et al., 2018; Neffke et al., 2018; Zhu et al., 2017). These incidents indicate that existing resources, routines, and productive capabilities of a firm do influence but do not dictate the firm's growth trajectory. This, in turn, shows that strategic choice and agency on firm-level do not succumb fully to a strict evolutionary path-dependent trajectory. The second phenomenon, which is even more striking, is the weak link observed between productivity and profitability growth, on the one hand, and sales growth, on the other (Bottazzi et al., 2010). In other words, economic efficiencies achieved from building and accumulation of productive capabilities tend to improve productivity. Nevertheless, they do not lead—directly or via improved profitability—to the growth and expansion of the firm. These findings led scholars to suggest that growth and expansion seem to be less driven by accumulating capabilities and (financial) resources and more by “idiosyncratic strategic orientations” of firms in dealing with expansion opportunities (Yu et al., 2017, p. 1033).

The second perspective on inter-firm heterogeneity adopted by scholars with strategic management orientation emphasises the role of strategic capabilities in driving the growth and expansion of firms. This perspective is rooted in both the behavioural and the evolutionary theories of the firm and represented in multiple research lines, notably, the Penrosean and the dynamic capabilities views. Both views contend that strategic capabilities, which Penrose refers to as entrepreneurial while Teece calls dynamic capabilities, are behind managerial abilities to perceive new productive opportunities to grow and to re-interpret and reconfigure existing resources and capabilities in

novel ways. This perspective with those two conjectures gives potentially valuable insights into the two puzzling phenomena of unrelated capability building and the idiosyncratic strategic orientations towards growth. Regarding the first phenomenon, scholars of this perspective argue that strategic capabilities enable firms to break away from history and use learning and exploration modes not anchored in the past to re-interpret the productive resources and capabilities of the firm, which enable them to use existing resources and capabilities in novel ways. Regarding the second, they argue that growth and expansion opportunities are subjectively perceived and created by firms more than objectively discovered and analysed. Hence, firms, based on their subjective images of opportunities, show idiosyncratic attitudes towards growth and expansion.

In this regard, the dynamic capabilities conceptualization and framework, set out by Teece (2007, 2012, 2014, 2019), managed to provide a view that partially bridges the gap between the two perspectives. The view embraces both factors of path-dependent evolution of firms' capabilities *and* strategic choice of firms, calling it 'evolution with design' (Augier & Teece, 2008). The dynamic capabilities view has rich intellectual foundations that can be traced to the evolutionary theory, the behavioural theory of the firm, the resource-based view, as well as the Penrosean view on the nature of the firm (Teece & Augier, 2009). It also recognises the two main streams of literature on firms' growth and innovation, as it is based on the capabilities theory of the firm, and, at the same time, has a Schumpeterian orientation (Teece, 2007). However, in the two decades since its original appearance, literature has been split in two different conceptual views on the nature, and consequently, antecedents of dynamic capabilities.

Initially, dynamic capabilities were defined as organizational processes (Eisenhardt & Martin, 2000), or as comprising processual micro-foundations (Teece et al., 1997; Teece, 2007). However, in developing the concept further, scholars took different paths in theorizing about nature and

antecedents of dynamic capabilities. Two major streams emerged with one giving more emphasis to dynamic routines and processes of the organization and the other giving a balanced view of organisational routines and cognitive abilities of decision-makers. The chasm became even wider as the balanced view of dynamic capabilities, championed by David Teece, started to move further along the evolution-agency continuum towards a more agency-based view, focusing on actors more than processes. It could be argued that this difference mirrors the chasm between Schumpeterian Mark I and Mark II views. This debate on nature and antecedents of dynamic capabilities has been going on for two decades now without signs of convergence on the horizon. However, for practical reasons, in empirical studies on dynamic capabilities in general, and in a development context in specific, scholars quite often choose to adopt the pure process view in defining and operationalising dynamic capabilities (Kump et al., 2018), despite the shortcomings of the pure process view when used to study contexts that involve change and uncertainty. Scholars argue that managing change cannot be based on processes alone that belong to the dominant logic that produced them (e.g., Danneels, 2011; Schreyögg & Kliesch-Eberl, 2007; Tripsas & Gavetti, 2000). Managing change has to be enabled by capabilities that are “non-routine” in nature (Teece, 2012, p. 1397; Teece, 2023; p. 122) to overcome the inherent risk of becoming rigid and trapped in old patterns of thinking and acting when addressing changing contexts.

Reviewed literature also suggests a lag in investigating the concept in the setting of a development context. Much of the scholarly work on the dynamic capabilities concept emerged to address advanced country questions about the capabilities required to enhance R&D-based competitiveness at the technology frontier (Khan, 2019). While this understanding is important, it needs to be modified to address quite different problems faced by far-from-the-frontier firms, such as acquiring competitiveness in industries, in which technical knowledge is likely to be partially



or fully globally diffused, and in a “sino-centric world”, where the cost alone cannot support competitiveness (Cimoli et al., 2009a, p. 10).

To sum up, a) the conflicting views about the primacy of productive versus strategic capabilities in determining firms’ growth and expansion, b) the contested area about nature and antecedents of dynamic capabilities, and, adding to that, c) the less investigated development context in dynamic capabilities literature and d) its skew towards adopting a process view in operationalizing dynamic capabilities all represent a compounded research gap of contradicting views, contextual gap, and methodological gap that this study targets to address.

The thesis adopts the areas that are almost uncontested in the economic and strategic management perspectives of capabilities as a point of departure, namely the centrality of organisational capabilities in explaining firms’ heterogeneous growth performance, the importance of seizing opportunities in firms’ catchup performance, and the importance of dynamic capabilities as a concept in capturing the critical factor(s) behind firms’ ability to deal with change and uncertainty inherent in growth and expansion. The study formulates its research questions to contribute to two identified areas of contention in literature: the debate about the roles of productive versus strategic capabilities in enabling firms to successfully address expansion opportunities, and the debate about the nature and antecedents of dynamic capabilities in managing change and uncertainty associated with expansion opportunities in a development context. The research setting constitutes examining three cases of medium- and high-tech firms in the development context of Egypt.

The level of analysis is the firm operating in a developing context. The study analyses the decision-making response to expansion opportunities that open up due to changing conditions and the effects of this behaviour on the opportunity exploitation outcome. The unit of analysis is the events of expansion opportunities opening up due to environmental changes as they provide prospects for

firms to grow in scale and scope. Firms' response to these opportunities represents instances of strategic change that put to test firms' abilities to innovate, compete, and reconfigure capabilities, making them most fitting to study dynamic capabilities at play. Using an inductive qualitative theory-building method from cases (Eisenhardt, 1989; Eisenhardt & Graebner, 2007), the researcher collects subjective and objective data to track the behaviour of decision-makers and its outcome and applies the code analysis technique to identify key patterns and advance propositions.

The research findings from the detailed case studies are reconciled with literature in multiple domains to develop and propose four preliminary propositions on capabilities that influence firms' behaviour in addressing expansion opportunities of scale and scope and what constitute antecedents of dynamic capabilities in a development context that enable firms manage change and uncertainty inherent in expansion opportunities.

First, dynamic capabilities depend on the willingness to act under uncertainty, but willingness alone does not guarantee the effectiveness of action. The willingness to act is responsible for initiating and sustaining the action, whereas dynamic capabilities is concerned with its effectiveness. This difference distinguishes the dynamic-capabilities concept from other constructs, mainly entrepreneurship, which emphasize risk-taking, proactiveness (e.g., Lumpkin & Dess, 1996; Miller, 1983) and overconfidence (e.g., Bernardo & Welch, 2001; Hayward et al., 2006). Regarding what determines the effectiveness of action under uncertainty, case study evidence highlights two critical factors which seem to separate success from failure at a time of change: engagement with learning (i.e. knowable unknowns) and engagement with uncertainty (i.e. unknowable unknowns). The argument is that change opens up new spaces for learning and other spaces for creation. Effective action at the time of change must comprise effective learning about the new objective realities *and* shaping these new realities by creating novel combinations.

Meaning, effective action is a combined outcome of learning, which involves being influenced and shaped by the external state, and creation, which involves influencing and shaping the external state.

The second proposition deals with the much-emphasised role of productive capabilities in the growth of firms. While case study evidence shows that productive capabilities are integral to the effective expansion of scale and scope, strategic (dynamic) capabilities precede and steer their development, acquisition, and deployment. Hypothesising the nature of dynamic capabilities that sets them apart from productive and operational capabilities, the thesis proposes that dynamic capabilities, unlike productive capabilities, do not seem to gain their quality from knowledge transfer, practice, and repetition. They are enhanced by specific tacit beliefs that influence how decision-makers perceive and engage with learning and exploring the unknown. Thus, dynamic capabilities are belief-enhanced, rather than practice-enhanced, capabilities.

Third, regarding tacit beliefs about learning, drawing on educational psychology, specifically the goal orientation theory, people adopt one of two beliefs regarding knowledge and learning: a belief in extant knowledge and abilities or a belief in continuously knowing more and better (Ames & Archer, 1988; Dweck, 1999, 2008; Elliot, 1999). Those, who hold the first view (entity view), treat knowledge and abilities as resources, which should always be leveraged. They accept information that confirms what they know and builds on it and are less ready to accept what could challenge the value of what they already have, i.e. know. Conversely, those who hold the second view (incremental view) perceive knowledge not as a resource but more as a process. They engage in learning opportunities to achieve a better understanding, increase their competence, and master new abilities. At a time of change, those who hold the second view are in a better position to manage the new spaces of learning that open up.

Fourth, regarding tacit beliefs in dealing with unknowable unknowns, attachment theory (Bowlby 1969/1982, 1973, 1980) posits that the need for security intervenes with exploring the unknown. The individual requires a “secure base” from which to explore the environment (Bowlby, 1979). People, who have this secure base internalized, are able to engage fully with exploring the environment, undeterred by the high risk of failure. Those who do not have this secure base arguably tend to prefer what is familiar because it gives them comfort and a sense of predictability (i.e. control) about the outcome. At a time of change, those who have this secure base internalised or embedded in the organisational culture are in a better position to explore the new spaces of creation that open up.

To conclude, the study, with its findings and propositions, gives insights into the behavioural dimension of dynamic capabilities. It proposes that the belief system of decision-makers shapes how they engage with knowable and unknowable unknowns, influencing behaviour and forming part of the antecedents of dynamic capabilities that precede and steer the development and deployment of productive capabilities. The thesis concludes by identifying four belief-based behavioural profiles that arguably explain decision-makers’ differential attitudes in addressing expansion opportunities in a development context.

The thesis contributes to knowledge on four fronts. As a first step to theorising about the nature of dynamic capabilities, we disentangled the concept from other neighbouring concepts, like entrepreneurship, understood as an urge to act under uncertainty. Second, we introduced a new construct in the dynamic capabilities literature, which is ‘belief-enhanced capabilities’ to distinguish them from ‘practice-enhanced’ productive capabilities. We believe this construct help elaborate and integrate the so far less explored behavioural aspect of dynamic capabilities. Third, we proposed potential antecedents of the dynamic capabilities pertinent to addressing expansion

opportunities in a development context, which advances the theoretical research agenda initiated by Teece (2007), and answers Zollo and Winter's (2002) question concerning where dynamic capabilities come from. Fourth, the proposed behavioural profiles of firms that influence the way they approach growth and expansion opportunities in a development context inform policy making discourse and open the door for integrating a behavioural dimension in policy design.

The thesis is structured as follows. Chapter Two covers the literature review. Chapter Three sets out the research questions and details of the research methodology followed to examine the subject. Chapter Four gives a brief look at Egypt's economic context. Chapters Five, Six, and Seven present the narratives and within-case analyses of the three cases. Chapter Eight comprises a cross-case analysis and reconciliation of findings with extant literature. Chapter Nine presents research synthesis and propositions. Chapter Ten sets out some tentative conclusions, policy implications, research limitations, and suggestions for future research.

## 2 Literature Review

The overarching research question is: *in a development context, what stands behind the differential response and outcomes of firms in addressing opportunities to expand scale and scope?* To frame our review, it is important to highlight what is excluded before discussing what is included. First, the neoclassical approach with the “representative firm” paradigm, in which firms are treated as homogeneous entities with undifferentiated decision behaviour and performance, would be an inadequate theory to examine the question of what stands behind firms’ heterogeneous performance. Second, institutional and industrial policy factors pertaining to property rights, market competition, learning and innovation, coordination, and so on can influence firms’ productivity only to some extent. Firms operating within the same national innovation system and subject to the same industry policies still demonstrate heterogeneous outcomes (e.g., Figueiredo, 2002, 2003). Thus, institutional economics (e.g., North, 1990, 2000; North et al., 2009), industrial policy (e.g., Cimoli et al., 2009a), and other research lines on systemic level factors are not included in the literature review.

We begin by reviewing theoretical work concerning sources of firms’ heterogeneity in performance. We, then, focus on the capabilities theory of the firm and review the economic and strategic management perspectives of capabilities. Within the strategic perspective, we focus on dynamic capabilities literature. Admittedly, it is impossible to enumerate all key contributions that are worth reviewing. We hope we have selected the ones that help illustrate the different perspectives concerning the subject.

## 2.1 Heterogeneity & Firm-Level Perspective of Development

Traditionally, the literature on the process of development has been following the conventional neoclassical theory that treats firms as homogeneous optimizing entities. Accordingly, scholars have focused on aggregate units such as countries or regions (Barro et al., 1991; Barro & Sala-i-Martin, 1992). In this paradigm, the ‘representative firm’ (i.e. representing all firms in a country or region) converges towards an established and well-known best-practice or technology frontier. If that were true, then a firm-level examination of development would be unwarranted. Perhaps the first to challenge that paradigm was the British economist Edith Penrose in her book *The Theory of the Growth of the Firm* (1959). Her conceptualization of the firm and the sources of its growth painted a different picture.

### *Penrose’s theory*

Penrose contends that firms are heterogeneous, and firm-specific resources, knowledge, and capabilities are the source of this observed heterogeneity. Unlike the neoclassical view, in which demand is exogenously determined by environmental forces, Penrose’s (1959) resources approach also recognizes the close relationship between the entrepreneur and the opportunities that open up in the external environment. This approach implies that inter-firm heterogeneity in performance is “at least in part, a direct result of heterogeneity of entrepreneurial beliefs and the heterogeneity of other resources and capabilities of firms” (Kor et al., 2007, p. 1190). A firm’s pool of unused productive services of resources interacts with the vision of entrepreneurs to create subjective productive opportunities for each firm, which is the source of firm heterogeneity. As such, her

choice of the “carrier” of firm-level heterogeneity is the interplay of firms’ resources and capabilities and the entrepreneurial subjective image of opportunities.

Penrose’s reconceptualization of the firm and the origins of its growth took some time to make inroads in the economic literature. The slowdown of the United States’ productivity in the seventies and eighties of the last century led to a series of scholarly studies (e.g., Chew et al., 1989; McKinsey, 1993; Salter, 1969) investigating the productivity and productivity growth on firm level. The observed inter-firm heterogeneity revived the interest in Penrose’s work. Recently, large micro-level data (LMD)-based empirical studies confirmed what case studies had uncovered before, namely a high degree of inter-firm heterogeneity even within the same firm among different plants (Chew et al., 1989; Doms & Bartelsman, 2000). This applies to developed countries (Dosi, 2007; OECD, 2015; Syverson, 2011) and even more so to emerging economies (Yu et al., 2017). The inter-firm heterogeneity within industries became a research area of major importance in both economics and strategic management literature. In this regard, the evolutionary theory of economics (Nelson & Winter, 1982), with its behavioural underpinnings, makes one of the seminal contributions to the subject.

### *The Evolutionary Theory*

While Penrose chose to “cultivate her own garden” (P. Penrose & Pitelis, 1999, p. 18), Nelson and Winter’s (1982) evolutionary theory was no less than a “frontal assault” on the prevailing body of neoclassical economics (Gavetti & Menon, 2016, p. 214). Provoked by the gap between the image conjured by assumptions of rationality at the individual level and equilibrium at the system level, on the one hand, and the observed persistent heterogeneity in capabilities and behaviour of firms,



on the other, the authors looked for more realistic assumptions to explain firms' behaviour and were more inspired by the work of March and Simon (1958) and Cyert and March (1963) (Gavetti & Levinthal, 2004).

Nelson and Winter (1982) explain that the root cause of firms' heterogeneity is decision-makers' inability to predict the future with any level of accuracy due to their bounded rationality and the enormous complexity of the system. "In coping with exogenous change and in trying out new techniques and policies, firms have but limited bases for judging what will work best; they may even have difficulty establishing the range of plausible alternatives to be considered." (1982, p. 399). As a result, they rely in making decisions about the future on their 'memory', i.e. past experiences embedded in routines and processes, which are heterogeneous among firms. As such, the authors' choice of the "carrier" of firm-level heterogeneity is organisational routines. As Nelson and Winter's routines represented the building blocks of organizational capabilities (Dosi et al., 2000; Nelson & Winter, 1982; Winter, 2000), the evolutionary theory formed the basis for the capabilities-based-view (CBV) and the capabilities accumulation literature that shaped the economic perspective of inter-firm heterogeneity in a development context.

We could say that both Penrose's theory of the growth of firms and Nelson and Winter's evolutionary theory with its behavioural underpinnings represent the common grounds between economics and strategic management with respect to the subject of inter-firm heterogeneity. The two theories reject the neoclassical approach with its key assumptions and introduce a new conceptualization of the firm that is heterogeneous at its core. They both agree that at each point in time, the opportunities confronting firms—and their ability to respond to them—are shaped by the idiosyncratic and specific nature of past decision-making within each firm, resources and capabilities, which have been accumulated so far, and organisational routines, which have been

developed. While Penrose explicitly embraces the entrepreneurial component of management in her theory, the evolutionary theory does not. Although Nelson and Pack commented on the Asian Miracle in 1999, saying, “To do this [Asian miracle] was far from a routine matter, but involved risk-taking entrepreneurship as well as good management.” (1999, p. 418), the evolutionary theory treatise is based on a neo-Schumpeterian approach to innovation. Meaning, the authors adopt Schumpeter’s Mark II view, which posits that innovation has become systemized and routinized in R&D departments of large corporations, and entrepreneurs are no longer the drivers of economic development (Lazonick, 2008).

On another front, the catch-up scholars, who set out on a journey to find out the determinants of economic development on a firm level, had their own revelations. Up until the end of the 1970s, the emphasis has been on technology transfer from advanced economies to developing countries (e.g., Findlay, 1978; Krugman, 1979). During the 1980s and 1990s, a series of works questioned the ability of this story to explain the success of latecomer countries, like South Korea and Taiwan, and introduced the important role of firm learning and capabilities to absorb new technologies (e.g., Bell & Pavitt, 1993; Dutrenit, 2000; Kim, 1997; Lall, 1992; Mathews, 2002), building on the earlier ‘absorptive capacity’ work of Adler (1965) and Chenery and Strout (1966). This capabilities view was complemented with work on systemic-level learning and capability building under the theme of the national system of innovation (Freeman, 1987; Lundvall, 1992). Since then, the view that emphasises the factor of technological capabilities and its accumulation at firm level dominated the catch-up literature (e.g., Aistleitner et al., 2021; Dosi & Yu, 2018).

As such, the line of research on the heterogeneity of firms’ performance intersects with that on the catch-up of late-coming firms, and the point of intersection is the capabilities theory of the firm, which is currently considered the widely accepted theory that offers an explanation to firms’

heterogeneity. In reviewing this literature in the next two sections, we separate between two strands, one strand with an economic orientation and mainly focuses on productive capabilities and another strand with strategic management orientation and focuses on strategic and entrepreneurial capabilities.

## 2.2 Economic Perspective of Capabilities

The use of the word “capability” conveys multiple features. First, it implies an act with a specific purpose to produce something with functionality that serves the purpose (e.g., Dosi et al., 2000; Helfat et al., 2007; Winter, 2003). Second, the word also implies the ability to repeat the activity and produce a consistent outcome (Helfat & Winter, 2011; Winter, 2000, 2003). Combining these features, Loasby (2010) provides a definition for the generic concept, saying that it “implies the potential to deliver consistent performance within a specified field by repeated applications of established patterns of behaviour, which constitute knowledge how.” (2010, p. 1303).

Based on the evolutionary theory, the organisational capabilities view of economic growth (i.e. the capabilities-based-view) emphasises the role of firms as “repositories” of economic knowledge (Dosi et al., 2005, p. 32) and learning as the way of refreshing these repositories. As such, firm-level capabilities have been studied in two main research traditions. The first addresses learning in general, while the second focuses on capability accumulation in late-industrializing economies. First, we review in brief important scholarly work on learning and then move to the capabilities accumulation literature.

## 2.2.1 Learning and Capability Accumulation

### *Learning*

In his seminal work *The Learning Economy and the Economics of Hope*, Lundvall (2016) states, “It is assumed that the most fundamental resource in the modern economy is knowledge and accordingly that the most important process is learning.” (2016, p. 85). Knowledge acquisition refers to the scientific, technological, organisational, or general knowledge (Lane et al., 2006) acquired by a firm from outside. One strand of literature addresses organisational learning in general (e.g., Argyris & Schoen, 1978; Hedberg, 1981; Levitt & March, 1988; Levinthal & March, 1993), and the other focuses on technological learning in specific (e.g., Cohen & Levinthal, 1989, 1990; Kim, 1997, 1998; Leonard-Barton, 1992, 1995; Pisano, 1994; Rosenberg, 1983)

Under the second strand, learning is understood as the various processes by which additional technical skills and knowledge are acquired by individuals and, through them, by firms (Bell, 1984). Learning enables firms to accumulate new competencies and capabilities. Thus, “learning is at the core of any process of development” (Lundvall & Lema, 2014, p. 455). Nelson and Pack (1999) argue that “if...one marshals [inputs] but does not innovate and learn, development does not follow” (1999, p. 434). Given the voluminous literature on learning, we select a few studies that are related to learning in a development context and discuss very briefly the role of learning versus innovation, systemic versus intra-firm learning, and the speed and intensity of learning.

### *Learning versus Innovation*

The literature concerned with the economic development of late coming economies focuses on learning more than innovation, which implies that what takes place in a developing context is

learning to imitate productive activities that already take place in developed economies. Growth theories identify the distance from the world technology frontier as a key determinant of whether firms are likely to engage in innovation or in imitation (i.e. learning) of established products and technologies (Acemoglu et al., 2006). Scholars contend that technological learning throughout the catching-up process, and especially in its early phase, involves a lot of imitation, reverse engineering, marginal modifications of products and processes, and “straightforward copying.” (Cimoli et al., 2009b, p. 15). For instance, at the early stage of Chinese industrialization, Chinese firms were engaged for a considerable period of time with learning through imitation, reverse engineering, and far-from-the-frontier innovation (Xiao et al., 2013). Innovation has rarely been mentioned in Huawei’s internal documents, remark Tian and Wu (2015). Zhang (2011) notes that Huawei’s top executives, including the founder Ren Zhengfei, warned against too radical change or innovation. Perhaps Amsden conveys this message clearly by saying, “Late industrialization...is devoid of innovation and occurs on the basis of learning. Learning involves borrowing, adapting, and improving upon foreign designs.” (Amsden, 1989, p. 140).

Departing from this strict technological perspective of innovation, Noman and Stiglitz (2016) define innovation in broader terms and assert that what is going on in developing economies most certainly is innovation in the sense that there is a break from past familiar practices, considerable uncertainty about how to make the new practice work effectively, a need for sophisticated learning by doing and by using, high risk of failure, as well as major potential payoff from success.

### *Systemic and Intra-firm Learning*

Systemic learning literature focuses on the role of national systems of innovation (e.g., Freeman, 1987; Lundvall, 1992). According to this strand, the innovative process is not the outcome of an individual process of learning and capability accumulation. It is placed and determined within a larger system that supports and benefits from it (e.g., Freeman, 1987; Lundvall, 1992; Nelson & Rosenberg, 1993; Patel & Pavitt, 1994). Learning originates from the interaction of firms with each other, with suppliers, users, competitors, as well as institutions and public organisations. On the other hand, while the firm's successful technological learning "requires" an effective national innovation systems (Kim, 1997, p. 219), Figueiredo's (2002, 2003) empirical work reveals that firms operating under the same national and sectorial conditions tend to accumulate technical capabilities at different rates owing to the intra-firm process of learning which leads to heterogeneous outcomes among firms. He argues that firms' accumulation paths are more dependent on internal learning processes than external conditions. Kim (1998) as well emphasises the unique learning processes that Hyundai introduced inside the organization in the seventies and eighties of the last century to intensify and speed up learning and capability upgrades.

### *Differential Rate of Learning*

Given the importance of learning as the core of the capability accumulation process, it follows that the faster the pace of learning proceeds, the higher the average level of capabilities of a firm and a country. Different scholars engage in studying what affects the rate of learning and learning outcomes. In multiple papers, Cohen and Levinthal (1989, 1990, 1994) emphasise that firms generate knowledge internally but also enhance their ability to leverage knowledge external to

them, and they call the second “Absorptive Capacity”. The absorptive capacity of a firm is fundamentally about learning (Cohen & Levinthal, 1989). In a subsequent paper, the authors argue that prior knowledge substantially affects the learning process and its outcome “because prior related knowledge confers an ability to recognize the value of new information, assimilate it, and apply it to commercial ends” (1990, p. 128). This characteristic makes the absorptive knowledge base dimension cumulative and path-dependent, which we will discuss later. Second, Cohen and Levinthal argue that the “intensity of effort is critical” in acquiring new knowledge, and the rate of acquisition is critical because “it is insufficient merely to expose an individual briefly to the relevant prior knowledge (1990, p. 131).

Based on the work of Cohen and Levinthal (1990), Kim (1998) investigates the case of Hyundai transforming itself from a mere assembler of Ford models to a designer and exporter of its own cars and reports important insights about learning in a catch-up context. First, Hyundai used migratory knowledge to raise the level of prior knowledge base. Second, management constructed internal crisis conditions to intensify efforts and expedite learning inside the organisation, which emphasises not only the extant stock of knowledge and learning abilities but also the motivation behind learning. In a similar vein, Winter (2000) posits that the level of aspiration is a determining factor of the amount of learning invested in acquiring a capability because reaching a satisficing outcome would end the learning process. As such, low aspirations would lead to an early end to learning and a relatively inferior achievement in capability. High aspiration levels, on the other hand, are conducive to “protracted learning” and a stronger capability outcome (2000, p. 987). He adds that aspiration levels are not static. They are dynamic in the sense that multiple external factors, like competitive pressure, could raise or lower them.

In a comparative case study investigating the source of differences in technological capabilities accumulation in two steel companies in Brazil, Figueiredo (2003) reports a number of findings. First, learning processes inside firms play a significant role in explaining the differential rate in accumulated capabilities. Second, intensity and functioning are two key features of learning processes required to yield an effective and speedy capabilities accumulation inside firms.

### *Capability Accumulation*

Sutton argues in his book *Competing in capabilities: The globalization process* (2012) that “The proximate cause [of differences in the wealth of nations] lies, for the most part, in the capabilities of firms” (2012, p. 8). Capabilities referred to in this paradigm are the production capabilities, technological and organizational, needed for the execution and improvement of production functions in production units (Richardson, 1972; Sutton, 2012). Dosi et al. (2008) distinguish between technological and organisational capabilities. Whereas technological knowledge concerns “the structure of the (physical) world” and routines regarding ‘how to handle it’, organisational capabilities, on the other hand, are knowledge and routines concerns “how to handle people” (2008, p. 1170). The accumulation of technological capabilities in terms of skills, knowledge and routines (Bell & Pavitt, 1995; Cohen & Levinthal, 1990; Dosi et al., 2000) is the key factor that explains the catch-up outcome of a firm and a country. As Yu et al. (2017) put it, “the ‘unbound Prometheus’ systematically accumulating and improving technological and organisational knowledge is a crucial deus ex machina of the early industrialization of almost three centuries ago as well as of subsequent episodes of development” (2017, p. 1021). Hidalgo and Hausmann (2009) show “countries tend to approach the level of income associated with the capability set available in them” (2009, p. 10570). On the firm level, Aharonson and Schilling (2016) maintain that



technological capabilities were found to be “central to [a firm’s] identity, its strategies, and its potential for success” (2016, p. 81). Several papers have provided an empirical account of the relationship between capability accumulation and firms’ performances. Figueiredo (2002), for instance, shows that inter-firm differences in technological capability accumulation explain a large portion of the increase in operational performance of Brazilian steel companies. Similarly, Mu and Lee (2005) investigate the growth of technological capabilities in the telecommunication industry in China and find that they are of key importance in favouring industrial growth. As such, evidence supports the argument that the long-term accumulation of advanced capabilities by domestic firms represents a necessary condition for better firm performance and catching up with leading global incumbents.

### *Path Dependence*

It is easier to produce new products that require capabilities already present in the local economy rather than those requiring new capabilities that are currently non-existent. Thus, the set of available local capabilities guides the processes of learning and building new capabilities inside firms, regions, and countries. This *Principle of Relatedness* (Hidalgo et al., 2018) in capability building is highlighted as early as the rise of the capability theory itself. Richardson, in his article *The Organization of Industry* (1972), introduces the concept of organisational capabilities and argues that organisations tend to specialise in activities that draw on the same set of capabilities, leading “a firm into a (coherent) variety of markets and a (coherent) variety of product lines” (Dosi et al., 2008, p. 1169).

Numerous empirical investigations support the notion that accumulation and relatedness is indeed key characteristic of the knowledge generation process on national, regional, and firm levels in both developing and developed countries. Using the patenting activity of 65 countries, Petralia et al. (2017) show that the development of new technologies is a highly cumulative and path-dependent process in which technological upgrading emerges out of preexisting knowledge bases. They argue, “It is important to understand that developing strong capabilities and leadership in technologies out of the blue is nearly impossible.” (2017, p. 964). Hausmann and Klinger (2007) and Hidalgo et al. (2007), using the Product Space, which is a network of relatedness between 774 globally produced and exported products, confirm a general pattern of path dependency in the newly introduced products of a country to its export basket. The authors assert that new products use the same productive capabilities of preexisting products in the export basket.

Regionally, using plant-level data for 70 Swedish regions in the period 1962-2002, Neffke et al. (2011) report evidence of path-dependent evolution of long-term production diversification of regions. On firm level, Lo Turco and Maggioni (2016), using Turkish firm-level data, show that the existing firm capabilities and local capabilities drive firms’ product portfolio. The study also shows that firm-specific capabilities, more than existing provincial capabilities, explain what firms produce. Analogous results are found by Cirera et al. (2012) in Brazil. The authors document that trade diversification mostly stems from related sectors. Diversification in sectors that are unrelated to the preexisting production basket is less frequent. Breschi et al. 2003 show that knowledge-relatedness is a major feature of firms’ innovative activities. Several other empirical studies confirm expansion to related products (e.g., Poncet & de Waldemar, 2013, 2015). Using a different measure of capability relatedness, Neffke and Henning (2013) use labour flows among industries as an indication of relatedness and report that firms are over 100 times more likely to diversify

into industries to which the firms' core industries are strongly skill related in comparison with industries for which such skill-relatedness linkages are weak. All these studies corroborate the evidence that extant capabilities determine the direction of new capability building and, at the same time, constrain moving to unrelated capabilities. In other words, the set of available capabilities shapes the introduction of new products by firms and directs their growth strategies.

### *Unrelated Capability Building*

Although path-dependent capability accumulation is found to be the dominant mode of knowledge generation, its adverse effects on sustaining the competitive advantage of firms and on the catch-up process of countries were also empirically recognised and documented. Evidence shows that the path dependency of the accumulation mode can explain why firms fail to sustain their competitive advantage (Christensen, 1997). Extant specialisation may hinder moving to products of the new technological paradigms, which offer richer market opportunities compared to old technologies (e.g., Aistleitner et al., 2021). For instance, despite observing a highly cumulative mode of capability building in the patenting activities of countries, Petralia et al. (2017) warn against policies that support only technologies that are closely related to existing capabilities. “Such a development strategy won’t be risky in the short run, but it can lock-in technological development of countries in the long run” (2017, p. 964). Authors contend that policies should not be designed to reinforce the observed path-dependent process. In incentivizing micro-level innovation, policymakers should take some risk in promoting not-too-related technological jumps. Even proponents of capability accumulation as the primary factor in catch-up admit that “the acquiescence to the revealed comparative advantages” one country inherits from its past cannot

set the country on a high-growth trajectory. Productive forces of a nation “must be purposefully constructed” (Cimoli et al., 2008, p. 3).

Due to the importance of the role of unrelated upgrades on the growth trajectory of the economy, different scholars started to examine the questions of if and when path-breaking moves take and could take place. Regarding the *IF* question, scholars conduct a number of researches to check in hindsight if new products that were introduced to the export portfolio of a country were all ‘related’. For instance, Bustos and Yildirim (2017) run an interesting exercise on the product portfolio of China to identify what would have been suggested to Chinese policymakers as the potential product moves in 2000 given China’s extant capabilities at the time, and then they compare this suggestion list with what actually took place by 2010. The comparison reveals that China has indeed a) successfully moved to some of the products in the suggested list, b) did not move to some other products that were suggested, and c), finally, moved to totally new products that were not suggested and were unrelated to its extant production capabilities back in 2000. Approximately 60% of the product moves China made within this period are considered unrelated product moves, according to the criteria set by the report. Zhu et al. (2017) use export data of Chinese regions and reached findings that confirmed the national level findings; unrelated moves took place across all Chinese regions. These findings indicate that the initial capability and resource base of a firm, region, and country does influence but does not dictate the structural change path. The mixed profile of related and unrelated capability building—although the latter is less frequent—presents a less evolutionary view of learning and diversification than previously anticipated.

To investigate the ‘when’ question, Coniglio et al. (2018) find that, on average, approximately 30% of new goods that enter the export basket of Italian provinces are largely unrelated to the

preexisting comparative advantage, and this percentage increases at crisis times (2007-2011) compared to non-crisis times (2002-2006). Researching Swedish regions' diversification moves between 1994 and 2010, Neffke et al. (2018) find that while having access to the same local capability base, start-ups and nonlocal firms make more unrelated moves than established and local firms do. Incumbent companies tend to reinforce a region's existing capability base and deepen its specialisation, whereas nonlocal companies tend to diversify into unrelated products.

To summarize, the economic perspective of the capability theory posits that learning and capability accumulation are at the heart of firms' growth and catch up, as they are the crux of closing the gap with more advanced players in an industry. Scholars of this perspective explain that the initial stock of resources and capabilities is different from one firm to the other and from one economy to the other. This initial differential position is enough to explain the heterogeneity of firms' growth performance. Adding to that, firms are also heterogeneous in the rate of learning and capability accumulation. Second, diversification into related products seems to take place naturally through the evolutionary process, while unrelated diversification takes place infrequently, sometimes by established firms, but mostly by start-up companies, under crisis conditions, or through the heavy involvement of the state.

Before leaving the economic domain, another aspect related to capability accumulation has concerned economic scholars lately, namely the relationship between capabilities and growth. If firms learn and accumulate capabilities in their industries, achieving higher productivity levels, do they subsequently grow in sales and employment?

### 2.2.2 The Capabilities-Growth Nexus

While capability accumulation is the driver of growing productivity, economists expected that productivity would, in turn, drive profitability and (sales) growth. Yu, Dosi, and colleagues (2017) state that “persistent heterogeneity in productivity ought to have some systematic, direct or indirect, effect upon corporate performances and in particular corporate growth.” (Yu et al., 2017, p. 1022). The explosion of microdata has enabled economists to examine this productivity-growth link. Empirical studies examined this relationship in two forms: a) the direct relation between productivity and growth b) and the indirect relationship mediated by profitability. In examining the two forms in the case of Italy and France, Bottazzi et al. (2010) report that the relative productivity appears to “explain” roughly between 3% and 5% of the overall variance in sales growth in all sectors in both countries. Authors report that “Greater degrees of efficiency are indeed robustly associated with higher profitability, but the latter does not display any straightforward association with growth,” (2010, p. 1977), adding that “the links between efficiency (and innovation), on the one hand, and corporate growth, on the other, are likely to be profoundly mediated by large degrees of behavioural freedom, in terms, e.g. of propensities to invest, export, expand abroad, pricing strategies, and patterns of diversification.” (2010, p. 1986). The authors conclude that “corporate growth seems to be driven much more by elusive and idiosyncratic animal spirits” (2010, p. 1987).

In exploring the extent to which firm growth rates are shaped by relative productivity levels (i.e. inter-firm variation) and productivity variations (i.e. intra-firm variation over time), Yu et al.

(2017) report a “mild” relation between firms’ relative productivity levels and growth levels<sup>1</sup>, reiterating Bottazzi et. al.’s (2010) key finding that “firms’ fixed idiosyncratic strategic orientations play a prominent role” in explaining the different patterns of firms’ growth (2017, p. 1033). This is consistent with earlier studies (e.g., Coad, 2007, 2009) which found no robust association between profitability and subsequent growth.

In general, these empirical findings suggest that growth decisions are shaped by firms’ strategic orientations more than by the microeconomics-presumed link between productivity and growth. In other words, while capability accumulation may have achieved better firm productivity, there is no evidence that capability accumulation and resultant productivity are directly or indirectly linked to firms’ growth in terms of sales and employment. In unpacking the factor of this idiosyncratic behaviour, two lines of research in the realm of economics could be helpful in this regard: the role of growth opportunities, researched under the term ‘windows of opportunity’, and the role of growth disposition, researched under many terms including ‘entrepreneurial orientation’.

### *Opportunities for Growth*

Under the ‘window of opportunity’ catch-up strand, catch-up is conceptualised as a potential outcome of a ‘window of opportunity’; technological, demand, or institutional, opening up

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<sup>1</sup> In email correspondence with Professor Yu, she explained what is meant by "relative productivity" by saying: “relative productivity means firm *i* (in year *t*)’s productivity relative to the industry average productivity”. July, 2022

exogenously sensed and seized upon by latecoming firms to forge ahead in a way that cannot be explained alone by the level of capabilities accumulated so far. While the capabilities-based-view is an inside-out view of catch-up, the ‘window of opportunity’ is an outside-in view.

Starting from the eighties of the last century, an outward-oriented approach focusing on exogenous changes that generate opportunities for growth found inroads into the catch-up literature under the theme ‘windows of opportunity’. Perez and Soete (1988) are the first to introduce the concept of “windows of opportunity” to refer to the role of the rise of new techno-economic paradigms in the leapfrogging of late-coming firms and countries who take advantage of a new paradigm and overtake incumbents. Perez and Soete (1988) and Freeman and Soete (1997) argue that the emergence of radical discontinuities in technological evolutions opens windows of opportunity for less developed countries to escape the vicious circle. The requirements for entry into new products within new technology systems are relatively low with regard to accumulated knowledge, capabilities, and skills, and that would make them ideal for developing countries that would potentially be in a relatively advantageous position compared to countries that had accumulated assets in the now superseded technology systems.

Lee and Malerba (2017) extend Perez and Soete’s (1988) windows of opportunity approach and argue that catch-up and the change of industrial ranking– regionally or globally– are the outcome of a combination of some discontinuities emerging along three dimensions of a sectoral system: technology, demand and policy/institutions, on the one hand, and the responses to these windows by firms and other parts of the sectoral system, on the other. While confirming the critical role of capability accumulation and learning in the catch-up process, Lee and Malerba (2017) contend that accumulation alone is insufficient to catch up with more advanced incumbents. They emphasise the role of seizing technological, demand, and institutional opportunities for firms and countries



to narrow the gap with advanced firms. The authors assert that the successful exploitation of opportunities for growth and catching up is not to be taken for granted. On the contrary, they argue that the successful sensing and seizing of opportunities is what separates winners from losers in this process. “Firm leaders tend to become complacent and entrenched with their current success. They do not pay attention to new technologies, disruptive innovations, new types of demand, or newly growing markets” (Lee & Malerba, 2017, p. 340). It is worth noting that such a perspective is consistent with a stream of management and earlier economic studies that dealt with the topic of how radical, competence-destroying innovations or ‘creative destructions’ can weaken incumbents and boost the growth of newcomers (Anderson & Tushman, 1990; Christensen 1997; Tripsas 1997).

Empirically, using a history-friendly simulation, Li et al. (2019) investigate the catch-up process of Chinese firms in the mobile communication industry. They conclude that domestic firms managed to survive the infant stage by leveraging their comparative advantages (e.g., cheapness) in targeting low-end markets and accumulated technological capabilities over time that enabled them to move from the price-sensitive low-end segments to quality-sensitive high-end ones. However, contrary to the common understanding in the literature on technological discontinuities, authors found that if technological changes that take place in the telecom industry are too radical, domestic firms actually cannot catch up because, in these cases, domestic late-coming firms are competing, not with incumbent developed firms, who are burdened with the old technology, but with developed new entrants, who typically have higher initial capabilities supported by a more sophisticated national innovation system.

In sum, catch-up scholars added to the prerequisites of catch-up, besides the ability to assimilate and accumulate capabilities, the ability to sense and seize discontinuous opportunities—

technological, demand, and institutional— opening up exogenously at critical conjunctures and provide a chance for late coming firms to close the gap with established players.

### *Disposition for Growth*

Entrepreneurship is an action-oriented behaviour. To be an entrepreneur is “to act on the possibility that one has identified an opportunity worth pursuing” (McMullen & Shepherd, 2006, p. 132). The entrepreneur, with its broad definition, introduces new combinations that are new to the economy (Schumpeter 1934) or just new to the firm (Baumol, 1996; Penrose, 1959).

The entrepreneurial factor has been highlighted in the economics literature as early as Keynes’ writings in the first half of the last century. In his *General Theory of Employment, Interest, and Money* (1936), Keynes pointed out that investors usually belong to one of two types: entrepreneurs and speculators. While entrepreneurship is rooted in spontaneous optimism, speculation is rooted in cold calculus. Keynes saw in cold calculus and pecuniary motives a threat to capitalism. He explains: “if the [entrepreneurial] animal spirits are dimmed and the spontaneous optimism falters, leaving us to depend on nothing but a mathematical expectation, enterprise will fade and die” (1936, p. 161f.). Schumpeter agrees and adds that an entrepreneur’s first motivation in creating a “new combination” is not profit. The entrepreneur is prompted by the joy of winning and creating. “Profit crowns the success of the new combinations”, as it is more an expression of the value, not the motive, of the entrepreneur’s contribution to production (Uzunidis et al., 2014, p. 587). Both Keynes and Schumpeter regarded entrepreneurship as a prerequisite for the success of capitalism and warned against its decay. While Schumpeter saw entrepreneurship threatened by big

corporations, which would dissolve the emotional bond of proprietors to their firms (Schumpeter 1943, 1962), Keynes saw the threat coming from financialization (Hecker, 2020).

Theories of entrepreneurship have taken one of two forms. The first strand is concerned with the role of entrepreneurship in the economic system. Scholars of this strand argue that the “health of the economy depends on the pursuit of opportunities by prospective entrepreneurs” (Mcmullen & Shepherd, 2006, p. 132). The main function of entrepreneurship from an economic point of view is to introduce change to the system by trying things (varieties) with a high probability of failure and thus generate knowledge on a systemic level about what works and what does not. The market selection mechanism then separates the wheat from the chaff. To put it in evolutionary terms, the entrepreneur “generates variety, a few instances of which turn out to possess sufficient advantages to survive in their particular environment” (Loasby, 2010, p. 1305). Thus, according to this view, the central issue is whether entrepreneurial action occurs, not how it occurs or why. The action itself is enough to produce the required new knowledge. Proponents of this view see entrepreneurs as optimistic and over-confident agents who usually fail, but “their failure opens the way to the take-off of the industry” (Dosi & Lovallo, 1995, p. 28).

The second strand, represented by economists with strategic management orientation, e.g. Edith Penrose, David Teece, and Chris Pitelis, perceives entrepreneurs as agents with unique capabilities in imagining the future, managing change, and innovating new combinations. They are not only agents with an urge for action; they are agents with special capabilities that enable them to succeed in their novel combinations. As per Penrose, entering into new markets requires a “versatile” type of entrepreneurial services such as “the imaginative effort, the sense of timing, the instinctive recognition,” and those services are not likely to be equally available to all firms (Penrose 1959, p. 37). The entrepreneurial capability involves imagination and vision (Jones & Pitelis, 2015) and

“differs from administrative and technical managerial competence, which alone is insufficient for expansion that involves significant change in the firm’s range of products and for growing the business of a firm facing unfavorable demand conditions for the existing products” (Kor et al., 2016, p. 1730).

The two strands agree that the entrepreneurial component in the economy is essential to discover new combinations that would not have been discovered with the profit-maximising calculating attitude. As such, a new construct on entrepreneurship emerged under the name ‘entrepreneurial orientation’ (EO) to represent the growth orientation (Lumpkin & Dess, 1996) of firms. EO term is used to separate this strand from entrepreneurship, which refers most of the time to starting up ventures. EO, on the other hand, is a strategic construct whose conceptual domain includes certain firm-level outcomes and management-related preferences, beliefs, and behaviour as expressed among a firm’s top-level managers. As originally proposed by Miller (1983), EO is revealed through an organisation’s exhibition of risk-taking, innovativeness, and proactiveness. Lumpkin and Dess (1996) added another two variables, competitive aggressiveness and autonomy. As such, EO is an approach that advocates the behavioural view of the expanding firm.

Using an EO scale validated by Covin and Slevin (1986, 1989) and based on a sample of 110 manufacturing firms, Covin et al. (2006) report a positive effect of EO on the sales growth rate of firms. Anderson et al. (2009), in another study, confirm the direct effect of EO on strategic learning capability. Several ambitious attempts were made to link economic development and growth on the macro level with the entrepreneurial orientation of firms on the micro level. Mthanti and Ojah (2017), using data of 93 countries over the period 1980-2008, when researching the relation between economic growth and entrepreneurial orientation (EO), not narrowly defined as start-up

intensity but more as a firm behaviour and a strategic orientation, found that the level of EO positively and robustly correlates with economic growth.

To summarise, the literature reviewed so far on firm-level heterogeneity from an economic perspective conveys three key messages: First, the building of new productive capabilities follows a path-dependent trajectory but, at the same time, unexplained incidents of unrelated capability building take place on firm and country levels. Second, the ability to sense and exploit growth opportunities that open up exogenously is as important for catchup as the ability to achieve productive efficiency. Third, the predisposition to grow, expand, and diversify, seems to be separate and independent from the resources and productive capabilities factors. Given these key take-outs, a careful investigation of the subject from another perspective that does not adopt a strict evolutionary view and, at the same time, is concerned with firms' idiosyncratic strategic orientations and capabilities to sense and seize growth opportunities is warranted. The strategic management perspective of the capability theory of the firm seems a potential area to review.

### 2.3 Strategic Management Perspective of Capabilities

As highlighted earlier, the strategic management perspective of capabilities is selected for review as it can potentially give insights on the phenomenon of unrelated capability building and elaborate on firms' growth dispositions and abilities to seize growth opportunities. A number of key concepts developed in the strategic management literature provide suitable areas for review. They are the resource-based view of the firm emphasizing the idiosyncratic resources and unique capabilities of organizations (e.g., Penrose,1959; Barney,1991), the classification of capabilities under operational (ordinary) and dynamic capabilities (e.g., Winter, 2003), and the different

conceptualisations of dynamic capabilities that enable organizations renew their competences to achieve congruence with the changing environment.

Influenced by Bain's (1959) Structure-Conduct-Performance model in industrial organisation, scholars of strategic management focused initially on industry structure and market power as sources of firms' profit heterogeneity. Montgomery and Porter (1991) argue, "Average industry profitability is, by far, the most significant predictor of firm performance and firms' monopoly power." (1991, pp. xiv-xv). Based on this argument, and in what Hunt and Madhavaram (2020) call "a highly creative manner" (2020, p. 131), Porter (1980, 1985) turned the SCP model "upside down" (Barney & Ouchi, 1986, p. 374). If barriers to entry enable firms in concentrated industries to collude and superior financial performance results from collusion, then analysing and choosing attractive industries should be the focus of the strategy, argue Porter and colleagues. Although Porter's industry-based strategy "influenced greatly the emerging area of strategic management" (Hunt & Madhavaram, 2020, p. 131), in the 1990s, critics pointed out that differences between firms within industries account for most of the variance in firms' profitability (Rumelt, 1991) arguing that strategy should, instead, focus on heterogeneous and imperfectly mobile firm resources. Reviving and building on Penrose's work (1959), strategic management scholars introduced new approaches (e.g., the resource-based view (RBV) and the Dynamic Capabilities approach) that advocates an inside-out, instead of an outside-in, strategic view.

Together with a focus on the firm's resources and capabilities, strategic management discipline is premised on the existence of room for strategic choice, i.e. human agency. Consequently, scholars reject the organisational ecology approach (Hannan & Freeman, 1977), which presumes that path dependencies are so strong that the enterprise simply cannot adapt (Augier & Teece, 2008). Earlier, Penrose conveyed her criticism of the biological analogy that has gone too far, saying, "To treat

the growth of the firm as the unfolding of its genetic nature is downright obscurantism. To treat innovation as chance mutations not only obscures their significance, but leaves them essentially unexplained” (Penrose, 1952, p. 818). She insists on the importance of human motivation for a firm’s growth, saying, “To treat them [innovation] directly as purposive attempt of men to do something makes them far more understandable” (Penrose, 1952, p. 818).

We select from the voluminous strategic management literature the strands that are grounded in evolutionary economics (i.e. acknowledge inter-firm heterogeneity and impact of history) and, at the same time, accept intentionality and strategic choice. The Penrosean view (1959) and the Dynamic capabilities framework (Teece, 2007) take a position that synthesizes evolution and agency. The two integrated approaches can be particularly helpful in investigating firms’ heterogeneity in learning and capability building and in sensing and seizing growth opportunities.

### 2.3.1 The Penrosean and the Resource-based Views

Extant research regularly cites Penrose’s (1959) conceptualization of the firm as a unique bundle of resources while neglecting that her original work is a multi-faceted yet integrated conception of the firm. She proposes that managerial choices shape the productive services of resources and that the interactions between managers and resources jointly drive the growth of firms (Kor et al., 2007)

First, Penrose acknowledges the evolutionary aspect of firm’s growth. It stems from the firm’s underlying resources acquired from the past and the learning-by-doing process that frees up these resources for more growth, both influencing the direction and scope of growth and diversification. In her view, the two types of learning mechanisms in play, learning-by-doing and managerial learning, act on firms’ unique historical knowledge bases leading them to diversify in directions

very much related to current competencies. Consistent with the evolutionary approach, she acknowledges that it is difficult for a firm to diversify into entirely new areas of specialisation and favours finding new markets in which the firm can build on its existing competencies and specialisation (Penrose, 1959).

Second, Penrose contends that managerial decisions are derived, in part, from evolutionary learning about a firm's resources and, in part, from the subjective image (i.e. imagination) of what is taking place in the present and what might take place in the future. Experiential knowledge of the firm's resources and entrepreneurial imagination jointly shape how the firm "sees" the demand and which opportunities it will pursue (1959, p. 31). As Penrose states: "the decision to search for opportunities is an enterprising decision requiring entrepreneurial intuition and imagination and must precede the "economic" decision to go ahead with the examination of opportunities for expansion" (1959, p. 34). Due to this subjectivity, what the firm can and cannot do is not predictable from what the firm already has "because the causal linkage between resources and the services of these resources occurs because of the subjective perceptions of the entrepreneur" (Kor et al., 2007, p. 1192). She says, "If we can discover what determines entrepreneurial ideas about what the firm can and cannot do, that is, what determines the nature and the extent of the 'subjective' productive opportunity of the firm, we can at least know where to look if we want to explain or to predict the actions of particular firms" (Penrose, 1959, p. 42).

Unlike neoclassical microeconomics treatments of entrepreneurship, which typically posit demand as exogenously determined by environmental forces, Penrose's (1959) resources approach recognizes the close connection between the entrepreneur and the opportunities the environment offers to the firm. She does not consider external conditions as serious barriers to growth because a firm can always escape stagnant markets by diversifying into other product markets or



geographical locations. In her view, the notion that a firm's growth is inhibited by external conditions typically should be attributed to its lack of entrepreneurial capabilities.

Finally, Penrose touches lightly on the issue of firms' drive to grow and expand. She relies on long-run profit-seeking as a motive and adds that the quality of entrepreneurial services responsible for successful growth is critically dependent on entrepreneurial ambition and "interest in experimenting with new and alien lines of activity, or in moving into new geographical areas" (1959, p. 35).

In sum, Penrose's theory introduces an interesting picture of a dynamic interplay between structure and agency. She depicts actions to be shaped by conscious actors, and yet path-dependent and structure moulded. Knowledge created inside firms is the product of both the objective reality of learning-by-doing and historical accumulation and, at the same time, the subjective 'images' of the entrepreneur. One thing Penrose has unwavering conviction about: both the sources of and constraints on a firm's growth are internally determined.

An offshoot of Penrose's conceptualisation is the Resource-Based View (RBV) (see Kor & Mahoney, 2004; Pitelis, 2007). The central idea of the RBV is that resources, which encompass all assets (tangible or intangible) that a firm effectively controls, are the source of intra-industry differences (Penrose, 1959; Rumelt, 1984; Wernerfelt, 1984). A superior performing firm is one that is able to achieve a competitive advantage over its rivals because its internal resources and capabilities are deemed to be (V)aluable, (R)are, (I)nitiable and (N)on-substitutable (VRIN) (Barney, 1991, pp. 106-112). However, the view does not specifically address how future valuable resources could be created or how the current stock of VRIN resources could be refreshed in changing environments. Indeed, as Barney and Clark (2007) note, "resource-based theory takes the existence of heterogeneous firm resources and capabilities as given and examines the impact

of the resources for the ability of firms to gain and sustain competitive advantage” (2007, p. 257). Later, Alvarez and Busenitz (2001) advance the boundary of resource-based-view to include the cognitive abilities of the entrepreneur, saying, “Entrepreneurs have individual-specific resources that facilitate the recognition of new opportunities and the assembling of resources for the venture” (2001, p. 1).

Another management view inspired by Penrose’s work is the dynamic capabilities view (Teece et al., 1997), which complements the rather static early focus of the RBV, and, at the same time, changes the focus of the strategic management discipline dominated at the time by Porter’s five forces framework. While Porter (1980) posits that environmental forces and competitive pressure determine the firm’s behaviour and financial performance, the dynamic capabilities approach advocates a view that sees the firm’s behaviour and strategy influence the external environment and “blunt competitive pressures” (Teece, 2020, p. 9).

### 2.3.2 The Dynamic-Capabilities View

Teece and colleagues (Teece et al., 1997; Teece, 2007) introduced the Dynamic Capabilities concept in the 1990s. They define it as the “firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (1997, p. 516). Crediting Penrose as being an inspiration, Teece and Augier (2008) see the business enterprise as being in part a product of its own history, but not completely so. “Managers can shape outcomes and are not completely trapped by prior decisions and investments” (2008, p. 1187). While the evolutionary theory has interpreted capability building as an outcome of strongly path-dependent learning sharply restricting the role of strategic choice (Dosi et al. 2000), the concept of Dynamic

Capabilities is premised on the ability to identify and select new productive and organisational capabilities and reinterpret existing ones to serve changing contexts and sustain competitive advantage. The Teecean view of Dynamic Capabilities framework embraces both path dependency and management cognition effects on capabilities reconfiguration prospect, calling it ‘evolution with design’ (Augier & Teece, 2008). While the evolutionary theory, rooted in biological conceptualization, was a revolution against the neoclassical equilibrium view, the concept of dynamic capabilities of decision-makers, rooted in the behavioural theory of the firm, is no less than a revolution against the evolutionary theory.

In the Teecean view, dynamic capabilities are separate and independent from all other organisational capabilities, which are, to a large extent, operational, whereas dynamic capabilities are higher-order capabilities and strategic in nature. They act on ordinary capabilities to reconfigure and change them in order to deal with the dynamism of the environment. Teece (2019) confirms the importance of operational capabilities, which he calls ordinary, as they support technical efficiency (and hence productivity), but do not help in deciding “How well- or ill-suited the outputs are to the firm’s competitive needs” (Teece, 2007, p. 1321). He adds that creating and maintaining a competitive edge needs dynamic capabilities, the “capabilities to decide, to innovate and to change.” (Teece, 2019, p. 3).

Literature on dynamic capabilities is divided over the underpinnings of dynamic capabilities. Influenced by the evolutionary theory, some scholars place more emphasis on organisational routines and processes, and others try to strike a balance between the organisational routines and processes and the idiosyncratic competencies of entrepreneurial managers.

The process-focused scholars contend that dynamic capabilities reside in processes (e.g., Eisenhardt & Martin, 2000) and routines (Zollo & Winter, 2002). Zollo and Winter (2002) define

dynamic capabilities as “routinized activities directed to the development and adaptation of operating routines” (2002, p. 2). Industrial economists adopt the process view as well and argue that dynamic capabilities, in essence, reside in processes that take care of coordination between those who understand the market and those who understand technology (Cimoli et al., 2008)

The second strand of scholars sees process only as a mechanism by which organisations put dynamic capabilities into use (Helfat et al., 2007). Dynamic capabilities is a “capacity to modify the resource base of an organisation” (2007, p. 30). This capacity or ability is put into action through a process. Accordingly, the capability itself lies on the content side, not on the process side of strategy. Yet, it depends on organisational and managerial processes to function. Helfat et al. (2007) highlight the criticality of the executive role, saying that when there are major discontinuities, dynamic environments and complex situations, executives “interpret” and evaluate capabilities in the new context and make “judgments” about what to do and what not to do (2007, pp. 56-63). Teece (2012) breaks away further from the evolutionary tradition as he places entrepreneurship at the heart of dynamic capabilities to carry out change, saying that dynamic capabilities need to be tied to real-time knowledge creation, not accumulated learnings stored in routines, and that the creative managerial and entrepreneurial acts “are, by their nature, strategic and non-routine” (2012, p. 1397). Teece and Leih (2016) follow Schumpeter’s logic when they rule out “inductive and deductive approaches” as possible knowledge creation modes that can “help managers cut through the fog that deep uncertainty creates”. They add, “Managing uncertainty requires a different kind of resource that is deeply entrepreneurial in nature.” (2016, p. 19).

More management scholars emphasise the role of actors over processes. Building on the behavioural underpinnings of the evolutionary theory, they posit that the root problem is in the

bounded rationality of actors and concomitant cognitive biases. For instance, Tripsas and Gavetti (2000) contend that radical change, which requires radical new capabilities to be developed, new learning to be distant, and the core business model to be altered, require a change in the strategic beliefs (dominant logic) adopted in the firm. This sort of change, in their view, has to be initiated by individuals, and they have to be in top management. Individuals at lower levels are not free to put into practice a strategic logic different from that of top management unless the latter endorses this new logic (Tripsas & Gavetti, 2000). So, top management is the gatekeeper of strategic belief change, if not its direct initiator. Schreyögg and Kliesch-Eberl (2007) contend that dealing with change cannot be guided by organisational routines and processes. Extant routines and processes are a codified representation of the prevailing logic in the firm and in its service, and so they cannot by themselves be the initiator or instrument of strategic belief change.

In sum, not surprisingly, the factor of managerial capabilities (and deficiencies) feature prominently in strategic management view about carrier of firms' heterogeneity in learning and capability building and in abilities to sense and seize growth opportunities. Despite consensus on the importance of the concept, process-agency bifurcation of literature is ongoing. We summarize the literature reviewed in this section in a few points.

First, the strategic management perspective about sources of heterogeneity, while adopting an inside-out view, gives different emphases to different factors. The RBV puts the emphasis on accumulated resources, and Penrose adds managerial learning. Dynamic Capabilities scholars are split between giving more emphasis to dynamic routines and processes or entrepreneurial capabilities of management. It could be argued that this difference mirrors the chasm between Schumpeterian Mark I and Mark II views (Lazonick, 2008).

Second, the strategic management perspective, and especially that of Teece and Penrose, while acknowledging the evolutionary trajectory of growth, introduces an important factor that may explain the phenomenon of unrelated capability building documented in empirical capabilities studies. The two economists emphasise the managerial ability to reinterpret existing resources and capabilities and use them to serve new goals and build better competitive positions. Penrose argues that what the firm can and cannot do is not predictable from what the firm already has because the linkages between resources and the services of these resources are strongly mediated by subjective perceptions of the entrepreneur. Teece makes almost the same argument saying, “capabilities are what the organisation could accomplish, not necessarily what it is currently producing.” (Teece, 2014, p. 329). In his view, capabilities are “untethered from particular purposes or products.” They can serve multiple purposes and products (Teece, 2019, p. 8). They need entrepreneurial capabilities to envision these purposes and products.

Third, on the issue of entrepreneurial capabilities, a number of strategic management scholars adopt the view that confers special capabilities on entrepreneurs. These capabilities, they argue, help entrepreneurial managers escape the traps of dominant logic and other ways of thinking that are anchored to past trends and experiences.

## 2.4 Dynamic Capabilities of Emerging-Market Firms

The voluminous empirical work on dynamic capabilities predominantly focuses on developed markets cases and contexts (e.g., Adner & Helfat, 2003; Danneels, 2011; Monteiro et al., 2017; Tripsas & Gavetti, 2000). Fewer studies are focusing on emerging-market firms within a development context. We review some of these studies in this section.

A case study on a Russian oil company (S. Dixon et al., 2014) investigates over five years the micro-foundational processes that contribute to dynamic capabilities. Based on a bottom-up code analysis of the data presented in a two-level structure, the authors identify some actions, routines, and processes and suggest they represent the micro-foundations of the dynamic capabilities of adaptation and innovation. Under adaptation, the study proposes first-order micro-foundations of knowledge acquisition, internalisation and dissemination which form the second-order capability of exploitation. First-order micro-foundations of resource reconfiguration, divestment and integration form the second-order capability of deployment. Both exploitation and deployment comprise the dynamic capability of adaptation. Under innovation, the study proposes first-order micro-foundations of search, experimentation, and risk-taking which form the second-order capability of exploration. First-order micro-foundations of project selection, funding, and implementation form the second-order capability of path creation. Both exploration and path creation comprise the dynamic capability of innovation. Hinting at an ambidextrous nature of dynamic capabilities, the authors state that, “exploitation and deployment activities are required to develop the new operational capabilities needed for survival and short-term competitive advantage, whereas exploration and path creation are needed to develop unique capabilities for sustainable competitive advantage.” (2014, p. 202)

Another single case study (Pandit et al., 2017) of a firm operating in the Indian automotive sector, Mahindra Reva, investigates the role of dynamic capabilities in triggering disruptive innovation. Employing an inductive qualitative approach using analytical coding, the authors start by defining the dynamic capabilities of sensing, learning, integrating, and reconfiguring based on the ability to produce certain outcomes, as an indication of the existence of the capabilities. In other words, they define dynamic capabilities as capacities, not processes (Kump et al., 2018). However, they

do not address the point of what antecedents allowed the realisation of such abilities. It could be argued that this investigation falls into the tautological trap that many scholars warned against in investigating dynamic capabilities. We find Froehlich et al. (2017) tackle this issue in a case study on a Brazilian chemical company.

A case study on a Brazilian chemical company (Froehlich et al., 2017), using a qualitative content analysis approach, seeks to identify antecedents of dynamic capabilities and their role in innovation. The authors report that findings suggest that the sensing capability is very important in building competitive advantage. They identify two antecedents of the ‘sensing’ capability: processes to manage innovation on a strategic level and processes oriented toward collaboration with suppliers to complement and stimulate innovations within the company. It is observed that the authors while defining dynamic capabilities in terms of the capacity to do something, have focused their investigation on uncovering antecedents of such capacity.

As an example of quantitative approaches to the subject, Qaiyum and Wang (2018) conducted a quantitative study on a sample of 260 high-tech firms in India to test the relationship between the organisation position in the five-stage life cycle (start-up, accelerated growth, steady growth, stability, and decline) and the deployment of capabilities; ordinary and dynamic. To tackle the subject quantitatively, the authors operationalise ordinary and dynamic capabilities in terms of observable input activities and processes. Their findings suggest that for firms that are in the start-up, the accelerated, and the decline stages, ordinary capabilities outperform dynamic capabilities in improving firm performance. However, in firms in the steady growth and stability stages, both types of capabilities contribute equally. In terms of firm size, the authors contend that for small and medium enterprises (SMEs) ordinary capabilities are more important than dynamic capabilities. Large firms, on the other hand, are served equally well by both types of capabilities.



Unlike studies that took a pure process view of the nature and underpinnings of dynamic capabilities, Zeng and Mackay (2018) take an approach that accommodates both the processual and cognitive-agency views on dynamic capabilities. The authors present a qualitative hypothesis-testing case study tracing the evolution of two Chinese Internet platform companies, Alibaba and Tencent. They examine the similarities in the processes of deploying “core” and “contingent” dynamic capabilities in a changing organizational and environmental context and investigate the effect of managerial attention on such deployment. In their study, they identify core dynamic capabilities as “product and platform development processes” and contingent dynamic capabilities in the form of “collaboration and external influence processes” (2018, p. 15). In other words, they adopt the process view about what constitutes dynamic capabilities, and they track the development and application of these processes in the empirical data to understand the impact of managerial attention on these dynamic processes, i.e. dynamic capabilities. The authors conclude by confirming their initial hypothesis that the factor of managerial attention plays a critical role in the deployment of dynamic capabilities. While this study also adopts a process view of dynamic capabilities, it investigates cognitive-agency factors of management for potential impact on the deployment of dynamic capabilities.

It could be argued that, in light of reviewed literature, it seems that empirical studies on dynamic capabilities in a development context tend to follow one of two approaches. Some researchers define dynamic capabilities as capacities - successful production of certain outcomes - and seek to identify the processes that represent sources and antecedents of these capacities. Other scholarly works define dynamic capabilities themselves as processes, not outcomes, and seek to directly test their relationship with firm’s performance. In the two approaches, dynamic capabilities and their micro-foundations are defined and tested through the lens of observable and trackable input

activities and processes. Those two approaches have produced a series of potential, alternative processes that are mainly related to searching, learning, and strategising beyond the firm's existing products and markets.

However, the path of investigating cognitive and non-cognitive (emotional) factors seems to be less trodden, despite its potential in uncovering new elements that could shed light on nature and antecedents of dynamic capabilities, particularly in a development context. Researchers, who attempt to test the relationship between dynamic capabilities and firm performance, found themselves constrained by what could be observed and measured, and thus opted for the process view (i.e. behaviour observed at the artefacts level), as it lends itself relatively easily to empirical observation. While the process view focuses on important elements of how dynamic capabilities develop and manifests inside firms, these elements are less likely to be the key factor when it comes to dealing with changing industry dynamics (technological, demand, and institutional change) which represent critical junctures that offer emerging-market firms opportunities to grow and catch up with more developed ones (Lee & Malerba, 2017). In other words, the narrow, processes-only approach is more likely to miss out on other important elements that constitute firms' ability to grow and seize opportunities in the changing context of development and catch up.

## 2.5 Critical Evaluation of the Literature

The literature review started with an overarching question on determinant(s) of firms' contribution to the development process of an emerging economy. Firms' performance in terms of growth, profitability, and productivity is found to be quite heterogeneous within the same sector. The

review surveyed key firm-level theories on sources of this heterogeneity starting from Penrose (1959), passing through the evolutionary theory (Nelson & Winter, 1982) and ending with the capability theory of the firm from economics and strategic management perspectives. Generally speaking, the proposed primary carrier of heterogeneity in these theories is organisational resources, routines, productive capabilities, strategic, and entrepreneurial (dynamic) capabilities, respectively. These streams represent an inside-out view of determinants of firm performance contrary to the outside-in view that used to dominate both the economics- with Bain's Structure-Conduct-Performance model (1959)—and the strategic management—with Porter's five forces model (1980, 1985)—strands. They also agree on the need to shift focus from tangible (e.g. capital and labour) to intangible resources (e.g. routines and capabilities).

Within the economic perspective, capabilities scholars concerned with economic development adopt an evolutionary stance and emphasise in their work the factor of learning and accumulating productive capabilities in explaining firms' heterogeneous performance in a development context. Nevertheless, scholars of this perspective are puzzled by two main phenomena that are not aligned with the underpinnings of this perspective: first, the observed incidents of unrelated capability building which are unexplained by the evolutionary path-dependence tenets of their perspective, and, second, firms' growth dispositions that seem to be driven by firms' idiosyncratic strategic orientations more than by micro-economic factors like profitability and productivity, as they would have assumed (Yu et al., 2017). The importance of those two phenomena, unrelated capability building and firms' growth disposition, warrants careful investigation of the subject from another perspective that does not adopt a strict evolutionary view and, at the same time, is concerned with firms' idiosyncratic strategic orientations. Also in the related catch-up literature, scholars started to adopt a conceptualisation of the catch-up process on the firm level that highlights the importance

of the firm's strategic capabilities, a factor that was not highlighted before in the economic perspective view of capabilities. The two prominent catch-up scholars Lee and Malerba (2017) confirm the importance of the accumulation factor of productive capabilities and add the importance of firms' strategic responses to windows of opportunity that open up due to exogenous changes and offer chances to close the gap with leading firms. Given all that, the strategic management view of the capability theory of the firm seems a natural area to review in this regard.

The reviewed strategic management literature on firms' capabilities, which is currently dominated by the dynamic capabilities view, acknowledges an evolutionary, though less strict, progress of the knowledge base of firms, deviates from the economic perspective in three areas. First, scholars of this perspective propose that the different uses of existing resources and capabilities of a firm are not innate. They are subject to imagination and interpretation by the firm's management (Penrose, 1959; Teece, 2014, 2019). Second, growth opportunities are subjectively perceived more than objectively identified and assessed, which hints at the Schumpeterian factor of entrepreneurship. Third, the entrepreneurial factor, which is thought to fuel a risk-taking and growth disposition, is perceived by strategic management scholars less as a set of heuristics and cognitive biases that serve the economic system—as per the economics perspective—and more as a special set of capabilities that enable managers to identify growth opportunities and re-configure internal base of resources and capabilities to seize such opportunities and adapt to changing external conditions.

To sum up this point, reviewed literature reveals that the economic perspective gives primacy to productive capabilities, contends that its development adheres to a path-dependent evolutionary course, and, subsequently, views decision-making inside firms as either succumbing fully to these dynamics or driven by some heuristics. The strategic management perspective, on the other hand,

concedes the evolutionary path-dependent effects but still insists on special strategic (entrepreneurial) abilities that enable decision-makers to escape these effects. It also advocates a capability view of entrepreneurship, rather than a cognitive-biases-based view. While acknowledging the plausibility of the two perspectives, the observed incidents of unrelated capability building and the idiosyncratic strategic orientation of firms towards growth may give ostensible weight to the strategic management view, subject to verification.

Reviewed literature on the dynamic capabilities view, which is currently regarded as the most advanced framework based on the capability theory of the firm in the strategic management domain, highlights another area of contention that has been debated for almost two decades. While scholars seem to agree on the multidimensionality of the dynamic capabilities concept, pinpointing the nature and underpinnings of these capabilities remains an elusive goal. Literature is almost split on the conceptualization of dynamic capabilities into a process view and an agency view. The process view is more congruent with the evolutionary roots of the concept itself as initially proposed by Teece and colleagues (1997) and many other prominent scholars (e.g., Eisenhardt & Martin, 2000; Winter 2003). In this view, dynamic capabilities are usually described as processes (Ambrosini & Bowman, 2009), or as comprising processes (Teece et al., 1997; Verona & Ravasi, 2003). This process view represents the theoretical basis for measuring scales constructed to measure dynamic capabilities (Kump et al., 2018), which makes empirical studies on dynamic capabilities, especially those applying a deductive method, skewed towards adopting the process view.

However, about a decade ago, many scholars, including David Teece himself, started to break away from the predominantly evolutionary-process view, leaning more towards a cognitive-agency view. They adopt a position that attempts to balance and synthesize evolution and agency

calling it ‘evolution with design’ (Augier & Teece, 2008). In subsequent articles, and probably influenced by the rise of Apple in the smartphone market at the expense of the incumbent leader, Nokia, Teece and colleagues started to go even further in suggesting that dynamic capabilities are predominantly cognitive abilities of management (e.g., Teece, 2012, 2014; Teece et al., 2016), that are non-routine and “non-practicing” (Schreyögg & Kliesch-Eberl, 2007, p. 927). This debate about nature of dynamic capabilities, which reflect on nature of their antecedents, has been going on for decades now.

On the back of this split in literature, it is observed that dynamic capabilities literature related to development context is adopting views that are predominantly processual partially due to the difficulty of operationalizing dynamic capabilities without relying on observable activities or artefacts. While the process view focuses on important elements of how dynamic capabilities develop and manifests inside firms, these elements are less likely to be the key factor when dealing with changing industry dynamics (technological, demand, and institutional change) which represent critical junctures that offer emerging-market firms opportunities to grow and catch up with more developed ones (Lee and Malerba, 2017). In other words, the narrow, processes-only approach is more likely to miss out on other important elements that constitute firms’ ability to grow and seize opportunities in the changing context of development and catch up. Hence, the currently less investigated agency view could provide fresh insights on what constitutes dynamic capabilities in a development context that enable far-from-the-frontier firms to address expansion opportunities to grow in scale and scope and catch up with leading firms.

Reviewed empirical studies on dynamic capabilities in developing/emerging countries suggest also a lag in investigating the concept in the setting of a development context. Much of the scholarly work on the dynamic capabilities concept emerged to address advanced country questions about

the capabilities required to enhance R&D-based competitiveness at the technology frontier (Khan, 2019). While this understanding is important, it needs to be modified to address the typical developing country problems at the initial phase of industrialization, like acquiring competitiveness in industries, in which technical knowledge is likely to be partially or fully globally diffused, and in a “sino-centric world”, where the cost alone cannot support competitiveness (Cimoli et al., 2009a, p. 10).

Based on the reviewed literature, and in light of the two literature gaps discussed in this section, the research problem is framed in terms of broadly scoped research questions and an inductive approach seems more fitting to give more flexibility to investigate conflicting views about the primacy of which set of capabilities—productive versus strategic, and, at the same time, examine both processes and cognition in search for new insights about nature and antecedents of dynamic capabilities in the less investigated context of developing countries.

### 3 Research Question and Method

This chapter is on stating the main research question given the literature reviewed in the previous chapter and explicating the research method to be used to examine the question.

Section 3.1 focuses on stating the research question that represents a gap or a point of contention between scholars with different perspectives on the subject. Section 3.2 explicates the details of the method employed to investigate the research concern. The section starts by briefly elaborating on the difference between the grounded theory method and the theory building from cases method, and then states a number of reasons for using an inductive method, and ends by giving more details on the research protocol designed to reach the research objective. Section 3.3 is dedicated to the conceptual framework used to examine the data. Section 3.4 describes the data collection instruments and the theoretical coding process used to produce codes and themes from raw data. Section 3.4 relates some challenges faced in the data collection and analysis phases.

#### 3.1 The Research Question

The overarching research question is: *in a development context, what stands behind the differential response and outcomes of firms in addressing opportunities to expand scale and scope?*

Reviewed literature gives important clues in highlighting inter-firm heterogeneity of performance and offers a number of possible explanations. Literature also highlights the importance of organizational capabilities and their development, and the importance of firms' dynamic capabilities to manage change and uncertainty that are usually associated with growth and



expansion. In the meantime, critical areas that would complement our understanding of firms' behaviour towards growth and expansion are still contested and unresolved.

Scholars, while in agreement on the centrality of organizational capabilities in explaining firms' heterogeneous growth performance, disagree about two main areas. The first area of contention is related to the primacy of productive capabilities versus strategic and entrepreneurial in driving growth. Broadly speaking, the economic perspective of capabilities gives primacy to productive capabilities in affecting firms' growth performance, while the strategic management perspective emphasizes strategic and entrepreneurial capabilities that drive both the development of productive capabilities and the successful exploitation of exogenous opportunities. Dynamic capabilities view is currently the widely accepted approach that represent these strategic capabilities in the strategic management domain.

The second area of contention lies within the dynamic capabilities literature itself and is concerned with the nature and antecedents of dynamic capabilities. Two major streams emerged with one defining dynamic capabilities in terms of dynamic routines and processes of the organization and the other emphasises cognitive and (emotional) abilities of decision-makers. Moreover, empirical studies on dynamic capabilities in a development context is less investigated compared to the developed one (Khan, 2019), and existing scholarly work is skewed towards adopting a process view in defining and tracking dynamic capabilities within firms (Kump et al., 2018). As such, we address with this study a compounded research gap of contradicting views, contextual gap, and mythological gap.

Given the overarching research concern and the two areas of contention in literature, research questions take as point-of-departure propositions that are largely accepted in the literature, namely, the primacy of organizational capabilities factor in determining firms' performance, and the

importance of dynamic capabilities in seizing expansion opportunities. In the meantime, the research questions target the contested areas identified in the literature, which are concerned with the role productive versus strategic (dynamic) capabilities play to enable firms to successfully address expansion opportunities, and, second, what constitute the nature and antecedents of dynamic capabilities in this development context.

*RQ1: What roles do productive and strategic capabilities play in shaping firms' response to expansion opportunities of scale and scope?*

*RQ2: What are the nature and antecedents of dynamic capabilities of firms in emerging markets?*

To investigate these questions, and given the conflicting views in literature, we use an inductive method to give more flexibility in searching for new insights without being constrained by initial hypotheses that are based on one perspective and not the other. We select firms operating in high or medium-tech industries in Egypt that have recently undergone expansion projects in scale or scope to seize opportunities that have opened up due to exogenous technological, demand, and institutional change. These instances give an adequate research setting to examine the role of productive capabilities, accumulated or acquired, and the role of dynamic capabilities in addressing these opportunities to expand scale and/or scope on a firm level in a development context.

### 3.2 Theory-Building from Case Studies

The theory-building method constitutes an inductive method. Induction is defined as “a type of reasoning that begins with the study of a range of individual cases and extrapolates from them to form a conceptual category” (Charmaz, 2006, p. 188). Inductive research provides a data-driven

way of surfacing new concepts and generating new theories (Gioia et al., 2012). The inductive theory-building method allows the researcher to begin a research study without a hypothesis and develop hypotheses after gathering and analysing data. For this reason, it is called hypothesis-generating research rather than hypothesis-testing research. The outcome is a theory that is yet invalidated but offers new insights and contains concepts and possible relationships that are grounded in empirical data to be tested in subsequent research.

The origin of the theory-building method is Glaser's and Strauss' seminal book *The Discovery of Grounded Theory* (1967) which established the grounded theory methodology to challenge the hypothetico-deductive approach that demands the development of precise and clear-cut theories or hypotheses prior to the data collection. Glaser and Strauss criticised the "overemphasis in current sociology on the verification of theory, and a resultant de-emphasis on the prior step of discovering what concepts and hypotheses are relevant for the area that one wishes to research" (1967, p. 1). Besides Glaser and Strauss (1967), seminal contributors to grounded theory are Corbin and Strauss (1990) and Charmaz (2006, 2014), but it has since developed into a "big tent", covering a number of approaches around building a theory from data (Gehman et al. 2018, p. 5).

### *Theory-building versus Grounded Theory*

The two terms 'theory-building' and 'grounded theory' both refer to the inductive approach that is based on continuous cycling between empirical data collection and data analysis to develop concepts through a coding process, which allows the generation of theory. However, there is an important distinction in the use of one term or the other. Specifically, the distinction separates the strict from the more flexible view and is concerned with two main areas: a) the issue of consulting

extant literature at the beginning of the research and b) the issue of the processes to be followed for codes to emerge out of the empirical data.

Regarding the first issue of consulting extant literature, the ‘grounded theory’ proponents’ approach is “literally to ignore the literature of theory and fact on the area under study, in order to assure that the emergence of categories will not be contaminated.” (1967, p. 37). In other words, the researcher should free her mind from any theoretical preconceptions before approaching empirical data. However, those arguing for a more flexible view state that this pillar of grounded theory proved epistemologically unattainable since it is widely accepted in cognitive psychology that “there are and can be no sensations unimpregnated by expectations” (Lakatos, 1978, p. 15). Kelle (2007) adds that the “construction of any theory, whether empirically grounded or not, cannot start ab ovo, but has to draw on already existing stocks of knowledge.” (2007, p. 135). Eisenhardt (1989), using the theory-building term, takes a middle ground between the strict and the liberal approaches. She argues that some initial knowledge and review of literature are necessary to identify research gaps that warrant inductive research. She convincingly argues, “It’s almost impossible to find those problems [that do not have true answers yet] without knowing the literature” (Eisenhardt in Gehman et al., 2018, p. 287). At the same time, she posits that researchers “should avoid thinking about specific relationships between variables and theories as much as possible, especially at the outset of the process” (1989, p. 536). In other words, Eisenhardt advocates approaching research data with an open mind instead of an empty head.

On the second issue, Glaser and Strauss lay down a specific process that should be followed in data gathering to judge the quality of the research conducted. Eisenhardt and Graebner (2007), on the other hand, argue against this strict process, saying, “This strict adherence can also result in

theory with limited generalizability (Langley, 1999) and idiosyncratic path dependence on the particular empirical starting point.” (2007, p. 30)

We use Eisenhardt’s theory-building from cases approach (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) as a set of orientating principles in designing the research protocol. Recognising that “a methodology is not a cookbook” (Gehman et al., 2018, p. 298), the protocol is customized to fit the specific purpose of the research, as will be explained in Section 3.2.2. Before describing the research design, it is important first to explain the reasons for using an inductive method, particularly the approach ascribed to Eisenhardt (1989) and Eisenhardt and Graebner (2007).

### 3.2.1 Why Theory-Building from Cases

The inductive method allows the researcher to acknowledge that she may not know enough to formulate meaningful hypotheses. Admitting ignorance and confusion is arguably an important prerequisite for a successful research endeavour. This section focuses on the question of why the research question is best addressed by an inductive qualitative method, particularly theory-building from cases (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). The first two points deal with the methodological choice of an inductive method, whereas the third and fourth points elaborate on the reason for choosing the inductive theory-building from cases approach in specific.

First, the economic perspective of capabilities with its evolutionary tenets posits that productive capabilities and their acquisition and accumulation is the main factor behind firms’ heterogeneous growth performance and advocates a path-dependent evolution of these capabilities, leaving less room for strategic decision-making to play a role in the process. The strategic management view, on the other hand, is loosely evolutionary. It contends that there is room for strategic management

to steer the direction of capabilities development and emphasises the role of strategic (entrepreneurial) capabilities in the successful exploitation of opportunities. The point of contention about the primacy of which set of organisational capabilities—technological and productive or strategic and entrepreneurial—in determining firms' performance warrants an inductive research approach that is not constrained by initial hypothesis based on one perspective and not the other. This point of contention has significant implications on designing policy interventions to serve the development agenda of countries.

Second, reviewed literature on dynamic capabilities reveals conflicting views on the nature and antecedents of dynamic capabilities. One view advocates organizational experience embedded in routines and processes and the other espouses special capabilities of decision-makers. Hence, an inductive approach that is not based on a specific paradigm about nature and antecedents of dynamic capabilities in a development context is merited.

Third, the study of dynamic capabilities is better approached using in-depth qualitative case studies because this approach allows for capturing the complex business context, which influences firm behaviour and performance. Teece (2012), along with other strategic management scholars (e.g., Danneels, 2011; Tripsas & Gavetti, 2000), advocate in-depth qualitative research over quantitative research since the dynamic capabilities concept is still relatively new and there are opportunities to uncover new variables and relationships. That's why we adopt an inductive method that is based on case study.

Fourth, Eisenhardt's (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) approach is more capable of investigating the point of contention about the nature and antecedents of dynamic capabilities explained earlier, because contributing to this debate requires gathering information about what is taking place physically in the real world in terms of organisational activities, practices, and

outcomes and what is taking place inside the minds of decision-makers in terms of intentions, expectations, perceptions, and beliefs. The theory-building inductive method of Eisenhardt (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) is better at capturing both the subjective and objective accounts of firms' strategic behaviour, and propose tentative explanations for variance. While other scholars may impose their ontological paradigm onto their data gathering strategy, Eisenhardt explicitly states that the theory-building from cases method is not “locked into an epistemological or an ontological point of view” (Eisenhardt in Gehman et al. 2018, p. 292). In other words, aiming to investigate variance, i.e. potential factors that might be correlated with the outcomes—which is arguably a positivist goal—, does not rule out gathering subjective views of research participants about the phenomenon, which may be regarded as a constructivist data gathering approach. According to Eisenhardt (Eisenhardt in Gehman et al. 2018), the researcher should gather as many varied perspectives on the phenomenon as possible. Research participants are an important source of knowledge about how they perceive their own worlds. They provide some deep insights into the phenomenon that could not be obtained without engaging them. It could be argued that Eisenhardt and Graebner (2007) adopt a positivist goal in seeking to uncover causal links, and, at the same time, acknowledge the influence of the subjective accounts of participants in shaping relationships. This approach, from the researcher's point of view, methodologically fits the intended contribution of the research with regard to exploring the nature and antecedents of dynamic capabilities more than other approaches.

### 3.2.2 The Research Design

The research strategy followed in this study is theory building from cases (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) as detailed in Section 3.2. Since the research question is about “how do things happen” and “why” questions—as opposed to “what” and “how much” questions, qualitative research is more appropriate as a research strategy. The literature review has revealed two areas of contention, a contextual gap, and a methodological gap. First, there are conflicting views on the set of capabilities that play a central role in addressing expansion opportunities in a development context. Second, the issue of nature, antecedents, and impact of dynamic capabilities is so far unresolved in literature. Third and fourth, there is a dearth of empirical studies on dynamic capabilities in a development context, especially those that do not address the subject from a pure process view. These gap areas identified in the reviewed literature influence our understanding of how to enable emerging-market firms address and successfully seize opportunities to expand scale and scope. Given the importance of expansion opportunities in the development process and the instrumentality of policy interventions to facilitate and encourage firms’ successful expansion, these areas warrant undertaking more empirical work with an inductive approach to research the subject. The intended contribution is to investigate the roles of productive and dynamic capabilities to seize opportunities of expansion and to propose insights about these nature and antecedents of dynamic capabilities in a development context. Thus, the level of analysis is a qualitative hypotheses-generating exploratory case study on a firm-level within a development context and the unit of analysis is the expansion opportunity that opened up due to technological, demand, and institutional change in a development context and the firm’s response.



### *Extant Literature*

A literature review is an essential component of almost any research project, even inductive research. Eisenhardt argues that some initial knowledge and review of literature are necessary to identify research gaps that warrant inductive research (Eisenhardt in Gehman et al., 2018) but, at the same time, maintains that researchers “should avoid thinking about specific relationships between variables and theories as much as possible, especially at the outset of the process” (1989, p. 536). In this thesis, the literature review also helps identify areas that are empirically supported to act as foundations and points of departure for the research design. Examples of these areas in this study are heterogeneity of firms’ behaviour and outcomes, the partially path-dependent capability evolution inside firms, and the critical role of exploiting opportunities to advance firms’ productivity and profitability.

As an inductive-theory-based study, another round of consulting extant literature takes place after formulating research insights. The aim of the second round is to see if research insights are reconciled with extant literature and highlight deviations. Research insights are presented in Section 8.1, and the second round of literature consultation is in Section 8.2.

### *Level and Unit of Analysis*

Based on the research objective, identified gap, and formulated questions, the level of analysis is the firm operating in a developing context. The study analyses roles of capabilities, productive and strategic, in addressing expansion opportunities of scale and scope and their effects on opportunity exploitation outcomes.

We choose instances of exogenous changes that have opened up opportunities for firms to expand scale and scope and use these events to examine firms' responses. The incident of the opening opportunity and firm's response represent the unit of analysis.

### *Variance-based Multi-case Study*

The multiple-case study aims to present a series of incidents of the phenomenon under investigation within different contexts to capture and propose an explanation for differences observed in behaviour and outcome (i.e. the variance). A key step in the variance-based multi-case study is to decide where to control versus create a variance. In other words, variability of cases should be allowed but within limits to balance the goal of preserving the minimum level of comparability and the goal of including multiple domains of the population to create additional insight that will advance the theory (Gehman et al., 2018).

In this study, the focal phenomenon is the expansion opportunity and the firm's strategic response. The phenomenon is replicated in four instances (as the third case includes two incidents). We compare firms' response in the four instances in an attempt to detect the difference (i.e. variance) and propose an argument for how it is linked to outcome. Given the research concern and the focal phenomenon, we decided to control the variability of instances by focusing only on expansion opportunities of scope (new products) or scale (new markets) of Egyptian firms. In the meantime, we allowed variation by looking at firms of different sizes, ages and in different industries. It is worth noting here that in the theory-building approach, selecting cases has to follow theoretical sampling (Eisenhardt & Graebner, 2007), which means selecting cases "because they are

particularly suitable for illuminating and extending relationships and logic among constructs (2007, p. 27).

### *Conceptual Framework*

Both theoretical and conceptual frameworks help the reader understand the assumptions the researcher makes, how she conceptually grounds her approach, the scholars she is in dialogue with, and whom she agrees and disagrees with. Without such a framework, conceptual or theoretical, a study lacks proper direction and a basis for pursuing a fruitful review of literature, as well as interpreting and explaining the findings accruing from the investigation.

Sometimes scholars use theoretical and conceptual frameworks interchangeably—suggesting that they are conceptually equivalent, which is inaccurate. Whereas a theoretical framework refers to an existing theory that offers an explanation for an event or phenomenon, a conceptual framework comprises a number of related concepts and perspectives derived from multiple sources and views. Liehr and Smith (1999) associate most theoretical frameworks with quantitative research, which in turn tends to rely on deductive reasoning, whereas most conceptual frameworks are associated with qualitative research—mainly utilising inductive reasoning (Imenda, 2014).

Finally, using dynamic capabilities micro-foundations of sensing, seizing, and reconfiguring (Teece, 2007) as part of the conceptual framework should not be deemed as a violation of the inductive approach since the micro-foundations (sensing, seizing, and reconfiguring) are used as a way of unpacking firm's strategic response. The firm's strategic response is categorised under three phases: the first phase is concerned with sensing the opportunity, the second phase is seizing

the opportunity, and the third phase focuses on reconfiguring firms' resources and structures to serve opportunity exploitation.

### *Data Gathering Instruments*

The examination aims to capture actions and practices, but also meanings, intentions, and expectations. Gathering objective and subjective accounts would help build an integrated perspective of what is taking place *physically* in the real world and what is taking place in the *minds* of decision-makers. The resultant stock of empirical data would be used to identify patterns (relationships) in the analysis step and propose preliminary explanations in the synthesis step. For example, identified patterns would say that A and B go together. The explanation would propose an argument about *why* A and B tend to go together. Interviewing is the primary data collection method to capture the actions and meanings people give to actions.

### 3.3 The Conceptual Framework

Given the inductive approach of this research, we conducted a literature review that involved reading many individual theoretical perspectives and conceptualisations, from which we identified a number of salient concepts and principles, which are used to build a conceptual framework to address the research problem. Identified concepts are development, expansion opportunities, types of windows of opportunity, dynamic capabilities of sensing, seizing, and reconfiguring, and finally, levels of uncertainty.

### *The Development Concept*

Development is an expansion of both scale and scope. Expansion of one type without the other does not yield development in its full sense. Expanding the scale of existing activities without introducing new higher value-added activities may lead to growth but not development (Hausmann & Bustos, 2012). Katz (2006) maintains, “The greater or lesser success of any development process has much to do with the introduction of new production activities into the economy.” (2006, p. 60). The introduction and growth of such activities are crucial for the wealth of the nation, as they are characterised by “rapid technological learning, increasing returns to scale and increasing world demand” (Lundvall & Lema, 2014, p. 458). Kutsnetz (1966) elaborates on the equally important expansion of scale because even if an expansion of scope introduces new higher-value activities, their contribution to aggregate growth will be modest for short- to medium-term. He shows that aggregate growth typically requires the already existing big sectors to grow rapidly. As such, the development-inducing behaviour of firms in this study refers to an expansion of scale, scope, or both.

### *The Expansion Opportunity Concept*

Building on the definition of development above, the focus of analysis is on firms’ projects that aim to expand the scale, scope, or both. Referring to Ansoff’s Matrix (1957), also known as the Product/Market Expansion Grid, it is generally acknowledged that the fundamental vectors for growth are 1) growth achieved by greater market penetration, 2) by new product development to existing markets, 3) by new market expansion, and 4) by new product and market expansion. The expansion opportunities that are the subject of this research are those that involve expansion to

new markets (segments and geographies), leading to output increase, expansion to new products, leading to capability upgrade, or both. Therefore, expansion opportunity (hereafter referred to as “opportunity”) is defined as a situation conducive to expanding to new markets, introducing new goods and services, or both.

Lee and Malerba’s (2017) framework introduces three types of ‘windows of opportunity’ on the sectoral level that may open up for firms to expand in scale and scope. A technological window is when a new technology or radical innovation is introduced. A demand window refers to a new type of demand, a major shake-up in local demand, or a business cycle. An institutional/public policy window can be opened through public intervention in the industry or through drastic changes in institutional conditions. Sometimes opportunities open up due to a combined change in two or more of those areas. For instance, some opportunities open up due to a mix of technological and institutional changes. Therefore, opportunities addressed in the cases are categorized as ‘technological opportunity’, ‘demand opportunity’, ‘institutional opportunity’ or a mix of two or three types.

### *The Dynamic Capabilities Micro-Foundations*

The micro-foundations of dynamic capabilities (sensing, seizing, and reconfiguring) addresses recognition and exploitation of an opportunity. The three micro-foundations are used as the three phases of opportunity exploitation. The sensing phase refers to recognizing an opportunity due to environmental change. The seizing phase is concerned with the formulation of a response to accomplish this expansion. The reconfiguring phase is related to the realignment of the organisational resource/capability base, structure, and people. The reason for selecting these

micro-foundations to be included in the conceptual framework is that they are well suited to unpack the opportunity exploitation, which is the research unit of analysis (see Section 3.2.2).

### The Sensing Phase

Sensing usually involves gaining knowledge about the external and internal environment and creating a conjecture or a hypothesis about the likely evolution of technologies, customer needs, marketplace, and institutional responses (Teece, 2007). It essentially deals with the central problem of growth and expansion, namely the knowledge (or lack thereof) of the decision-maker concerning the future.

### The Seizing Phase

The 'Seizing' phase acts on the main assumptions made earlier in the 'Sensing' phase and involves setting a plan about how to deliver value to the customer and capture value for the company. In this phase, decision-makers "articulate the value proposition", "identify" target segments, "define the structure of the value chain", and "estimate the cost structure and profit potential" (Chesbrough & Rosenbloom, 2002, p. 533). The business modelling exercise is the major outcome of this phase as it defines how the enterprise would deliver value to customers in a differentiated way versus incumbents and new entrants.

### The Reconfiguration Phase

Reconfiguration (also called orchestration) involves reconfiguring tangible and intangible assets so that new goals are served, and path dependency and structural inertia are avoided. The outcome of this phase is usually closing capability gaps by building new organisational and productive capabilities and the assembly of co-specialized and complementary assets within the resource base of the firm. Re-alignment of structure and people should also take place in this phase.

### *Levels of Uncertainty*

Given the importance of the factor of uncertainty in exploiting expansion opportunities, we use Sarasvathy et al.'s typology (2003) of business opportunities to delineate three levels of uncertainty that could afflict an expansion opportunity.

#### 1. Low Uncertainty-Recognizable Opportunity

If both sources of supply and demand exist rather obviously, the opportunity for bringing them together has to be “recognised”, and then the match-up between supply and demand has to be implemented through either an existing firm or a new one. This notion of opportunity has to do with the exploitation of existing markets. In the context of a developing economy, this type of opportunity can be equated with expansion into new geographical markets with an already existing locally manufactured product. This is a low uncertainty expansion opportunity since both demand and supply are well known. Thus, economic agents act out of knowledge, not just opinion.

#### 2. Moderate Uncertainty-Discoverable Opportunity

At this level of uncertainty, opportunity consists of the exploitation of existing or latent markets with imperfect information about the supply or demand factor. If only one side exists—for instance, demand exists, but supply does not, or vice versa—then the non-existent side has to be “discovered” before the match-up can be implemented. In a developing economy context, opportunity discovery can be equated with manufacturing a product in-house to substitute importation or increasing the percentage of the local content of a product already assembled in-house. This is a medium-level uncertainty type of opportunity since demand is relatively known and demonstrated, while supply, in terms of required capabilities and business model, needs to be explored.



### 3. High Uncertainty-Created Opportunity

If neither supply nor demand exists in an obvious manner, one or both have to be “created”. This notion of opportunity has to do with the creation of new markets. In a developing economy context, opportunity creation can be equated with introducing new technology into the economy for the first time to substitute a product or an entire product sector. Given the novelty of the product in this specific marketplace and uncertainty about consumers’ and institutional response, this is a high-level uncertainty opportunity.

To summarize, in analysing research data on firms’ behaviour in exploiting opportunities at hand, this section explicated a conceptual framework that employs Ansoff’s growth vectors (1957) and the dynamic capabilities micro-foundations (Teece, 2007), fused with elements from Lee and Malerba’s (2017) work on catch-up ‘windows of opportunity’ and Sarasvathy et al.’s (2003) levels of uncertainty in entrepreneurial opportunities.

#### 3.4 Data Collection and Analysis

The study employed interviewing as the primary instrument of data collection. We also used secondary sources like government reports, periodicals, websites, and international development agencies’ reports. It is important to iterate here two points related to case selection and data collection instruments in the theory-building methodology. First, the purpose of the research is to contribute to developing a theory, not to test an existing one, and so the cases are not supposed to be *representative* of some population. Hence, theoretical (not random or stratified) sampling is the appropriate sampling approach (Eisenhardt & Graebner, 2007). Second, in the theory-building method, instruments of data collection are constructed not to operationalize variables, as in the

theory-testing method, but to gather as much information as possible about the phenomenon in question. In the following subsections, we give more details on case selection, interviewing, the theoretical coding process, and finally, some challenges encountered.

### 3.4.1 Case Selection

As discussed in Section 3.2.2 on research design, we applied a multi-case comparison methodology among three companies that have undertaken expansion projects of scale and scope between 2012 and 2020 to exploit opportunities amid changing environmental conditions. The goal is to better understand how firms explore and exploit expansion opportunities. In this section, we explain the selection process of companies studied. In the theory-building approach, cases are not selected to represent a specific population. Instead, they are selected to create additional insight that will advance the theory. Following are more details on the sampling approach and the case selection criteria.

#### *Sampling Approach*

The sampling approach refers to the way the sample for the study is constructed. The sampling approach impacts the generalisability of the research findings (see details in Section 10.3). There is theoretical generalisation and statistical generalisation. Usually qualitative studies adopt theoretical sampling and seek to achieve theoretical generalisation (Eisenhardt, 1989), while quantitative studies with a statistical generalization goal require adopting random sampling (Johnston et al., 2011). However, interestingly enough, it is observed that quantitative studies on dynamic capabilities adopt a theoretical sampling approach. Eriksson (2013), who has

systematically reviewed the methodological choices of 142 articles on dynamic capabilities, reported that the majority of quantitative studies followed theoretical sampling. The author contends that “because D[ynamic] C[apabilities] is difficult to observe and capture, careful sampling is necessary” (Eriksson, 2013, p. 314) even if it leads to sacrifice statistical generalization.

The purpose of this research is to contribute to developing a theory, not to test an existing one, and so the cases are not supposed to be *representative* of a specific population. Hence, theoretical (not random or stratified) sampling, which means selecting cases that are “particularly suitable for illuminating and extending relationships and logic among constructs” pertaining to the phenomenon under study (Eisenhardt & Graebner, 2007, p. 27), is deemed more fitting for our research question and intended contribution. In the meantime, convenience played a role in selection. Companies were selected based on accessibility and willingness to participate and provided they are located in Cairo.

### *Selection Criteria*

To follow the theoretical sampling rule, we applied three main selection criteria. First, cases had to involve the phenomenon under investigation, which is the carrying out of an expansion project to new products or new markets to seize opportunities that open up due to demand, technological, or institutional change (see Table 1).

Second, the selection of cases proceeded sequentially so that each added case covers a new context of the phenomenon and a new variation of expansion. The first case selected was the solar PV case. It represented introducing a new technology of solar PV and creating a B2B market for this

new technology. The second case was the high voltage case, and, unlike the first case, it provided an instance of expanding an existing product into new geographical markets. Next, the fibre optic case was an instance of a firm that added a new product to its portfolio to serve an existing market. The three cases covers three of the four growth vectors identified in Ansoff's Matrix (1957). Excluding market penetration, the three growth vectors covered in the study involve an expansion of scale and scope by introducing new products or moving to new markets. Each type of expansion is associated with a different level of uncertainty, depending on how much of the demand and supply sides were unknown at the outset, as depicted in Sarasvathy et al.'s typology (2003) (see details in Section 3.3). This variation in type of expansion opportunity and level of uncertainty has substantially enriched empirical data and findings of the research (See Table 1).

Table 1 Description of selected cases

The Case / The Firm	The Opportunity	The Expansion project	The Growth vector <sup>1</sup>	Level of uncertainty <sup>2</sup>
The Fibre Optics / DN	<u>Demand change:</u> Demand of fibre optic cables in Egypt increased.	Manufacture fibre optic cables in house.	Develop a new product for an existing market	Medium level of uncertainty
The Solar Photovoltaic / KS	<u>Technological change:</u> Solar photovoltaic technology became economically competitive.	Provide B2B solar PV solutions to I&C clients.	Introduce a new product to a new market.	High level of uncertainty
The High Voltage / EN	<u>Institutional change:</u> Egypt signed regional FTAs with EU, Arab, and African partners.	Expand exports to FTA regions.	Introduce existing product to new geographical markets	Low level of uncertainty

Note.

DN= anonymized name of the case company in the fibre optic case

KS= anonymized name of the case company in the solar PV case

EN= anonymized name of the case company in the high voltage case

[1] = Adapted from Ansoff, I. (1957) Strategies for diversification. Harvard Business Review 35(5), 113-124.

[2]= Based on Sarasvathy et al. (2003)

Third, cases were selected provided they carry out economic activities that are medium or higher in terms of technological intensity. These sectors arguably play an important role in development, as structural change usually involves moving from low to medium and high technological-intensity activities. In identifying technological intensity of activities, we relied on the modified OECD taxonomy (Galindo-Rueda & Verger, 2016), which is based on the R&D intensity- the ratio of R&D to value added within an industry. In this taxonomy, manufacturing and non-manufacturing activities are clustered into 5 groups: high, medium-high, medium, medium-low, and low R&D intensity industries.

However, the exercise of identifying the technological intensity of cases to be selected was not straightforward. Companies usually do not fit squarely into only one sector. Each company's product portfolio could be broad enough to make it fit in multiple sectors identified in the OECD taxonomy. To tackle this challenge, we used the principal economic activity involved in the expansion project of the company to identify the sector and the corresponding group of technological (R&D) intensity in the taxonomy. Accordingly, companies were selected when the opportunity and expansion involved economic activities are classified under at least a medium technological intensity level. In this regard, grouping the solar developer, KS, under 'Architectural and engineering activities; technical testing and analysis (71)' and not 'Electricity, gas, steam and air conditioning supply (35)' requires some elaboration. Considering that KS product portfolio included engineering design of both turnkey and non-turnkey (generation) contracts, research and development activities related to engineering, and project management activities related to construction, KS's main economic activities carried out to address the solar PV opportunity at the time of fieldwork seem to fall under sector 71 more than sector 35, as the latter only includes the generation and operation parts, as per ISIC Revision 4 document (United Nations, 2008). Table 2

shows the different economic activities carried out by each case company and its technological intensity. The economic activities involved in the expansion projects studied and its corresponding technological intensity are dark shaded.

Table 2 Technological intensity of economic activities of selected cases

The Case / The Firm	The Product Portfolio	The Industry Subsector <sup>1</sup>	ISIC, Rev.4 <sup>2</sup>	Technological Intensity <sup>3</sup>
The Fibre Optics / DN	Distribution of telecom equipment	Wholesale of electronic and telecommunications equipment and parts	4652	Low
	Integration of telecom solutions	Electrical installation	4321	Low
	Manufacture of telecom fibre cables	Manufacture of fibre optic cables	2731	Medium-high
The Solar Photovoltaic / KS	Generation of solar power	Electric power generation, transmission and distribution	3510	Low
	Development and integration of solar solutions	Architectural and engineering activities and related technical consultancy	7110	Medium-low
The High Voltage / EN	Manufacture of insulated wire and cable, made of steel, copper, aluminium	Manufacture of other electronic and electric wires and cables	2732	Medium-high

Note.

DN= anonymized name of the case company in the fibre optic case

KS= anonymized name of the case company in the solar PV case

EN= anonymized name of the case company in the high voltage case

■ = The economic activity involved in the expansion project studied and its corresponding technological intensity

[1] & [2]= Based on United Nations. Statistical Division. (2008).

[3]= Based on Galindo-Rueda, F. and F. Verger (2016)

One caveat needs to be made. Authors of the modified OECD taxonomy contend that technological intensity differs significantly among countries (Galindo-Rueda & Verger, 2016). Meaning, the

same industry in one country can be more or less R&D intensive than the case in another country. This perhaps could be attributed to difference in the complexity of the manufacturing steps of a product. Some steps are less complex (R&D intensive) than others, as could be observed in the fibre optic product manufacturing steps (see details in Section 5.1.1). Hence, R&D intensity of an industry in a country depends on which manufacturing steps take place in a country.

Regarding the number of cases studied, although Eisenhardt and Graebner (2007) advocate no less than four cases to strengthen the empirical grounding of the emergent theory, unfortunately, we had to settle for three firms only due to the COVID-19 impact. Nevertheless, it has been partially compensated by studying four instances of opportunity expansion, not three, as the third case includes two instances: expanding to FTA markets and producing the 400 kV EHV cable (see details in Section 7.1.3).

One final remark, one case represents a failed exploitation project. Studying failure has the potential to offer greater learning lessons because, as succinctly stated by Williamson (1999), “More informative, often, than success stories are stories about failure—especially the failures of once successful enterprises to adapt to new circumstances” (1999, p. 1093). The unintended, different strategic outcomes in the three cases turned out to be helpful in drawing out valuable inferences. Imperfections can indeed be theoretically informative.

In presenting the narrative and analysis of the three case studies, Chapters Five, Six, and Seven follow the same structure. Each Chapter comprises three sections. The first section gives a brief description of the industry, the specifics of Egypt’s context, and the opportunity that opened up exogenously, eliciting industry firms’ strategic responses. The second section starts with a background about the case company, followed by a detailed description of its strategic response to seize the opportunity. Finally, the third section develops an initial within-case analysis using the

micro-foundations of the dynamic capabilities framework (sensing, seizing, and reconfiguring) as three phases of opportunity exploitation and using theoretical coding as the analytical technique.

### 3.4.2 Interviewing

As a tool of qualitative research, interviews are “a highly efficient way to gather rich, empirical data” (Eisenhardt & Graebner, 2007, p. 28). This is especially so given that the phenomenon of interest–expansion projects of scale and scope inside organisations– is occasional and infrequent, and the focus of the study is on the *why* and the *how*, as opposed to *how frequent* or *how many*. Importantly, the interview method sheds more light on the element of intentionality, which is key in understanding drivers of firms’ behaviour. For example, in investigating the event of Honda’s US market entry in 1953, there is a stark difference between the account given by the BCG report *Strategy Alternatives for the British Motorcycle Industry* (1975) commissioned by the British government and how Honda’s six executives involved in the project remembered the episode when interviewed by Pascale (1984). While the BCG report explained Honda’s success in microeconomic terms, stating that Honda’s success was the outcome of a calculated attempt to exploit economies of scale, interview data with the actual decision-makers painted a completely different picture about people’s beliefs, expectations, and intentions behind the decisions taken (Runde & de Rond, 2010).

We conducted between 6-10 qualitative interviews per case between October 2019 and February 2022, with respondents from multiple hierarchical levels, including front-line managers, top-level executives, ex-employees, and clients. These varied informants helped build an integrated perspective of what was taking place *physically* in the real world and what was taking place in the



*minds* of decision-makers. It also helped limit the influence of ‘retrospective sensemaking’ which is usually “deemed as the prime culprit” of the interview method (Eisenhardt & Graebner, 2007, p. 28).

Regarding the structure of the interview questions, first, it is important to define the main types of interviews and the reason we used one type and not the other. Interviews fall into either of two types: structured interviews and qualitative interviews (Yin, 2011). Structured interviews follow a formal questionnaire that lists every question to be asked. It is designed to ask all of the interviewees the same set of questions, each having a limited set of choices (Fontana & Frey, 2005). Qualitative interviews, on the other hand, do not have a predetermined list of questions for participants. Instead, questions tend to be open-ended, and the researcher has a mental framework of study questions, but the specifically verbalized questions posed to any given participant differ according to the context, interviewee, and the setting of the interview.

Interviews conducted in this research were of the qualitative type. This type was more fitting to the research strategy compared to the structured type. First, the open-ended questions of the qualitative interviews encourage participants to speak freely and openly using their own words, which is crucial for a better understanding of the intentionality and meanings participants bestow over their actions and inactions. Second, the qualitative interview gives room to dwell on trends and contextual conditions across participants’ experiences to understand their worlds in their own words. We added extra questions whenever we deemed appropriate to seize opportunities for gaining more insight. As per Charmaz (2014), the researcher can change the questions asked later in the research process, especially in inductive approaches.

Collecting and confirming data required a series of interviews with the same participants. Some participants were interviewed once; others were interviewed two or three times, which is normal

for qualitative interviews (Seidman, 2005, pp. 16-19). The interviewing process went through three stages. The first stage was an orientation meeting with the gatekeeper and the CEO of each company, with the goal of introducing the research project, signing the consent form, agreeing on the expansion project to focus on, and making a suggested list of interviewees. The second stage involved conducting interviews with all the participants who could shed light on the expansion project selected for investigation. In the third stage, follow-up interviews were conducted with selective participants to fill in missing information, confirm key understandings, and probe interviewees on emergent codes.

Table 3 Interview questions

No.	Interview Questions
1	Tell me about joining the Company and your role
2	Tell me about (the expansion project) and the role you played in the project
3	Tell me more about the opportunity you sensed in the market
4	Tell me about the Company's competitive edge and the competition you faced in the market
5	Tell me about the resources and capabilities (the expansion project) needed and how you secured them.
6	Tell me, from your point of view, what are the main factors that led to the success (failure) of the expansion project?
7	Tell me about the Company's intentions and objectives for undertaking (the expansion project).
8	Tell me about the deliberations that took place before taking the expansion decision.
9	Tell me about the risks involved in (the expansion project).
10	Could you direct me to others I should talk to who can shed more light on the expansion project?

The interview consists of three groups of questions: a) questions on the background of the interviewee; 2) questions on the opening up of the opportunity and the firm's strategic response; and 3) questions related to objectives, intentions, and expectations.

We usually started the interview by asking participants about their personal careers before joining the company and why they joined. These questions proved excellent at establishing rapport since people get verbose when asked about themselves and their life journey. However, in some interviews, interviewees seemed to be on a tight schedule, and we felt obliged to go directly into key questions. The second group of questions addressed the firm's expansion project. Initially, questions took the form of nondirective 'grand tour' questions (Brenner, 2006; Spradley, 1979) that opened the broad topic of expansion without talking about specific decisions or outcomes. Out of the participants' answers, we started to ask follow-up questions on specific aspects of the expansion projects that took place, eventually getting to the desired level of detail about the opportunity, the strategy that was followed, and the outcome. The third group of questions were about the meaning and intentions behind actions. They were mostly formulated in *why* questions to let the participant make the first mention of what meaning and intentions he or she attached to decisions and actions. Questions on the intentionality behind actions were tricky since interviewees initially tended to give politically correct answers. It took some probing for participants to start talking about real intentions, motives, and underlying beliefs and expectations. Leaving the questions about intentions to the end also proved to be useful since we used the details revealed in the first two parts to probe the interviewee's answers regarding real objectives, intentions, and expectations.

### *Anonymization*

We collected a signed consent form from the CEO of each participating company. The consent form has outlined the title of the study and core research protections, such as voluntary participation, confidentiality, the choice not to answer questions, and the option of anonymity (see Appendix A: Consent Form Template). Although the CEOs of the three companies opted for non-anonymity, we chose to anonymize data, given the unpredictable environment in Egypt. Anonymization involved removing the names of companies and research participants. Whenever there is a change in original information, we include a replacement term in its stead [square brackets]. We have also removed interview data that refers to any entity or individual related to the state.

### 3.4.3 The Coding Process

This step is the start of data analysis. Analysing data is the heart of building theory from cases, but it is both the most difficult and the most time-consuming step. As Eisenhardt (1989) notes, “a huge chasm often separates data from conclusions” (1989, p. 539). In this section, we explain the theoretical coding approach followed in analysing data.

Data analysis is carried out in two steps: a within-case analysis step and a cross-case analysis step. In the first step, the data of each case is analysed as a “stand-alone entity” (Eisenhardt, 1989, p. 540), and codes emerge from the data to represent the main patterns observed. Sections 5.3, 6.3, and 7.3 present the within-case analysis of the three cases. In the cross-case analysis step, codes are compared in search of general themes across cases, and the outcome is formulated in key insights presented in Section 8.1.

The coding method is a procedure for organizing the qualitative data, especially interview transcripts. Coding “is the simple operation of identifying segments of meaning” (Skjott Linneberg & Korsgaard, 2019, p. 6) in the interview text and labelling them with a code. The code can be defined as “a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (Saldaña 2015, p. 3).

There are two types of coding used in qualitative research: top-down and bottom-up. Deductive coding is a top-down approach where the researcher starts with a set of predetermined codes and then finds excerpts that fit those codes. The predetermined codes in deductive coding are usually theoretical concepts or themes drawn from the existing literature. Deductive coding is mainly used to test or refine an existing theory. Inductive coding, on the other hand, is a bottom-up approach where the researcher starts with no codes and develops codes as she analyses the dataset. In this study, we used bottom-up inductive coding.

We carried out the bottom-up coding on multiple iterative rounds (cycles). Skjott Linneberg and Korsgaard (2019) argue, “It is helpful to see coding as occurring in two or more cycles” (2019, p. 15), because they allow for deep thinking about what the data is trying to ‘say’. In the first round (cycle), we derived codes from the raw data without preconceived notions of what the codes should be or how they compare with codes of the other two cases. The goal was to allow the unique codes of each case to emerge. The second round of coding was carried out during the cross-case analysis to probe the emergent cross-case patterns (i.e. themes) and build the research insights on solid grounds from the data. The multiple cycles of coding turned out to be very useful because the first round allowed each case to reveal its unique patterns. On the other hand, the second round of coding was crucial to probe and substantiate themes that emerged in the cross-case analysis phase.

We also conducted the two rounds of coding using two different tools, Excel and NVIVO, to repeat the whole cycle again without dropping any step.

### *Cycles of Coding on Excel and NVIVO*

Following Auerbach and Silverstein's (2003) recommendation, we started coding without an analysis program. The authors recommended using paper and marker (by hand) in the first round of coding, but being acquainted with Excel, we decided to use Excel in the first round. After highlighting the relevant passages in the transcript Word files, we copied all the highlighted passages on one sheet into one Excel file so that we would need to open only one file to have access to the full content of the research, which facilitated cross-case comparison in the later stage. In the Excel sheet, relevant passages were organised as follows: each relevant passage makes one row, and for each row, there are columns that indicate the case title, the passage in the original language, an English translation, the phase (sensing, seizing, reconfiguring) to which this text belongs, the title of the interviewee, and three columns for codes and themes. The Excel filtering option made it easy to see passages pertaining to each code in one screen view. Excel also made it easy to reassign passages to different codes, change code labels, and group codes under higher codes and themes.

Although Excel is powerful in organizing and grouping data, we decided to do the coding process again using a data analysis program to increase the transparency of the outcome. The various qualitative software programs fall under a generic label known as Qualitative Data Analysis (QDA) software. There are many QDA programs in the market. Experimenting with several to choose which one to use would have been time-consuming. Instead, we decided to use the NVIVO

program (Release 1.6.1). The decision was based on three main reasons. First, Auerbach and Silverstein (2003), whose book was used in this study as one of the references for the theoretical coding process, specifically recommend the use of NVIVO for its advantages over other applications, like ease-of-use and popularity among social science scholars. Second, in the literature review step, we found that NVIVO was used in many research papers on dynamic capabilities and in firm-level research papers in general (e.g., Davies et al., 2016; Froehlich et al., 2017). Third, NVIVO is one of the preferred QDAs in SOAS. As such, we decided to use NVIVO to carry out the second round of coding.

### *The Coding Process*

A *code* is a description of the key idea inferred from a relevant passage. There could be multiple levels of codes that are eventually grouped under more abstract ideas called themes or categories (Gioia et al., 2012). The central idea of the coding process is to move from raw data to the research concern in small steps, each step building on the previous one. The outcome of the coding method is key themes and their relations to each other and to the phenomenon. The codes, themes, and findings represent a three-phase bridge built to connect the research concern with raw data. The coding process followed in this study is adapted from Auerbach and Silverstein (2003) and comprises three phases: a) highlight and code, b) compare and consolidate, and c) report findings and research synthesis. Below is a brief description of the coding process.

## 1. Highlight and Code

In this step, with the research concern in mind, we went through all the interview transcripts and highlighted the passages that shed light on the expansion opportunity and the firm's strategic response (Auerbach & Silverstein, 2003). Highlighted passages are then copied into Excel, and we systematically went through them, assigning a tentative code for each row of passages. This task of assigning and labelling codes to relevant passages was carried out numerous times for each case. In the beginning, we were naming the key idea (code) without knowing whether it would be repeated or not. Afterwards, repeating ideas, expressed multiple times and by two or more interviewees, started to show a pattern of repeated codes. It required multiple iterations to settle on the labels (i.e. naming) of the repeating codes. We kept changing code labels to choose words that better represent the idea behind the passages. In these iterations and label revisions, Excel was helpful because the filter function, displaying all filtered rows on one screen, made it easy to read and compare all the passages under each code and double-check their affiliation to that specific code. The same step was repeated with the transcripts of the other two cases.

## 2. Compare and Consolidate

In this stage, we started to compare lists of emergent codes of the three cases to observe the variance in the attitudes and behaviour, but also to identify the dimension along which they vary. Despite the incomparability of industries of the three cases, several dimensions of interest seemed comparable, for example, the 'proactive-reactive' dimension of sensing and the 'limited-extensive search' dimension of seizing. Identifying these intersects was critical for the next step, which is grouping emergent codes of the three cases under higher codes (second order codes).



We then started to group codes under themes. Themes are abstract representations of affiliate codes and attempt to reflect the key dimension that has an influence on the firm's response behaviour. Each theme comprises codes from the three cases indicating a specific pattern or dimension of comparison observed in the cases. Those themes grouped under dimensions convey critical insights about the phenomenon under study. Table 4 is an example of a table showing the hierarchy of codes and themes pertaining to one area of research findings. This hierarchy is an adaptation of Gioia's data structure (Gioia et al., 2012). We are mindful of the interpretivist paradigm Gioia and colleagues adopt, which is different from Eisenhardt and Graebner's (2007). Nevertheless, since our method is data-driven and relies on interviewing as the main data source, we think it is still appropriate to borrow Gioia's systematic presentation of codes and themes. In the example table below, the 1<sup>st</sup> order codes 'aspire to match peers', 'seeking social impact', and 'feelings of anger' are identified within each case. They are grouped under the theme 'Motives and emotions instigate and direct action'. Together with another theme 'Loss-aversion predisposition influences action and inaction', they are grouped under the dimension 'motives, emotions, and predispositions'.

At this stage, we conducted a second round of coding to verify the emergent themes and double-check if data that could further confirm or contradict emergent themes was overlooked. In this round, we also compared higher codes with highlighted passages of lower codes to assess how well or poorly the higher code fits with row data. The outcome of this stage was four themes presented in Section 8.1.

Table 4 Example of a data structure table

Case	1 <sup>st</sup> order codes	2 <sup>nd</sup> order themes	Dimension
DN	Aspire to match peers (extrinsic motive)	Motives and emotions instigate and direct action	Motives, emotions, & predispositions
KS	Seeking social impact (intrinsic motive)		
KS	Feelings of anger		
EN	Avoiding loss more than seeking gains	Loss-aversion predisposition influences action and inaction	

*Note.*

DN= anonymized name of the case company in the fibre optic case

KS= anonymized name of the case company in the solar PV case

EN= anonymized name of the case company in the high voltage case

### 3. Report Findings and Research Synthesis

In this phase, we used emergent themes to report key findings that represent a cross-sectional depiction of differences across case studies and a tentative argument that explains these differences (see Section 8.1). At the end of each point, we attached a table that shows the code tree that empirically support that point. In Section 8.2, we reconciled insights with literature, and in Chapter Nine, based on research insights and consulted literature, we constructed a theoretical argument with a number of propositions that give a preliminary explanation of firms' responses.

#### *Interpretive Content Analysis*

Three points need to be highlighted regarding the methodology and analysis process detailed above. First, we adopted an interpretive content analysis approach in analysing (i.e. coding) interview data. Interpretive analysis means that both the manifest and latent meanings of the words

are considered (Krippendorff, 2013). Baxter (1991) notes that “if a researcher is interested in a richer understanding of the meanings of content, manifest content analysis will not be as enlightening as what I shall call interpretive content analysis.” (1991, p. 240). In assigning codes to passages, we considered the latent content or meaning conveyed besides the literal content. In this regard, the context of the case was vital to understand the latent meanings of words and sentences. For example, in the HV case, EN’s vice chairman said in the interview, “The Gulf market is weak and idle capacity is high, so producers are burning prices like crazy in all cable ranges. That made us think about new high-margin niche products. That's why we decided to produce the 400 kV [EHV] cable.” Employing an interpretive approach, this sentence was coded as ‘avoiding loss more than seeking gain’, indicating that EN’s decision-maker in exploiting the 400 kV opportunity was motivated more by avoiding loss than seeking gain. Although the interviewee did not literally state this motive, this meaning is inferred from what the interviewee said and the details of the case context. This is an example of what Drisko and Maschi (2015) call “low-inference interpretations”, which “can focus on the meaning conveyed in the material even though they are not necessarily literal.” (2015, p. 62).

Second, it is important to highlight an important issue regarding the interpretation of data using theoretical coding or any other method for that matter, and that is, there is no *one* right way to interpret the data. There are multiple ways. The important thing is that the proposed interpretation would be valid. Landing on a valid interpretation is about how much the proposed interpretation is supported by data (i.e. case evidence). As Auerbach and Silverstein (2003) claim, “If your interpretation is supported by the data, then it is valid, even if there are other ways to interpret the same data.” (2003, p. 36).

Third, in the coding process, too many codes emerged from the interview data that it was impossible to group them all under themes and report them in findings without losing focus. In trying to strike a balance between capturing the complexity and diversity of reality but also having a workable number of codes, we had to select codes to keep and others to discard. This does not mean that discarded codes were unimportant, just that the eventual findings and synthesis cannot aim to explain everything that took place in the cases. For example, in the Solar PV case, multiple passages were around the interviewees' belief in the importance of patient capital to achieve success. However, the 'patient capital' related codes were not included in the themes or findings because it was not a comparable point among the three cases. Below we highlight some other challenges we faced in the fieldwork.

#### 3.4.4 Challenges

This section notes a number of key challenges faced in the fieldwork and analysis phases.

##### *Impact of the COVID-19 on fieldwork*

The fieldwork took place between October 2019 and February 2022. During that time, the global outbreak of COVID-19 pandemic in March 2020 had some negative effects on the research fieldwork. First, face-to-face interviews were terminated, and phone calls were used instead. Phone calls provided less bandwidth for communication and data sharing compared to the face-to-face mode. Second, visiting research participants' work sites, which represented an important source of observations and probing questions, became non-applicable. Third, due to the detrimental and prolonged economic impact of the pandemic on companies, especially companies, which rely on

import and export activities, research participants became heavily occupied dealing with the crisis. This has delayed their response to requests for an interview, and sometimes led to cancelling interviews altogether. As a result, in the high voltage case, for instance, we managed to conduct only six interviews compared to ten in the fibre optic case and eight in the solar PV case.

### *Code Generation*

While the coding itself (i.e. assigning codes to text) was easy to do on Excel and NVIVO, the code generation was not without challenges. It took patience, open-mindedness, and discipline to let the data ‘speak’ and understanding emerge without worrying if emerging insights would be comparable across the cases, conform to or contradict literature, or if they would eventually lead to a fruitful contribution. We exerted sincere effort to keep the codes close to the data and not over-interpret passages or choose code labels that are loaded with undue meanings.

The second challenge related to code generation is that the researcher is a non-native English speaker. This challenge manifests in difficulty in articulating ideas and presenting arguments in general, but particularly in labelling codes. We have bent over backwards to find a few words that could reflect the key idea behind multiple passages and, at the same time, comprehensible to an academic reader. Applying an interpretive type of content analysis (see Section 3.4.3) did not help since code labels are supposed to reflect not only the manifest but also the latent meanings of content. The fact that we had to translate the passage from Arabic to English has increased the difficulty of labelling since it is relatively easier to convey key ideas in the language of the original text than from a translation.

### *Case Richness*

We conducted a variance study on three companies with four incidents and observed the strategic responses occurring in different ways (variance). In this regard, it was hard to keep both the richness of the gathered data and, at the same time, develop comparisons with clearly distinct outcomes. We chose to sacrifice the many observations that could be made on the case stories to focus on a few codes and themes (constructs) to use in comparing and generating insights.

In general, although it is easier to claim that the journey has neatly followed the research protocol, in reality, what took place is best described as a chaotic process of searching for what could not be pinpointed at the outset.

## 4 Egypt's Economic Background

Egypt's economy is Africa's third-largest economy by GDP after Nigeria and South Africa, accounting for 12.5% of continental GDP (OECD et al., 2021). Egypt is also the third most populous country in Africa, behind Nigeria and Ethiopia, with a population estimated at 109 million people in 2021<sup>2</sup>. Based on development stage, Egypt is classified as an emerging industrial country. In terms of income level, it is classified as a lower-middle income country (UNIDO, 2020).

Egypt had and still has at its disposal key assets to foster industrialization while its demographic window of opportunity is still open: a young workforce, a large local demand, strategic geographical location and proximity to Asian, African and European markets, a number of free trade agreements and arrangements, and a product space position with untapped potential. We briefly elaborate on each asset.

First, about 62 percent of Egypt's population is between ages 15 and 64, and only 5 per cent of the population is older than 65<sup>3</sup>— meaning that most of the population is of the productive age. Second, the substantial local demand of 109 million Egyptians allows for large-scale production. Meaning, even industries with high fixed investment can become profitable because of the large domestic demand (Loewe, 2013). Third, Egypt is located at the juncture of Africa and Asia as well as between the Mediterranean Sea and the Indian Ocean. Transportation and communications are

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<sup>2</sup> World Bank Data <https://data.worldbank.org/country/EG>

<sup>3</sup> World Bank Data <https://data.worldbank.org/indicator/SP.POP.65UP.TO.ZS?locations=EG>

thus cheap and easy in all directions. Fourth, Egypt has signed a number of trade agreements that open markets in Europe, the Middle East, and Africa to Egyptian products. Egypt is member of the African Free Trade Continental Area (AfCFTA), which, when fully implemented, “will create an integrated African market of 1.2 billion people, almost equal to the population of India, and the world’s biggest single market for goods and services by number of countries.” (OECD et al., 2021, p. 134)

Finally, from a productive capabilities perspective, if we use export sophistication index (EXPY)<sup>4</sup> as proxy for the level of sophistication of productive capabilities (Hausmann et al., 2007) available in the economy, we find that Egypt’s export basket sophistication is more than expected given its income level, even after excluding natural resources effect. The same thing is true with Egypt’s Economic Complexity Index (ECI)<sup>5</sup> versus its income level. Both discrepancies indicate that Egypt has an income that is lower than that which its productive capabilities should be able to support (Hausmann & Bustos, 2012), suggesting that the economy is expected to grow faster in the future if the potential of available productive capabilities is well exploited.

This chapter provides an overview of the country’s economic background. It has three sections. The first focuses on development in terms of employment, investment, and competitiveness in the last two decades. The second and third sections provide a snapshot of institutional conditions and government policies.

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<sup>4</sup> EXPY: Measure of the export sophistication of a country’s exports and a good indicator of the income potential of a country’s export basket (Hausmann et al., 2007)

<sup>5</sup> ECI: is a holistic measure of the productive capabilities of large economic systems (Hidalgo and Hausmann, 2009)



#### 4.1 The Development Course (2000-2020)

Currently, Egypt is a case of middle-income country who managed to grow and attain middle-income status, but subsequently failed to achieve high-income status, a situation that is termed ‘middle-income country trap’<sup>6</sup>. Reaching a middle income category means that a country cannot compete as before with low-wage manufacturers and, at the same time, is still lacking the technological capabilities to compete with advanced countries (e.g., Aiyar et al., 2013; Cherif & Hasanov, 2015; Paus, 2017). The main challenge faced by such economies is to transition the economy from resource-based and cost-of-production-based competitiveness to innovation- and technological-capabilities-based competitiveness.

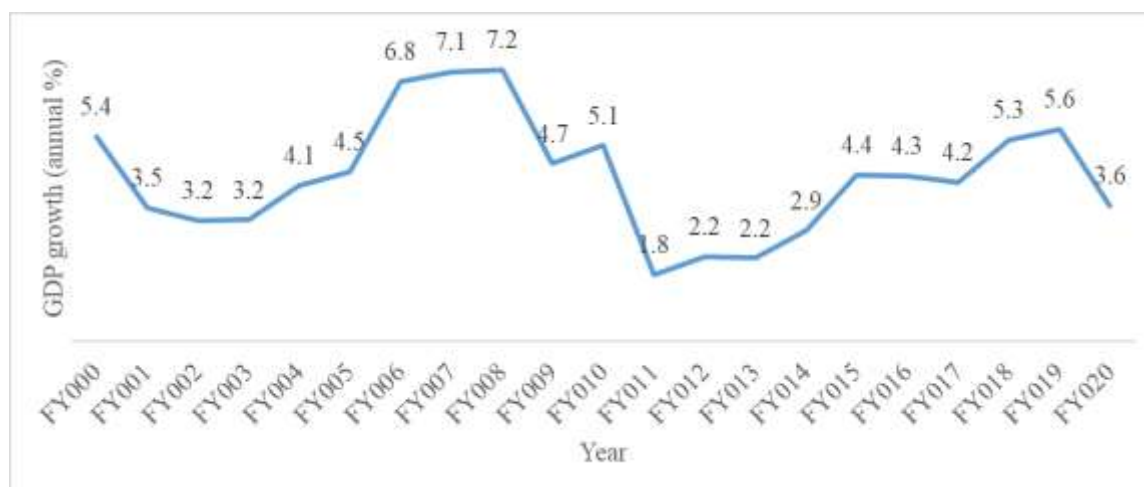
Egypt experienced good economic growth between 2000 and 2010 (Figure 1), with annual per-capita growth averaging 6 per cent from 2004 to 2008 and only dropping below 2 per cent for one year which has witnessed the January 25th revolution (Loewe, 2013). However, GDP growth numbers do not give an indication of Egypt’s performance with regard to structural change and competitiveness.

In this section, we discuss Egypt’s economic development in the last two decades (2000 to 2020) with special focus on areas that are related to structural change, mainly employment, investment and competitiveness.

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<sup>6</sup> The term “middle-income trap” was originally coined by Indermit Gill and Homi Kharas to refer to the marked slow-down seen in South-East Asia’s economic growth following the 1997-98 financial crisis. The term is now used more broadly to refer to a slow-down in growth observed when an economy approaches the upper/middle-income level (EBRD, 2017, p. 8).

Figure 1 Egypt's annual GDP growth (%), 2000-2020



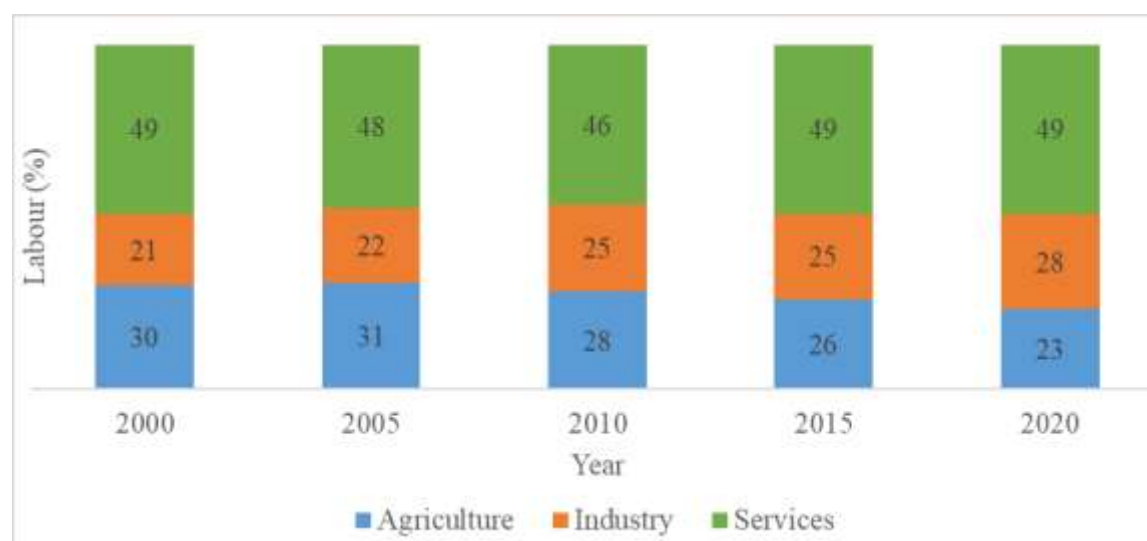
Source: UNIDO databases. <https://stat.unido.org/>

### *Employment*

The employment-to-population ratio is estimated at 28.3 million workers in Egypt in 2020 (DTDA, 2020). The distribution of this workforce over the aggregate sectors has changed during the last two decades (Figure 2). The agricultural sector share of total employment dropped from 30 in 2000 to 23 percent in 2020, as labour force mainly moved to the industry sector peaking at 28 percent in 2020. However, this movement was mainly to low-productivity sectors like construction (DTDA, 2020).

The breakdown of workforce employment sectors shows that the dominating sectors are the agricultural sector (23%, 6.6 million workers), public administration, education, and health (17%, 4.7 million workers), trade, restaurants, and hotels (16%, 4.5 million workers), construction (14%, 3.9 million workers), manufacturing (13%, 3.6 million workers), and transport, storage, and communication (8.7%, 2.47 million workers) (DTDA, 2020).

Figure 2 Egypt employment by aggregate sector (%), 2000-2020

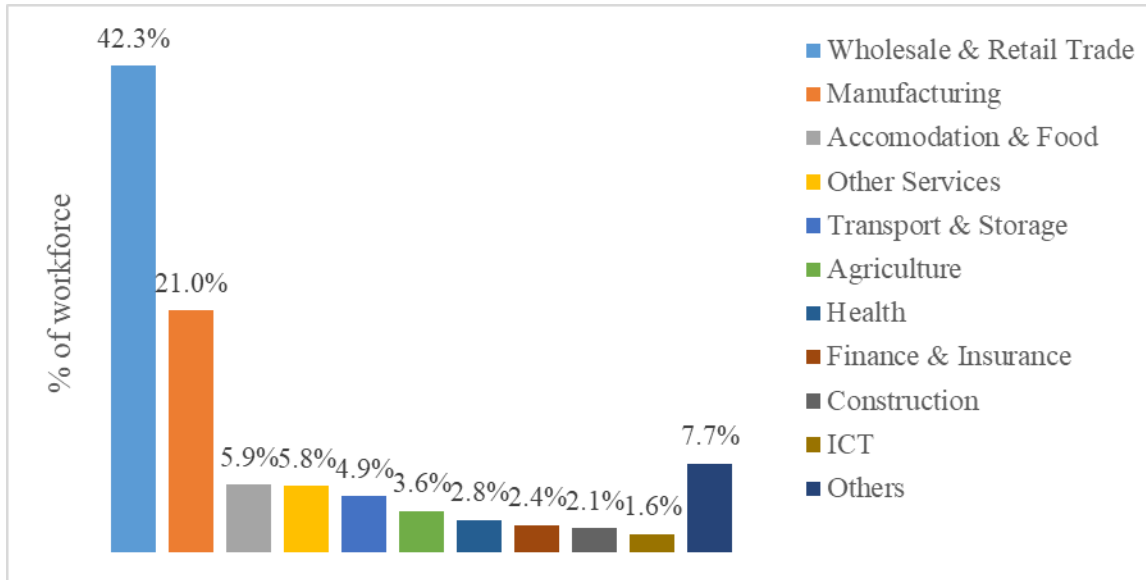


Source: Danish Trade Union Development Agency. (2020, September). Labour market profile Egypt-200/2021 Ulandssekretariatet-DTDA.

The private sector plays a key role in driving the economy and creating decent jobs. Private sector employment has remained broadly stable, constituting 77 percent of total employment in FY2019, which is lower than the global average of 90 percent (IFC & World Bank Group, 2020). Within the private sector, the distribution of employment by economic sector (Figure 3) shows that more than 42 percent of employment is concentrated in wholesale, retail, and trade activities, while manufacturing industries provide 21 percent of private sector employment (IFC & World Bank Group, 2020).

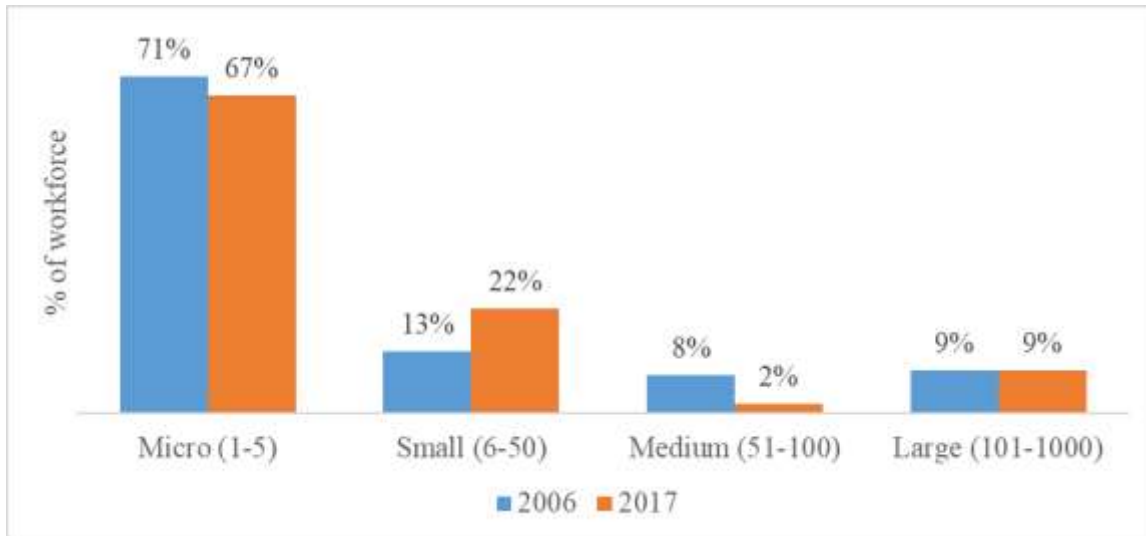
Most firms in Egypt are microenterprises concentrated in low-skill sectors. In 2017, about 97 percent of firms employ one to five workers, and provide employment to 71% of the total workforce. Meanwhile, small enterprises make 3% of total firms and employ 22% of workforce, while medium enterprises only make 0.05% of firms and employ 2% of workforce. These numbers suggest that Egyptian firms have difficulty growing (IFC & World Bank Group, 2020).

Figure 3 Private sector employment by economic activity (%), 2017



Source: IFC & World Bank Group. (2020). *Creating markets in Egypt: Realizing the full potential of a productive private sector*. International Finance Corporation. World Bank Group.

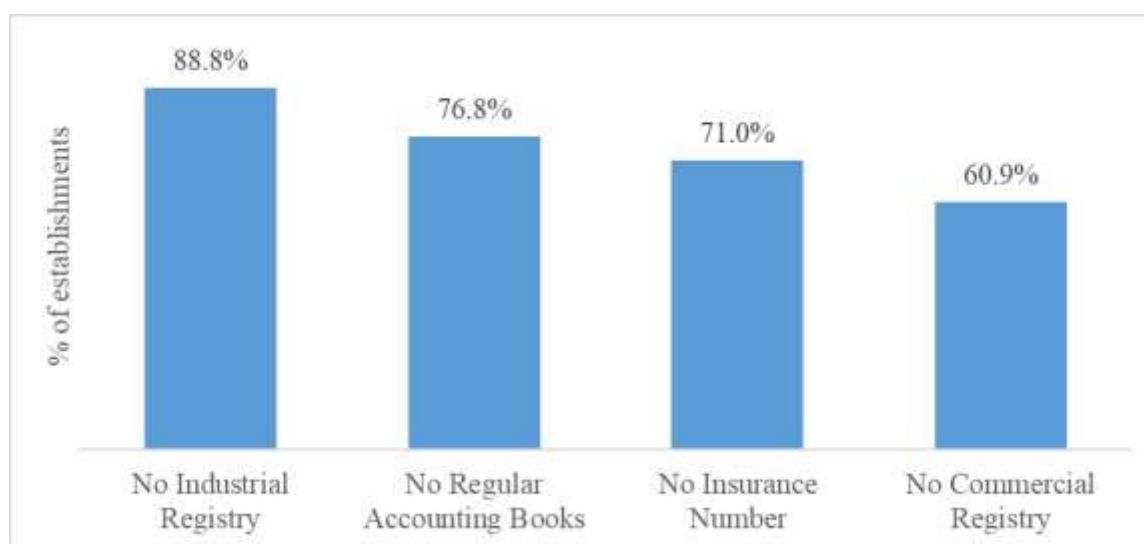
Figure 4 Employment by firm size (%), 2006 vs. 2017



Source: IFC & World Bank Group. (2020). *Creating markets in Egypt: Realizing the full potential of a productive private sector*. International Finance Corporation. World Bank Group.

*Egypt Labour Market Profile-200/2021* report (DTDA, 2020) indicates that the proportion of informal employment in non-agriculture employment was estimated at around 52% in 2009 and suggests that the informal economy supports “a significant part of the economy from 37% to 70% of GDP depending on the applied methodologies” (2020, p. 18). Another report by IFC and the World Bank Group (2020) uses multiple indicators derived from the Central Agency for Public Mobilization and Statistics (CAPMAS) data to report the widespread informality in the Egyptian private sector in 2017 (Figure 5). Moreover, informal jobs are usually low-quality jobs that provide low productivity and low pay.

Figure 5 Selected indicators for informality, 2017



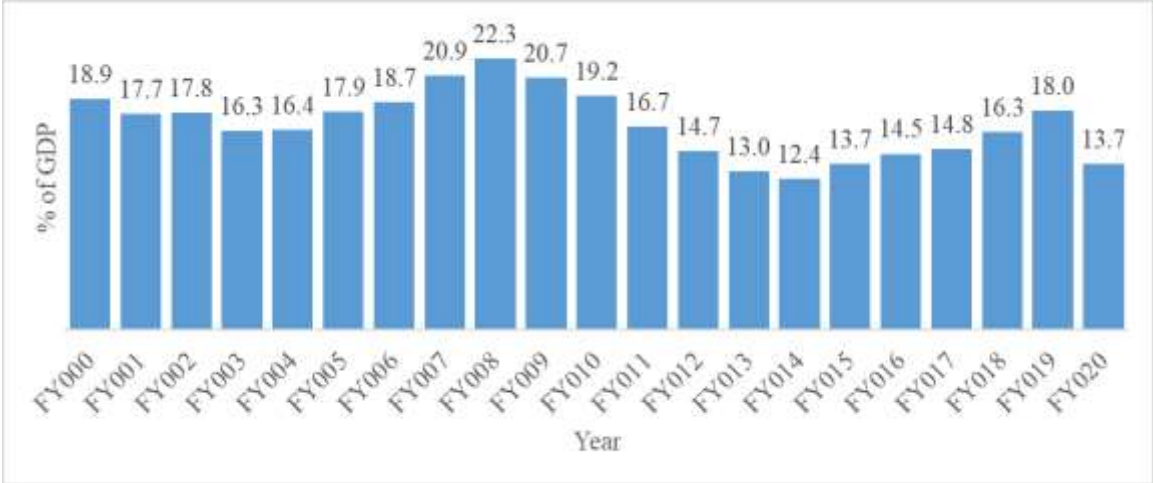
Source: IFC & World Bank Group. (2020). *Creating markets in Egypt: Realizing the full potential of a productive private sector*. International Finance Corporation. World Bank Group.

### *Investment*

Successful investment policies in the period 2004-2008 (see Section 4.3) helped increase the share of total investment in GDP reaching a peak of 22.3 percent of GDP in FY2008 (Figure 6) before

it started to go down as a result of the economic slowdown following the financial crisis end of 2008 and due to the political instability that accompanied January Revolution in 2011. There was a slight rebound in FY2015 till FY2019 before dropping again in FY2020 to 13.7% (Helmy et al., 2018).

Figure 6 Total gross fixed capital formation (investment) share of GDP (%), 2000-2020

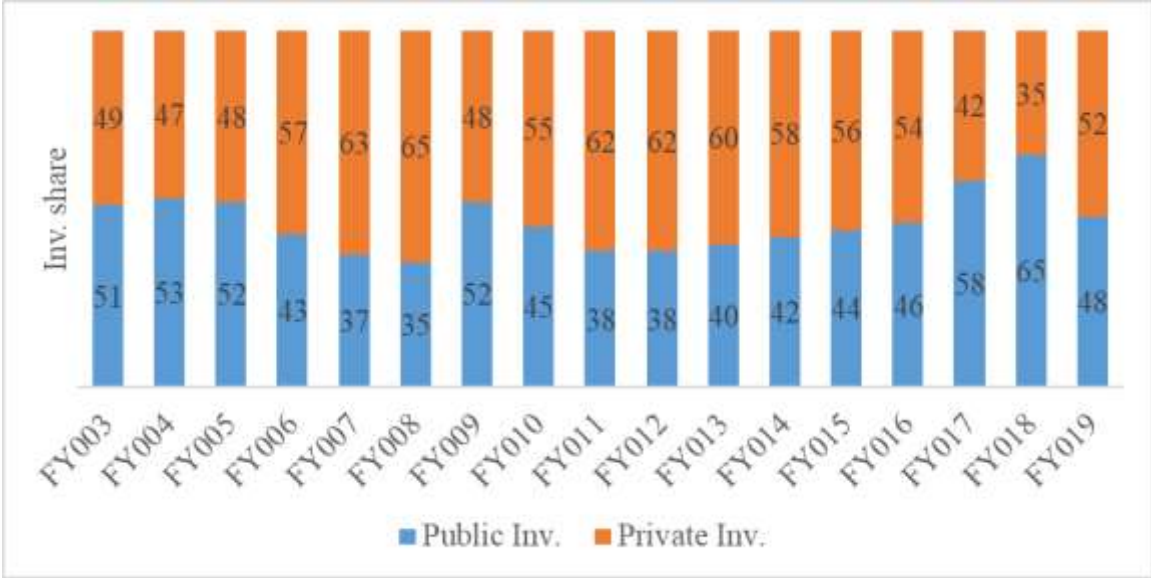


Source: World Bank national accounts data, and OECD National Accounts data files.

The share of private investment in total investment has witnessed a declining trend since FY2013 reaching a low of 35 percent in FY2018 before starting to recover in the following year, still lower than its historical point of 65% in FY2008 (Figure 7). As a percentage of GDP, private investment has begun to increase, reaching 9 percent of GDP in FY2019. Still, in comparison with other peer countries (15.3 percent in Jordan, 23 percent in the Philippines, and 17 percent in Thailand); the weight of private investment of GDP in Egypt is considerably low (IFC & World Bank Group, 2020). Moreover, “the increase comes mainly from the extractive (gas) industries, utilities, and real estate”, according to the report (2020, p. 28). For example, in natural gas extraction, private

sector investments have increased to 21 percent of total private sector investment in FY2019 up from 14 percent in FY2014. Likewise, in the utilities sector, as the Law 97/2015 opened the door for private sector participation, “private investment in the electricity sector reached LE 50 billion during FY2019, compared with a cumulative LE 4.5 billion in the past 15 years.” (2020, p. 138).

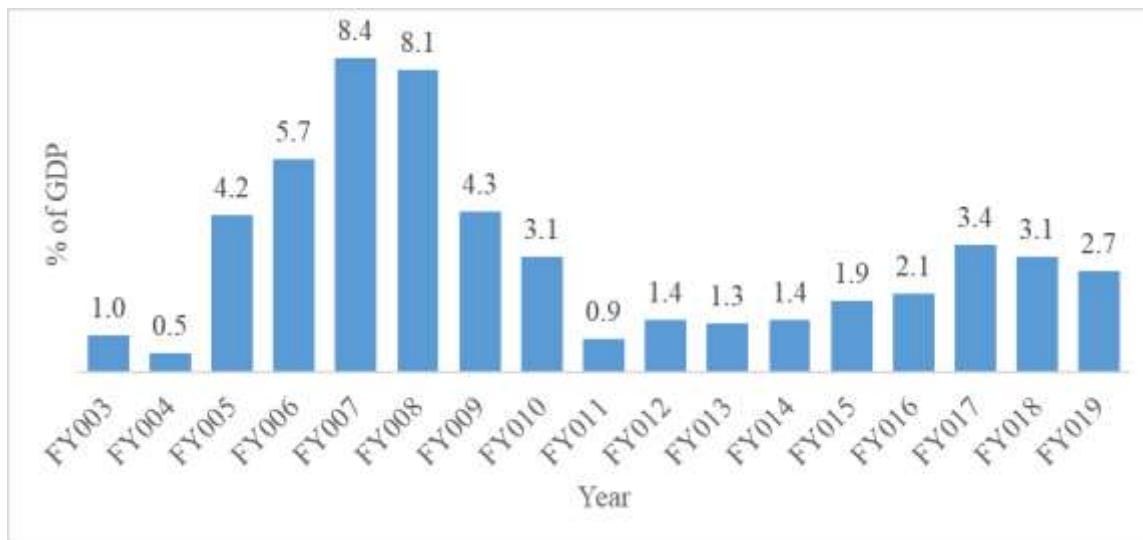
Figure 7 Public versus private sector investment share (%), 2003-2019



Source: IFC & World Bank Group. (2020). *Creating markets in Egypt: Realizing the full potential of a productive private sector*. International Finance Corporation. World Bank Group.

FDI inflows to Egypt is the largest in Africa (IFC & World Bank Group, 2020). However, its average in the last decade is well below the previous decade. Following the 2011 uprising, net FDI sharply dropped to 0.9% of GDP in FY2011 before starting to pick up slowly to reach 3.4 percent in FY2017 (Figure 8). Indicatively, FDI in FY 2019 remains concentrated in the petroleum sector (74.3 percent of total FDI) promoting a resource-based type of economy. Conversely, the share of FDI in more technology-and capabilities-intensive sectors, such as services and manufacturing, remains at 14 percent and 5 percent respectively (IFC & World Bank Group, 2020).

Figure 8 Evolution of net FDI (%), 2003-2019



Source: IFC & World Bank Group. (2020). *Creating markets in Egypt: Realizing the full potential of a productive private sector*. International Finance Corporation. World Bank Group.

### *Competitiveness*

In order to transition the economy to a high-income economy, Egypt has to raise its technology-based competitiveness. Multiple indicators are used to measure competitiveness. We use here three of them in this section: exports, MVA, and CIP.

### *Exports*

Exporting is a key vehicle for fostering productivity and growth. Learning by exporting (LBE) is recognized as an effective development model as firms demonstrate improvements in their performance in terms of growth, technological upgrading, and efficiency, after entering export markets (De Loecker, 2013).



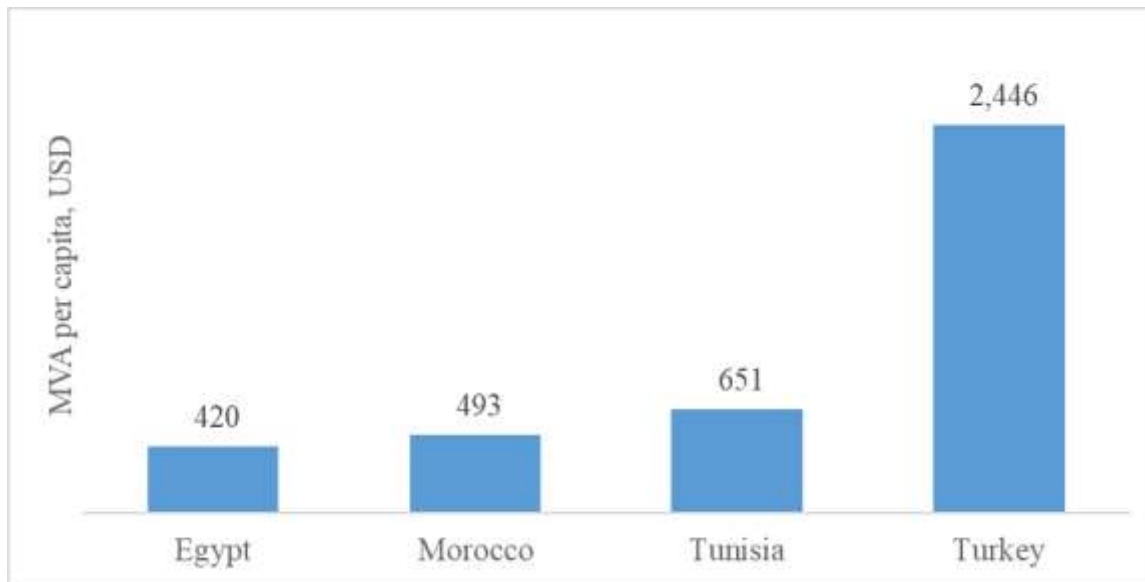
The majority of firms in Egypt are non-exporters. According to the IFC and World Bank report (2020) quoting CAPMAS Establishment survey (2017), only 1.1 percent of the surveyed firms export (2020, p. 34). The export market is concentrated among large firms, which account for around 75.6% of total exports (compared to OECD average of 64%), whereas small firms represent only 4.8% (compared to OECD average of 20%) (OECD et al., 2021). The number of manufacturing firms that export directly is very low standing at 9 percent (IFC & World Bank Group, 2020). In terms of export composition, the share of primary exports has decreased from 89 in 1980 to 52.3 percent of Egypt's exports to the world in 2018-20 (OECD et al., 2021), whereas about a quarter consisted of medium- and high -technology exports. By comparison, in Turkey and Malaysia, medium- and high-technology exports account for 42 percent and 58 percent, respectively (IFC & World Bank Group, 2020). In terms of exporting sectors, more than half of the exporting private firms are in the wholesale and retail trade industries, while manufacturing private sectors make up the rest, with agribusiness, apparel and textiles, metals, and furniture are contributing with 22.6%, 19.4%, 8.8%, and 8.6% respectively of total private sector manufacturing exports (IFC & World Bank Group, 2020).

In terms of global value chains (GVCs), the IFC and World Bank Group report (2020) states that Egypt's participation is also low compared to other regional countries. This low rate is due to the composition of the exports basket, mainly primary commodities and less sophisticated products, whereas GVC growth is concentrated in machinery, electronics, and transportation. Egypt's poor participation in the GVC comes as a surprise given Egypt's position in the product space map which shows that "its exports of connected and complex products such as transportation and electronics are currently mostly untapped, except for a small percentage of chemical-based exports" (2020, p. 71).

## MVA

MVA is a well-recognized and widely used indicator to assess the level of industrialization of a country. The share of MVA in GDP reflects the role of manufacturing in the economy and a country's level of industrialization (UNIDO, 2020).

Figure 9 MVA per capita of Egypt versus regional countries (USD), 2018



Note.

MVA = Manufacturing value added

Source: IFC & World Bank Group. (2020). *Creating markets in Egypt: Realizing the full potential of a productive private sector*. International Finance Corporation. World Bank Group.

Egypt's manufacturing value added grew from about 34.0 billion in 2009 to 48.2 billion US dollars in 2019 (IFC & World Bank Group, 2020). However, if we use MVA per capita to adjust for the size of the economy, we find that Egypt is lagging behind other regional countries. In 2018, its manufacturing value added per capita was 420 US dollars, compared with 493 for Morocco, 651 for Tunisia, and 2,446 for Turkey. (IFC & World Bank Group, 2020). Manufacturing exports, as an indicator of the competitiveness of manufactured products, gives the same profile. The

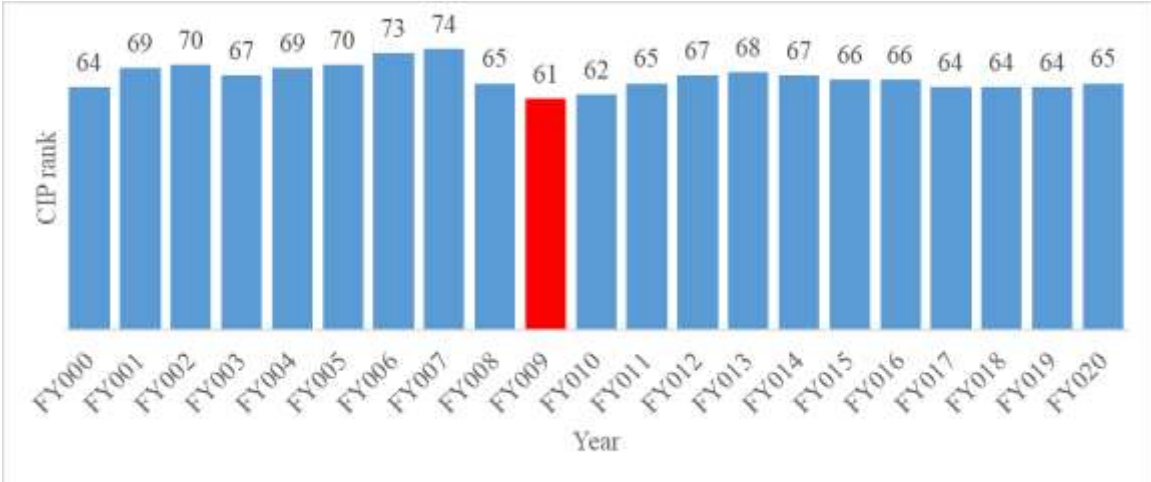
manufacturing exports per capita for Egypt are only 140 US dollars compared to 564 for Morocco and 1,718 for Turkey (IFC & World Bank Group, 2020).

In terms of technological intensity, Egypt’s manufacturing sector’s export structure shows that manufacturing exports in 2018 are 37.3% resource-based, 29% low-technology, 31% medium technology, and 2.8% high-technology (UNIDO, 2020).

*CIP*

The Competitive Industrial Performance (CIP) report presents UNIDO’s annual CIP index which is a composite index that captures the competitiveness of 152 national economies and provides a prospective means for international comparison. Industrial competitiveness is calculated as a non-linear combination of eight component indicators grouped in three dimensions.

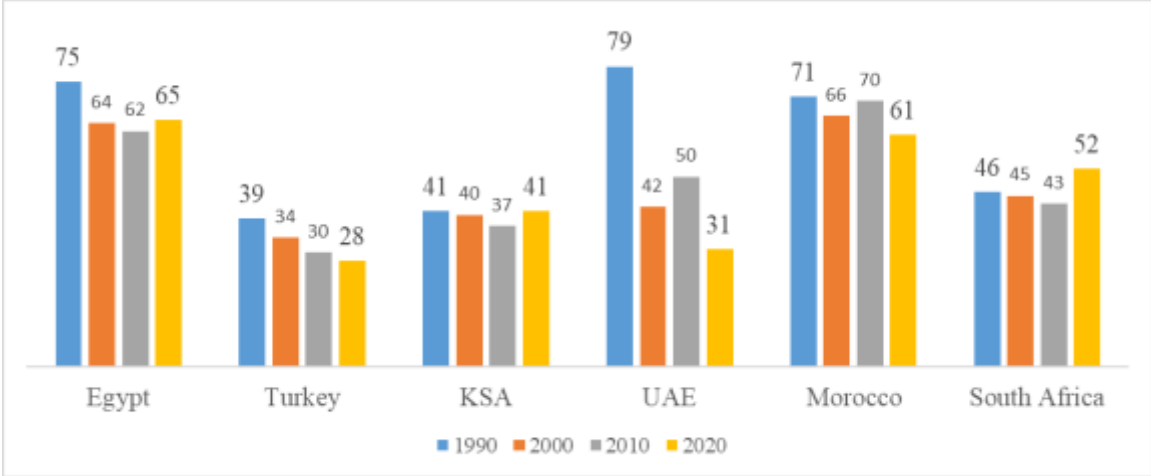
Figure 10 Egypt CIP rank change, 2000-2020



Source: UNIDO databases. <https://stat.unido.org/>

Interestingly, between 2000 and 2020, Egypt did not improve in CIP rank, but slightly went down one position from 64 to 65, compared to Turkey, which improved its rank by 6 over the same period, UAE 11, Morocco 5 (Figure 11). The breakdown of the CIP index shows that Egypt ranks 76 in ‘Share of Medium and High-Tech Activities in Total Manufacturing Value Added Index’, 59 in ‘Industrialization Intensity Index’, and 68 in ‘Industrial Export Quality Index’ out of 152 countries (UNIDO, 2020).

Figure 11 Egypt’s CIP rank change with other regional countries, 1990-2020



Source: UNIDO databases. <https://stat.unido.org/>

To wrap up this section, Egypt has achieved good GDP growth performance in the past two decades. However, structural change and productivity indicators have not improved much. The employment, investment, and competitiveness indicators reveal three key phenomena, namely informal economy, the missing middle, and weak competitiveness. Solving Egypt’s stagnant structural change process require a deep dive into institutional conditions behind the three phenomena.

## 4.2 Institutional Conditions

Before giving an overview of government policies implemented in the last two decades, it is important to take a brief look into the institutional conditions of Egypt historically and in the last two decades. These conditions give important clues on the incentives policy makers had when designing their interventions. On this, we draw from the works of Kang (2002) and Khan (2010). Egypt industrialization started early in the 1900s during the colonial era when it relied on its main raw material, cotton, to feed several industries, such as cotton spinning and weaving (Hawash, 2007). In the 1950s and 1960s, the post-colonial regime embarked on a statist path of development to promote structural change and growth (Loewe, 2013). The regime headed by Nasser implemented an import substitution industrialisation strategy, in line with many developing economies around the world at the time. Main import-substituting industries were chemicals, metals, paper, steel, fertiliser and textiles, as well as higher technology goods such as automobiles, TV and radio sets, white goods, and pharmaceuticals (Loewe, 2013). Many of the industries that exist today originated during that period (OECD et al., 2021). While domestic products had been successfully substituted for many imported primary and consumption goods, the strategy did not target exportation. As a result, between 1948 and 1973, Egypt's share of global exports shrunk from 1.0 to 0.2 per cent of global trade (Loewe, 2013). Weak exports and dependence on imported capital goods and parts to produce import substitutes led to the depletion of the country's foreign reserves. By the end of the 1970s, foreign-exchange pressures and low competitiveness of local firms led to a rethink of the development strategy, facilitated by a change in head of the regime, as Sadat succeeded Nasser in office.

The new development strategy focused more on promoting exports. The state started easing foreign trade and investment rules in the 1970s (a process known as “opening up”) to attract export-

oriented investments in labour-intensive commodities, such as textiles, footwear and electronics (OECD et al., 2021). Incentives to foreign investors included giving legal protection against expropriation, multiple tax holidays, and reductions. In 1977, these incentives were extended to domestic private investors (Loewe, 2013). This strategy continued well into the 1980s, until “the low oil prices of the 1980s, combined with weak investment levels, depleted revenues and led the government to seek out a structural adjustment programme supported by the IMF and the World Bank” (OECD et al., 2021, p. 38)

Until the 1990s, central planning, trade protection and administered prices prevailed, and the private sector was not very involved in industry (Loewe, 2013). By implementing the IMF-led structural adjustment program, Egypt’s economy started to move gradually to be, to a great extent, a capitalist economy. However, since the successive political regimes were autocratic in nature, they produced what Chekir and Diwan (2014) call crony capitalism, in which autocrats tend to allow business elites to capture significant rents in exchange for support for the regime (Henry & Springborg 2010, Heydeman 2004, King 2009).

Diwan and colleagues (2018) provide evidence on Egypt that supports the negative effective of business elitism on growth and competitiveness of Egypt’s firms and sectors. The authors (2018) use a database of 385 connected firms in Egypt between 1996 and 2006, which is a period that witnessed a rise in the number and influence of connected firms in the economy, to test the link between the entry and number of connected firms in a sector and the growth of the sectors in which they operate. They reported evidence that support their initial hypotheses: “despite receiving privileges that should support their own growth, connected firms undermined the overall growth of their sectors” (2018, p. 8). Not only that, the distribution of firms in sectors that experience crony entry exhibits a few connected firms with large market shares, and many unconnected firms

who prefer to stay small and “operate *under the radar* in local market niches, often in the informal sector.” (2018, p.7). These findings indicate that connected firms may be one of the causes of the missing middle and informality phenomena observed in the Egyptian private sector landscape (see Section 4.1). Diwan and Colleagues (2018) uses Aghion et al.’s (2001) model on the effect of competition on innovation to propose an understanding of the important dynamics that lead to these results. The authors contend that the regulatory and financial privileges of connected firms lower aggregate growth because they reduce firms’ incentives to invest in new, more efficient technologies in the sectors in which they operate. Instead of escaping competition via cost-reducing innovations and adopting better technologies, connected firms rely on regulatory and financial privileges. The authors argue that when leading firms already enjoy a substantial cost advantage due to regulatory and financial privileges, “their market share is already large and the payoffs to further innovation are low.” (2018, p.7). The authors go even further in suggesting that regulatory and financial privileges also discourage non-connected firms to innovate “because even successful innovation is unlikely to allow them to underprice the market leader and recover market share.” (2018, p.7). This attitude of non-connected firms further discourages leading firms to innovate knowing that non-connected firms tend not to innovate or grow, thus, do not pose any threat.

While there is consensus that Egypt’s institutional conditions contribute to its suboptimal development performance, scholars from different economic camps give different prescriptions to solve the problem. Scholars who adopt Washington consensus attribute Egypt’s suboptimal performance to the continuing use of industrial policies to promote domestic manufacturing. The IFC and World Bank Group report (2020) on Egypt hints at this issue saying that, for example, the high MFN tariffs, erected to protect domestic industry, may have led to a distortion of incentives

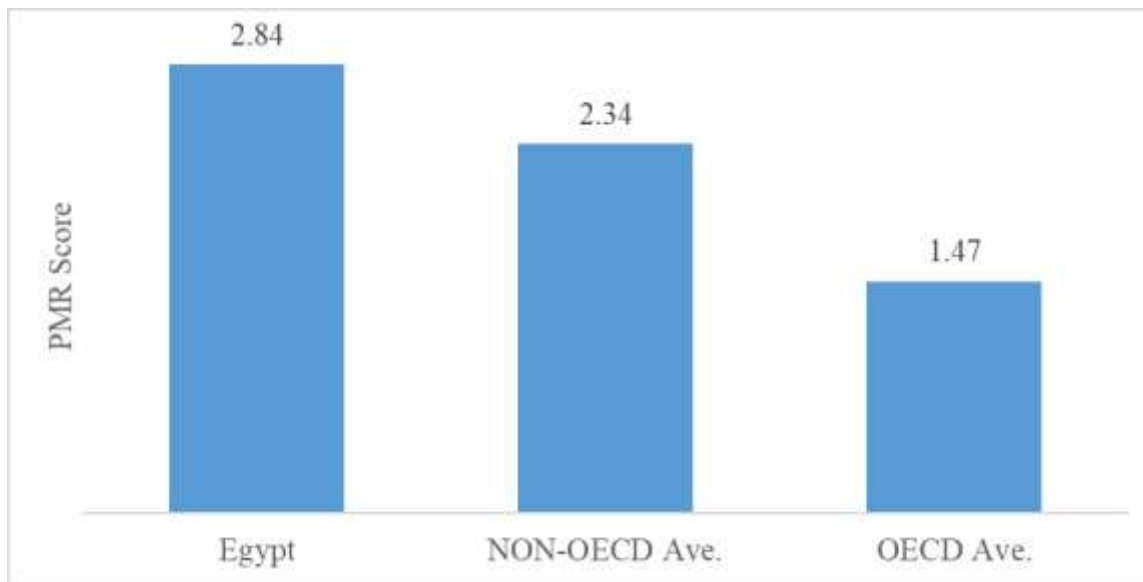
to export and raise competitiveness “either because profits per unit are much higher when selling to the domestic market or because protection limits the impetus to make productivity-enhancing investments that could lead firms to become internationally competitive.” (2020, p.42). The report uses the Product Market Regulation (PMR) methodology to give evidence that barriers are not only erected against international competition, but also to distort competition among domestic players.

The Product Market Regulation (PMR) methodology explores three main aspects that affect competition in markets: the extent of state control, the presence of barriers to market entry and rivalry, and the presence of barriers to trade and investment. The combination of these aspects shapes the competitive environments that enable firms to enter new markets, invest, and expand. (IFC & World Bank Group, 2020). Newly available product market regulations (PMR) data suggest that Egypt compares unfavorably on the economywide score, which is higher than that of countries with similar income levels (Figure 12). The report states, “Breaking down that score shows that Egypt’s standing is influenced not only by State control, but also by barriers to entrepreneurship (entry and rivalry). State control appears to be driven mostly by public ownership, whereas barriers to entrepreneurship account heavily for the complexity of regulatory procedures as well as regulatory protection of incumbents” (IFC & World Bank Group, 2020, p. 54).

In calling for removal of any barriers on entry, investment, and expansion, the report contends that leveling the playing field would be the way to promote Egypt’s domestic and international competitiveness.



Figure 12 Egypt's PMR score versus non-OECD and OECD averages, 2019



Note.

PMR = Product Market Regulation indicator. Absolute values from 0 to 6. Higher values are associated with regulations more restrictive to competition.

Source: IFC & World Bank Group. (2020). *Creating markets in Egypt: Realizing the full potential of a productive private sector*. International Finance Corporation. World Bank Group.

Conversely, scholars of the heterodox camp advocate selective rent-creating industrial policies to promote learning and building of technological capabilities. They attribute the sometimes observed ineffectiveness of industrial policy to the inability of the regime to make credible threats to withdraw subsidies in case of non-performance (Khan, 2013). Indeed, in the industrialization case of South Korea, some scholars argue that what made industrial policies effective and successful is the ability of the developmental state to incentivise technology adoption, and, at the same time, enforce performance conditions and penalise non-performance (Amsden, 1989; Chang, 1994; Khan, 2013). Without a credible threat to withdraw rents, “the outcome is typically a low effort learning strategy on the part of firms, and competitiveness is often never achieved.” (Khan, 2013, p. 15). While Khan (2013) seems to agree with the Washington-Consensus-backing scholars that

firms prefer to achieve normal rate of return through the rent allocation mechanism than “to earn a similar normal profit through the tougher route of production in an uncertain and harsh market environment.” (2013, p. 16), he, and scholars of this camp, insist that the route to raised competitiveness is not by revoking the rent-creating policies, but through disciplining the rent recipients.

### 4.3 Government policies

This section highlights key investment, industrial, and trade policies the government has enacted in the past two decades.

#### *Investment Policies*

Egypt started promoting investment by establishing free zones late 1990s. The General Authority for Investment and Free Zones (GAFI) was created in 1997 to regulate these zones. Some of the central benefits in these zones are the free transfer of invested capital and profits abroad, complete exemption from private and corporate income taxes, low land rental and utility rates, and other benefits related to residency facilities and granting permits to foreign workers (DTDA, 2020). GAFI also regulates entry to industrial sectors, including cement and steel sectors (Diwan et al., 2018). GAFI was part of the Ministry for Industry and Trade since 2004, until it became an autonomous body in 2019 reporting to the PM’s office.

The post-2004 government gave special focus to improving *doing business in Egypt*. In 2004, the government created a single access point for business registration with approval in 24 hours

(Helmy et al., 2018). The adoption of the Small Enterprise Law (Law No. 141 of 2004) and its implementation between 2007 and 2009 have greatly simplified the rules and procedures for registering new businesses, lowered registration fees and reduced the minimum capital requirements for registration (Assaad & Rana, 2019).

Regarding access to credit for SMEs, the government took the first step by establishing a credit bureau (I-Score) in 2007, which according to its website, maintains a database of credit information for credit consumers and SMEs. In 2008, the Central Bank of Egypt (CBE) introduced its SME initiative, exempting loans extended to SMEs from the reserve requirements of Egyptian banks. In 2016, the central bank stipulated that Egyptian banks increase lending to SMEs to 20% of their total loan portfolio by the end of 2020. It also subsidised interest rates to SMEs by capping rates at 5% for small businesses and 12% for mid-sized firms. The central bank, through the Credit Guarantee Company, created a guarantee trust fund of two billion Egyptian pounds targeted at SMEs (Assaad & Rana, 2019).

In 2008, the government has also shifted the focus of the Social Fund for Development (SFD), which was founded in 1991 mainly to cushion the negative impacts, to micro- and small enterprises (MSEs) development activities. It provided a range of financial and non-financial services to MSEs. Later in 2017, the SFD was replaced by the Medium, Small and Micro Enterprises Development Agency (MSMEDA), which operates as a one-stop-shops to enable quick registration for MSMEs. A law on MSMEs was enacted in 2020 (Law No. 152/2020), which replaced the previous Small Enterprises Law of 2004 and provided financial and non-financial incentives (OECD et al., 2021).

These reforms in aggregate seem to have improved access to credit for SMEs. Egypt's rank in the World Bank's Doing Business report on this dimension improved from 159 in the world in 2007 to 60 in 2019 (Assaad & Rana, 2019).

In 2015 a new investment law was issued (Investment Law-decree 17/2015) to provide further incentives to investors and introduce new dispute settlement mechanisms. In 2016, The Supreme Council for Investment, chaired by the president, was created and tasked with supervising investment policies in the country. Based on the Council's recommendations, the Law of Investment Guarantees and Incentives (Law No. 72/2017) was enacted. It included the following main points reported in Helmy et al. (2018) report:

- Investors were granted strong safeguards and generous incentives
- Land may be allocated free of charge or benefit from a 50% refund from the State for some strategic activities and under specific conditions
- Quota of foreign workers per production unit was increased from 10% to 20%
- Special incentives were granted to investment projects in under-developed geographic locations, export-oriented projects, labor-intensive activities, SMEs, communication and information technology activities, environment protection, healthcare, social care, cultural care, technical education, scientific research and training.

(Helmy et al., 2018, p. 24)

### *Industrial and trade policies*

Egypt has implemented a number of industrial policies to improve competitiveness of the manufacturing sector to promote structural change. Policies included horizontal (cross-sectoral)

and vertical (selective) policies to support the manufacturing sector in general and the advance of particular sectors.

In 2005, the Ministry of Trade and Industry developed ‘Egypt Industrial Development Strategy’ (EIDS) to focus on enabling the industrial sector to be the engine of growth through the expansion of exports and job opportunities. EIDS focused on promoting medium and high technology activities as new industrial niches for the Egyptian manufacturing industries. The identified sectors are:

1. Engineering machinery and equipment (renewable energy);
2. Labour-intensive consumer electronics;
3. Automotive components;
4. Life sciences;
5. Biotechnology; and
6. Ethnic products

(Hausmann & Bustos, 2012, p. 91)

The EIDS defines eight fields of action: (i) human resources and entrepreneurship, (ii) access to finance, (iii) infrastructure, (iv) innovation and technology, (v) quality assurance, (vi) enterprise competitiveness, (vii) exports and (viii) FDI (Loewe, 2013). Although the strategy is ambitious and could “change the productive landscape, as it did in Korea.” (Hausmann & Bustos, 2012, p. 96), January Revolution in 2011 disrupted its implementation and there is no sign that the government is still pursuing its goals.

Tariffs are one of Egypt's key industrial policy instruments to promote domestic manufacturing and upgrade of capabilities. In general, Egypt maintains high external tariffs. Between 2000 and 2018, Egypt's average applied tariffs declined from 25% to 9.6% but they remain on average nearly double the rate prevailing in MENA (5%) and higher than in sub-Saharan Africa (7.76%). In the meantime, the average most-favored nation (MFN) tariff is 19 percent. "This makes Egypt the second-most-protected economy in the world after Sudan" (IFC & World Bank Group, 2020, p. 42).

The applied pattern of tariffs favours local production and assembly of goods. Tariffs are lowest for capital goods, higher on raw materials and intermediate goods, and highest for consumer goods. "The average consumer goods tariffs under Most Favored Nation (MFN) terms (excluding alcohol) is nearly 26%, while that for capital goods is 5.4%." (OECD et al., 2021, p. 43).

Besides import tariffs, Egypt used another export-promoting policies. Exporters are allowed duty free imports provided these will be re-exported in a more processed form. In 2017, the Export Development Authority was established in 2017 to promote exports through the management of export grants, information dissemination, business matchmaking and capacity building. The government has also moved to solve a key trade impediment of the cumbersome customs clearance process. (IFC & World Bank Group, 2020). It introduced the National Single Window (NSW), "which operates as an online platform to speed up customs processes. The transition to the NSW is part of Customs Law No. 207/2020, which aims to simplify customs procedures within the framework of Egypt's national strategy to take advantage of the African Continental Free Trade Area (AfCFTA)" (OECD et al., 2021, p. 68).

Egypt has put in place several FTAs that feature zero or close to zero rates for tariffs on goods (OECD et al., 2021). According to the national General Authority for Investment (GAFI), Egypt

is involved in several multilateral trade agreements. In the Middle East and Africa region, Egypt signed the Pan Arab Free Trade Agreement/ Greater Arab Free Trade Agreement (GAFTA), Agadir Free Trade Agreement, Qualified Industrial Zones (QIZ), Common Market for Eastern and Southern Africa (COMESA), and Egypt-Turkey Free Trade Agreement. Egypt has also signed several bilateral agreements with Arab Countries: Jordan (1999), Lebanon (1999), Libya (1991), Morocco (1999), Syria (1991), and Tunisia (1999). On a global level, Egypt and China entered a trade accord in 1995, and Egypt-MERCOSUR Free Trade Agreement with Latin American countries entered into force in 2017<sup>7</sup>.

In 2004, Egypt's Partnership Agreement with the European Union (EU) entered into force. It creates a free-trade area between the EU and Egypt by removing tariffs on industrial products and making agricultural products easier to trade. The Agadir Agreement and GAFTA are interwoven to the EU Association Agreement for relation on trade between Egypt and the EU. In 2007, Egypt adopted the European Neighbourhood Policy (ENP) Joint Action Plan. That same year, a free trade agreement with the European Free Trade Association (EFTA) came into force. As of 2016, there were 22 bilateral investment treaties (BITs) signed between Egypt and most of the EU countries (Helmy et al., 2018).

Finally, the OECD et al. (2021) report *Production Transformation Policy Review of Egypt* considers The African Continental Free Trade Area (AfCFTA) which entered into force in 2019

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<sup>7</sup> Foreign Trade Information System [http://www.sice.oas.org/tpd/mer\\_egy/mer\\_egy\\_e.asp](http://www.sice.oas.org/tpd/mer_egy/mer_egy_e.asp)

“a game-changer for the continent and for Egypt” because it gives Egyptian exporters access to the fastest growing continent and an integrated market of 1.2 billion people.

In sum, while Egypt has made good progress in the past two decades to promote investment, domestic production, and exports, little impact is observed on the structural change front. While policies have improved entrepreneurs’ access to finance, simplified tax rates and procedures and cut away red tape, they have not substantially improved the technology content of exports, firms’ business sophistication and technology absorption, or raised the level of applied research and innovation in Egypt (Loewe, 2013).



## 5 Case One: Fibre Optic Cables

DN is an Egyptian telecom solutions company established in the 1980s. Initially, the company focused on wiring products based on heat shrinkable technology, then expanded into integrating telecom solutions serving telecom and oil & gas clients. In 1994, DN installed the first fibre optic (FO) cable in Egypt for Cairo University computer department. DN was also the first to introduce air-blown fibre (ABF) to the Egyptian Market in 2014. The case focuses on DN's exploitation strategy of the FO demand boom opportunity in the Egyptian telecom market between 2012 and 2020.

We conducted ten qualitative interviews with executives and middle managers in DN between March 2020 and February 2022 (see Appendix B-Table 35 for a list of interviewees). Interview data provided three types of information. First, an overview of the FO industry in terms of economics, market, competition, and regulations; second, descriptive details of the opportunity, DN's response, and the outcome; and third, stakeholders' accounts of how they perceived the opportunity, their intentions and objectives, and what shaped their exploiting behaviour.

The following sections are organised along the following lines. Section One is a background on FO technology, Egypt's context, and the details of the FO opportunity. The data sources of this section are mainly industry papers, government documents, websites, and interview data. Section Two uses interview data to describe DN's strategic response in detail, focusing on how it exploited the FO opportunity. Section Three develops an initial within-case analysis using the micro-foundations of the dynamic capabilities framework (sensing, seizing, and reconfiguring) as three phases of opportunity exploitation and theoretical coding as the analytical technique.

## 5.1 Background and Opportunity

This section briefly describes the industry, the specifics of Egypt's context, and the opportunity that opened up exogenously, eliciting firms' strategic responses.

### 5.1.1 Technology & Industry Background

#### *Technology Background*

An optical fibre is a single, hair-fine filament drawn from molten silica glass. These fibres replace copper wire as the transmission medium in high-speed, high-capacity communications systems that convert information into light, which is then transmitted via the FO cable. Fibre has many advantages over copper. In copper networks, loss increases with signal frequency, meaning high data rates increase power loss and decrease transmission distances. In FO networks, the loss does not change with signal frequency, providing high data rates for long distances.

In 1982, Air-Blown Fibre (ABF) system, an alternative to conventional fibre system, was first developed and installed by British Telecom. ABF is a micro cable installed in a slim micro duct typically with an inner diameter of 2-3.5 mm, forming the infrastructure into which the fibre units are blown. The ABF enables quick, easy installation and minimises the number of fibre splice joints in the network compared to conventional fibre systems. The design is intended to accommodate additions and changes with minimal disruption. It also allows switching between fibre types as they evolve. ABF technology is quickly becoming the preferred system of choice in access networks, where the cost per home, speed of deployment, flexibility, and future scalability are of utmost importance.

FO hair is composed of two basic concentric glass structures: the core, which carries the light signals, and the cladding, which traps the light in the core. The cable is composed of a number of fibre hairs enclosed together with strength members in a protective covering. Manufacturing of FO cable goes through three main steps (*FOA Tech Topics: Manufacturing Optical Fiber, 2022*):

1. **Preform:** This step is about manufacturing the pure glass rod, known as the preform. In this step, ultra-pure chemicals, primarily silicon tetrachloride and germanium tetrachloride are converted into pure glass, forming the core and the cladding. The entire preform manufacturing process is highly automated with minimal human involvement.
2. **Drawing:** This step is about converting the manufactured preform into a hair-thin fibre in a process called fibre draw. In this process, the preform goes into a furnace with tightly controlled temperatures approaching 1900°C to produce the thin fibre strands.
3. **Cabling:** This step involves applying an outer plastic layer over the fibre core for mechanical protection, followed by one or more cabled fibres with strength members inserted in a protective covering called a jacket.

The first step of manufacturing is highly sophisticated and takes place almost exclusively in a few developed markets, as per DN's CEO. The second step, though less sophisticated, is still concentrated in a few countries. Almost eighty per cent of global exports of the fibre core—produced in step two—come from nine countries: The United States, Germany, Japan, China, India, Denmark, Hong Kong, Netherlands, and the United Kingdom (*Trade statistics for international business development, 2020*). The third step, cabling, is relatively unsophisticated but requires expertise in the cable industry.

### *Industry Economics*

The typical fibre cable is made up of a 36-fibre core (36 fibre hairs in the core) and other materials used for buffering, armouring, sheathing, and labelling the cable. The fibre core component makes up about 50% of the cost of direct materials. As previously mentioned, countries that export the fibre core are few but increasing. According to DN's technical manager, the increasing competition makes suppliers' prices very close to each other (within 0.5% difference).

Although the fibre core is imported from China and multiple other countries, the other input materials used in buffering, armouring, sheathing, and labelling, which make up around 40-50% of the cost (depending on type of core), are imported mainly from China, which gives Chinese producers a cost advantage. This cost advantage diminishes in fibre cables whose number of fibre cores is higher than 36 since the other-material share of total cost shrinks as more fibre cores are added to the cable.

Another important factor in industry economics is the size of orders and backlog. Backlog allows continuous production around the clock without interruption, which leads to saving on scrap of up to 15% of input materials, as per DN's production manager. This is besides the lower cost per unit that comes with volume production.

Finally, unlike the power cable product, the quality of the fibre cable is not specification-driven. Meaning, two fibre optic cables could meet international specifications but differ significantly in their quality. Moreover, the difference in quality is not revealed except over a long use period, as per DN's quality control manager.

### 5.1.2 Egypt's Industry Context

Historically, the government has adopted a policy of protecting the Egyptian industrial base by issuing the Tenders Law 89 of 1998, which contains preferences for Egyptian domestic contractors in government tenders (*Doing Business in Egypt*, 2016). It gives priority to Egyptian contractors if their bids do not exceed the lowest foreign bid by more than 15 per cent. The Egyptian Telecom Incumbent (ETI), which was wholly owned by the state until 2005, applied this law in all its competitive bids for copper and fibre cables. Under the protection of this law, Egyptian cable companies captured one hundred per cent of ETI's purchases of copper and fibre cables. In 2005, when ETI sold approximately 20% of its shares in an IPO to private institutions and individuals, it became only partially owned by the state (*Telecom Egypt Rings in \$891 Million IPO*, 2006) and would no longer have to abide by Law 89 of 1998 in competitive tenders. However, Egyptian cable producers lobbied against revoking preferential treatment, and their pressure led ETI to issue an internal decision in 2005 to return to the preferential treatment of Egyptian cable companies in copper and fibre cable tenders.

Regarding trade policy, customs related to FO cables and components currently penalize in-house manufacturing of FO cables, as the custom rates on components for fibre optics range between 2-10 per cent, while finished FO cable is imported custom-free, as per DN's procurement manager.

#### *The Competitive Landscape*

Regarding the competitive landscape, an Egyptian producer of electric wires, referred to as (E), formed a joint venture with Siemens Egypt in 1993 to produce telecom copper cables. Upon seeing the potential demand for FO in the telecom market, producer (E) moved to produce FO cables in

1998 and became the first and only local producer of FO cables in Egypt. The company imported the fibre core from abroad and performed the cabling process in-house. At that time, FO was a new technology, different from copper production, and the partnership with Siemens provided access to needed know-how. Under the protection of the preferential treatment of the Tenders Law 89 of 1998 (see Section 5.1.1 for more details), producer (E) effectively monopolized the telecom fibre cable market for more than ten years.

In the meantime, Chinese and Indian cost leaders, who have a cost advantage in manufacturing FO cables, could not compete in the Egyptian FO market due to two key policies. First, non-telecom clients stipulated in their tenders that the source of supplied cables should be local, European, American or Japanese only. Secondly, Law 89 gives preferential treatment to Egyptian companies bidding in government tenders, minimising the chances of Chinese and other low-cost suppliers in tenders unless their prices were 15% less than the Egyptian offering.

However, on the heels of the January 2011 Revolution, the dramatic change in the political scene has rendered established lobbies ineffective, and new lobbies emerged. Sensing this change, the local producer (E) decided to liquidate its FO assembly assets and exit the market in 2013. Another local copper cable producer (S) decided to fill the void created by the exit of the sole local producer and built a factory to produce conventional FO cables in 2016.

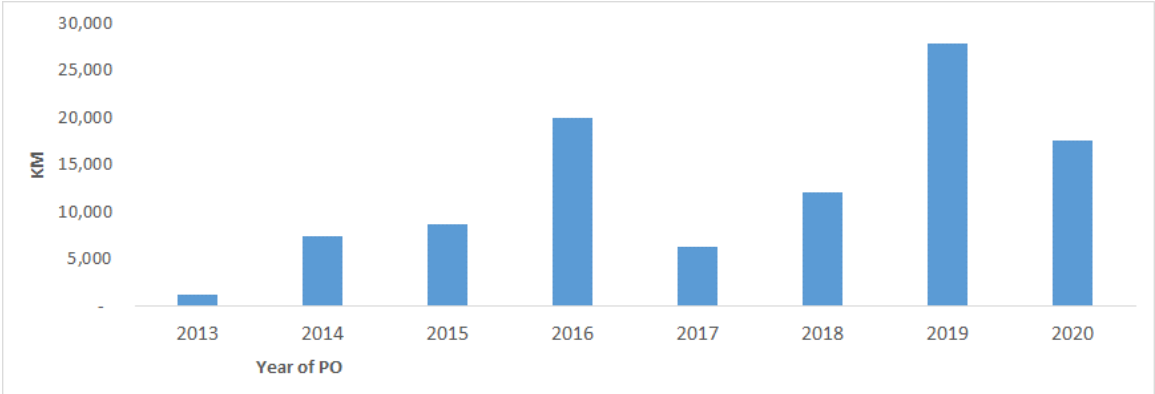
### 5.1.3 The Fibre Optic (FO) Opportunity

With a large urbanized population and effective competition, Egypt has one of the largest fixed-line and mobile telecom markets in North Africa. Investment has spurred broadband infrastructure and migration to the digital economy (Indexmundi, 2012). The exponential growth of fixed data

traffic (ADSL), mobile voice, and data traffic, especially with the introduction of 3G and 4G services, have increased transmission requirements exponentially. These new services required the Egyptian telecom Incumbent (ETI) to carry out continuous upgrades of FO capacities in the core telecom network. ETI is considered the primary buyer of FO cables in Egypt, purchasing large volumes of the product annually.

Two breakthroughs in the telecom market skyrocketed FO demand. The first occurred in 2008 when ETI embarked on rolling out an advanced German system (MSAN) that uses high bandwidth FO cables in the access part of the network (fibre-to-the-curb) instead of copper cables. The second breakthrough took place in 2014 when ETI started offering fibre-to-the-home (FTTH) in affluent residential areas. The exit of the sole local FO producer compounded the opportunity, as it opened the way for new players to fill the void and capture a significant share of ETI’s increasing demand.

Figure 13 ETI's FO purchases (in km), 2013-2020



Note.

ETI= Egyptian telecom incumbent

PO= Purchase order

Source: ETI’s records.

## 5.2 DN's Strategic Response

The section starts by giving background information on the company and the evolution of its product portfolio before describing how it addressed the FO demand boom opportunity.

### 5.2.1 In-house Assembly of Harnesses

After his return from the US, where he earned his PhD in Engineering and worked in US companies for several years, Dr. N founded the company (DN) in Egypt in 1987. The company supplied local state entities with wiring systems and harnesses for professional applications using heat-shrinkable technology in partnership with his previous US employer. In the beginning, the finished harnesses were imported from the US before Dr. N quickly realized the opportunity of assembling the product in-house. Since the assembly phase included manual work that would cost much less if conducted in Egypt, this move created immediate value-added and improved DN's margins.

### 5.2.2 Trading & Solutions Integration Models

With its experience in heat shrinkable technology, DN decided to expand into the telecom market, selling ETI heat shrinkable closures used to fuse copper cables in backbone networks. Building on the founder's extensive relations with American suppliers, DN became an agent and distributor of multiple American brands, like Belden, Molix, and Corning. Through these partnerships, DN expanded its product portfolio by adding multiple telecom-serving products and accessories, including structured cables, testing and measurement solutions, and LAN solutions. In 1994, DN installed the first fibre optic cable in Egypt from Corning for Cairo University computer



department. Expanding DN's portfolio of telecom products coincided with ETI undertaking a full network revamp around the mid-1990s, making DN a pioneer in supplying ETI with high-quality copper and FO accessories.

### 5.2.3 Introducing the ABF Technology

DN founder's son, who was studying Engineering in the UK, came across the ABF technology (mini and micro-fibre cables) (see Section 5.1). After his return and assuming the role of CTO in the company, DN decided to introduce the ABF to the Egyptian market. At that time, ETI was about to implement an ambitious plan to roll out FTTH services in affluent residential areas in Cairo. DN suggested that ETI uses the more advanced ABF for this rollout instead of conventional FO cables, especially since ABF systems require much less civil work and disruption. This advantage was all the more attractive given that FTTH installations would be implemented in high occupancy areas. Moreover, ABF price per km was approximately 70% less than that of conventional cable. Convinced by its merits, ETI altered all its tender specifications of planned FTTH installations to ABF. In the meantime, DN signed a mutually exclusive supply agreement with a British company known for its high-quality ABF systems to bid for ETI's upcoming tenders. In 2014, ETI held its first tender for ABF, and DN managed to win 100% of the frame agreement to supply and install all ETI's requirements of ABF for three years for FTTH deployments in gated residential compounds. The new technology quickly became the main draw, as ETI decided to deploy ABF even outside compounds. In the second three-year frame agreement, ETI chose two more contractors besides DN to supply and install ABF. The third frame agreement, with the

largest quantities, went totally to Indian and Korean companies, as DN was pushed out with its highly priced UK product.

#### 5.2.4 In-house Assembly of Conventional FO Cables

##### *The Initial OEM Model*

When the FO market started to pick up in 2008 after ETI signed a megaproject with Siemens to implement FO cables systems instead of copper (see Section 5.1), DN tried to use its American FO brands to compete for ETI contracts for conventional FO, but its prices were uncompetitive compared to the local supplier (E)'s. At that time, DN was using an OEM model to supply ETI with DN-branded copper cables and accessories. Sensing that FO would eventually substitute copper cables in the telecom backbone infrastructure, DN's CEO decided to extend the OEM model to FO cables and compete in ETI conventional FO tenders with a DN-branded fibre cable manufactured in China. At that time, Producer (E) was the only local producer of conventional FO and managed to capture all ETI purchases for almost ten years (see Section 5.1). The OEM model proved highly competitive as DN managed to bid for and win ETI's conventional FO contracts between 2012 and 2015 with prices 30% less than Producer (E)'s prices. Right after Producer (E)'s exit in late 2013, DN won 100% of ETI purchases between 2013 and 2015 using this OEM model.

##### *The FO In-house Assembly Model*

Despite the success of the OEM model, DN's CEO contemplated establishing FO assembly facilities in-house, similar to the assembly model of the harnesses. He stated in the interview that

he believed that increasing the value-added contribution of the company creates stability and sustainability for the business. Besides, he saw local manufacturing as a strategic imperative that the government has to ‘encourage’, especially with the foreign currency shortage.

In 2014, after the exit of the main competitor and the only local producer (E), DN started to take serious steps to build a factory to assemble conventional FO cables instead of importing it from China under the OEM agreement. To test the waters, the CEO discussed his vision with ETI’s CEO, who encouraged him to make the move. They even discussed the prospect of ETI renting a production line in this new factory to produce ETI’s conventional FO requirements. However, these discussions were not formulated in a binding agreement.

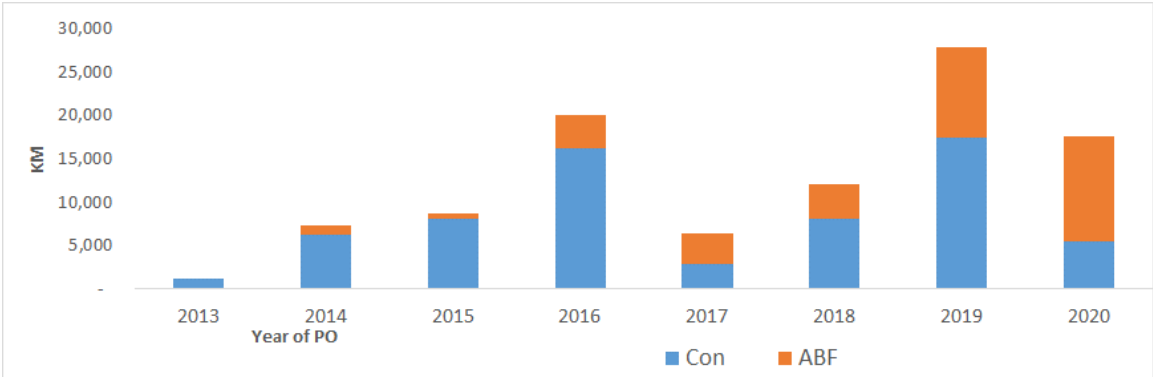
The key assumptions underlying DN’s manufacturing model around the likelihood and size of the opportunity were as follows: first, ETI’s existing strong FO demand and preference for the conventional type of FO would continue in the future. Second, related to value capture, DN built the model and strategy on the assumption that the 15% preferential treatment for Egyptian companies that effectively block foreign suppliers from competing over ETI contracts would continue without change. Based on these two assumptions, DN opted for a small-scale assembly line producing conventional FO with a production capacity equivalent to 90% of ETI’s FO purchases for 2014.

To secure input components with competitive prices, DN’s CEO discussed with the Chinese OEM producer (HeT) the prospects of a joint venture to build and operate the assembly factory in Egypt. HeT welcomed the idea and was ready to join since DN at that time was taking the lion’s share of ETI’s lucrative business of both conventional FO and ABF cables. However, when ETI abandoned the preferential treatment given to Egyptian companies in 2016, as we will see, HeT lost interest in the joint venture and chose to compete in ETI’s tenders directly.

Regarding productive capabilities, technical expertise became available in the Egyptian market since the end of the 1990s, when the Egyptian cable producer (E) established an FO assembly line in a joint venture with Siemens. This joint venture created a pool of human expertise in the assembly of conventional FO cables. In order to secure the required human expertise for the new in-house line, DN’s CEO seized the opportunity with the market exit of the only local fibre producer (E) and poached members of the production team who used to work there. From that team, DN managed to hire the chief production and quality managers to design and operate the new facility.

Right after DN made its investment in the assembly machines that produce conventional FO, dramatic changes occurred in the market. First, a dramatic surge in ETI demand for ABF cables began in 2016. Figure 9 shows the surge in ABF purchases compared to conventional FO.

Figure 14 ETI's purchases (in km) of conventional and ABF fibre cables, 2013-2020



Note.

ETI= Egyptian telecom incumbent

PO= Purchase order

Con= Conventional fibre optic

ABF= Air-blown fibre

Source: ETI’s records.

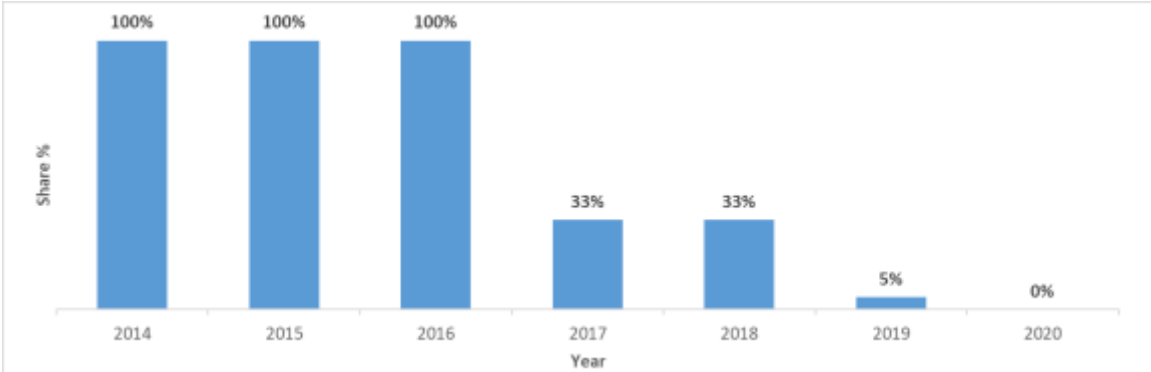
From ETI's perspective, ABF was a solution that would lower the cost of civil works and provide flexibility for future needs. Moreover, the micro fibre cable used in ABF is about 30% of the conventional cable price per km. ABF offered an ideal solution for ETI, first in affluent gated compounds and later in expansions in many areas in Cairo. ETI purchases of ABF climbed until it surpassed conventional FO purchases in 2020. That change was a major blow to DN, who had betted on a continuing ETI preference for conventional FO.

Second, Egypt's foreign currency crunch in 2016 triggered a dramatic change in the competitive landscape of the FO market. Still on the OEM model, DN faced great challenges in fulfilling its 2015 contracts with ETI due to the foreign currency cap. This led ETI to revoke its 2005 decision (see Section 5.1.2) and directly invite foreign suppliers to compete for upcoming contracts, abandoning the 15% price advantage given to Egyptian companies. With the entry of Chinese and Indian suppliers in 2016, the market suddenly became hyper-competitive. Chinese prices were about 40% less than DN's in-house assembly bidding prices, and even with a 'materials plus' price, DN would still be higher than the winning price. The economies of scale stemming from the large production capacity of Chinese and Indian players gave them an unbeaten cost advantage in input markets. The custom-free importing of finished fibre optic cables did not help DN's case either. As a result, all ETI purchases of FO cables between 2016 and 2020 went to Chinese companies. Figure 15 shows the change in DN's share of ETI's contracts between 2014 and 2020.

To summarise, DN, a leading company in telecom solutions with a strong product portfolio and network of clientele in the oil & gas, state, and telecom sectors, moved to exploit the boom of the FO demand in Egypt that started in 2012. At first, DN used an OEM-based model to compete in ETI's FO tenders. The OEM model, which was based on manufacturing FO in China with an OEM partner and importing it back to Egypt, was a success since it enabled DN to offer prices

significantly lower than the local producer’s who used to monopolize ETI’s tenders for more than ten years. In 2014, DN decided to move to an in-house assembly model. To execute this new strategy, DN managed to secure the required capital and productive capabilities to establish the FO assembly line, and the factory started production in 2018. However, the strategy did not result in seizing the posed opportunity. Three years into the investment, DN’s exploiting model was undermined by hyper-competition from Chinese and other low-cost rivals, as well as a change in ETI’s demand preferences from conventional to ABF cables. As a result, DN could not seize a significant share of ETI’s FO purchases for conventional and ABF cables.

Figure 15 DN's share (%) of ETI's total fibre optic purchases, 2014-2020



Note.

DN= Anonymized company name

ETI= Egyptian telecom incumbent

PO= Purchase order

Source: ETI’s records.

### 5.3 The Fibre Optic Case Analysis

In 2014, DN moved to exploit the FO demand surge opportunity in the telecom sector in Egypt by building an in-house FO assembly line to produce conventional FO cables. The boom in ETI's demand for FO cables represented a demand window of opportunity (Lee & Malerba, 2017) for cable and telecom players to capture share of this demand boom.

Regarding the level of uncertainty, demand and supply information about the product—conventional fibre optic cables—existed and were accessible, market demand was upward trending, and the local assembly model was tried and proven, albeit by another player. Given these conditions, the uncertainty level seemed moderate and related mainly to applying the assembly model for fibre optic cables inside DN for the first time. According to Sarasvathy et al.'s (2003) typology, the opportunity, in this case, is of the discovery type (see Section 3.2.2), where demand is expressed, while the supply model needs to be explored

As detailed in Chapter Three, we use the sensing, seizing, and reconfiguring phases to unpack the data on opportunity exploitation. In analyzing the data, we follow a bottom-up coding approach, in which interview transcripts are reviewed, highlighting passages that shed light on the phenomenon and assigning codes to these passages. The highlighted passages and assigned codes are included in the analysis below to provide transparency about the interpretations made during this process.

#### 5.3.1 DN's Capability of Sensing the Opportunity

1. *Code: 'Proactive in riskless, reactive in risky choices'*

Proactive sensing is exercised when organisations initiate or change their objectives, strategy, and capabilities in anticipation of changes in markets, technologies, and the business environment. Reactive sensing, on the other hand, is carried out after the fact to seize a clear opportunity or to remain competitive in the face of this environmental change.

In the FO market, DN's management exercised proactive sensing several times. For instance, DN introduced FO cables to the Egyptian market in 1994 in partnership with Corning and installed the country's first FO cable when the fibre market was still nascent and demand was small. DN was also highly proactive when it sensed the advantages of ABF versus conventional FO. DN managed to instigate demand for the ABF in the Egyptian market and was the first to supply and install ABF in the telecom market. On the other hand, regarding investing in in-house fibre assembly, DN was not proactive but reacted to existing conditions. In deciding which FO type to assemble, DN chose to assemble conventional FO, unwilling to invest in the potential but still small ABF demand. Similarly, DN built the value capture model on existing regulatory conditions that favour Egyptian companies in ETI's tenders without taking into consideration possible changes that might take place in the future.

It could be argued that DN was proactive in the early introduction of fibre optic into the Egyptian market in 1994 and later to the ABF opportunity because no investment was involved. In both cases, products were to be supplied through a partnership agreement with a foreign company. Under a trading model, no investments were required before a contract was secured. With no investment risk involved, DN was proactive in sensing new opportunities and creating new value for the customer. Conversely, DN switched to reactive sensing when the investment in the local assembly strategy was significant, upfront, and irreversible. The irreversibility of the investment decision made DN prone only to follow unambiguous signals and minimize risk by investing in



what is already existing and demonstrated. The below interview quotes reveal how DN was proactive in sensing the value of ABF and introduced it to the Egyptian market under a trading model. However, when investment in an assembly line was about to be made, DN decided to invest in producing the conventional type because the demand for the conventional fibre was then still much bigger than the demand for ABF type.

Table 5 Interview quotes under the code ‘Proactive in riskless, reactive in risky choices’

#	Interview Quotes	Interviewee
1	“We promoted the [ABF] technology for the first time to our customers in 2012.”	DN Technical Engineer
2	“Our CTO was the one who introduced and promoted the micro-cables [ABF] to ETI and convinced them of its benefits and advantages over the conventional type.”	DN Sales Account Manager
3	“We were the first to supply and install ABF [in the Egyptian market].”	DN Sales Account Manager
4	“Micro cables [ABF] are the future, but then [at the time of making investment decision] that was not obvious.”	DN Services Director
5	“We went for producing conventional cables based on Sales [people] input. We were reactive.”	DN Owner & CEO
6	“It is true that we were the ones who encouraged ETI to use ABF. But at the time [of making investment], ABF purchases were not big enough to invest in ABF assembly.”	DN Sales Account Manager
7	“I found that demand for conventional FO is higher [than ABF], and so decided to go for producing conventional. I could say we were conservative in our strategy.”	DN Owner & CEO

## 2. Code: ‘Aspire to match peers (an extrinsic motive)’

The interviews revealed that the CEO, who is also the company’s owner, had a predilection for building a FO assembly line, even before the exit of the local producer (E), despite the success of the OEM model with ETI. The production manager said that the CEO conveyed his intention to establish a FO assembly facility between 2012 and 2013 when he visited Producer (E)’s fibre

factory before its exit. In the interview, the CEO made some statements that reveal his underlying motive that could explain his predilection to build an assembly factory. First, he said, “One has to have his value-added, not just move boxes”. Then, he stated in the interview, “Most of my peers in the US Company [where he started his career] are now factory owners.” The CEO viewed owning and operating a factory as a source of pride and sense of achievement. As he was approaching retirement, the CEO might have regarded owning a fibre optic factory as a way of fulfilling his legacy. It could be argued that the CEO was already set on making the in-house assembly move. When an opportunity that made in-house assembly look commercially viable opened up, the CEO moved in that direction, fuelled by the long-standing positive image and emotions he associated with that option.

Table 6 Interview quotes under the code ‘Aspire to match peers (an extrinsic motive)’

#	Interview Quotes	Interviewee
2	“One has to add his value contribution, not just move boxes.”	DN Owner & CEO
4	“From the beginning, I was inclined to go into manufacturing this [FO] product [before the exit of producer E from the market in 2013].”	DN Owner & CEO
5	“Most of my peers in [name of the US company] are now factory owners.”	DN Owner & CEO

### 5.3.2 DN’s Capability of Seizing the Opportunity

#### 3. Code: ‘Limited probing & information gathering’

Interview data reveals that critical information about the supply side of the business model was available and accessible to DN decision-makers. Nevertheless, they did not examine this information before making the investment decision. For instance, the CEO said in the interview

that DN recently discovered that Chinese exporters receive an export tax rebate from the Chinese government, which partially explains their aggressive prices in ETI tenders. This information is well known to industry experts and available in trade periodicals. DN was also unaware that China is the source of about 40% of the input materials used in the assembly of the FO cable, which gives a significant cost advantage to Chinese producers versus Egyptian producers. Furthermore, interviews reveal also that DN’s decision-makers did not use forecasting tools, like sensitivity analysis or scenario-planning, that could have drawn attention to different alternatives and encouraged information-seeking efforts. In sum, the management assumed a static environment and acted as if the future was under control. According to one executive, “we assumed that capturing ETI’s business is guaranteed”. They presumed that they knew all that they needed to know.

Table 7 Interview quotes under the code ‘Limited probing and information gathering’

#	Interview Quotes	Interviewee
1	“We discovered that importing fibre core and materials from China and manufacturing the cable in-house will have a higher cost than importing the whole cable from China.”	DN Owner & CEO
2	“In the latest [ETI] tender [2020] that we lost to the Chinese, the Chinese bidding price was even less than the cost of our direct materials.”	DN Production Manager
3	“We need 8-9 months to deliver what Chinese can deliver in three.”	DN Sales Account Manager
4	“We did not do sensitivity analysis [for the in-house production plan]. We thought that the continuity of business coming from ETI is guaranteed.”	DN Financial Director
5	“It is true. We did not conduct a sensitivity analysis or [probe] different scenarios.”	DN Owner & CEO

#### 4. Code: *'Cognitively Entrenched'*

Signals that underlying assumptions might change in the future were overlooked. For instance, the CEO of the established local producer (E), who decided to exit the market in 2013, conveyed to DN's CEO his prediction (or inside information) that the Chinese would be allowed to compete over ETI tenders in the future without applying the protectionist preferential treatment law, and that local producers would not be able to match their prices. When asked about his reaction to receiving this early warning, DN's CEO replied that it did not change his mind. He was still convinced that the government "had to" continue supporting Egyptian producers to maintain jobs of the labour force. The CEO did not even task the finance department with investigating this scenario and its implications on investment.

Another indication of cognitive inertia is management's belief that product assembly, which has been successful with the harnesses, is the ultimate model that should be pursued regardless of market context. DN's CEO stated in the interview that he wanted to replicate the success of the harnesses assembly model thirty years ago, although the customer requirements and competitive environment for harnesses were very different from FO. Harnesses were purchased by a state entity that prioritised quality over cost and stipulated American components. ETI, on the other hand, is a price-conscious client. DN attachment to a specific model which has proved successful under different conditions created blind spots when exploiting the new opportunity. DN's decision-makers selected signals that confirmed what they already knew and filtered out information that was not aligned with the dominant logic (Prahalad & Bettis, 1986) that guided their strategy.

Table 8 Interview quotes under the code ‘Cognitively entrenched’

#	Interview Quotes	Interviewee
1	“The reason for building the factory is that local assembly gives the business stability. From day one, we started to add value. Like harnesses, we contributed value added from day one. We have this [value-added] orientation for 30 years now.”	DN Owner & CEO
2	“We always had an orientation to produce and increase our value-added.”	DN CTO
3	“I met [the CEO of Company E] to know why he exited the market. He told me that the Chinese would be allowed to compete on ETI tenders, and we [as local producers] will not be competitive anymore. However, I believed that the government will keep protecting local manufacturing.”	DN Owner & CEO
4	“I was under the impression that ETI would welcome our direction [to establish a FO assembly facility]. That is what they said. Later, the Chinese came, and ETI changed its strategy.”	DN Owner & CEO

5. Code: ‘Customer-eccentric product proposition’

According to DN’s CMO, ETI is its primary customer and the source of 80% of its revenues. The strategy of building a factory was specifically targeting ETI’s demand. Nevertheless, the business model designed to capture ETI’s demand was not tailored to ETI’s needs. ETI is a price-conscious client that does not stipulate high-quality specifications in its fibre purchases. This was obvious to DN from the start when ETI chose to go for Chinese-manufactured fibre (within the OEM model) instead of high-quality cable from the local producer because the former was cheaper. Despite that, DN invested in factory machines and materials that would produce fibre cables with quality even higher than that of the previous local producer (E), and “close to European quality.” It was only natural that the incurred cost to achieve this high quality did not help DN’s price competitiveness when the market opened up to Chinese entry. Perhaps, the only thing that could justify the assembly of a high-quality product is to meet the high requirements of the non-telecom customers, such as oil & gas and state entities, who account for 20% of DN’s revenues. However, it not clear

why DN’s management gave priority to clients who are the source of 20% of the company’s revenues over the client who is the source of 80% of its revenues.

Table 9 Interview quotes under the code ‘Customer-eccentric product proposition’

#	Interview Quotes	Interviewee
1	“When I first joined DN, I met the CEO and his vision was to build a factory to produce conventional FO cables with very high quality.”	DN Production Manager
2	“The forecast was primarily based on ETI demand.”	DN Production Manager
3	“For ETI, the price became the decisive factor in their purchases.”	DN Commercial Manager
4	“My quality [in this factory] is close to European quality, much better than Chinese quality.”	DN Production Manager
5	“Oil and gas and state entities demand high specifications, and that’s why they take our product with high prices.”	DN CTO
6	“If we compare the ABF that ETI currently imports and that of our UK-based partner, we find a huge difference in quality [in favour of the UK company].”	DN Services Director
7	“The price difference [between UK ABF and low-cost rivals] could reach 40%.”	DN Services Director
8	“We did not try to work with another ABF company because we have a two-way exclusive agreement with the UK company. When ETI invited Indian and Chinese alternatives, we could not compete.”	DN Services Director

The same disregard for customer’s needs happened with the ABF product. DN decided to source ABF from a UK company, whose prices were expensive compared to Indian and Korean rivals. According to DN’s services director, the price gap could reach 40%. This preference for expensive high quality was an apparent mismatch with ETI’s cost-conscious ABF model. As DN locked itself in an exclusive agreement with the expensive British Company, it lost all of ETI’s purchases of ABF from 2018 onwards. Insisting on the British supplier that did not match ETI’s budget is quite puzzling, particularly since ETI was the sole buyer of ABF in Egypt at that time.

Interview Quotes in Table 9 show the dissonance between building the model to capture ETI's booming FO demand and, at the same time, targeting a product proposition that does not meet ETI's needs.

### 5.3.3 DN's Capability of Reconfiguring Resources

#### 6. Code: 'Managed to acquire new-to-the-firm productive capabilities'

The move to a different business model, in-house fibre cable assembly, required technical and organisational capabilities that were new to the organisation. Before moving to the in-house assembly model, DN enjoyed good technical capabilities in fibre cable solutions integration, resulting from a long history of offering fibre solutions since installing the first FO cable in Egypt in 1994. Moreover, engaging with the OEM model for several years provided DN with experience in cable design and procurement. What DN missed was production capabilities to operate an assembly line. These capabilities were available in the market because producer (E) started assembling FO in Egypt since the 1990s in a joint venture with Siemens. This joint venture created a pool of human expertise in the cabling phase of FO production.

Table 10 Interview quotes under the code 'Managed to acquire new-to-the-firm productive capabilities'

#	Interview Quotes	Interviewee
1	"We hired part of the team that used to work in Producer E's fibre factory".	DN CTO
2	"We hired people with experience in FO production ... [In addition to] our long history of implementing FO solutions."	DN CTO
3	"I started working in copper cables in a joint venture with Siemens in 1993 under the Siemens license. Afterwards, we began fibre assembly under the Siemens license in 1997-1998. We were 'brought up by Siemens'."	DN Production Manager
4	"My quality [in this factory] is close to European quality, much better than Chinese quality."	DN Production Manager

When DN decided to move to fibre assembly in-house, DN management hired the chief production and quality engineers who used to work in Producer (E). This effectively secured the technical capabilities DN needed for its expansion project.

Regarding aligning people to the new strategy, one crucial code emerged from the interview data.

#### *7. Code: 'Conformity culture'*

The owner of DN, who championed the expansion move, stated in the interview that there was no disagreement about the new vision. "I think they all agreed with me," he said. Conversely, another top executive in a separate interview said there was resistance in the executive team to the in-house assembly move on the basis that "the manufacturing trend all over the world is waning out." This contradiction in statements reveals that discomfort and disagreement with the new vision were not channelled into the strategic discussions between 2014 and 2015, leading up to the investment decision. Interviews also reveal that even procedural exercises like sensitivity analysis and scenario planning were not conducted to challenge the new vision. Discussions moved quickly from the 'why' and 'what' to answering the 'how' questions. For instance, the option of assembling ABF instead of the conventional type of fibre was never brought up in the discussions, according to the CEO, although, in 2014, the company had just won a frame agreement with ETI for three years to supply and install ABF cables. The possibility of competition from Chinese competitors was not discussed either, although the CEO of the exiting producer (E) warned DN's CEO that preferential treatment for Egyptians will not continue in the future. The absence of a challenging culture—whether out of deference to the owner, or out of lack of safe space to voice disagreement—has impeded a better engagement of stakeholders in the formation of the new vision. Such engagement could have enriched the strategic discussion, encouraged managers to be alert to a range of possible futures, and built a robust strategy in the face of environmental change.



Interestingly, interviews revealed an incident that showed how acquiescence could be different from alignment. According to DN’s commercial middle manager, after the factory had started producing conventional cables in 2018, two senior commercial executives approached ETI’s management to convince them to turn current long-haul conventional fibre cable systems connecting central offices to ABF. Such an action was obviously inimical to the new vision and the new model. This incident shows that the commercial team was still clinging to the old trading and solutions integration identity. They were not committed to the new in-house sourcing business, still prioritizing trade in their day-to-day operations. It could be argued that the lack of serious discussion and deliberation around the new vision did not help mobilise management and staff behind the change. Quoting Teece in this regard, “acquiescence is shallow and easily abrogated. Strategic alignment is deep, committed and accountable” (2019, p. 14)

Table 11 Interview quotes under the code ‘Conformity culture’

#	Interview Quotes	Interviewee
1	“There was resistance to the [in-house manufacturing] idea.”	DN Senior Executive
2	“I don't know why we chose to manufacture conventional FO. It would have been better to produce ABF.”	DN Services Director
3	“There was no opposition in the executive team to the idea of building the factory...I think they all agreed with me.”	DN Owner & CEO
4	“The CTO participated in the decision-making process and did not question the decision of assembling the conventional type, or suggested the ABF type instead.”	DN Owner & CEO
5	“We did not conduct sensitivity analysis or probe different scenarios.”	DN Owner & CEO

## *Summary*

It is worth recapping the case analysis in a few sentences to set the stage for the cross-case analysis in Chapter Eight. The FO demand boom that started in 2012 has opened up an opportunity for Telecom and cable companies to increase their revenues by capturing a share of ETI's FO increasing purchases. The opportunity involved a moderate level of uncertainty since the FO market is already established since 1998 and customer demand is demonstrable. Uncertainty is related mainly to exploring a supply model that would be competitive enough to capture a good share of ETI's FO purchases versus rivals.

Emergent codes show that DN followed a business model that assumed the continuity of a benign environment, where rules of the game are not changing, competition is local, and no technological changes are foreseen. There was an illusion that all what is needed to be known is already known. The new vision went quickly into execution without taking enough time in strategic discussion. Although DN demonstrated resource-flexibility by managing to change the company's resource structure and acquire new-to-the-firm capabilities, the new resources and capabilities were subdued to the old dominant logic, which led to constrained search efforts and business model that was anchored in the past. When the competitive landscape changed with the Chinese entry, DN was unable to compete and could not capture any significant share of ETI's conventional and ABF purchases.

## 6 Case Two: Solar Photovoltaic Energy

KS is an Egyptian solar solutions company established in 2011 through self-funding, with a start-up capital of 250,000 Egyptian pounds (41,471 US dollars). Initially, the company introduced the solar water pumping (SWP) product for irrigation in off-grid areas and then moved to offer hybrid solar solutions to commercial and industrial clients in off- and on-grid areas. The case focuses on KS's exploitation project of solar Photovoltaic (PV) B2B solutions between 2011 and 2020.

We conducted eight qualitative interviews with stakeholders including front-line managers, top-level executives, former employees, and key customers, between March 2020 and February 2022 (see Appendix C-Table 36 for a list of interviewees). Interview data provided three types of information. First, an overview of the solar Photovoltaic (PV) industry in terms of market, competition, and regulations; second, descriptive details of the opportunity, KS' response, and the outcome; and third, stakeholders' accounts of how they perceived the opportunity, their intentions and objectives, and what shaped their exploiting behaviour.

The following section provides a background on the solar PV technology and industry, Egypt's context, and details of the solar PV opportunity. The data sources of this section are mainly industry papers, government documents, international agencies' documents, and interview data. Section Two uses interview data to describe in detail KS's strategic response, focusing on how it exploited the solar PV opportunity. Section Three develops an initial within-case analysis using the micro-foundations of the dynamic capabilities framework (sensing, seizing, and reconfiguring) as three phases of opportunity exploitation and using theoretical coding as the analytical technique.

## 6.1 Background and Opportunity

This section briefly describes the industry, the specifics of Egypt's context, and the opportunity that opened up exogenously, eliciting industry firms' strategic responses.

### 6.1.1 Technology & Industry Background

Renewable Energy (RE) plays an important role in transitioning towards low-carbon development growth, enhancing technology diversification, and hedging against fuel price volatility. It promotes industrial development and employment generation, and facilitates access to electricity to promote rural development and reduce poverty (IRENA, 2018a)

#### *Solar Water Pumping (SWP)*

Although solar pumps were introduced in the late 1970s, the first generation had multiple technical problems and used expensive technology that discouraged investment in its technical development. It took about 40 years for SWP to make headway and be used for groundwater pumping. Since 2009, solar has become increasingly affordable, making solar-powered irrigation systems an interesting alternative for the agriculture sector. Decreasing solar panel prices incentivised solution providers to invest in developing more efficient solar-powered irrigation systems, which resolved many of its technical issues. The decrease in the price of solar panels coupled with technical improvements has resulted in the increasing use of solar pumps.

### *Utility-scale and Distributed Generation*

Solar projects are defined based on connection to the grid into two main types. The first is utility-scale projects that feed power directly into the national electric grid. The second type is distributed generation projects, which are micro-grids made of interconnected loads and distributed generation sources within a clearly defined electrical boundary that acts as a single controllable entity. Often, utility-scale solar projects are described as being ‘in front of the meter’ as opposed to distributed generation systems, which are ‘behind the meter’, i.e. a system paired with the energy load of a facility and directly supplies that facility with power. Historically, distributed generation of solar energy grew and attracted more investment worldwide than utility-scale before the latter started to catch up (IRENA, 2020).

Distributed generation, or micro-grids, are not new, as diesel and gas generator sets have been sold for several decades to power remote applications. What is new is the hybrid micro-grid systems that include solar sources. Compared to purely conventional generation, integrating renewable technologies reduces operating expenses and optimises system reliability, efficiency and flexibility. The concept has become increasingly attractive as the cost of energy from wind and solar PV generation declined. A solar capacity equal to that of the diesel generator can save up to 30% of fuel (RCREEE & UNDP, 2016). Distributed solar PV solutions are mainly used in commercial and industrial segments and off-grid areas. Subsidy reform, appropriate legislation (such as net metering and wheeling), and increased consumer awareness are all factors that are contributing to the continued growth of distributed solutions (MESIA, 2016).

## *Industry Economics*

At the dawn of the last decade, wind and solar energy were dots on the horizon of the world power system, accounting for only four per cent of the global generating capacity and much less of the total electricity produced. They were also relatively expensive and reliant on subsidies. A startling transformation has since taken place. By 2020, the two leading RE technologies, wind and solar, accounted for around 18% of the global generating capacity after investing some 2.4 trillion US dollars in new projects over ten years (Frankfurt School-UNEP Centre/BNEF, 2019). A cost revolution is one factor behind the dramatic change. Between 2009 and 2020, the global benchmark for the levelized cost of electricity for solar PV without tracking systems dropped by 90%, with an average annual decline of 19%, reaching 36.5 US dollars per MWh (LCOE mean) in the first half of 2020. The equivalent for onshore wind dropped by 71% to 40 US dollars per MWh (LCOE mean). As a result, the cost comparison with conventional sources changed beyond recognition, as by 2020, the cheapest source of new generating capacity became in many countries, either solar, wind, or both (Frankfurt School-UNEP Centre/BNEF, 2019).

This transformation was the result of several factors: fierce competition among developers and manufacturers to cut overheads; the influence of RE auctions in driving competition; improving technology that incrementally led to higher efficiency (the number of MWh of energy coming from the same number of MW of capacity); and a sharp drop in finance costs (Frankfurt School-UNEP Centre/BNEF, 2019) (see Appendix C-Figure 6, Levelized Cost of Energy Comparison, 2020).

## *Policy Background*

RE used to be a policy-driven market when RE technologies were still emerging and expensive. Key policy tools for the sector included unsolicited proposals, a feed-in tariff (FiT) program, and a competitive auction. Under a FiT scheme, the government first sets a premium rate (off-taker price) to be paid to private RE generators for electricity fed into the electricity grid. Then, the government invites generators to submit proposals and screens bids for financial, operational and development experience to select winners. The design of FiTs typically involves three key incentives: (a) a preferential tariff, (b) the guaranteed purchase of the electricity produced for a specified period, and (c) guaranteed access to the grid. By contrast, a competitive auction provides the second and third incentives, but awards the bid with the lowest price (Azuela & Barroso, 2011).

Setting a fixed purchasing price is one of the key advantages of a FiT scheme, because it supports the ‘bankability’ of the project. Wind and solar projects require significant upfront capital costs, while operating costs are modest. Getting that funding, whether through equity or debt, will depend on whether those involved have a high level of confidence that the project will make adequate returns. That level of confidence hinges on the price that the project will be able to set for its electricity over the 10-15 years ahead. Market electricity prices are volatile and hard to predict, so almost all non-hydro RE projects became viable thanks to some sort of contract securing the selling price that their owners would receive (Frankfurt School-UNEP Centre/BNEF, 2019).

FiTs have been implemented in about 49 countries worldwide and are often cited as the most effective policy for attracting private investment in RE because it lowers investors’ risks, making projects attractive to sponsors and banks. However, as wind and solar technology costs have gone down dramatically since 2009, countries have increasingly moved away from FiT arrangements towards auctions, which brings in the element of competition among developers. The auction

mechanism has led to much lower electricity prices for wind and solar projects than preceding FiT arrangements earlier in the decade (Frankfurt School-UNEP Centre/BNEF, 2019).

### 6.1.2 Egypt's Policy Environment

Governance in the energy sector consists of two state-owned supply complexes, one for petroleum and gas, the Egyptian General Petroleum Corporation (EGPC), and one for electricity, the Egyptian Electric Holding Company (EEHC). Both exercise government policy functions, regulatory functions and all supply operations from production to product delivery. As a first step to separate regulatory and policy functions from the supply, both entities were converted into state-owned joint-stock holding companies under the direct control of separate ministries; EGPC in 1976 under the Ministry of Petroleum and Mineral Resources (MoP), and EEHC in 2000 under the Ministry of Electricity and Renewable Energy (MoEE). Both holdings own numerous public sector companies active in upstream and downstream activities, including generation, transmission, distribution, and services (Suding, 2011).

Egypt has good sources of oil and gas and enjoys almost universal access to electricity, with the electrification rate estimated at over 99.8% (World Bank Group, 2017). Energy subsidisation is a major factor influencing how competitive solar can be versus fossil fuel sources. In Egypt, energy subsidies and low energy prices of fossil fuels have led to the development of energy and carbon-intensive industries, making Egypt the third most energy-intensive economy in the MENA region. Before Egypt's January 2011 Revolution, liberalizing the energy market was not on the horizon. The formula adopted under Mubarak's regime was resource-based, meaning electricity, water, and oil and gas were provided at relatively low prices to households and industries. This formula kept



wages and energy prices at internationally low levels, thereby enhancing international competitiveness, and satisfying a large share of the low-income population. Liberalising the prices of energy and using revenues to support low-income brackets and invest in the overall competitiveness of the economy was opposed not only by the old guard but also the new guard, the most prominent of which made their fortune from steel, cement, and ceramics using low priced domestic energy (Suding, 2011).

However, the last decade has witnessed a shift in energy supply, as Egypt became a net importer of oil (U.S. Energy, 2014). The governing National Democratic Party (NDP), at its 2007 security conference, presented a comprehensive strategic energy policy document for Egypt. Of the nine major features of the energy plan, three were relevant to the RE industry and market (Suding, 2011). The plan adopted a 20% RE target by 2020 (later extended to 2022) based on an eight per cent hydro and 12% wind energy mix, the latter being the cheapest RE source at the time (Bloomberg New Energy Finance & UNEP, 2010).

Feature 4: Adopting policies of energy support that focus on extending this subsidy to those that deserve it, while expanding the application of the system of consumption brackets and correcting the prices on the medium term according to specific criteria.

Feature 5: Reaching a capacity of electricity generation from renewable energy sources to produce about 20% of the total generation by 2020.

Feature 9: liberalize the energy market while applying effective mechanisms to protect the consumer and to develop the government's role as to become an observer and regulator of the energy market. (Suding, 2011, p. 4432)

Although the plan implicitly maintained consumer subsidies, deteriorating economic conditions following the January 2011 Revolution put pressure on the cash-strapped government to gradually phase out energy subsidies as of February 2013 after decades of subsidizing energy. A five-year plan to phase out internal subsidies in the electricity sector was officially endorsed as per the Prime Minister's Decree No. 1257 of 2014 (see Appendix C-Figure 8, Industrial tariff subsidy removal plan and actuals, 2014-2019), and then extended for three more years so that a complete phasing out of electricity subsidies is expected by 2022 (IRENA, 2018b).

A regulatory breakthrough came in 2014, as the new government was eager to make a popular achievement in the electricity service marked by multiple disruptions and blackouts in 2011 and 2012 due to fuel shortages and delayed maintenance of existing capacities. The government announced the Benban Solar Park, a solar energy megaproject extending over a plot of 37 km<sup>2</sup> near Aswan, in the south of Egypt, producing 1,800 MW. At the time, Benban Solar Park was the largest solar complex globally. Divided into 39 subplots, each subplot allows for a 20-50 MW plant, with subprojects allocated to investors/developers through a FiT scheme.

The government had to create appropriate regulatory and legal frameworks to pave the way for the Benban megaproject under a FiT scheme. In 2014, the Egyptian Government issued the Renewable Energy Law (Decree No 203/2014) to encourage the private sector to produce electricity from RE sources. The law introduces several development schemes for the private development of RE projects, including competitive bidding for BOO constructions, FiT, and independent power producers (IPP) through third-party access (*Egypt Renewable Energy Law (Decree No 203/2014)-Policies*, 2016).

Under the FiT program, private sector investors can build, own and operate RE power stations. Via long-term Power Purchase Agreements (PPAs), electricity companies (EETC or distribution

companies) buy the energy produced at a pre-announced price that generates an attractive return on investment. PPAs for FiTs last 20 years for solar installations and 25 years for wind projects (IEA, 2016).

In late 2014, Egypt launched its FiT scheme with a tariff of 0.1434 US dollars per kWh for 20-50 MW solar PV projects. The program called for a build-out of 55 projects totalling 2,500 MW across three territories: Benban (Aswan), Zaafarana (Gulf of Suez) and Minya. The program attracted an enthusiastic response from international investors. By early 2016, more than 20 groups were preparing proposals looking to conclude PPAs by an October deadline to declare financial close. However, the Egyptian Minister of Electricity introduced a new clause stipulating that disputes between parties should be resolved domestically through the Cairo International Arbitration Centre. The issue sparked protests from international companies amidst fears that the condition would compromise their ability to resolve disputes quickly and fairly (Hafez, 2017). Foreign investors' reluctance to accept local arbitration has been accentuated by Egypt's forex crisis, which directly affects the Egyptian government's capacity to meet its commitments in the FiT scheme, especially after the continuous devaluation of the Egyptian pound against the US dollar since the beginning of 2016. Development finance institutions (DFIs) pulled out of the process, and, according to the Ministry of Electricity, only three companies remained and signed PPA contracts. KS, the case under study, was one of those three.

In response to complaints, the Ministry changed the terms for the second phase of the FiT to allow for international arbitration and doubled the maximum project size from 50 MW to 100 MW. At the same time, the state slashed tariffs by more than 40% to 0.084 US dollars per kWh. The tariff was 70% indexed and 30% fixed at 8.8 Egyptian pounds per US dollar, resulting in an equivalent levelized tariff of 0.071 US dollars per kWh. Unlike Round One, where developers could select

between three solar park sites, the government decided to focus all efforts on just Benban Solar Park. In addition, the number of projects on offer fell from 55 to 33. In Round Two, self-financing was not allowed, requiring projects to be fully financed through banks or lending institutions, with a minimum of 70% of the project investment cost (compared to 85% in Round One) in foreign currency secured from outside Egypt (*Round Two of Egypt FiT Program Announced*, 2016).

Out of the 33 solar plants in the project, the International Finance Corporation (IFC), a member of the World Bank Group (WBG), provided 653 million US dollars in a debt package to finance the construction of 13 plants to be built and operated by six groups of private power companies. IFC marshalled support from a consortium of nine international banks: the African Development Bank (ADB), the Asian Infrastructure Investment Bank (AIIB), the Arab Bank of Bahrain (ABB), CDC Group (a DFI owned by the UK government), Europe Arab Bank (EAB), Green for Growth Fund (GGF), the Finnish Fund for Industrial Cooperation (FinnFund), the Insurance Corporation of British Columbia (ICBC), and the Development Bank of Austria (OeEB). The European Bank for Reconstruction and Development (EBRD), leading a consortium that included the Dutch Entrepreneurial Development Bank (FMO) and the Green Climate Fund (GCF), financed 16 more plants of the project.

Another tool for promoting solar energy generation is net metering. Introduced in 2013, the scheme allows small-scale RE projects in residential, commercial, and industrial sectors to feed electricity into the low-voltage grid. Under the scheme, solar PV generation is credited against the user's bill for consumption from the grid, using a calculation method that credits surplus electricity in the consumers' highest tariff bracket. The guidelines were revised in 2017 to allow larger systems (up to 20 MW).

Although the government has been facilitating this growth for the past few years, its policy recently started to change. On 28 April 2020, EgyptERA issued Circular no. 2/2020, applicable as of 20 May 2020, restructuring the net-metering scheme in Egypt. The circular put in place several new parameters, which aim to limit the overall setup of new net metering projects. It introduces two caps: a cap of 25MW per solar developer on the total contracted capacity for all their net metering projects with distribution companies; and another cap of 300 MW for the total capacity generated from solar net metering projects on the national grid, past and future, for all solar developers in Egypt. The reason behind this policy change could be attributed to the continuing cross-subsidisation of electricity prices across consumer segments. High-value consumers, who are moving to solar solutions through IPP models, are the ones who are currently cross subsidizing lower consumer segments. Other analysts mention capacity surplus as another reason for policy change.

### *Competitive Landscape*

Before KS foundation in 2011, solar energy market was almost non-existent in Egypt, except for a small retail market of solar water-heaters sold to households and resorts, and a government-run CSP utility of 20 MW in Kuraymat funded primarily by the Global Environment Facility (IRENA, 2018b).

In 2011, and with the drop of the solar PV panel prices, energy solutions providers, like Caterpillar agent in Egypt (Mantrac), were probably aware of the solar PV opportunity, and they enjoyed a considerable knowledge base, technical and organisational capabilities, and capital resources to

explore the opportunity. However, they were reluctant to adopt a disruptive technology that would negatively affect their profits from the existing products.

Industrial and commercial businesses, who were progressive enough to seek to experiment with the solar PV technology early on, contracted foreign suppliers to build solar stations for their internal use. For instance, in March 2015, SEKEM, an Egyptian Sustainable Development Initiative with an organic farm based on the outskirts of Cairo, has contracted a German solar company, Aschoff Solar GmbH, together with a local partner, to install a 60 kW stand-alone solar system on their desert farm in the Bahareya Oasis. The 60 kW polycrystalline solar system was built to operate a 37 kW pump irrigating 60 acres of date palms (RCREEE & UNDP, 2016).

### 6.1.3 The Solar PV Opportunity

Situated on the global sunbelt, Egypt has one of the best solar resources in the world (see Appendix C-Figure 9, Egypt Photovoltaic Power Potential and Irradiation), with daily sunshine averaging 9-11 hours, low humidity, and global horizontal irradiation of around 2230-2330 kWh/m<sup>2</sup> per year (African Development Bank Group, 2019).

Historically, solar energy remained largely untapped since Egypt was relatively rich in fossil fuels. However, by the end of the last decade, Egypt became a net importer of oil and gas (U.S. Energy, 2014), triggering the government to set ambitious plans in 2007 to reach a 20% RE share by 2020. The plan was mainly based on building hydro and wind generating capacities since they were the cheapest renewable sources of electricity at the time. Interested in grabbing a share of this ambitious plan, IDAs established several initiatives targeting RE in North Africa, especially Egypt. For instance, in 2009, the EIB offered to lend southern Mediterranean states 5 billion euros (6.71

billion US dollars) over three years to invest in RE. In 2009, Egypt attracted the largest investment in Africa— 490 million US dollars were invested in a 200 MW wind project in the Gulf of El Zayt, offered by the German development bank, KfW Bankengruppe (KfW), and EIB (United Nations, 2011). Until 2010, most of the investment in RE went to wind projects. By 2010, investment in wind energy in Egypt totalled 682.98 million US dollars versus 9.42 million US dollars in solar energy. Total capacity was standing at 550 MW (producing 1159 GWh) for wind versus 15 MW from solar energy (producing 25 GWh) (IRENA Renewable Energy Statistics, 2020).

However, 2010 witnessed a breakthrough in the economics of solar PV technology, when the LCOE mean of utility-scale solar PV dropped 30% in one year (Lazard.com, 2020). The global RE scene started to change drastically as solar PV became increasingly feasible. Egypt, however, still faced major obstacles for wide-scale adoption, like energy subsidisation, low market awareness, the absence of a regulatory framework for private sector entry, and the lack of capabilities.

On the demand side, long-standing energy subsidies have weakened the competitiveness of renewable energy, including solar PV. There were doubts that the government would ever lift subsidies on fossil fuels (Suding, 2011). Moreover, a UNDP study in 2016 (RCREEE & UNDP, 2016) on solar energy in four Arab countries, including Egypt, revealed a major awareness gap about the potential of solar retrofitting for diesel-fuelled generators for industrial and commercial use. The study stated that lack of awareness is particularly prevalent among energy users in Egypt's industrial, tourism and agricultural sectors, sectors that are usually considered natural early adopters of solar energy. The study revealed a “common misperception about solar power not being “strong” enough to power machinery and air-conditioning” (2016, p. 14). These prevailing

misperceptions the study attributed to the “absence of success stories that may serve to dispel these myths and demonstrate the reliability and benefits of solar PV systems” (2016, p. 15).

Low awareness was detected among energy solution providers as well, who stated in the interviews that they did not view solar retrofits as a “potential market segment with profitable investment opportunities for solar PV. These service providers continued to steer their off-grid clients towards diesel gensets” (2016, p. 14). For instance, Caterpillar, which is one of the global suppliers of energy solutions, started to offer solar-based solutions worldwide only in 2015 through a partnership with First Solar (Caterpillar, 2015). Another particularly important gap, as reported by the UNDP study (2016), is the absence of a proven business model that is tailored to specific local market conditions, which is key to creating a market for this new product.

In terms of technical expertise, the manufacturing arm of an Egyptian state entity was the first to bring the know-how to Egypt when they built the first solar station in 2009 for internal use. They invested heavily in acquiring the required know-how by sending a team of seven engineers to Spain and India to obtain full knowledge of designing, building, and operating hybrid solar stations. This team later became Egypt's knowledge pool for the whole business sector venturing into the solar market.

In addition to ambiguities in the demand and supply of B2B solar solutions, the prevailing regulatory and investment conditions were not favourable at the time of establishing the business. Until mid-2014, Egypt had no frameworks for regulating private sector entry into solar energy (see Section 6.1.2), making this a prominent deterring factor for any investment in the new sector. Fossil-fuel energy is an old and established sector in Egypt, with considerable rents flowing to the state and its alliances (Suding, 2011). It was unpredictable how the state would react to new private actors venturing into solar energy solutions to commercial and industrial (C&I) sectors, as their



entry could potentially upend not only the business models of fossil-fuel energy companies but also the nationwide cross-subsidisation of electricity provision.

Another barrier was the perception of the high risk associated with solar energy technologies. Most bankers interviewed in the UNDP study (RCREEE & UNDP, 2016) seriously doubted the accuracy of expected energy and financial savings from retrofitting diesel-based systems with solar PV. This perception of high risk prevented actors across the value chain from investing in solar power, thereby limiting the development of the solar energy market. The macroeconomic landscape between 2011 and 2014 did not help either. Marked by high systemic risk, hardly any investors were willing to invest in Egypt at that time, let alone invest in high-risk ventures.

In summary, Egypt's growing dependence on imported oil and gas, coupled with its prime location on the global sunbelt and the falling cost of PV technologies in 2010, has opened an opportunity for solar PV in Egypt. In 2011, it was a potential but largely untapped opportunity marked by high uncertainty about demand, institutionalised barriers, like energy subsidies, and the absence of regulations, all of which have dis-incentivized existing and potential market players from exploitation.

## 6.2 KS' Strategic Response

### 6.2.1 Solar Water Pumping

Before establishing KS, its four founders were part of a business development team working in an oil & gas company, headquartered in the Gulf and operating a subsidiary in Egypt. The team was tasked with carrying out feasibility studies on alternative RE models in Egypt, namely wind,

biogas, biomass, and solar. Their feasibility study concluded that solar is the only viable RE alternative for B2B. However, the owner and chairperson of the Gulf company, who was behind the RE vision, suddenly died, and the CEO rejected the business development team's solar business model and decided to shut down the newly formed RE unit and terminate the contracts of the whole team. Fuelled by disappointment and eagerness to “prove [the CEO of the Gulf company] wrong”, the head of the team decided to start up his own business in 2011 offering B2B solar energy solutions. Three of his previous team members from the Gulf company joined him as co-founders.

KS's first product was solar water pumping (SWP) for deep wells serving off-grid agricultural areas. New agricultural farmland in Egypt is increasingly located in off-grid areas, particularly mega-farms in the Western Desert, which cultivate crops for export. Some of these farms are tens of thousands of acres in size and have more than seven MW of diesel-based pumping systems (RCREEE & UNDP, 2016).

The deep well version of solar water pumping was a new product, and few companies worldwide offer the solution. The cost advantage of the off-grid solution versus diesel was not obvious either. Diesel was still the cheaper option. Moreover, the solar retrofitting product had no prior awareness in the marketplace, and the cost per pump was significant. It took KS's founding team almost a year and much door-knocking to find their first client, a prominent agri-business group that have operations in the Western Desert. Its entrepreneurial founder and CEO agreed to give KS the chance to pilot their SWP against two conditions: he will only make a purchase if the pilot performance is satisfactory, and secondly, he will provide payment over ten-year instalments. The client was mostly motivated by the shortage in diesel than by the economic benefits of solar power, which were still speculative. In the wake of the January 2011 Revolution, access to diesel became

increasingly unreliable and, when purchased, was subject to theft by locals. The client, a big exporter of aromatic herbs to European markets, was especially susceptible to diesel shortages that would lead to irrigation deficiencies, which, if frequently occurring, would permanently affect orchards. Although KS did not have available funds to finance the cost of the pump, it still agreed to these conditions in order to create awareness, combat the perception of high risk associated with REs, and initiate a market for solar pumps in Egypt. KS founders financed the first solar pump (\$50,000 US dollars) out of their pocket. “We decided to bear this risk since the market was not yet ready to do this,” said the KS financial analyst in the interview.

KS’s first project, however, was not without a few snags. Implementation got complicated when the American-based model for deep wells, which KS initially relied on, was a poor fit for local conditions. “[The American Company's] solution was rigid, and the team that designed the solution left the company, so it was not adaptable or scalable,” said the co-founder and R&D Executive. KS took a bold decision to abandon the American solution and invest in R&D to develop a better version of SWP that matches local conditions and would be easier to scale up in the future. “We internally figured out a better way of designing the solution... we even patented the product in the U.S.” ([Company Name], 2015). In 2013, KS piloted a successful 50 kW pure solar system operating a water pump, and the client, satisfied with the outcome, contracted KS to install 32 more systems with a total capacity of 1.1 MW paid in full. The client’s requirement was a pure solar system that works only during the day since that area suffered from high levels of iron in its groundwater. The pumped water must be first stored in water reservoirs and filtered from its iron content before feeding it into the irrigation network at night. These conditions were particularly favourable for KS’s first venture since, at the time, it was at the beginning of its learning curve.

Just as KS was about to target more clients with the SWP solution, SWP prices crashed to very low levels when a Chinese version found its way to the nascent market. Realising that KS's product had lost its competitive edge in the market, management decided to move to a new product and model.

## 6.2.2 Off-grid Distributed Generation

The cost of diesel continued to rise in Egypt due to the gradual removal of energy subsidies. The first adjustment of diesel prices in the second quarter of 2014 amounted to a 63% increase (RCREEE & UNDP, 2016). On the other hand, solar PV prices decreased 75% between 2009 and 2014 (IRENA). This development has led to a significant decline in the levelized cost of PV power electricity, improving its economics versus conventional sources. Furthermore, solar PV technologies proved flexible and adaptable, allowing for seamless integration into existing power generation and distribution systems in remote areas to create hybrid solar/diesel solutions (RCREEE & UNDP, 2016).

KS moved to offer distributed generation to off-grid centralised hybrid systems. The hybrid system is more attractive than pure solar solutions because a solar PV component is integrated into the existing diesel-based power network to create a hybrid system generating electricity day and night. Ideally, solar panels would provide a significant share of needed power, and existing diesel gensets would consume less fuel. Unlike SWP solutions, the centralized hybrid model targets a niche business segment in off-grid areas who are likely to be more quality oriented. Traditionally, the energy solutions market was operating based on an EPC (Engineering, Procurement, and Construction) model. In that model, the client is expected to pay in full to own the solution and

assets, and the price is calculated based on the total watt installed. In the case of solar/diesel hybrid solutions, the client was reluctant to make a considerable upfront investment to build the station with a minimum payback period of six years (based on international diesel prices). It was a hard sell for such a new product with no track record of success in Egypt before 2014. KS went into negotiations with potential clients for over a year. Eventually, it took a bold decision to change the business model from EPC to PPA (private purchase agreement), which takes both capital expenditure (capex) and operating expenditure (opex) off the client's side and onto the solar developer's balance sheet, turning the developer into a utility company paid for actual kWh consumption. The new business model involved not only higher capex requirement but also greater risk related to the continuity of the client's business for the duration of the agreement, which is 25 years. With this model, KS targeted the clients who are well established and credible, but also "known as pioneers in their industries. Those players are role models even to their competitors...So if KS managed to install solar solutions to these companies, then the rest of the market would follow," explained the R&D executive. The strategy of targeting pioneering companies paid off. "The diesel-based generation solution was still lower than solar cost per kWh at the time by around 0.5 EGP per kWh", said KS's first PPA client in the tourism sector, who owns a diving centre in Marsa Allam. He added, "We saw that this will change in the near future with the removal of fuel subsidies. We are pioneers in our business, and we ought to pioneer eco-friendly tourism as well". KS managed to secure three clients; one in agri-business for 1MW hybrid system and two touristic diving centres in Marsa Allam resort city for 75 and 150 KW, all in off-grid areas.

Up until 2014, KS was not operating within a regulatory framework and certainly could not sign a PPA agreement as an IPP without a license from the government. The breakthrough occurred in

2014 when, given the acute electricity shortage in 2013, the newly appointed government decided to launch the Benban Solar Park as the biggest solar project worldwide using FiT mechanisms (see Section 6.1.2). The New and Renewable Energy Authority (NREA) had to issue a regulatory framework for IPPs to open the bid for Benban's subprojects. In October 2014, a presidential decree was issued permitting the NREA to contract any entity to implement, operate and maintain any new and renewable project. This was followed by the Renewable Energy Law (Decree No 203/2014) in December, which introduced several schemes for the private development of RE projects, and allowed IPPs to access the national grid (*Egypt Renewable Energy Law (Decree No 203/2014)-Policies*, 2016). KS obtained its license as a third-party solar developer in November 2014 and signed PPA agreements with the three clients between April and July 2015. These were the first corporate PPA-based solar projects signed in Egypt.

Having resolved regulatory issues, KS moved on to the next hurdle, raising capital. Acquiring funds from equity investors or banks depends on their confidence that the projects will make adequate returns. Solar energy at that time was a green field with no proven record of ROI. The PPA model KS signed with the three businesses involved relatively higher risk compared to solar turnkey. The security of the PPA agreement from a legal point of view, the continuity of the client's business for the duration of the agreement, and the unpredictability of fuel prices all affected the bankability of the PPA. KS first sought finance from banks, but interest rates were high due to the dire macro-situation at the time, so they turned to the Social Fund for Development (SFD)<sup>8</sup>, which

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<sup>8</sup> "The Social Fund for Development (SFD) is a semi-autonomous governmental agency under the direct supervision of the Prime Minister, financed by the Government of Egypt in cooperation with the World Bank/IDA, the European Union, Arab Funds and other donors. The SFD was created to protect and improve the status of the poor and the

focuses on supporting the self-employed with micro-credit. It took a whole year of negotiations with SFD to reach an agreement to finance the required investment with a subsidised interest rate.

Technical expertise was another hurdle KS had to overcome. The hybrid solution requires higher technical expertise to design and implement than a SWP. At that time, this expertise was not easy to find in the Egyptian labour market. The manufacturing arm of an Egyptian state entity was the first to bring the know-how to Egypt when they built the first solar station in 2009 for their own use. They invested heavily in acquiring the required know-how by sending a team of seven engineers to Spain and India to obtain full knowledge about designing, building and operating hybrid solar stations. This team later became Egypt's knowledge pool for the whole business sector venturing into the solar market. KS poached one of those engineers to fill the knowledge gap in building and operating large-capacity solar stations.

For efficient and seamless performance, KS decided to go for a fuel saver option that was still a new technology worldwide. The fuel saver is a hybrid application in which solar panels and diesel gensets operate simultaneously throughout the day in order to secure a stable electricity supply. The simultaneous operation of solar and diesel generators requires a control system to ensure optimal utilization of both technologies to maximize solar fraction during sun hours. To improve the efficiency of the system, diesel gensets should be configured to ramp up and down production based on the availability of power from the solar panels. Fuel savings of up to 30% can be achieved

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unemployed, during the period of economic transition. Its mission is to facilitate the implementation of Egypt's economic reform programme by mitigating the adverse effects of structural adjustment on low income groups, and by strengthening Egypt's institutional capacity (governmental and non-governmental) to develop new social programmes and upgrade existing ones" (Wahba, 2009, p. 24)

(RCREEE & UNDP, 2016). KS chose one of the world's top suppliers of solar inverters, a German supplier, to provide the technology, and sent a technical team to Germany for a full training course on operating the Fuel Save Controller. KS project was the seventh worldwide to implement this technology. Although KS could have commissioned the German supplier to carry out the design and commissioning of projects, top management decided to pursue a strategy of independence in developing in-house technical capabilities. "That was our value-added in the value chain," said KS Technical Manager.

In September 2016, Egypt's first PPA solar-powered station began operating at a capacity of one MW in Al-Wahat Al-Bahareya in the Western Desert, saving up to 600,000 litres of diesel per year and avoiding the annual emission of 1,620 tonnes of carbon dioxide. An additional agreement was signed with the same client to supply the farm's administrative and staff accommodation buildings with 100% of electricity needs from solar sources.

### 6.2.3 Utility-scale and On-grid projects

When NREA announced the FiT program in 2014 and invited local and international consortiums to apply, KS, was one of only three to agree on the local arbitration clause (see Section 6.1.2) and was allocated a 2 MW project in Hurghada. The lucrative FiT rates in Round One (\$0.143 per kWh) came as a saver for the cash-strapped start-up.

Without having to wait for the government to sort out the land lease obstacle that delayed all other developers, KS managed to secure land for their project by signing a 27-year lease agreement with an Egyptian tourism company against a two per cent profit share. Starting ahead of other



developers, KS was the first company under the FiT program to start feeding solar power into the national grid in 2016.

With the continuous and gradual removal of power subsidies, solar energy became a viable solution for industrial and commercial on-grid businesses. KS moved to provide micro-grid solar solutions to on-grid industrial and commercial enterprises at competitive prices and delivered Egypt's first two grid-connected PPAs. In pricing the solar-generated electricity rate in the on-grid PPA contract, KS initially offered a high price at the beginning of the contract that goes down gradually along the contract term. However, this was not attractive enough for the client who wanted a price rate lower than grid rates from day one. Accordingly, KS changed the pricing scheme so that it provides cash flow benefits to the customer from day one.

In 2019, the French EDF Renewables, a clean energy subsidiary of Électricité de France S.A (EDF), announced that it had strategically acquired an undisclosed equity stake in KS for 25 million US dollars (*France's EDF Renewables invests*, 2019). These investments form part of EDF Renewables' goal of doubling its renewable capacity worldwide between 2015 and 2030 to reach a net of 50 GW. At the time of the transaction, it had already installed a gross capacity of 12.5 GW worldwide, with projects in Brazil, China, India, South Africa and the Middle East, as well as Europe and North America, according to the company's website. KS management refused to disclose company value at the time of the transaction, but their financial analyst stated in the interview that the company's value in 2019 was ten times greater than its worth three years earlier.

In May 2022, The Financial Times announced the inaugural FT annual ranking of Africa's Fastest Growing Companies. The list included 75 companies, ordered by the highest compound annual growth (CAGR) in revenues between 2017 and 2020. KS ranked 19<sup>th</sup> in Africa and 1<sup>st</sup> in Egypt with CAGR 51.053% (Pilling, 2022).

To summarize, the technological change represented in the drop in prices of the solar PV technology in 2010 to be comparable, for the first time, with prices of other fossil fuel and renewable energy alternatives has opened up an opportunity for Egyptian energy solutions providers to use abundant Sun radiation in Egypt and create a solar PV B2B market. KS, established in 2011 to explore the solar PV opportunity, started with the SWP product to serve off-grid clients in the agri-business. When competition intensified in the SWP market, KS moved to offer hybrid solar solutions to clients in off-grid and later to on-grid areas. KS made a number of innovations to trigger a mass adoption of solar PV technology in the Egyptian market. First, it made product development of the SWP to fit local conditions. Second, in hybrid solar solutions, it changed the business model from EPC to PPA to remove financial obstacles and trigger mass adoption. Third, it adopted a pricing scheme for on-grid clients that delivered straightforward cash benefits to clients and, at the same type, captured good value for the company. In 2019, EDF Renewables acquiring a stake in the company came as a recognition of KS's success in pioneering the solar PV market so far and its potential in the future.

### 6.3 The Solar PV Case Analysis

In 2011, KS founders decided to exploit the solar PV opportunity by offering solar PV solutions to industrial and commercial clients in off-grid and on-grid areas in Egypt. The latent market for B2B solar PV solutions represented a technological window of opportunity (Lee & Malerba, 2017) with the potential to substitute fossil-fuel-based solutions (for off-grid clients) and the national grid (for on-grid clients).

Regarding level of uncertainty, demand and supply information about the solar PV opportunity in Egypt did not exist before the establishment of KS. On the demand side, a B2B market for solar PV in Egypt was non-existent, and market awareness about solar PV as an energy source was lacking. On the supply side, the solar PV business model involved many unknowns around subsidies of electricity and other fossil fuel products like diesel. The regulatory setup was another area of high uncertainty, as it was not yet permitted for private sector players to generate solar energy and sell directly to I&C customers. On the other hand, solar PV solution, being a service, was largely shielded from economies of scale requirements. Given these conditions, the level of uncertainty in the opportunity was high, and involved creating a B2B market for solar PV in uncharted territory. According to Sarasvathy et al.'s (2003) typology, the opportunity in this case is of the third type, market creation (see more details in Section 3.3).

As detailed in Chapter Three, we used the sensing, seizing, and reconfiguring phases to unpack the data on opportunity exploitation. In analyzing the data, we followed a bottom-up coding approach, in which interview transcripts were reviewed line by line highlighting passages that shed light on the phenomenon and assigning codes to these passages. The highlighted passages and assigned codes are included in the analysis below to provide transparency about the interpretations made during this process.

### 6.3.1 KS' Capability of Sensing the Opportunity

#### *1. Code 'Perceive potentiality in opportunities with uncertain rewards'*

In October 2011, no one in Egypt was talking about the solar PV technology. The main RE technologies that were efficient at that time were hydro and wind. With solar PV prices beginning

to drop in 2010 (see Section 6.1.3), KS founders sensed that they might witness in the near future the inflexion point of the solar PV technology worldwide. However, it was hard to predict when this inflexion point would materialise globally and in Egypt. The level of uncertainty was especially high in Egypt where there was an old and established oil & gas sector, and a tradition of heavy subsidisation of fossil fuel energy prices. At the time, sensing the PV solar opportunity for a market yet to be created and amid these unfavourable conditions indicates that KS was intrigued by a possibility more than a reality and decided to pursue an opportunity that was not immediately recognisable.

Table 12 Interview quotes under the code ‘Perceive potentiality in opportunities with uncertain rewards’

#	Interview Quotes	Interviewee
1	“Solar panels were expensive, electricity was subsidised, and diesel was subsidised. Still solar made economic sense considering what it is going to be, not what was there at the time.”	KS CEO & Co-founder
2	“Let me tell you something. An opportunity is something that exists at a time when it is not possible.”	KS CEO & Co-founder
3	“They [in KS] were a team of seven. They were all industry-aware, and faced the challenge of coming up with a solution for a problem [SWP for deep wells] that did not yet have a solution worldwide.”	Former R&D employee
4	“From the beginning, we knew that there is no solar solution available [for Egypt’s deep water], and we knew we are addressing a problem with no off-the-shelf solution. So, there was a probability that we may achieve nothing. That was scary. And we were not working on anything else except this problem. That was scary too.”	Former R&D employee
5	“We were promising and hoping to produce a patent, and to make it work, and hoping for many things. But, we didn’t have any guarantee that any of these was going to work. But it just did.”	KS CEO & Co-founder

The interview quotes in Table 12 reveal how KS founders recognized an opportunity in the high ambiguity of the solar PV opportunity. Moreover, they decided to tackle a problem—solar water

pumping for deep wells—that had no off-the-shelf solution yet. In other words, they were intrigued by the new value they could create to the market.

## 2. Codes '*Seek social impact (an intrinsic motive)*' and '*Feelings of anger*'

Interview data showed that intrinsic motivations played a significant role in motivating the founding team to explore the solar PV opportunity in Egypt amid adverse conditions (see Section 6.1.3). Many interviewees expressed motives that revolve around 'seeking social impact'. Emotions also played a role in motivating the founding team. As detailed in Section 6.2.1, before launching KS, the four founders were part of a business development team working in a Gulf oil & gas Company subsidiary operating in Egypt. The team was tasked with carrying out a feasibility study on alternative RE models in Egypt. They studied different RE alternatives, including wind, biogas, biomass, and solar, and concluded that solar PV is potentially viable for private sector entry. However, the owner and chairman of the Gulf Company, who was championing the RE venture, suddenly died. With the outbreak of the January Revolution of 2011, the CEO of the Gulf Company decided to dissolve all subsidiaries under 10 million US dollars, including this RE subsidy.

The development team, who were very passionate about solar PV prospects, proposed to the Gulf Company's management to finance the solar venture themselves but under the name of the Gulf Company. Nevertheless, the CEO rejected the team's proposal and fired them all. Fuelled by disappointment and anger, four team members decided to start up their own business to explore the solar PV opportunity. The interview quotes in Table 13 reveal how founders and senior

executives had motives beyond pecuniary benefits. They were motivated by a combination of seeking social impact, anger, and eagerness to prove their former employer wrong.

Table 13 Interview quotes under the codes ‘Seek social impact (an intrinsic motive)’ and ‘Feelings of anger’

#	Interview Quotes	Interviewee
1	“[In London] where I used to work, one has to fit within a system...I wanted to work outside the system. Besides, it [the UK] is not my place, so I did not have a cause.”	KS CEO & Co-founder
2	“I decided I wanted to do something more impactful [with my life]. Although there was no solar energy market at that time in Egypt, I was not thinking specifically of where to go. I was thinking about something that would have an impact.”	KS CTO
3	“At the beginning, the company had social objectives, not just profitability.”	KS CTO
4	“We established this company not only to make money but also to achieve many other things; to win myself as a human being.”	KS Technical Manager
5	“Most people working in KS were not thinking about a career. This has to do with recruitment. Employees were all very competent and knew they were underpaid [in KS], but they were not working for money.”	KS Former R&D Employee
7	“There was a lot of anger [at the time]... “We just wanted to prove [our former employer] wrong.”	KS CEO & Co-founder

### 6.3.2 KS’ Capability of Seizing the Opportunity

#### 3. Code ‘Feasibility-driven in search and discovery’

KS had a strong searching and probing approach in formulating a strategy to exploit the solar PV opportunity. Interviews show that KS studied the feasibility of different RE alternatives before selecting solar PV technology. They also chose agriculture and tourism businesses in off-grid areas as potential target sectors, based on the investigated economics of solar PV versus diesel. They also decided to exit the SWP market after the entry of low-cost, low-quality local and Chinese SWP competitors. They probed different pricing schemes for the PPA model until they settled on a pricing model that provides straightforward savings on the customer’s electricity bill, and, at the

same time, captures good value for the company. It could be inferred, that in deciding on their solar PV exploiting strategy, KS was not driven by specific affinities to a particular product, sector, or model. They followed a disciplined, pragmatic approach in assessing and reassessing opportunities. At the same time, it is observed that while being feasibility-driven, they did not prioritise maximum or immediate profitability. They prioritised maximum value to the customer and good value for the company, with a long-term approach to profitability.

Table 14 Interview quotes under the code ‘Feasibility-driven in search and discovery’

#	Interview Quotes	Interviewee
1	“We studied biogas but did not make sense [economically] and its logistics are very expensive. Wind also did not make sense, and government controlled everything. We studied solar energy and found that it holds some hope.”	KS CEO & Co-founder
2	“We focused at the beginning on off-grid because the on-grid market was not feasible. Electricity prices were low and subsidised. So, it was not economical [to offer solar to on-grid]. So, we focused on the off-grid market.”	KS Financial Analyst
3	“We explored many business lines...until we settled on this [solar PV]. We were a small team capable of studying the feasibility of any opportunity to see if it made sense or not.”	KS Financial Analyst
4	“We kept changing the business model according to customer requirements to solve any obstacle preventing (businesses) from going solar.”	KS CEO & Co-founder

#### 4. Code ‘Experimentation’

KS faced many unknowns in their effort to create a market without much information on its demand. They could not forecast with good level of accuracy the size of the market, the adoption rate, or the underlying cost structure of the proffered solutions. Their ability to undertake a cost-benefit analysis to decide the commercialisation strategy was limited at the outset. One prospective investor told KS CEO when he presented the business plan, “Look! All these numbers you have are probably wrong. The right numbers we do not know yet, and it does not matter. Numbers are

going to change every six months”. KS CEO admits, “He was right. That’s what happened.” To figure out market unknowns and create the market, KS had to adopt experimentation as the business-as-usual mode. They experimented with the product to reach a design that fulfils local conditions and customer needs. They experimented with different propositions to deliver value-for-money high enough to trigger mass adoption. They experimented with different business models that would serve the proposition and, at the same time, capture value for the company. It is observed that they were not experimenting under anxiety or fear of failure. They were enjoying it. “This unfolding and everyday discovery is some kind of adrenaline shot,” said KS CEO.

Table 15 Interview quotes under the code ‘Experimentation’

#	Interview Quotes	Interviewee
1	“The unknowns were too many and one had to figure them out day by day.”	KS Director of R&D &Co-founder
2	“We were definitely experimenting all the time.”	KS CEO & Co-founder
3	“This unfolding and everyday discovery is some kind of adrenaline shot. Some people have this adrenaline addiction. Some people are born to work outside of the comfort zone and discover things that are not yet known.”	KS CEO & Co-founder
4	“Every day we discover something new and may be contrary to what we thought. We found that to be delightful.”	KS Director of R&D &Co-founder
5	“I was trying...Taking it one day at a time.”	KS CEO & Co-founder
6	“When KS approached us in the beginning, they did not have a specific offer.”	First PPA Client

##### 5. Code ‘Customer-centric product proposition’

It is observed that KS prioritised value creation over short-term profitability in key strategic decisions. This orientation could be observed in their product selection, in designing the business model, and in the pricing mechanism. We explain below the three areas.



Table 16 Interview quotes under the code ‘Customer-centric product proposition’

#	Interview Quotes	Interviewee
1	“To convince the first client with the product, we offered a pilot SWP free of charge. If successful, the customer could pay in 10-year instalments, and we financed [the pilot pump] out of pocket.”	KS Financial Analyst
2	“We thought of the PPA model to overcome the main obstacle for the customer to buy since the customer doesn't want to make a big initial investment in building and operating a solar station, especially when the whole thing is still a black box to them. So, they just did want to bear that risk.”	KS PMO Director
3	“We kept changing the business model according to customer requirements to solve any obstacle preventing [businesses] from going for solar solutions.”	KS PMO Director
4	“We changed the model [from turnkey] to PPA. It was easier to sell [than turnkey], but financing the stations was a key obstacle, and a government license was another obstacle.”	KS Financial Analyst
5	“Customers are not interested in owning the solar stations. They will not go for EPC. They are interested in a cash flow solution.”	KS CEO & Co-founder
6	“They [KS] were open to any suggestion from our side [about the business model].”	First PPA Client
7	“Our price for the first PPA customer was low...But, at the time, we were not keen on profitability. It was about ‘shaking hands’ with this industry.”	KS Director of R&D & Co-founder
8	“At the beginning, we used to set specific prices in the 25-year [PPA] contract. It used to start higher than grid prices and gradually goes down over time. But this pricing scheme was not attractive to [potential] customers. So, we now set the price at a fixed percentage lower than grid price from day one and throughout the contract term.”	KS PMO Director

In product selection, KS decided to address the problem of finding a solution for SWP for deep wells in desert areas. According to a former employee in the R&D team, “Egypt’s problem was different from that of Europe. Egypt has good sun and unreachable water (i.e. deep water), while Europe has less sun and reachable water. So, no one was servicing our [Egyptian] requirement. Even the German solution made for African countries was very basic and not well set up. The problem was obvious, and the potential to fill the gap was also obvious.” At the time, KS did not have a privileged market position in this nascent market. They started with a perceived value to the customer by working on solving a problem that did not have an off-the-shelf- solution yet.

Secondly, KS agreed to sell the first SWP on ten-year installments, and at the same time, decided to abandon the American SWP solution and invest in in-house R&D at an early stage to come up with a better SWP solution. In doing this, KS exposed itself to considerable operational and financial risk in order to fulfil customer needs. Less than satisfactory performance of the in-house solution would have led to a total loss of initial capital.

In the areas of business model design and pricing of centralized hybrid solution, KS focused on clearing all obstacles for market adoption. First, after several unsuccessful attempts to sell solar stations on EPC (Engineering, Purchasing, Constructing) terms, KS abandoned the EPC model and offered the less proven, less bankable PPA model, shifting all financial, legal, and regulatory risks, as well as capex and opex onto KS's side, prioritising market adoption over short-term transactional profitability. In pricing the solar-generated electricity rate in the PPA contract, KS initially offered a high price at the beginning of the contract that goes down gradually along the contract term. However, this was not attractive enough for the client who wanted a price rate lower than grid rates from day one. Accordingly, KS changed the pricing scheme so that it provides cash flow benefits to the customer from day one.

#### *6. Code: 'Anticipated and adapted to continuous change'*

Over eight years, KS changed its commercial model at least four times. The idea of continuous change was emphasised multiple times in interviews with both management and staff. They rarely expressed satisfaction with their past success. In addition, they did not hold fast to solutions and business models if changing environment made them less viable. They quickly adapted and changed without too much concern for past practice. Even when they came up with new business

models, they expected that at some point in time they would have to change them. They shared the belief that any of their innovations that succeed in the market would give them an edge only temporarily until the competition catches up or the market changes. Unsettled by this belief, they were constantly searching for improvements, always questioning whether they were on the right track or not.

Table 17 Interview quotes under the code ‘Anticipated and adapted to continuous change’

#	Interview Quotes	Interviewee
1	“KS’s competitive edge is the ability to adapt.”	KS Director of R&D &Co-founder
2	“KS’s strength is in the continuous change of business model.”	KS PMO Director
3	“The objective is to maintain market leadership ...To maintain market leadership the business model has to change continuously.”	KS Technical Manager
4	“Everything we go into, we foresee how it will eventually end.”	KS CTO
5	“EDF Renewables acquired a stake in KS because they were looking for the ability to adapt, not a conventional business model, but a company that can survive in a market that changes every day.”	KS Director of R&D &Co-founder
6	“There is no fear of profitability. There is fear of staying profitable and staying relevant...That’s what takes most of our effort, making sure we stay relevant.”	KS CEO & Co-founder
7	“I think we have what other companies don’t have...and that’s our agility, creativity, and ability to work outside of the box. And big companies are not able to do that because they have to follow a certain way of thinking and a certain decision-making process.”	KS CEO & Co-founder
8	“I remember when I was doing a presentation to [...] one of our investors, he said, ‘look, all these numbers you have are probably wrong. The right numbers we don’t know yet, and it doesn’t matter. Numbers [assumptions] are going to change every six months.’ He was right. That’s what happened.”	KS CEO & Co-founder

### 6.3.3 KS’ Capability of Reconfiguring Resources

#### 7. Code: ‘Managed to build and acquire new-to-the-firm productive capabilities’

It is observed that at the outset of each product move, KS took preparatory measures to acquire the technical knowledge needed to elevate its knowledge base to match the requirements of the new product or business model. In the SWP product, KS took a bold decision to abandon the American solution and invest in R&D capabilities to develop a better version of the SWP that matches local conditions and is easier to scale up in the future.

Table 18 Interview quotes under the code ‘Managed to build and acquire new-to-the-firm productive capabilities’

#	Interview Quotes	Interviewee
1	“The truth is that KS did not have any technical capabilities at all when it started.”	KS CTO
2	“In reality, those who had solar experience in the market were very few. We relied on teaching engineers and technicians from scratch. From one project to the other, capabilities accumulated, and today KS is considered a school for solar energy in Egypt.”	KS Director of R&D &Co-founder
3	“Engineers who design, implement, and maintain solar stations got their training in Germany, plus know-how from the CTO and technical manager who had solar experience.”	KS Director of R&D &Co-founder
4	“We took a managerial decision from the first project to send a team to learn about the commissioning of solar stations so that we do not have to rely on foreign expats. This is KS’s value-added in the value chain.”	KS Technical Manager
5	“We first used the American company's SWP product, but then we internally figured out a better way of executing.”	KS Director of R&D &Co-founder
6	“Not many companies imitated KS in the PPA [of hybrid stations], because other than KS, technical capabilities in the market are still weak, but it will improve over time.”	KS PMO Director
7	“It was by mere luck that we landed an outstanding R&D recruit. Much of KS’s success could be linked to him specifically. Because of him, our edge at the time was that KS is a technology provider, not only a solar integrator. ... He was very clever in basic research.”	KS Director of R&D &Co-founder
8	“To be able to move from small projects to megaprojects, we had to work on planning, procurement, cost and quality control [capabilities], so we formed a Project Management Office to work on them.”	KS PMO Director

When KS moved to hybrid solutions and building bigger solar PV stations, technical expertise was a hurdle the company had to overcome. The hybrid solution required different technical expertise

to design and implement from that of the SWP. At that time, this expertise was not easy to find in the Egyptian market. The manufacturing arm of an Egyptian state entity was first to bring the know-how to Egypt when they built the first solar station in 2009 for their own use. They invested heavily in acquiring technical know-how by sending a team of seven engineers to Spain to obtain full knowledge about designing, building, and operating hybrid solar stations. KS poached one of those engineers to fill the knowledge gap in building and operating high-capacity solar stations.

Regarding aligning people to the new strategy, one crucial code emerged from the interview data.

#### *8. Codes: 'Engaging culture' and 'safe environment'*

Regarding aligning people, interview data revealed two main codes under the 'engagement culture' that are worth elaborating on: the 'mix of intrinsic and extrinsic motives' and 'a safe space to challenge the status quo'.

Regarding intrinsic and extrinsic motives, the interviews revealed how KS management provided a mix of intrinsic and extrinsic motivation to achieve staff commitment and engagement. First, management defined the organisation's *raison d'être* in a way that is passionate and personal rather than rational and objective. Second, the company had a community-driven vision and a problem-solving orientation. These were especially attractive to job applicants who were seeking meaning more than job security since the start-up was offering modest salaries and uncertain career prospects at the time. Those who appreciated this vision and that orientation had a natural intrinsic motivation to innovate and tolerate uncertainty. Third, KS management employed extrinsic incentives to complement intrinsic motivation by giving employees the opportunity to be

shareholders in the company. “All our employees have shares in the company, giving them a direct stake in its survival and prosperity,” said the CEO.

This combination of vision and incentive structure created a culture of engagement and commitment. “The core team did not have an employee mentality,” said the Director of R&D, who added, “The first critical factor of our success, I think, is the commitment of our core team...For instance, we were attending important trainings abroad from out-of-pocket.” She added “People [Staff] were contributing to the company without expecting to be compensated.”

Table 19 Interview quotes under the code ‘Engaging culture’

#	Interview Quotes	Interviewee
1	“This company represents the middle class.... [They] are the best employees you will ever find. However, they never own anything. We wanted to make KS a place the middle class can own and use to express themselves.”	KS CEO & Co-founder
2	“All our people [employees] have a direct stake in this company surviving and prospering. They buy shares in the company.”	KS CEO & Co-founder
3	“They were a team of seven. They all faced the challenge of coming up with a solution for a problem [SWP for deep wells] that worldwide, did not have an off-the-shelf solution yet. I was hooked.”	KS Former-R&D specialist
4	“I decided not to go to Schlumberger and join KS instead, although the salary difference was huge. But the value I saw in KS was bigger.”	KS Former-R&D specialist
5	“At the beginning, we had a social objective to serve the community. We could carry out projects for community service, not for profit. Now everything has to make economic sense.”	KS CTO
6	“We were paying low salaries. Sometimes we even had problem in paying salaries. But people chose to stay because they were learning.”	KS CTO
7	“We all have a shared commitment to make and lead the market.”	KS Technical Manager
8	“The core team subscribed to a vision, not financial security.”	KS Financial Analyst

Founders wanted to show that KS, though smaller and newer to the industry, could beat the established industry leaders. Shared values provided a deeper meaning to organisational members,

and acted as a compass that allowed for flexibility in reconfiguring business models. In sum, besides, the mechanics of incentives alignment, KS’s top management built both aspirational and emotional images that became sources of commitment and engagement.

Besides motivation, the interviews reveal that founders were deliberate in making the organisation a safe space to ‘fight’, i.e. challenge, speak up, contest each other’s viewpoints, and propose novel courses of actions.

Table 20 Interview quotes under the code ‘Safe environment’

#	Interview Quotes	Interviewee
1	“[KS] is a secure place to work in.”	KS CEO & Co-founder
2	“I founded a culture where anyone can say anything no matter how ridiculous it is.”	KS CEO & Co-founder
3	“Some people, you feel, are in life to fight. They want to fight, they like fighting. All they need is a safe place, and we give them a safe place to fight.”	KS CEO & Co-founder
4	“It’s an amazing thing to have fights. Fighting [heated discussions] is not a problem. The problem is that in the Egyptian culture, the first fight [argument] is the only fight, meaning when people fight it takes only one fight for them to break [apart].”	KS CEO & Co-founder
5	“This type of people [fighters] are the ones who push back existing systems, break them, and innovate.”	KS CEO & Co-founder
8	“A critical success factor is the CEO's strategy to instigate a ‘conflict’ by coming up with ideas that ‘are not doable’ far-reaching, and sometimes not even logical, and through these healthy conflicts, we on the other side push for something pragmatic, and so we end up with something that is forward-thinking.”	KS Director of R&D & Co-founder
9	“The CEO coming up with far-reaching ideas was key to end up with something very forward-looking and also implementable.”	KS Director of R&D & Co-founder
10	“We as management committed ourselves to accept people to mess up. We give people the space to mess up.”	KS CTO

First, in the recruitment process, executives were looking for those with a ‘fighting spirit’ because, as the CEO put it, those are the ones who would “push through existing systems and break rules.” Second, interviews revealed that the CEO used provocative ideas and far-reaching goals to encourage members to challenge him, and speak their minds openly without fear of retaliation, or of losing face in a collective process. That personal safety and mutual respect allowed team members to reveal their deeper motives and concerns, which enhanced their ability to make clear collective commitments needed to shake up and transform the status quo.

### *Summary*

It is worth recapping the case in a few sentences to set the stage for the cross-case analysis in Chapter Eight. The technological change represented in the drop in prices of the solar PV panels in 2010 opened up an opportunity for Egyptian energy solutions providers to use abundant Sun radiation in Egypt and create a solar PV market. The opportunity involved a high level of uncertainty due to many unknowns regarding demand and supply coinciding with unfavourable institutional conditions.

Emergent codes show that KS founders deliberately chose an opportunity with low level of predictability to give them a clear first mover advantage. In implementing this strategy, KS made a long-term investment in market experimentation, building, and accumulating capabilities, and relied on an engagement culture to encourage participation, commitment and active learning.



## 7 Case Three: High Voltage Power Cables

Established in the nineties of the last century, EN Power Cables, a leading producer of low voltage (LV), medium voltage (MV), high voltage (HV), and extra high voltage (EHV) power cables, is an affiliate of EN Group, a multi-discipline business group with diversified business operations in manufacturing, distribution, turnkey projects in power & telecommunications field. With a turnover exceeding \$1 billion and manpower of over 2500, the business group has lately diversified into cement, real estate, food, education, and financial services (BASEC, 2021).

We conducted six qualitative interviews with executives and middle managers in EN between March 2020 and February 2022 (see Appendix D-Table 37 for a list of interviewees). Interview data has provided three types of information: first, an overview of the HV industry in terms of industry economics, market, competition, and regulations; second, descriptive details of the opportunity, EN' response, and the outcome; and third, stakeholders' accounts of how they perceived the opportunity, their intentions and objectives, and what shaped their exploiting behaviour.

The following sections are organised along the following lines. Section One provides a background on the HV technology and industry, Egypt's industrial context, and the two HV opportunities under study. The data sources of this section are mainly industry papers, government documents, international agencies' documents, and interview data. Section Two uses interview data to describe in detail EN's strategic response. Section Three develops an initial within-case analysis using the micro-foundations of the dynamic capabilities framework (sensing, seizing, and reconfiguring) as three phases of opportunity exploitation and using theoretical coding as the analytical technique.

## 7.1 Background and Opportunity

This section briefly describes the industry, the specifics of Egypt's context, and the two opportunities that opened up exogenously, eliciting industry firms' strategic responses.

### 7.1.1 Industry Background

Power cables are categorised under low (LV), medium (MV), high (HV), and extra-high voltage (EHV) types. HV and EHV transmission lines typically carry electricity from where it is generated to where it is consumed. They are mainly used in long-distance transmission since they are more efficient than lower voltage lines. The idea behind efficiency is that electrical power is related to the product of voltage and current in a transmission line. The HV lines deliver the same amount of power by increasing the voltage and reducing the current, thus minimising the energy wasted from the resistance of conductors. Power plant transformers boost the voltage before sending electricity through three lines called phases. The widely used HV transmission line is the overhead transmission. The three lines are strung overhead on towers high enough to avoid contact with trees and human activities and to keep enough distance between each line so that electrical arcs do not form between them.

High Voltage (HV) and Extra High Voltage (EHV) power cable is a major backbone of the electric system. They are considered sophisticated products. Many countries worldwide are fully or partially dependent on HV and EHV importation (Apaydin et al., 2012). The reliability and safety of the transmission system essentially depend upon the quality of the cable. The higher the voltage, the greater the need for efficiency and safety. If a high-voltage cable fails, it can be disastrous. Therefore, choosing a cable brand with suitable references for manufacturing excellence and

reliability is of the utmost importance. The HV and EHV product specifications are standardised worldwide, and suppliers obtain certification from internationally recognised testing centres, like Kema in The Netherlands and The British Approvals Service for Cables (BASEC) in the UK, that their products meet international standards.

### *Industry Economics*

The internationally certified HV cable could be considered a homogeneous product where quality plays a role in bid qualification but does not play a role in winning contracts. In international competitive bids, suppliers mainly compete on price, delivery time, and service. One industry informant said, “Since all [bidders] have international certification of quality, the competition is mainly on prices and delivery.”

Worldwide, copper cable producers have comparable direct costs due to the fact that the copper power cable product is a special case in terms of scale effect on input materials cost. Three input materials that make the bulk of the variable cost of the high voltage cables, and power cables in general, are copper, lead, and aluminium. Since those primary goods are global commodities, they are sold through an international metal exchange index, and prices do not change much with bulk purchases. Therefore, China, which usually enjoys unbeatable bargaining power with input suppliers, does not have an absolute advantage in power cable production, except in the aluminium segment because, as per EN’s technical manager, sources of aluminium are close to China and its shipping, and transportation are costly. For copper cable products, which account for the bulk of market demand, producers could compete with Chinese rivals, and cost differences would typically not exceed 1-3% between any two manufacturers worldwide, as per EN’s technical manager. On

the other hand, idle capacity and target margins are key factors that influence each company's bidding price and delivery time in tenders other than operational efficiencies. Those two factors differ from one company to another and from one project to another.

### 7.1.2 Egypt's Industry Context

The copper cable industry is one of the oldest industries in Egypt. It goes back to the 1930s. Producers started with electric wires and then moved to telecom and power cable production. While LV and MV have multiple buying segments, including consumers and construction companies, the HV and EHV cables have only one customer, the state-owned Egyptian Electricity Holding Company (EEHC) and its several regional Electricity Distribution Companies (EDC). EDCs purchases usually take place through public tenders, in which product specifications are standardised. A prerequisite to applying for EEHC tenders is to obtain a license from the Research and High Voltage Testing Laboratory affiliate of the Ministry of Electricity and Energy. As of 2020, only three companies obtained this license. According to one informant, other companies working in MV and LV tried to obtain the HV license but were unsuccessful. As a result, the HV cable market is considered an oligopoly. Given product homogeneity, competition is mainly around price and delivery time, with tacit collusion to avoid driving prices down.

In terms of production capabilities, the government, being the sole buyer, has played an essential role in the capability building of HV producers in Egypt by adopting international product specifications in all its tenders. HV producers invested in acquiring, building, and continuously upgrading technical capabilities to meet international standards. According to one company

executive, “There is no difference in quality in the local market versus foreign markets...we already apply international standards in all of our production lines.”

Regarding policies that affect the industry, government procurement laws stipulate that Egyptian contractors are accorded priority if their bids do not exceed the lowest foreign bid by more than 15% (Doing Business in Egypt, 2016). According to one top executive, “This 15% is more than enough to win contracts against the Chinese”. This law effectively closed off the Egyptian market to foreign cable producers since its enactment in the 1990s. However, the electricity company recently started using legal loopholes to avoid applying preferential treatment. This had a tremendous impact on local producers, as will be detailed in the case.

Regarding trade policies, customs regulations promote exporting by allowing exporters to import input materials without duties if they are to be re-exported within one year as part of a final product. Known as the ‘drawback system’, exporters initially pay full customs duties upon entry and later reclaim the full amount as well as other select taxes, such as the sales tax (*Export.Gov*, 2019).

### *The Competitive Landscape*

As of 2020, there were 12 power cable producers in LV, MV, and HV segments in Egypt; six of them were considered major producers. The market share leader in all cable ranges is the producer (S), with a market share of 40% in HV, 40% in MV, and 60% in LV segments. Out of the 12, only three producers had licenses from the Ministry’s test lab to bid in HV and EHV tenders. In 2021, two more companies managed to obtain the license. With a 50% market share, EN, the case company, was considered the market leader in the HV and EHV segment.

As detailed earlier, the enactment of the preferential treatment law in the 1990s effectively closed off the Egyptian market to foreign cable producers. However, the electricity company recently started using legal loopholes not to grant preferential treatment to Egyptian producers. As a result, Chinese companies started to compete with Egyptian producers over HV tenders from 2019 onwards. Chinese producers do not have an unbeatable cost advantage in the copper cable product since they have to buy most of the input materials at almost the same price as smaller-scale producers. Nevertheless, the competitive landscape has changed significantly with Chinese entry, as Egyptian producers saw their HV market shares shrink and profit margins squeezed as a result of intensified competition.

### 7.1.3 The High Voltage (HV) Opportunity

#### *The Volume Exportation Opportunity*

With a sizeable and highly concentrated local market and accumulated technical expertise on par with international players, trade agreements became a crucial factor in the formula to enable Egyptian cable producers to expand internationally and compete with Chinese and other low-cost rivals.

Egypt has signed a wealth of bilateral and regional trade agreements that give an advantage to Egyptian exporters in many markets. Bilaterally, Egypt signed a Free Trade Agreement (FTA) with Turkey on 27 December 2005 in Cairo, which entered into force on 1 March 2007. Under this FTA, customs duties applied by Turkey on industrial goods originating in Egypt are abolished. (*Republic of Türkiye - Ministry of Trade, 2007*).

Regionally, on 25 June 2001, Egypt and the 15 European Union member states signed a partnership agreement in Brussels to gradually establish a free trade area over a transitional period that does not exceed 12 years from the agreement's entry into force. On 1 January 2004, the agreement entered into force and applied to industrial, agricultural, and processed agricultural products (*Agreement in the form of an exchange of letters*, 2003). Regarding industrial products, all industrial imports into EU member countries originating in Egypt are allowed free of customs duties or any other charge. Rule of origin (ROO) requirements of the agreement stipulate that local content accounts for at least 60% of the final product. (EU Trade Relations with Egypt, 2022).

On 27 January 2007, the EFTA states (Iceland, Liechtenstein, Norway and Switzerland) signed an FTA with Egypt in Davos, Switzerland. The agreement, which came into force on 1 August 2007, covers trade in industrial and basic agricultural products. Since its enactment, Egyptian industrial exports into the EFTA States have been duty-free, while customs duties applied by Egypt on the industrial goods originating in EFTA were to be abolished gradually until 1 January 2020 (Egypt Free Trade Agreement Enters into Force, European Free Trade Association, 2007).

Regionally, Egypt is a member of The Common Market for Eastern and Southern Africa (COMESA), which is a free trade area with 21 member states<sup>9</sup> and a combined population of 430 million people. All commodities between member countries are duty-free if they have a minimum local value-added of 45%. In 2008, COMESA agreed to an expanded free-trade zone, including

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<sup>9</sup> Nine members states formed a free trade area in 2000 (Djibouti, Egypt, Kenya, Madagascar, Malawi, Mauritius, Sudan, Zambia and Zimbabwe), with Rwanda and Burundi joining the FTA in 2004, the Comoros and Libya in 2006, Seychelles in 2009 and Tunisia and Somalia in 2018.

two other African trade blocs, the East African Community (EAC) and the Southern Africa Development Community (SADC).

“Trade agreements make a big difference. For instance, outside COMESA we do not have a competitive edge because the Chinese 'mince' prices, and we cannot compete.” EN’s CCO

Last, a free trade zone between Egypt, Jordan, Tunisia and Morocco, offering member states tariff- and quota-free access, and a ROO advantage, came into force in 2006 and 2007.

These FTAs, especially the regional ones, like the Mediterranean, EU and COMESA trade agreements, provide a significant advantage. First, FTAs offer Egyptian producers a price advantage in these markets over low-cost competitors like Chinese and Indian producers. Second, it offers Egyptian producers an opportunity to scale up production to reach a scale comparable to the Chinese eventually and compete with cost leaders outside the FTA zones.

Concerning the HV segment specifically, on the back of these trade agreements combined with export promotion laws, Egyptian HV cable producers are in an advantageous position to explore expansion into markets in Europe and Africa. Concerning exporting to Europe, Egyptian exporters have a cost advantage since they are exempt from most tariffs, and geographical proximity gives them a delivery time of three weeks (fast track) versus two months for Chinese exporters.

When exporting to Africa, the FTA advantage is twofold. First, zero customs on exports to COMESA “gives [Egyptian HV exporters] a 20 - 30% price advantage over the Chinese”, stated one informant. Second, exporting in high volumes yields cost-minimising advantages, including bulk purchasing and scale economies improving overall profit margins in the long run. Moreover, “Egypt has a reputation regionally and globally of high quality in power cables in general and HV



in specific. “So even when there is price parity with Chinese and Indian, the African customer chooses the Egyptian,” explains EN’s Africa export engineer. Additionally, Egypt has a delivery time advantage. Chinese and Indian models rely on mass production and long runs, and their pipelines are typically backed up, making it difficult to offer competitive delivery times to African customers who usually give weight to earlier delivery. “What they [the Chinese and Indian] deliver in 16 weeks, I can deliver only in 8 to 10 weeks”, added the Africa export engineer. On the other hand, as stated by one industry expert, the key obstacle to increasing exports to Africa is “payment terms”. “Obtaining insurance on credit facilities offered to the customer is expensive in Egypt, and claim procedures are lengthy and tedious”. Without credit insurance, EN “demands 100% down payment, which is a burden on the customer. Meanwhile, Polish exporters get credit insurance and can offer 90-120 days payment facility.” The same case with Chinese and Indian exporters.

In sum, a full-fledged expansion into free-trade regions represented a clear opportunity for cable producers, especially in the HV segment, to achieve profitable sales growth in the short-term and increase returns to scale in the medium to long-term. At the same time, the opportunity required investments to increase capacity, obtain international certifications, and hire and deploy international sales personnel. The risks involved were mainly financial (credit and payment risks) and political hazards in the African markets.

### *The EHV 400 kV Cable Opportunity*

The 400 kV is a sophisticated cable that only a few companies worldwide produce. Electricity companies in the Middle East used to rely completely on foreign producers from outside the region to supply this cable. Only a few producers outside the region produce this cable. For instance, a

huge market like India relies on importing the EHV cable since no local producer produces the 400 kV cable range, as per EN CCO. Inside the region, there is demand for the cable in many countries, especially in Saudi Arabia. Due to the absence of competition from local producers, European suppliers win the EHV contracts in Saudi Arabia with high margins. Although the Saudi government tenders law gives preferential treatment to local producers in power cable tenders, there were no local producers that produced this cable.

On the other hand, Egypt has a reputation for high expertise in the power cable industry. According to EN CCO, technical expertise is one of Egypt's areas of strength in the HV and EHV sector due to the accumulated capabilities over thirty years in this industry. He added, “We [in Egypt] have the best expertise in this industry worldwide. When we go into [producing] a new product that is more sophisticated, we do not have a problem in finding the human expertise to take on the job.”

In sum, given the existing demand for 400 kV cable in the region and worldwide and the availability of the requisite technical expertise, producing and exporting the 400 kV cable represented an opportunity for Egyptian cable producers to expand their portfolio of products.

## 7.2 EN’s Strategic Response

### 7.2.1 Limited Export Profile Model

EN Power Cables added the HV product range to its portfolio in 2005 when it acquired another Egyptian company specialised in the HV cable range. EN offers underground cables up to 220 kV and overhead transmission lines up to 400 kV in the HV and EHV segments. EN has HV

production facilities in Egypt and Saudi Arabia, and they are among the most advanced in the region.

As detailed in Section 7.1.3, FTAs offered EN an opportunity for sales and profitability growth in the HV sector. EN has the required technical capabilities and expertise to meet international standards since international standards are already applied in local government purchases. Second, the sizeable and highly concentrated local HV sector enabled EN to operate within an efficient production scale and achieve profits high enough to cover its fixed costs.

Before 2011, EN adopted a conservative export approach to use its idle capacity. "Utilisation rate of the factory affected the targeted export size and margin because I wanted to fill the idle capacity", said the CFO. EN selected projects with low payment risk and expected high margins within this conservative approach. Applying this strategy until 2011, EN managed to win supply and turnkey contracts in Tunisia, Morocco, South Africa, and Zambia.

The January Revolution in 2011 led to a political void and economic instability that lasted for two years. "Companies in power, construction and oil & gas sectors all depend on government contracts in their business," said EN CFO. He added, "The government did not undertake any project for almost three years... We had a huge financial crisis." Given these conditions, EN moved to export as an alternative revenue source to keep operations running. "We entered two HV bids in India in 2011 and 2012 and won both of them, beating local producers," said the CCO. EN had a low utilisation rate at that time, and the objective was to win with any profit margin to cover fixed costs. "We won because we were aggressive in pricing," said EN CFO.

Once a new regime came into power in 2014, the government enacted an accelerated plan to undertake delayed infrastructural projects. The plan created a spike in power projects, so EN refocused its working capital on the local market. EN's CCO stated:

“In 2014, the government set an accelerated plan to carry out delayed expansions and maintenance of the power grid. This caused a boom in projects and a spike in the company's revenues.”

However, the economic downturn between 2011 and 2013 has significantly caused an acute shortage in foreign currency reserves, and by 2016, the Central Bank of Egypt (CBE) capped foreign currency disbursements to businesses and individuals. During that time, EN had major government contracts under implementation and more in the bidding and contracting phases. The difference in the exchange rate between the unavailable official market and the black market reached almost 100%. This difference meant that projects costs could double, leading to significant losses for EN. EN's management decided to export to international markets to source their foreign currency needs instead of the black market. According to the CFO:

“The main reason we went for exporting [at the time] is that we had a problem sourcing foreign currency to cover our input purchases. There was a big difference between the [inaccessible] official rate and the black market rate. The difference was so big that it could ruin me financially... This is our main reason, and it is a critical reason.”

In November 2016, the CBE floated the Egyptian pound in a move that reduced its value by almost 50% against the US dollar. The floatation triggered a new set of challenges: soaring inflation and rising borrowing costs. Manufacturers, like EN, who relied on imported inputs, saw their working

capital fall by as much as half. “People are borrowing for working capital, but the risk does not justify a long-term capital investment. You have to be making sustainable profits in the order of 30-35% in order to take loans at 22-24%,” said the managing director of an investment bank (Saleh, 2017). Even if EN had plans to export more aggressively at the time, the macroeconomic situation might have given it a good reason to put any expansion plan on hold.

### 7.2.2 Volume Export Strategy Model

The explosive growth of infrastructural projects in Egypt between 2014 and 2018 in several sectors, including power and construction, resulted in record revenues and profits for power cable companies. However, this wave of infrastructural projects ended in 2018. To maintain the level of revenues and profits, EN decided to seek export markets for the third time. This round of exporting was especially aggressive and came as part of an overall strategic re-orientation. The reason, as per EN’s CCO, is the entry of Chinese and Indian firms into government tenders after the electricity company practically stopped applying the preferential treatment previously given to Egyptian producers. This was a major blow to EN and other local cable producers. On this, the CFO stated:

“I am going out [exporting] now because the local market is not covering fixed costs anymore. I am out to cover fixed costs. Any margin over materials will contribute to this goal. As long as price covers variable cost, I am not losing”.

In this wave of exportation, EN targeted both EU and COMESA markets for the first time. As a preceding step, in 2019, EN Cables obtained BASEC product certificate, a requirement to apply in the UK and other foreign markets. EN managed to win competitive bids in LV, MV, and HV

ranges in Europe and East Africa in less than a year despite fierce competition with Turkish, Chinese and South African rivals. Although margins were squeezed in export contracts to “2-3% materials plus”, EN’s strategy is to maximise sales volume; “to reach an export scale big enough to cover part of fixed cost, so as not to depend [totally] on the local market as before” said EN’s Vice-Chairman. He added, “I will focus on exporting to Africa. My personal objective is to export 60% of my production to Africa. Today it is less than 30%.”

### 7.2.3 The 400 kV EHV Upgrade

EN decided to invest in a capability upgrade to produce the 400 kV EHV cable in its manufacturing facility in Saudi Arabia, where the Saudi state electricity company announced procurement plans that included substantial demand for 400 kV cable in the following years. The 400 kV is a sophisticated cable that only a few companies worldwide produce. According to the Vice-Chairman, EN decided to make this upgrade on the back of the supply glut in the Gulf markets leading to a price burnout in all lower power cable ranges. Incentivised by the protectionist Saudi tenders law, which gives preferential treatment to local producers, EN’s objective from the move was to compensate for the low margins in other ranges. EN also had an export opportunity for this cable in other markets. For instance, a huge market like India relies totally on importing the EHV cable since no local producer produces the 400 kV cable range, as per EN CCO.

To win any contract for the new range, EN had to make the required investment in capability building first, which was not significant since existing machinery could produce the new EHV cable with a minor adjustment in the HV production line. The investment was mainly required to obtain international certification for the new product to apply in Saudi Arabia’s tenders and abroad.

It took three attempts within two years to pass Kema's certifying test. This move made EN the first certified producer of 400 kV EHV cable in the Middle East.

To summarise, Egypt's signed FTAs in Africa, Europe, and the Middle East represented a clear opportunity for industrial producers to increase sales and overall profitability. Between 2008 and 2018, EN approached the export opportunity on a limited scale to fill idle capacity and tactically as a contingency plan for the local market, i.e. to compensate for any drop in local market business and as a source of emergency foreign currency. However, the waning government expenditure on infrastructural projects and the Chinese entry in 2018 onwards have led to a new situation where local volume and margins became insufficient to cover EN's fixed costs. As a result, EN was impelled to reconceive its strategy, abandon the conservative strategy that it has followed for more than ten years (2006-2019), and adopt a full-fledged export strategy to reach an export contribution of 60% of EN's total production up from 30% in 2019. In less than two years, during the fieldwork, the strategy implementation seemed to make good progress as EN managed to obtain international certification for its products and open new markets for its HV and lower ranges cables in Europe and East Africa.

Regarding the opportunity to upgrade to the 400 kV EHV cable, EN already had the required resources in terms of human expertise and machines to produce the higher-margin sophisticated cable. These fungible resources were utilised to improve margins that suffered due to the supply glut in the Gulf market. EN managed to upgrade capabilities to produce the 400 kV EHV cable range and obtain Kema certification to be the first company to produce the cable in the region.

### 7.3 The High Voltage Case Analysis

In 2019, EN moved to exploit the two expansion opportunities of scale and scope that opened up in the HV segment, namely, exporting HV cables in large volumes to Free-Trade Agreement (FTA) regions in Africa and Europe and upgrading to the more sophisticated 400 kV EHV cable range in EN's Saudi manufacturing facility to serve the Saudi market.

Regarding the level of uncertainty involved in the two opportunities, it is observed that the HV cable market is well established with existing demand and supply, and vital information is available and accessible to all. Power cable demand is relatively stable since governments usually repeat their volume of purchases every year. On a transactional level, when tenders are announced in any geographical market, EN, and other cable producers, would be aware of who is likely to be competing for the contract, what their average prices are, the level of product quality, and delivery times they offer. Based on this information, EN decides whether to enter the bid or not, depending on its price advantage and idle capacity. On the supply side, the four main components that make the bulk of the cost of input materials are commodities with global prices, giving little advantage to the Chinese, and other low-cost producers, in competing for contracts (see Section 7.1.1). On the other hand, unless addressed in the contract's terms, there is a major risk of input material price fluctuations in global markets. Given these conditions, the two HV opportunities involved a relatively low level of uncertainty since both demand and supply existed and were relatively stable, and the opportunity was more about matching existing demand with existing supply (Sarasvathy et al., 2003).

As detailed in Chapter Three, we used the sensing, seizing, and reconfiguring phases to unpack the data on opportunity exploitation. In analyzing the data, we followed a bottom-up coding



approach, in which interview transcripts were reviewed line by line, highlighting passages that shed light on the phenomenon and assigning codes to these passages. The highlighted passages and assigned codes are included in the analysis below to provide transparency about the interpretations made during this process.

### 7.3.1 EN's Capability of Sensing the Opportunity

#### *1. Code: 'Passive and defensive sensing of opportunities with uncertain rewards'*

Egyptian producers were well aware of Egypt's signed trade agreements and the export advantages these agreements provide, especially at the regional level, like the Mediterranean, the EU and COMESA FTAs. Interview data revealed that profitable export opportunities were also abundant outside FTA regions, albeit with thinner margins. For EN, and other Egyptian industrial producers, exporting in large volumes to FTA and non-FTA markets promised economies of scale that would yield higher overall profits in the long run. Between 2005 and 2019, EN used exporting on a limited scale as a source of a foreign currency or as a way of increasing utilisation. According to the CFO, they did not think of going for a mass importation strategy to make full use of the signed FTAs. Likewise, the 400 kV cable upgrade opportunity seemed a high return investment since there was no local producer for this product in Saudi Arabia at that time, and the Saudi government law gives preferential treatment to local producers in tenders. At the same time, machines and expertise required for the upgrade were available in EN's Saudi factory. Nevertheless, in both cases, EN passively sensed these opportunities and preferred to stay focused on the local market in Egypt and the existing product portfolio without change in the Saudi market.

Under crisis, EN shifted from a passive to a defensive strategy when local market contracts and margins took a dive and no longer covered EN's fixed costs. In other words, the volume exportation opportunity became strategic only when the local market became less rewarding in terms of sales and margins due to the slow-down of the government projects in Egypt and the entry of Chinese players from 2019 onwards.

Table 21 Interview codes under the code 'Passive and defensive sensing of opportunities with uncertain rewards'

#	Interview Quotes	Interviewee
1	"We were late in entering COMESA markets."	EN CCO
2	"There is a two-way FTA with Turkey. But we did not make use of it."	EN CCO
3	"The main reason we went for exporting [in 2015-2016] is that we had a problem sourcing foreign currency to cover our input purchases. There was a big difference between the official and black market exchange rate. The difference was big enough to ruin me [financially]...This is my main reason and it is a critical reason."	EN CFO
4	"We have a big problem now in the local market because of the Chinese. The Chinese are now awarded overhead [HV] power cable contracts. They import everything from China, and it is still cheaper than me because of their huge production scale."	EN CCO
5	"I am going out [exporting] now because the local market does not cover my fixed costs anymore. I am going out to cover fixed costs. Any margin over materials will contribute to this goal. As long as price covers variable cost, I am not losing, and any margin achieved will contribute to covering fixed costs."	EN CFO
6	"I will focus on exporting to Africa. My personal objective is to export 60% of my production to Africa...so as not to depend solely on the Egyptian market."	EN Vice Chairman
7	"The Gulf market is weak and idle capacity is high, so producers are burning prices like crazy in all cable ranges. That made us think about new high-margin niche products. That's why we decided to produce the 400 kV cable."	EN Vice Chairman

The same response, switching from passive to defensive sensing, took place with regard to the 400 kV cable upgrade opportunity. According to the vice-chairman, EN decided to make this upgrade

on the back of the supply glut in the Gulf markets that led to price burnout in all lower power cable ranges. Incentivised by the protectionist Saudi government's tenders law, which gives preferential treatment to local producers, EN's objective from the move was to compensate for deteriorating margins in other ranges. Interview passages in Table 21 convey the shift from passive to defensive sensing in dealing with the two opportunities.

2. *Code: 'Avoiding loss more than seeking gain'*

Scaling up exports to the EU and COMESA markets came as EN's defensive strategy in crisis to cover fixed costs and gradually restore previous profit levels. Before the crisis, EN was in a better position to exploit the mass exportation opportunity since the local government purchases were sizeable enough to meet the minimum production levels required to cover fixed costs. EN would have been able to compete in international tenders with aggressive prices "without worrying about covering fixed costs" and penetrate multiple geographical markets. However, EN did not exploit the opportunity then. Instead, it resorted to exporting on a limited scale as a contingency plan to compensate for any drop in local market business and as a source of emergency foreign currency. The shift in strategy came only in 2019 when EN moved from a conservative export strategy to a full-fledged internationalisation to reach an export contribution of 60% of EN's total production, up from 30% in 2019. The shift in strategy was less related to growth in external demand and more to losses incurred in the local business model. The same attitude could be observed in EN's operations in the Saudi market. EN moved to upgrade its capabilities to produce the high-margin 400 kV EHV in crisis. It could be argued that seeking gains in the pre-crisis times did not trigger exploitation. Loss and fear of more loss encouraged EN to be more risk-taking and adopt a longer-term strategy. In addressing different expansion opportunities, EN was motivated by loss

avoidance more than seeking gains. This explains the passive sensing of the opportunity that later shifted to defensive sensing, as discussed in the previous code. Interview quotes in Table 22 show how loss aversion fuelled this shift from a passive to an active approach to exploiting opportunities.

Table 22 Interview quotes under the code ‘Avoiding loss more than seeking gain’

#	Interview Quotes	Interviewee
1	“The preferential treatment law is not applied anymore [in Egypt].”	EN CCO
2	“I am going out [exporting] now because the local market is no longer covering my fixed costs. I am going out to cover fixed costs.”	EN CFO
3	“I am exporting in big volume now but without profit, just a 2-3% materials-plus...I am unable to make a margin [to cover fixed cost] locally, so I am exporting in volumes to achieve margin on scale.”	EN Vice-Chairman
4	“My plan now is to increase export volumes to cover part of fixed costs, and not rely on the local market.”	EN Vice-Chairman
5	“The Gulf market is weak and idle capacity is high, so producers are burning prices like crazy in all cable ranges. That made us think about new high-margin niche products. That's why we decided to produce the 400 kV cable.”	EN Vice-Chairman

### 7.3.2 EN’s Capability of Seizing the Opportunity

#### 3. Code ‘Short-term profit-maximising orientation’

Regarding the volume exportation opportunity, interview data showed that export opportunities were abundant inside and outside FTA regions. Nevertheless, EN initially conducted exporting on a small scale to fill idle capacity and mitigate local market contingencies. The alternative of investing in capacity expansion to pursue a mass exportation strategy was not considered. Several possible reasons could be proposed based on interview data.

A high concentration market and homogeneous product mean that capacity expansion in Egypt’s factory would automatically bring EN’s prices down in the local market since idle capacity is the

major factor in deciding EN's bidding prices, as explained by EN's CFO. At the same time, EN would not benefit from such a price drop since other players would have to drop their prices too, as is usually the case in oligopolistic markets with a homogeneous product. The overall price drop would only lead to the shrinkage of local market revenue with major losses to EN and other local producers (the kinked curve effect). Even if added capacity would be filled gradually with export sales, the damage would already be inflicted on the local market since prices are not likely to bounce back to previous levels. If that is the case, from EN's view, a capacity expansion of HV lines in Egypt's factory, even if it targets export markets, may signal and eventually trigger a price war in the local market. The vice-chairman hinted at this vicious industry dynamic when he stated that new players who entered the lower ranges segments of the cable industry—MV and LV—dropped their prices, “something which has inflicted losses to all other players”, because the cable product, especially the lower ranges, is homogenous.

The second possible reason is related to behavioural economics more than microeconomics. The local industry was organised in a way that yields premium rewards to players without taking a high risk. Relatively small investments are made to fulfil contracts and incurred after contracts are secured. This short-term high-reward low-risk combination the local market offered represented the benchmark against which EN management assessed other opportunities in terms of profit margins, risk and speed of return. That is to say, the local market model represented the baseline or reference point, below which growth opportunities were not perceived as opportunities. This ‘unreal’ reference point of the local market, which was artificially constructed by Egypt's protectionist policy and regulatory entry barrier, has probably influenced decision-makers' general expectations and decisions concerning which new opportunities to pursue. Outside the local market, a high-margin low-risk reward is an expectation that real-world opportunities subject to

international competition can hardly meet. From this lens, a capacity expansion targeting volume exportation might have yielded higher margins than the focus on the local market in the long run. However, that alternative was more uncertain and required a longer-term investment in capacity, international sales, and certifications, compared to the local market focus. When asked about a capacity upgrade to tap into the opportunity of mass exportation, EN's CFO answered that "waiting 6-7 years to return such an investment is too long". This attachment to the local market conditions may have entrenched a satisficing attitude that could explain EN's initial response to the volume exportation opportunity. It is fair to say that the industry set-up partially induced EN's satisficing attitude.

Like the volume exportation opportunity, the 400 kV upgrade opportunity in EN's factory in Saudi Arabia was also exploited under crisis conditions, not earlier, although the investment required was not significant given the availability of the production machines and the high potential reward expected given the protectionist government policy in Saudi Arabia. However, the upgrade required an investment, albeit not significant, to be made in machinery adjustments, training, and certifications before any contract could be secured. This is considered a deviation from the strategic norm of EN, namely leveraging existing assets and capabilities and making small investments to implement projects after contracts are signed.

In sum, existing businesses were characterised by low-risk, short-term investment, and high margins. On the other hand, despite promising higher margins in the long run, the two opportunities involved higher risk and longer payback periods than existing operations. EN, with a short-term profit-maximising orientation, acted passively towards the opportunities because it lacked the incentive to allocate resources to longer-term ventures. Short-termism in this strategy did not give way to pursuing growth opportunities that would achieve a return on scale and better

overall profits in the long run. When the high margins of the local market came crashing with the Chinese entry into the Egyptian market, and when the supply glut in the Gulf markets squeezed EN margins in KSA, EN changed its attitude and became active in pursuing the two opportunities. The interview quotes below show the short-term orientation in profit-maximising that led to the delay of opportunities exploitation up until the crisis.

Table 23 Interview quotes under the code ‘Short-term profit maximising orientation’

#	Interview Quotes	Interviewee
1	“Without any exaggeration, we have export opportunities everywhere in the world.”	EN Export Engineer
2	“Utilisation rate of the factory affects the decision to export and its size because I want to fill the idle capacity.”	EN CFO
3	“It is hard to increase capacity for export [purposes] because the market now is 'sleeping' [bearish] because of Corona [COVID-19]...and even before that, global market growth was slow, and no one would make capital investment and wait for payback after 7-8 years.”	EN CFO
4	“I am going out now [exporting] because the local market is not covering fixed costs anymore. I am out to cover fixed costs. Any margin over materials will contribute to this goal. As long as price covers variable cost, I am not losing, and any margin achieved will contribute to covering fixed costs.”	EN CFO
5	“I am now exporting in big volumes but without profit, just 2-3% materials plus...I am unable to make margins [to cover fixed cost] locally, so I am exporting in volumes to achieve margins from scale.”	EN CFO

### 7.3.3 EN’s Capability of Reconfiguring Resources

#### 4. Code: ‘Managed to build new-to-the-economy productive capabilities’

The previous section analysed EN’s underutilised economies of scale. This section focuses on underutilised economies of scope (Penrose, 1959; Teece, 1982).

EN has significant accumulated capabilities in producing HV power cables that meet international standards. It possesses bundles of fungible resources that could be deployed to produce a variety of final products. As highlighted in Section 7.1.3, the 400 kV is a sophisticated cable serving a niche market. Electricity companies in the Middle East used to rely completely on foreign producers from outside the region to supply this cable since no regional producer was producing that cable before EN's move. Producing the cable represented an opportunity for EN to tap into a niche segment with less intensive competition and higher margins. EN, more than other Egyptian producers, was in a good position to exploit Saudi Arabia's 400 kV demand. EN already had a production facility in Saudi Arabia, a market that has demand for the 400 kV cable more than the Egyptian market and, at the same time, offers preferential treatment to local producers. EN also had an opportunity to export this cable to other markets since, according to EN's CCO, many other countries have demand for the cable and do not have enough production capacity to meet that demand.

On the back of the supply glut in the Gulf markets that led to a price burning in all lower power cable ranges, EN decided to invest in a capability upgrade to produce the 400 kV EHV cable in its manufacturing facility in Saudi Arabia. According to the vice chairman, EN's objective from the move was to compensate for the low margins in other ranges. In order to bid for a 400 kV contract, EN had to make the required investment in capability building first, which was not significant since the existing machines could produce the new EHV cable with a minor adjustment in the HV production line. The investment was mainly required to obtain international certification for the new product to apply in tenders in Saudi Arabia and abroad. It took three times within two years to pass Kema's certifying test. With this move, EN became the first certified producer of 400 kV EHV cable in the Middle East, according to EN's Vice Chairman.



It is observed that only under crisis conditions did EN decide to employ these underutilised resources and tap into this idle potential. It could be that Saudi Arabia’s demand for 400 kV was historically small and only started to pick up recently. However, the vice chairman explicitly stated in the interview that EN’s decision to invest in this capability upgrade came as a strategy to compensate for squeezed margins in other ranges on the back of the supply glut in the Gulf market. Interview passages below reveal EN’s fungible capabilities, resources and the reasons that instigated their capability upgrade move.

Table 24 Interview quotes under the code ‘Managed to build new-to-the-economy productive capabilities’

#	Interview Quotes	Interviewee
1	“Egypt does not have any problem in human expertise [in the cable industry].”	EN CCO
2	“Even human expertise in factories outside Egypt are also Egyptian...Most of the factories in the Gulf are operated by Egyptian engineers.”	EN CCO
3	“When we go into a new product that is more sophisticated, we don't have a problem in finding the human expertise to produce it.”	EN CCO
4	“We provide not only a competitive quality, we provide the best quality you can get anywhere in the world.”	EN Export Engineer
5	“The Gulf market is weak and idle capacity is high, so producers are burning prices like crazy in all cable ranges. That made us think about new high-margin niche products. That's why we decided to produce the 400 kV cable.”	EN Vice Chairman
6	“To produce the 400 kV cable, I already had the machines. I made some investment to adjust the machine to produce this new cable range.”	EN Vice Chairman

Regarding aligning people to the new strategy, one important code emerged from the interview data discussed below.

5. *Code: Conservative Culture*

Interviews revealed that export expansion targets were set and managed within the annual budget exercise. Meaning, the export sales personnel in the commercial department set international sales targets within the budget cycle based on their views of opportunities in export markets. According to the CCO, they tend to be conservative in their forecast, and by following this conservative approach, they managed to achieve the targets for five years in a row. It could be argued that, besides the short-term profit maximizing approach of management, detailed in Section 7.3.2, exploiting the export opportunity was also constrained at lower levels of the hierarchy by the general tendency to apply a conservative perspective to minimise personal risk. This culture of accountability (Weick, 1979), which promotes conservatism, has further constrained the company’s attitude towards the mass export opportunity.

Table 25 Interview quotes under the code ‘Conservative culture’

#	Interview Quote	Interviewee
1	“Every year, the management decides the [revenue] targets for local and foreign markets. They are all speculations. But we try to stand on solid grounds, not to be dreamers. So for instance, we have been meeting budget [targets] for the last five years.”	EN CCO
2	“We make a budget forecast based on the tenders we already know that it will take place in the budget year, because government purchases are usually recurring on yearly bases. Sometimes there will be new contracts expected but I don’t include them in the budget.”	EN Export Engineer

*Summary*

To set the stage for the cross-case analysis in Chapter Eight, we summarize the case analysis in a few sentences. The institutional change that took place between 1998 and 2007 in the form of Egypt signing a number of bilateral and regional free trade agreements has opened up an

opportunity for Egyptian industrial producers to scale up production and export in volumes to FTA destinations. The opportunity involved a low level of uncertainty since the HV market is well established, and both demand and supply are obvious. Risk is mainly related to global prices of input materials and payment risk. On the other hand, the sizable, protected, and highly concentrated local HV market has created conditions that yielded above-average profit margins for EN with low risks. Compared to the local market, volume export opportunity required long-term investment in capacity expansion, involved a higher risk of payment, and would yield a per-unit profit that is lower than what is currently achieved in the local market.

In the pre-crisis period, EN acted passively to the volume exportation opportunity. It focused on the local market that represented, from a short-term view, a lower-risk higher-margin business. Although the opportunity promised better profit margins in the long-term, EN adopted a satisficing rather than an optimizing strategy. However, under crisis, EN decided to pursue a higher risk strategy to restore its previous profit margins. In other words, EN was motivated more by avoiding loss than seeking gains. With regard to capabilities, EN managed to build new-to-the-economy capabilities to produce the 400 kV EHV cable in the Saudi market.

## 8 Analysis and Discussion

This thesis discusses case studies, in which three Egyptian companies exploited expansion opportunities, as a point of entry to the debate on sources of firm heterogeneity and nature and antecedents of dynamic capabilities. The discussion questions how firms in developing economies address expansion opportunities that open up exogenously in order to grow in scale and scope. In face-to-face interviews, questions asked were about how the three firms managed it, why, and with what outcomes. The research tracked not only the behaviour of decision-makers in dealing with opportunities at hand but also attempted to understand the minds and internal states of decision-makers, their intentions, expectations, and beliefs.

In Chapters Five, Six, and Seven, interview data and other secondary sources are used to construct and present an individual case narrative for each firm. These narratives describe the industry background, Egypt's context, the opportunity under investigation, the firm's background, product portfolio, and a chronological and detailed description of its strategic response to the opportunity. Consistent with the multiple-case analysis (Eisenhardt, 1989), the researcher conducted a within-case analysis for each case alone using an approach of emergent codes that is appropriate for the theory-building method (Eisenhardt & Graebner, 2007). This chapter represents the second step in data analysis. Section 8.1 is a cross-case analysis based on codes that emerged from the within-case analysis. Cross-case insights are then contrasted with extant literature in Section 8.2, and finally, a research synthesis is proposed in Chapter Nine.

## 8.1 Cross-Case Analysis and Insights

So far, data from each case has been analysed as a “stand-alone entity” (Eisenhardt, 1989, p. 540) in the within-case analysis section of each case chapter (see Sections 5.3, 6.3, and 7.3). In the within-case analyses, the codes that emerged from the data represent the main patterns and repeated ideas observed in each case. In this section, the codes of the three cases are analysed across cases. The aim is to identify and describe differences in firms’ behaviour in addressing expansion opportunities with evidence from the cases, formulate key insights that capture the hallmark of differential behaviour, and propose potential factors that could enhance the strength of exercised dynamic capabilities in exploiting business opportunities.

The cross-case analysis revealed four main areas of comparison (dimensions). The first is the role of inner drives (emotions, motivations, and predispositions) in motivating action (or inaction) in the three cases. The second is the role of productive capabilities in influencing the exploiting action and its outcome. The third area is related to the search and discovery of market information and alternative courses of action. Lastly, the fourth is related to how firms engaged with unknowable unknowns (deep uncertainty) that were involved in opportunity exploitation. The three firms varied in those four areas, and their differences have revealed several insights that potentially indicate some antecedents of effective dynamic capabilities.

Each point starts by stating the key cross-case insights, refers to the interview data to describe how these insights were inferred, and concludes by summarizing the point. Each point ends with a table that lists the main codes under each theme that represent the evidential bases of insights.

### 8.1.1 Motives, Emotions, and Predispositions

Evidence from cases indicates that recognizing opportunities alone is not enough to engage in a risky venture to exploit them. Even if opportunities present prospects of increasing profits in the long run, the decision to engage with uncertainty was affected, at least in part, by inner drives (personal aspirations, emotions, and predispositions) that were not solely based on the objective assessment of the opportunity. It is observed that profit-maximising may not necessarily be the main trigger of strategic responses. We discuss this point with evidence from the cases.

#### *Intrinsic and extrinsic motives and emotions*

In the fibre optic case, interview data showed that building a factory as a way of exploiting the fibre optic demand boom was by itself a personal goal, as it had a personal significance for the CEO. He stated in the interview that most of his peers in the US, where he started his career, “are now factory owners”. As he was approaching retirement, the CEO might have regarded owning a fibre optic factory as a way of fulfilling his legacy. This personal meaning of owning a factory could partially explain why the CEO decided to shift to the in-house assembly model, although it involved significant investment and higher risk compared to the OEM model (see details in Section 5.3.4). It might also shed more light on why the CEO did not make room in strategic discussions to contemplate and probe other alternatives for capturing the fibre optic opportunity, as discussed in Section 5.3.2.

In the solar PV case, intrinsic motives and emotional undertones of venturing into the unknown were obvious. Beyond the pecuniary value sought from the opportunity, the four founders were clearly motivated by a combination of seeking social impact, anger, and eagerness to prove their

former employer wrong, as he was not convinced that there was potential in the solar PV venture. Interviews showed that they proposed to their ex-employer that they finance the project from their own pockets, but he still refused and decided to close the subsidiary and terminate the contracts of the whole team. Interviews also showed feelings of joy and thrill in dealing with the unknowns and discovering them day by day.

The fibre optic and solar PV cases represented incidents where decision-makers voluntarily decided to invest in uncertain ventures. In both cases, there were emotional undertones and extrinsic and intrinsic motives behind their actions. Nevertheless, it is hard to quantify the contribution of these factors to the decisions and actions that ensued.

#### *Loss-aversion predisposition*

Evidence from the HV case shows that firms with loss-aversion predisposition adopted a risk-minimising approach to opportunity exploitation. Loss-aversion in the high voltage case initially led to inaction and then triggered action in crisis times. We discuss this point with evidence from the case.

The high voltage case shows the impact of loss-aversion on dynamic capabilities. In addressing the opportunity of volume exportation to FTA zones, EN acted passively since the local market presented the best resource allocation opportunity from a short-term, risk-minimising perspective. However, when competition intensified with the entry of Chinese competitors and margins were squeezed in the Egyptian market, EN changed its strategy in an attempt to restore previous profitability levels and moved to exploit the volume exportation opportunity. With the new strategy, EN showed effective seizing capabilities in its exploitation and managed to export to EU

and COMESA markets. EN also exercised effective reconfiguring capabilities in upgrading its capabilities to produce the 400 kV EHV cable in an attempt to restore profitability levels that have suffered due to price burnout in other cable ranges in the Gulf market. In other words, under crisis, EN moved to exploit opportunities it had previously ignored in favour of the shorter-term, lower-risk alternatives. Fear of loss underpins EN's passiveness to both opportunities pre-crisis as well as its shift to a defensive risk-taking strategy under crisis. This suggests that the loss-aversion attitude, in this case, was responsible for initially inhibiting and later unleashing a good level of dynamic capabilities to exploit the opportunities.

Table 26 Data structure under the dimension 'Motives, emotions, and predispositions'

Case	1 <sup>st</sup> order codes	2 <sup>nd</sup> order themes
DN	Aspire to match peers (an extrinsic motive)	Motives and emotions instigate and direct action.
KS	Seeking social impact (an intrinsic motive)	
KS	Feelings of anger	
EN	Avoiding loss more than seeking gains	Loss-aversion predisposition influences action and inaction.

*Note.*

DN= anonymized name of the case company in the fibre optic case

KS= anonymized name of the case company in the solar PV case

EN= anonymized name of the case company in the high voltage case

To summarise this point concerning aspirations, emotions, and the predisposition for loss-aversion, the case study evidence supports two main inferences. First, when opportunities involve uncertainty, which is usually the case, decision-makers, when they choose to act, they are driven by their emotions, personal preferences, and predispositions. Without considering these factors,



the profit-maximising objective (highlighted in the neoclassical model) does little to explain decision-makers' behaviour and change of behaviour in the cases. Second, there is a distinction between the general ability to exploit an opportunity— through sensing, seizing, and reconfiguring resources— and the ability (or willingness) to bear the risk of losing, with the latter having a strong bearing on the former. Decision-makers may have a good level of dynamic capabilities (sensing, seizing, and reconfiguring), but these capabilities would stay dormant if they have a general attitude of loss-aversion, or dynamic capabilities may be exercised only in crisis times to avoid loss or more loss. Those insights will be contrasted with related literature in Section 8.2.

#### 8.1.2 Dynamic Capabilities and Productive Capabilities

The strategic choices firms make regarding products and services, markets, and technologies have a profound influence on the knowledge required for the company to succeed in executing these choices (Makadok, 2001; Zack, 1999). Thus, realizing what the firm needs to know versus what it already knows is fundamental for the successful exploitation of an opportunity. A general observation is that decision-makers in the three cases were well aware of gaps in technical and productive knowledge they needed to fill to pursue pertinent opportunities, which they all managed to secure. Another observation is that upgrading or using underutilized capabilities came as part of the exploitation strategy. The third key observation is that the initial existence (or absence) of requisite productive capabilities did not guarantee (or hinder) the success of the exploiting strategy. We discuss these insights with evidence from the cases.

In the high voltage case, requisite production capabilities to produce high voltage cables were available in-house and to international standards. EN, and Egyptian cable producers, in general,

enjoyed a reputation for high-quality high voltage products in Africa and Europe. Nevertheless, exploiting the opportunity to export on a wide scale to the EU and COMESA was triggered by crisis conditions (i.e. involuntarily), not by the availability of productive capabilities. The same is true for the opportunity of producing the sophisticated 400 kV EHV cable. EN already possessed the required machines to produce the cable, albeit requiring minor adjustments. Still, upgrading to 400 kV EHV came as part of a strategy to compensate for the squeezed margins resulting from the supply glut that had sent prices in a downward spiral in lower cable ranges.

In the solar PV case, established providers of energy solutions to commercial and industrial clients, like Caterpillar, enjoyed a considerable knowledge base and technical and organisational capabilities. Nevertheless, they acted passively towards the solar PV opportunity and only started to address the opportunity in 2015, five years after solar PV prices started to go down worldwide. On the other hand, a new start-up company (KS) with investment constraints and a low prior knowledge base (Kim, 1998) in the subject matter moved to exploit the solar PV opportunity in 2011 and invested in creating technical capabilities almost from scratch.

In the fibre optic case, DN managed to acquire the best technical expertise available in the market and hired senior managers for production who had more than ten-year experience in fibre optic assembly. As per interview data, with this acquired expertise, DN produced fibre optic quality that surpassed that of the Chinese and was close to European quality. Nevertheless, DN failed to exploit the opportunity at hand, as detailed in Section 5.2.4.

The case study evidence on productive capabilities conveys three important points. First, it is observed that the availability of productive capabilities did not lead to their effective utilization. This point supports finding 8.1.1 that willingness is not driven by possessing the ability. Available productive capabilities represent internal stimuli for growth, but growth may or may not happen

depending on decision-makers' growth disposition. Second, productive capability acquisition, building, and upgrade came as part of the exploitation strategy of the firm. That is to say, learning and capability building from a firm-level perspective is not an objective in and of itself. Rather, it is considered as a means to an end by serving the commercialization strategy to capture value. If there is a way of capturing value without learning and capability building, firms will not pursue them. Third, the successful acquisition of productive capability did not guarantee successful opportunity exploitation. Exploitation requires strong strategic and commercial capabilities to succeed.

Table 27 Data structure under the dimension 'Productive Capabilities'

Case*	1 <sup>st</sup> order codes	2 <sup>nd</sup> order themes
DN	Managed to acquire new-to-the-firm productive capabilities	Successfully built and/or acquired requisite productive capabilities
KS	Managed to build and acquire new-to-the-firm productive capabilities	
EN	Managed to build new-to-the-economy productive capabilities	

*Note.*

DN= anonymized name of the case company in the fibre optic case

KS= anonymized name of the case company in the solar PV case

EN= anonymized name of the case company in the high voltage case

These observations deserve attention, considering how the catch-up and capability accumulation strands of literature over-emphasise the role of technical learning and productive capabilities in determining firms' success to grow and catch up. This overemphasis implicitly advances the notion that 'if you can produce it, you can sell it'. Case study evidence shows that this might not be the

case. Firms require, first, a willingness to grow and engage with opportunities and, second, strong strategic and commercial capabilities to pull through. These insights will be contrasted with extant literature in Section 8.2.

### 8.1.3 Dynamic Capabilities and Engagement with Search and Discovery

It is observed that the general attitude of decision-makers towards the search and discovery of market information and alternative strategic courses of action play a role in the outcome of opportunity exploitation. The differential attitude and behaviour of firms with regard to searching and discovering new alternatives could be noticed clearly in contrasting the emergent codes of the solar PV case with the codes of the fibre optic case. Before moving to the comparison, it is important to highlight that the modes of search and learning in the solar PV case and the fibre optic case are not the same, given the nature of the product and the investment decision in each case. So, in order not to confound the learning mode with how strong and effective the search and learning abilities of the two firms were, we start the comparison by describing the learning mode of each case first and then move to compare emergent codes that characterized their search and discovery efforts.

In the fibre optic case, DN is about to assemble a product with an already established market. Demand is already expressed, and demand and supply information is accessible. At the outset, decision-makers have good estimates of market demand and the costs of assembly. In the meantime, the in-house assembly model entails a large upfront and irreversible investment in specialized assembly assets. Partial implementation or prototyping is not applicable. Given these conditions, decision-makers in DN were in a situation of 'know-to-act'. That is to say, all available

and accessible information about demand and supply could be gathered and analysed at the outset to inform the company's strategic decision since there is little room for adjustment once an investment decision is made. Thus, information gathering, forecasting and scenario planning activities are crucial in this mode of knowledge generation— 'know-to-act', or what Gavetti and Levinthal (2000) call cognitive search.

We move now to analyse DN's attitude and behaviour with regard to market knowledge acquisition. As discussed in detail in Section 5.3.2, it is observed that decision-makers were limited in their search and information-seeking efforts (i.e. learning) before taking the investment decision. First, as per the CEO and the Financial Director, DN did not conduct scenario planning or sensitivity analyses to probe different alternatives and scenarios, although they were well aware of these forecasting tools. They acted as if they were certain of the future developments of the market. The lack of probing different scenarios resulted in limited information-seeking activities. For instance, the interviews revealed that decision-makers were unaware of some key information about a competing Chinese model, like the Chinese tax rebate system and its potential impact on Chinese bidding prices, although this information is widely accessible for those who work in the trade business. Interview data also reveals that DN's senior management sought opinions and advice from industry experts before making the investment decision. However, DN's management was unreceptive to information that contradicted their held beliefs. For instance, DN's CEO sought advice from the chairman of the exiting local producing company (E), which has been operating in the fibre optic market for over ten years and decided to exit the fibre optic market and liquidate its assets. The chairman discouraged the move, as he predicted (or had inside information) that the government would not apply the preferential treatment in the future, allowing the Chinese to compete on ETI's tenders. With Chinese entry, local producers would not have a chance to win

contracts. Surprisingly enough, DN's CEO was unreceptive to the advice he received from the chairman that conflicted with his beliefs and assumptions about future developments. He still believed that the government would retain preferential treatment towards Egyptian producers. Furthermore, receiving this information did not prompt DN management to conduct a scenario-planning exercise to examine its potential impact or at least to wait and see what would happen before making the investment decision.

The second code that emerged from the data is DN's internal culture regarding searching and discovery. The code 'conformity culture' indicates that the overall culture of the company was largely conformist to the CEO's vision. The interviews reveal that the vision of building an assembly line went quickly into execution without taking enough time for strategic discussion. The discussions that took place did not focus on *what* and *why*. They were more about how to execute. Even discussions about how to execute were limited. For instance, there were no discussions about a key decision of whether to assemble the conventional or the ABF type of fibre optic, although ABF demand was starting to pick up at the time. Effective engagement of top executives, middle management and front-liners could have enriched the strategic discussion and prompted more information-seeking activities. This environment of unchallenged authority was conducive to limited search and discovery activities and resulted in blind spots and an escalation of commitment (Prahalad & Bettis, 1986).

In the solar PV case, KS offers a solution for a market that is yet to exist. They began with a general idea about what could be done, and information about demand and supply was largely unknown. Information about potential demand was to be discovered gradually on a day-by-day basis through experimentation and interaction with potential customers and suppliers. The business model was not a one-time job. It evolved as KS acquired new market knowledge and as the regulatory climate

developed. The costs are ongoing to finance experimentation, capability building, and implementing projects. Given these conditions, decision-makers in KS were in a situation of ‘act-to-know’. In other words, experimenting, learning, and adjusting is a continuous process that informs the company’s emergent strategy. Thus, a process that facilitates continuous experimentation and learning play a critical role in the ‘act-to-know’ mode of knowledge generation, also called experiential search (Gavetti & Levinthal, 2000).

We move now to analyse KS’s behaviour with regard to search and discovery. The emergent codes, as discussed in detail in Section 6.3.2, indicate that KS employed multiple tactics to continuously search the market landscape. First, from the beginning, KS has used business casing and scenario planning as the main instruments to probe different alternatives about what RE field to choose, what market segment to target, and what business model to devise. For instance, regarding what RE field to choose, interviews reveal that they examined biogas, wind, and solar and studied multiple other opportunities in agri-business before they decided to venture into solar PV. In other words, they were not attached to a specific product or model. They were feasibility-driven, and that made them quite active in information seeking and processing. Second, KS embraced experimentation as a key strategy to discover the market and tap into latent demand for solar PV in Egypt. For instance, KS invested in experimenting with new designs of the SWP product and different business models of the centralized hybrid solution and used interaction with core and potential customers strategically to gain critical knowledge about how to trigger mass adoption of solar PV in the commercial and industrial segments in Egypt. Third, KS was strategic in building a network of advisors and shareholders with diversified experiences and expertise who can bring valuable insights to the strategic debate. For instance, they prioritised expertise and strategic support over financial support in recruiting new investors. The organic structure that is typical in

start-up companies (Covin & Slevin, 1988) also facilitated continuous communication and the diffusion of knowledge.

When contrasting the codes of the two companies— DN versus KS— in the area of search and discovery, the comparison clearly shows differential behaviour related to information seeking and processing and differential attitude towards openness to challenge and revise assumptions. As explained, that difference does not stem from the dissimilar modes of learning determined by the nature of the product and investment decision. The difference is in *the extent* to which each company embraced the mode of search and discovery that was appropriate to its context. For instance, while DN demonstrated limited forecasting activities, KS demonstrated extensive experimentation activities. Comparing codes also reveal a key difference in the organisational culture. While DN's culture was dominated by conformity, KS's culture encouraged engagement. These attitudes and concomitant behaviour around search and discovery particularly influenced the effectiveness of sensing and seizing capabilities in each case and the subsequent outcome of exploitation, as discussed earlier. A number of inferences could be made based on these observations.

First, while decision-makers may be highly motivated and risk-taking in engaging with expansion opportunities, the extent and intensity of their efforts in searching for different alternatives and seeking various sources of knowledge and ideas may vary markedly. It could be argued that KS' observed extensive and intensive efforts of searching and probing contributed to their eventual success, while DN's limited search and information gathering contributed to their unsuccessful exploitation.

Second, it is observed that KS's management, who were active and deliberate in their search and discovery activities, established a culture of engagement in which the management team and staff



were encouraged to voice their opinions and challenge authority as well as each other. Conversely, DN's senior management, who was unreceptive to information that conflicted with held assumptions, established a culture of conformity and deference. Likewise, EN's senior management, who demonstrated a satisficing attitude when the FTA opportunity opened up, established a conservative culture. This observed congruence between senior management attitude and organisational culture suggests that search and discovery abilities are a firm-wide capability that starts at the senior management level and trickles down to the rest of the organisation. It may also suggest that the effective exercise of search and discovery best practices (e.g., conducting sensitivity analysis or seeking outside views) is contingent on the cognitive flexibility of management.

Table 28 Data structure under the dimension 'Engagement with search and discovery'

Case	1 <sup>st</sup> order codes	2 <sup>nd</sup> order themes
DN	Limited probing and information gathering	Limited search and discovery efforts
DN	Cognitively entrenched	
KS	Feasibility-driven	Extensive search and discovery efforts
KS	Experimentation	
KS	Anticipate and adapt to continuous change	
DN	Conformity culture	Organisational culture shows congruency with search and discovery attitude
KS	Engaging culture and safe environment	
EN	Conservative culture	

Note.

DN= anonymized name of the case company in the fibre optic case

KS= anonymized name of the case company in the solar PV case

EN= anonymized name of the case company in the high voltage case

Finally, observed congruence suggests that if a capability is not exercised firm-wide, this may be indicative of lacking the capability firm-wide or a lack of senior management's belief in that capability to the extent that it is not allowed to be exercised by others. For instance, senior management who are unable to see the situation in a different light (i.e. challenge their own assumptions) or are very conservative in their aspirations may establish norms in the organization that reflect these attitudes.

#### 8.1.4 Dynamic Capabilities and Engagement with Uncertainty

The previous section focused on how firms engaged with unknowns that are knowable (i.e. discovered through search and learning efforts). This section focuses on engagement with unknowable unknowns in the opportunities they pursued. Unknowable unknowns are beyond the influence of decision-makers. Meaning, neither cognitive nor experiential search can remove this type of ambiguity. Knight (1921) is probably the first to raise the issue of a future that is not only unknown but is fundamentally unknowable (see also Chua Chow & Sarin, 2002; Feduzi et al., 2022; McKelvie et al., 2011).

The inter-firm difference in engagement with this type of unknown is discernable by comparing codes and themes of the solar PV case and that of the fibre optic and high voltage cases. The three companies took three different paths in dealing with uncertainty. While KS, in the solar PV case, showed a proactive attitude, trying to preempt market changes and influence future developments, DN, in the fibre optic case, showed a reactive attitude by acting only on what was existing and expressed. Finally, EN, in the high voltage case, chose inaction to avoid uncertainty until environmental conditions became so threatening that they forced them to take defensive action.

To make the comparison easier, we focus on comparing the solar PV and the fibre optic cases and elaborate on the high voltage case at the end.

In order to make the comparison, we select two areas of unknowable unknowns that are common between solar PV and the fibre optic case: the inflexion point of a new product and the regulatory climate changes. The inflexion point of a new product is a point, at which change in customers' preference starts to take place on a wide scale, foreboding the decline of the existing product (or product version) and the rise of the new product. In the fibre optic case, it was unknowable when the inflexion point of the ABF would take place. In the solar PV case, the wide adoption of solar PV by commercial and industrial clients to substitute fossil-fuel-based solutions was unknowable. The second area of unknowable unknowns that is common between the two cases is the regulatory climate and its development, which played a critical role in both cases. This area was also beyond the control of the two firms. In the fibre optic case, the initial regulatory setup at the time of taking the investment decision was favourable as it offered preferential treatment to Egyptian companies. However, the change in the political regime was a sign that things might change in the future. In the solar PV case, the initial regulatory setup at the time of starting up the venture was unfavourable, as it did not permit private companies to generate solar energy and sell it directly to business clients. However, the drop in the cost of solar PV panels in 2010 was a sign that things might change in the future. Both firms, DN and KS, could not predict with any level of accuracy if or when a change in the regulatory setup could take place.

In addressing these two areas of radical uncertainty, it is observed that decision-makers in the two firms behaved quite differently. While KS invested in preempting the inflexion point of the new product, DN invested in the existing product (i.e. conventional FO). While KS envisioned a change in regulatory conditions, DN envisioned its continuity. In investigating what is behind this

differential attitude, a few observations could be made before moving to propose a potential cause. First, regarding the new product inflexion point, the difference in attitude between KS and DN did not stem from an ability (or inability) to imagine and sense the better value of the new product versus the existing one. Both KS and DN were imaginative enough to envision the promise of better value of the new products versus the existing ones. Since the imagination factor was present in both cases, it cannot account for the differential attitude towards uncertainty. It could be inferred that choosing to invest in a proposition (product) that promises a better value to the customer is not necessarily linked to the decision-maker's imaginative and sensing abilities. A better value could well be imagined and sensed, but action to explore its economic potential may or may not follow. This point is important considering the heavy presence of the imagination factor in entrepreneurship and dynamic capabilities literature.

A need for control is a potential factor that could explain the difference. First, DN invested in demand that was already existing, demonstrable, and apparent, and KS invested in what did not exist yet and represented only a possibility. Second, DN invested given a controlled reward environment, namely, an institutional setup that guaranteed reward ex-ante, while KS invested under an uncontrolled environment, in which the reward was not guaranteed. To highlight the options each company faced, we could say that DN faced three options and KS faced two. For DN, option one was inaction. Option two was to act by leveraging existing demand and the favourable existing institutional setup. Option three was to explore a new and better value to the customer and a more competitive model but without having guarantees about reward outcome. KS had two options. Option one was inaction. Option two was exploring a new and better value to the customer and a competitive model without having guarantees about reward outcomes.

Now let us juxtapose DN's response to its options versus KS's response. Confronted with the three options, DN chose to act and invest in the controlled-outcome option, the option that provided a guarantee at the outset of demand and reward. The owner and CEO explicitly stated in the interview that he acted upon minimal perceived risk. He added that even this minimal risk "is mitigated by the ongoing appreciation of the factory land, which is sufficient to cover the capital investment made in the machines if the exploitation was not successful." On the other hand, confronted with two options, inaction and uncontrolled outcome, KS chose to act and invest in the uncontrolled-outcome option, the option that offered only a promise (no guarantees) at the outset of potential demand and reward. KS's CEO and co-founder explicitly stated in the interview that they were looking for an opportunity that looked more like just a possibility. That is, founders recognized the unpredictability of the future opportunity and based their value capture strategy on acting earlier, learning faster, and building their market position ahead of others (first-mover advantage). While DN relied on and invested in what is existing and predictable to capture value, KS relied on and invested in what could take place in the future. DN acted only upon what was already existing and demonstrable (existing FO demand and existing protectionist regulatory setup) to increase prospects of success. KS relied on choosing an opportunity that is highly uncertain and not apparent to other players and, at the same time, engaged in creating a markedly better value-added to the customer to increase prospects of success.

A complementing insight is related to value creation. KS created a better value for the customer because their value capture strategy heavily depended on the customer choosing their proposition over substitutes. On the other hand, DN's value capture strategy relied on the preferential treatment law (i.e. the protectionist policy) that favoured Egyptian suppliers based on their nationality, not based on the value they create for the customer. As a result, DN did not build good value for the

customer. Simply, it did not have to. Emergent codes give evidential bases to this inference. KS's emergent code 'Customer-centric product proposition' (see Section 6.3.2) and DN's emergent code 'Customer-eccentric product proposition' (see Section 5.3.2) highlight a number of incidents that show the difference in firms' value-creation orientation. It could be inferred that value creation is a means to an end, which is value capture. If policies construct some controls on the distribution of rewards, and this distribution is not based on a value created for the customer, firms will not create good value for the customer, and this could eventually weaken the system-wide competitiveness of the economy as a whole.

Regarding the high voltage case, the area of the unknowable unknown is different from the other two cases (fibre optic and solar PV). The opportunity of mass exportation to FTA markets involved uncertainty about demand size (i.e. market shares) that could be captured in new export markets. This uncertainty, though not a radical one, given that demand in these markets is established and relatively stable, and information is accessible, discouraged EN from making an investment decision to expand production capacity and pursue an aggressive internationalization strategy to exploit the FTA opportunity. Even when EN, later on, was forced to go aggressively for mass exportation due to crisis conditions in the local market, this move did not involve much uncertainty because EN was making use of the already idle capacity of existing production lines without having to make any new investments in new ones. Based on emergent codes, the reason for this satisficing attitude is that EN was seeking opportunities, not only with a guaranteed reward, as DN in the fibre optic case, but also with a short-term one.

To summarize insights on engaging with unknowable unknowns, there are three main insights related to firms' different attitudes in dealing with deep uncertainty. First, decision-maker's imaginative and sensing abilities may not be the key enabler in dealing with deep uncertainty.

Better value could well be imagined and sensed, but action to explore its economic potential amid high uncertainty may not follow.

Table 29 Data structure under the dimension ‘Engagement with uncertainty’

Case	1 <sup>st</sup> order codes	2 <sup>nd</sup> order themes
DN	Proactive in riskless, reactive in risky choices	Invest in action provided that reward is guaranteed and short-term.
EN	Passive and defensive sensing	
EN	Short-term profit-maximising orientation	
KS	Perceive potentiality in opportunities with uncertain rewards	Invest in action provided that reward is <i>not</i> guaranteed
DN	Customer-eccentric product proposition	Value creation depends on value capture strategy
KS	Customer-centric product proposition	

Note.

DN= anonymized name of the case company in the fibre optic case

KS= anonymized name of the case company in the solar PV case

EN= anonymized name of the case company in the high voltage case

Second, firms, in trying to raise their chances of success, follow two very different paths. Some firms tend to rely on what is already existing, demonstrable, and obvious as a way to increase the odds of success. In other words, they rely on the continuity of the present into the future. Other firms, seeking the same objective, rely on their own actions to direct future developments in their favour. While the first type relies on exogenous factors, the second type relies on their own actions.

### 8.1.5 Summary

This section concludes the step of the cross-case analysis, in which we made a comparison between emerging codes and themes of the three cases in four specific areas. Table 30 presents all emergent codes and themes under the four areas that represent four aggregate dimensions that characterise firms' response to opportunities. The first dimension is about the role of inner drives (emotions, motivations, and predispositions) in motivating action (or inaction) and addressing opportunities. The second dimension is about the role of productive capabilities in influencing the exploiting action and its outcome. The third dimension is related to the search and discovery of market information and alternative courses of action. The fourth dimension is related to engaging with unknowable unknowns (deep uncertainty) in opportunity exploitation. The three firms differed in those four areas, and their differences have revealed some insights that potentially indicate several antecedents of effective dynamic capabilities. The following is a summary of key insights detailed in points 8.1.1 to 8.1.4.

In the first dimension of comparison regarding the relationship between dynamic capabilities and emotions and predispositions, two main insights are inferred from case study evidence. First, when opportunities involve an uncertain outcome (i.e. uncertain likelihood and size of economic reward), which is usually the case, when decision-makers choose to act, they are driven more by their emotions, personal preferences, and predispositions than by a profit-maximizing objective. Second, decision-makers may have good dynamic capabilities, but these capabilities remain latent if they have a general attitude of loss-aversion (unwillingness to act amid uncertainty). In the same vein, actors may be willing to act amid uncertainty, but they exercise weak and ineffective dynamic capabilities. In other words, dynamic capabilities, as abilities to act *effectively* at a time of change and high uncertainty, seem to be separate from the willingness to act.



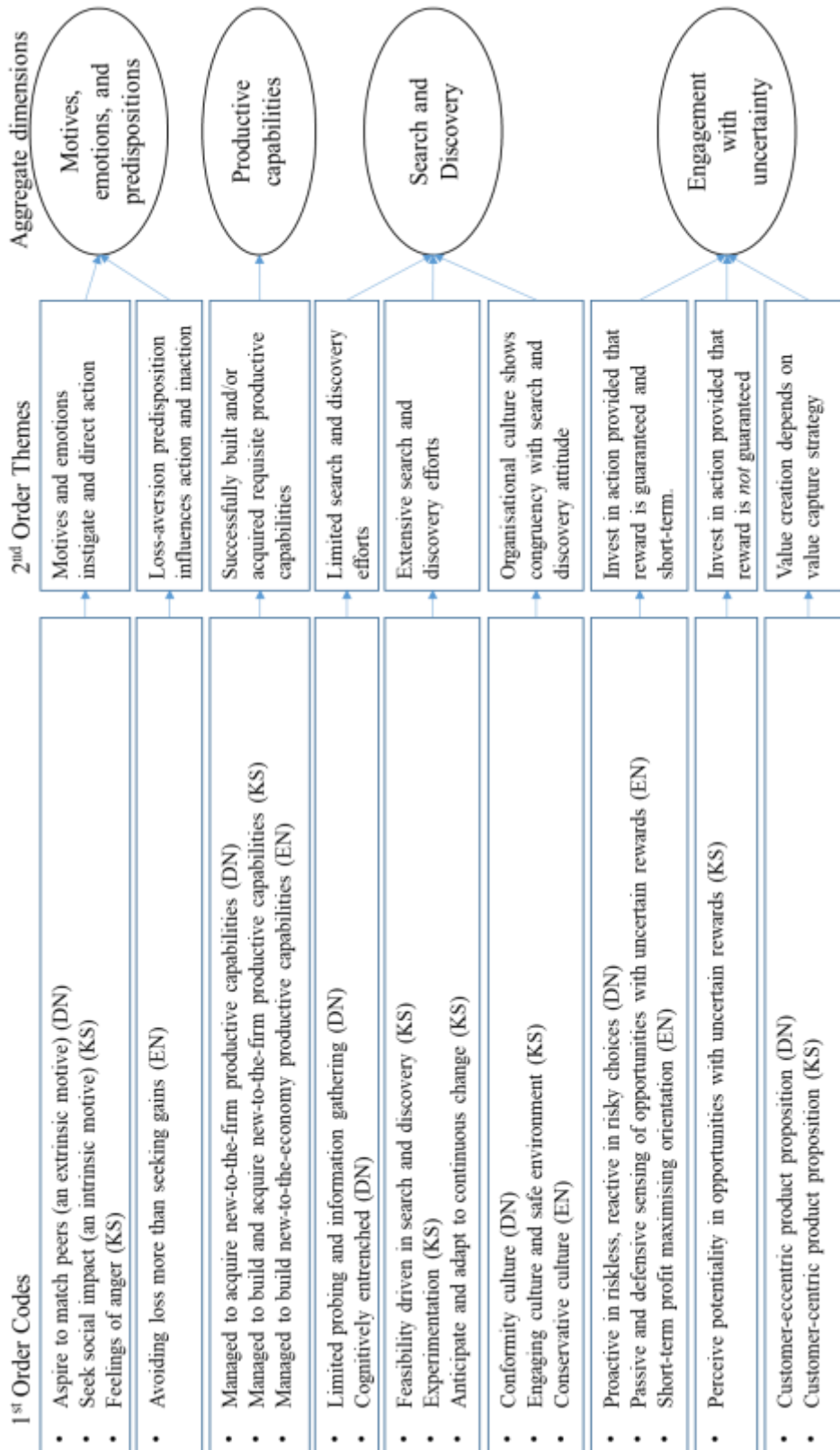
Second, regarding the role of productive capabilities influencing the exploiting action and its outcome, case study evidence indicates that successful acquisition or building of requisite productive capabilities is not a silver bullet for the successful exploitation of opportunities. Exploitation requires strong strategic capabilities to succeed, which were not sufficiently available in the three firms. Interestingly enough, while decision-makers in the three cases were quite aware of what productive capabilities they were missing and managed to secure them, they were not equally aware of deficient strategic capabilities, which resulted in delayed or failed exploitation. The third insight is that productive capability acquisition, building and upgrade, came as part of the exploitation strategy. That is to say, learning and capability building, which are critical for macroeconomic development, are not the ultimate objective from a firm-level perspective. They serve the commercialization strategy as a way of creating and capturing value. If the business context avails an option of capturing value without investing in learning and capability building, firms will not pursue them. While this point sounds simple and intuitive, sometimes it is overlooked when designing policy interventions to promote local industries.

In the third dimension of comparison related to search and discovery of market information and alternative courses of action, the cases show that the ability to learn is integral to dynamic capabilities. Differential search and discovery behaviour observed in the cases indicates that learning is not only a matter of practices and processes. Strategic fixations with old ideas, assumptions, and models may block effective learning and unlearning (Hedberg, 1981) from taking place.

Regarding the fourth dimension on managing radical uncertainty, there are three main insights to highlight. First, decision-makers' imaginative and sensing abilities do not seem to be the key enabler in dealing with deep uncertainty. Better value could well be imagined and sensed, but

action to explore its economic potential amid high uncertainty may or may not follow. Secondly, in trying to raise the chances of success of their ventures, firms follow two very different paths. Some firms tend to act upon only what is already existing, demonstrable, and obvious as a way to increase the odds of success. They rely on the continuity of the present into the future. Other firms use their own actions to direct future developments in their favour. While the first type relies on exogenous factors, the second type utilizes endogenous factors. Third, when the business context, which is partly determined by various aspects of public policy, presents a pay-off structure that does not link value creation with value capture, firms tend to forego opportunities for value creation.

Table 30 An aggregate data structure table



Adapted from Gioia et al.'s (2012) data structure

## 8.2 Discussion

The cross-case analysis in Section 8.1 produced insights pertaining to four main areas with potential importance for dynamic capabilities: a) motives, emotions, and predispositions, b) productive capability building and acquisition, c) search and discovery, and d) engagement with uncertainty. This section attempts to reconcile key insights of each area with extant literature.

To make full use of the inductive approach, we take some liberty to roam outside the core domains to neighbouring social science disciplines (e.g., educational and social psychology) that could potentially give fresh insight to the subject. It is important to note here that the interdisciplinary approach in management studies, pioneered by the Carnegie School, has characterised the discipline since the middle of the last century and led to the ground-breaking development of management theory (e.g., Cyert & March, 1963; March & Simon, 1958). Likewise, the strategic management domain, grounded in practice, was open to importing insights from neighbouring disciplines, like psychology and sociology, earlier than other fields of study. For example, Nelson and Winter (1982) note that one of the factors that have crippled the orthodox (neoclassical) economic approach is its “isolation from sources of information and insight that could be of great value to it from management theory and practice, psychology, organisation theory, and business history, for example” (1982, p. 33). The dynamic capabilities framework itself is “an integrative and interdisciplinary framework” (Augier & Teece, 2008, p. 1201), as the authors argue that “Inasmuch as business and management issues transcend disciplines, so must scholarships in business schools transcend disciplinary boundaries.” (Augier & Teece, 2005, p. 118).

The section is structured as follows. In each point, we start by stating key insights from the cross-case comparison, select some scholarly work that addresses these insights, and conclude by summarizing how much research insights are consistent with extant literature.

### 8.2.1 Motives, Emotions and Predispositions

The cross-case analysis provided two main insights related to motives, emotions, and predispositions detailed in Section 8.1.1. First, the willingness to act and respond to opportunities does not seem to emanate from a profit-maximising objective alone, if at all. Emotions, aspirations, and predispositions provide the urge to act and exploit an opportunity when uncertainty is involved. Second, the willingness to exploit is separate and not necessarily derived from possessing the ability to exploit.

The discussion of motives and their impact on dynamic capabilities is a potentially important addition to the dynamic capabilities framework (Teece, 2007), as it could be regarded as a response to Augier and Teece's (2008) call to investigate "an approach that combines both incentive and non-incentive issues" to help "move capabilities research towards a real paradigm" (2008, p. 1188). It is also directly related to informing policymakers in designing incentive schemes for businesses, as will be discussed in Chapter Ten. As Teece puts it, "Bad theory produces bad policy; and bad, poorly informed public policies can weaken an economy." (Teece, 2019, p. 24).

Since literature that deals with motivations and incentives is voluminous, we select strands that specifically deal with subjects highlighted in the findings, namely emotions, motivation, and loss-aversion.

## *Emotions*

In cognitive psychology, it has long been established that affective (i.e. emotional) reactions to stimuli are often the very first reactions of the organism and can occur without extensive perceptual and cognitive encoding (Zajonc, 1980). In other words, affective judgments are independent of, and precede in time, perceptual and cognitive operations. Affective processes, according to Zajonc's (1998) definition, motivate approach or avoidance behaviour (i.e. address "go/no-go" questions). Cognition by itself cannot produce action, argue Camerer et al. (2005), adding that in order "to influence behaviour, the cognitive system must operate via the affective system" (2005, p. 18). Compton (2003) states that "stimuli deemed emotionally significant are given priority in the competition for access to selective attention." In the presence of multiple alternatives, emotions send a response signal that helps in the evaluation of alternatives and their potential outcomes. The somatic marker theory posits that emotional processes can guide or bias human decisions (Damasio, 1996). Somatic markers are associations that induce emotions that, in turn, direct decisions on which options to explore or exploit. Meaning, the influence of emotions goes even beyond triggering action to shape the response as well.

In the context of innovation and strategic change, emotions, together with cognition, act as important motivators for action. Huy (1999, 2005) proposes emotions as the conceptual foundation for explaining why change is so difficult to realize. Emotions could be a mechanism to overcome strategic inertia and motivate change, as they galvanize decision-makers to make moves amid uncertainty and overcome personal and organisational inertia. The opposite is also true. Emotional mechanisms can be a "driver of the tendency to escalate commitment to failing courses of action" (Hodgkinson & Healey, 2014, p. 1311). Hence, Vuori and Huy (2015) suggest that emotions might

play a vital role in explaining the antecedents of success and failure in adapting to environmental change.

Lately, the role of emotions and emotional reasoning has started to find inroads in strategic management literature. Strategy scholars like Gavetti et al. (2012) and Hodgkinson and Healey (2011) emphasise the need to have a better understanding of all the processes of the mind without putting emotions to one side. Hodgkinson and Healey (2011) suggest that deliberations and group approaches could provide a potentially “useful means of crosschecking affectively rooted assumptions” (2011, p. 1505). Most recently, David Teece started to consider the role of the emotional dimension in dynamic capabilities, arguing that “the key problem facing most organisations is not economic...rather it is cognitive and perhaps even emotional” (Baden-Fuller & Teece, 2020, p. 105).

Case study evidence supports literature on the emotional factor and its role in pushing decision-makers to initiate action amid uncertainty. The role of emotions is particularly evident in the solar PV case, which involved the highest level of uncertainty of the three cases. In deciding to venture into the solar PV business amid unfavourable conditions and high ambiguity, founders were motivated by a combination of intrinsic motives and feelings of anger (see details in Section 5.3.1)

### *Loss-aversion*

Half a century ago, Cyert and March (1963) argued that managers “avoid the requirement that they correctly anticipate events in the distant future by using decision rules emphasising short-run reactions to short-run feedback rather than anticipation of long-run uncertain events.” (163, p. 167). The prospect theory posits that in light of incomplete information, decision-makers will use

heuristics based on satisficing rather than optimising principles (Kahneman & Tversky, 1979). In specific, the prospect theory postulates the existence of satisficing reference points, where firms above the reference point will be risk-averse in order to avoid falling below the reference point, and below the reference point, they will be risk-assertive. As such, decision-makers will invest more to avoid a loss than to obtain a gain, and they would demonstrate risk-aversion over gains and risk-seeking over losses. The prospect theory became the base for much scholarly work in strategic management under the concept of ‘strategic reference point’ (e.g., Bowman, 1982; Fiegenbaum et al., 1996). Shoham and Fiegenbaum (2002) posit that “reference points are critical elements in strategic choice since they predict that individuals and organizations exhibit a mixed of risk-assertive and risk-aversive behaviour when an outcome is below or above their reference point, respectively.” (2002, p. 127)

Case study evidence is consistent with the prospect theory. The high voltage case evidence shows a loss-aversion-related behaviour that initially inhibited and then later encouraged opportunity exploitation. EN demonstrated a risk-averse attitude when the firm was above the reference point. However, due to crisis conditions, the firm went below the reference point and consequently became risk-assertive and moved to exploit the mass exportation opportunity to restore its position on or above the reference point.

### *Intrinsic & Extrinsic Motives*

Intrinsic motivation refers to the desire to expend effort based on interest in and enjoyment of the challenge of the task itself (Amabile et al., 1994). Prosocial motivation, on the other hand, is more outcome-driven and refers to the desire to help others (Batson, 1987). Conversely, extrinsic



motivation is “the desire to expend effort to obtain outcomes external to the work itself, such as rewards or recognition” (Grant, 2008, p. 49).

About a century ago, Schumpeter asserted that an entrepreneur’s first motivation in creating “new combination” is not profit. The entrepreneur is prompted by the joy of winning and creating. “Profit crowns the success of the “new combinations”, as it is more an expression of the value, not the motive, of the entrepreneur’s contribution to production (Uzunidis et al., 2014, p. 587). Cognitive psychology recognised the importance of intrinsic motivation if the actor is to engage with action that incurs significant effort and its reward is uncertain (Kivetz, 2003). Put differently, in the absence of accurate and guaranteed monetization prospects of innovation and the presence of significant effort requirements, which is usually the case, intrinsic motives are one of the key reasons for decision-makers to follow an innovative path. Drawing on several studies, Kroll & Porumbescu (2019) contend that employees driven by intrinsic and prosocial motivations, relative to other employees, tend to perform better in tasks that require creativeness, hard work, and, at the same time, not well paid. Moreover, under low supervision, intrinsically motivated employees presented higher quality of work and cheated less compared to workers who did not like the task (Pascual-Ezama et al., 2013).

Case study evidence seems to support literature on intrinsic motives. Decision-makers who engaged with the opportunity with the highest level of uncertainty (according to Sarasvathy et al.’s typology) were the ones who expressed intrinsic motives and less interest in high compensation packages. One R&D engineer of KS’s core team stated in the interview, “Most people working in KS were not thinking about a career. This has to do with recruitment. Employees were all very competent and knew they were underpaid [in KS], but they were not working for money.”

In sum, it is obvious that case study evidence is consistent with the literature in areas of emotions, intrinsic and extrinsic motives, and loss-aversion. In general, it could be argued that decision-makers are motivated by a fear of failure that could lead to inaction or action according to the position from the perceived reference state. They may also possess inner drives that enable them to overcome the fear of failure.

While these theories explain the desire (or lack thereof) to take action with uncertain outcome, it does not explain, for those who take action, the source of this belief that the action will bring the decision-maker closer to her desire in the absence of any ability to predict results. The question is then about this obvious and unsubstantiated optimism and over-confidence that some decision-makers have (e.g., Bernardo & Welch, 2001; Hayward et al., 2006). To answer this question, we turn to the approach-avoidance theory.

### *Approach-Avoidance Tendencies*

About a century ago, Keynes wrote that entrepreneurs have an optimistic disposition to face and manage uncertainty, a trait that serves the progress of the economy as a whole (Teece & Leih, 2016). Multiple theories in the psychological realm using alternative labels support Keynes' observation and posit the existence of individual differences in temperament (i.e. predispositions): extraversion versus neuroticism, positive emotionality versus negative emotionality, and positive temperament versus negative temperament (Eysenck & Eysenck, 1985; Tellegen, 1985; Watson & Clark, 1993). In the same vein, theorists propose the existence of similar pairs in individual motivational systems, the most prominent of which is Gray's theory (1970): Behavioural activation system (BAS) facilitates behaviour and generates positive affect versus behavioural inhibition

system (BIS), which inhibits behaviour and generates negative affect. Elliot and Thrash (2002) maintain that all these motivational approaches converge under approach versus avoidance constructs. The approach temperament represents extraversion, positive emotionality, and BAS characteristics, while the avoidance temperament represents neuroticism, negative emotionality, and BIS characteristics. The authors add, “Approach and avoidance temperaments are construed as networks of biological sensitivities that are responsible for immediate affective, cognitive, and behavioural propensities in response to encountered or imagined stimuli” (2002, p. 806). This means that approach or avoidance motivations give rise to differences in the nature of information individuals attend to in their environment. People with an approach orientation are more attentive to information pertaining to positive outcomes (approach focus) relative to negative outcomes (avoidance focus), whereas people with an avoidance orientation show the opposite preference. As such, while interpreting the same situation, approach-oriented people would pick up positive signals and predict a positive outcome, while avoidance-oriented people would pick up negative signals and predict a negative outcome (Baron, 2008).

This converged approach, based on trait adjective, affective disposition, and motivational system approaches theories, provides an explanation for the entrepreneurial phenomena of optimism, uncertainty tolerance, and over-confidence and the non-entrepreneurial phenomena of status quo bias and risk-aversion. According to the theory, whereas approach-oriented people would perceive change and uncertainty as a potential opportunity rather than adversity, avoidance-oriented people would perceive the opposite.

The obvious implication of the approach-avoidance theory on dynamic capabilities is that firms with equal abilities would demonstrate different behaviour towards taking up uncertain and challenging tasks, depending on their motivational system (approach versus avoidance)

responsible for behaviour and affect. Second, intrinsic motivation has an effect on the quality of the action, compared to extrinsic motivation, in terms of the extent of effort, creativity, autonomy, and integrity. The two points have quite an important implication for policy intervention. Although the first point emphasises the importance of policy intervention to nudge ‘avoidant’ firms into action (i.e. to expand scale and scope), the second point emphasises the importance of designing policies that do not crowd out intrinsically motivated actors, who are usually more creative, persistent and less dependent on monetary incentives.

Perhaps the main point derived from case study evidence and the literature reviewed on this point is that dynamic capabilities, which are concerned with how effective actors are able to manage change and exploit opportunities, are separate from the optimistic, over-confident, and risk-taking attitude that is derived from an approach-oriented motivational system. While the approach-orientation, as explained by Elliot (1999), is consistent with what Keynes calls “the spontaneous urge to action” (1936, p. 161), it says little about how effective this action is in meeting its goal. Indeed, the tendency to act that is separate from the ability to act may explain the well-documented high rate of entrepreneurial (start-up) failure (e.g., Bernardo & Welch, 2001; Headd, 2003). Elaborating on this point, Elliot and Thrash (2003) highlight a critical point towards understanding dynamic capabilities. They state, “Dispositional, and particularly temperament-based, conceptualizations provide a rich explanation of how behaviour is energized or instigated but have a difficult time explaining the precise directionality of behaviour in specific situations” (2003, p. 814). The proposed thesis in Chapter Nine attempts to disentangle dynamic capabilities from the ‘urge-to-action’ as the first step into theorizing about the antecedents of effective action, i.e. strong dynamic capabilities.

## 8.2.2 Productive Capability Building and Acquisition

The cross-case analysis highlighted three main insights. First, available productive capabilities represent an internal stimulus for growth, but growth may or may not happen depending on decision-makers' growth disposition. Second, successful acquisition of productive capability did not guarantee successful opportunity exploitation to ensue. Exploitation requires strong strategic and commercial capabilities to succeed. Third, the question of why senior management in the three cases were aware of what productive capabilities were missing, and they managed to secure them, while they failed to do the same with strategic capabilities to successfully seize the opportunity.

### *Growth Disposition & Aspirations*

It is well established in the literature that knowledge and experience can influence growth directly and indirectly. However, in the absence of motivation, extant knowledge may not be put to the most productive use, and new knowledge may not be sought. Indeed, capability theorists have empirically discovered, much to their surprise, that firms that achieve high levels of productivity (i.e. high technical efficiency) and high profitability do not tend to reinvest in growing the business. They reported that growth seems to be defined by the strategic orientation and less by existing resources and accumulated capabilities (e.g., Bottazzi et al., 2010).

Winter (2000) contends that one of the forces behind the heterogeneity of firms' capabilities is firms' aspirations and adjustment of aspirations. He posits that the level of aspiration is a determining factor of the amount of learning invested in acquiring a capability because reaching a satisficing outcome would end the learning process. As such, low aspirations would lead to an early end to learning and a relatively inferior achievement in capability. High aspiration levels, on

the other hand, are conducive to protracted learning and a stronger capability outcome. He adds that aspiration levels are not static. They are dynamic in the sense that multiple external factors could raise or lower them.

Importantly, Winter introduces two classes of scenarios that may re-ignite learning efforts: First, a management doctrine of continuous improvement, and second, competitive pressure and crisis conditions, under which renewed learning (capability upgrade) promises to make a contribution to its resolution. This is consistent with Kim's (1998) account of how Hyundai managed organisational learning to build requisite auto-making productive capabilities in the seventies and eighties of the last century. Hyundai management resorted to constructing internal crises to intensify and speed up learning and capability upgrades.

A third point worth highlighting from Winter's work is that "decision processes that create performance estimates or targets at an early stage in the learning process may have a strong influence on aspirations" (2000, p. 989). Earlier, management scholars emphasised the role of stretch goals (Hamel & Prahalad, 1993) in driving performance. Perhaps the key message of Winter's work is that learning is bounded more by aspirations than by perceived abilities.

Evidence from the cases seems to support Winter's suggestions. First, in the high voltage case, crisis conditions re-ignited the learning process and triggered a capability upgrade to produce the 400 kV EHV cable. In pre-crisis times, the satisficing attitude of management did not give way for capability learning to continue and an upgrade of EHV production capabilities to materialize, despite the existence of market demand for the 400 kV cable in Saudi Arabia and internationally. Second, the impact of initial targets and estimates in intensifying the learning process could be observed in the solar PV case. Interviews revealed that KS's CEO used to set far-reaching, and at

times, “not even logical” objectives for the team to strive to achieve. KS’s director of R&D saw the CEO’s attitude as one of KS’s critical success factors (see Section 6.3.3).

### *Strategic (dynamic) Capabilities*

Regarding the importance of strategic (dynamic) capabilities, Teece (2014) argues that operational capabilities (which he called ordinary capabilities) are not sufficient for companies to sustain their edge in a competitive environment, and that is because much of the knowledge behind ordinary capabilities is accessible and can be bought. Earlier, Christensin (1997) and Tripsas and Gavetti (2000), among others, showed that incumbents may have the requisite technology to adapt and still fail to deal with strategic change. These studies emphasise this point with regard to developed markets, and the case study evidence suggests that it is more so in developing markets because, in such markets, productive knowledge of traditional industries with medium-tech technologies is widely diffused. Consequentially, strategic and commercial capabilities are expected to play a relatively bigger role in capturing value for the company since the competitive edge cannot rest on productive capabilities alone. Moreover, evidence from the cases suggests that resource rigidity (Gilbert, 2005) did not appear to be the problem. For instance, in the fibre optic case, DN invested in the productive resources needed to exploit the opportunity but failed to capture the value from these new resources due to cognitive inertia, which will be discussed in Section 8.2.3.

In sum, insights on productive capabilities seem to support extant literature. Growth is a matter of orientation as much as resources and productive capabilities. Learning and capability building depend on pre-set aspirations. They stop once aspirations are met. Second, productive capabilities alone do not guarantee successful exploitation of opportunities. Strong strategic capabilities are

required. Perhaps an important point highlighted by research and yet remains unanswered is why senior management in the three cases were aware of what productive capabilities were missing, and they managed to secure them, while they failed to do the same with strategic (dynamic) capabilities. The proposed argument in Chapter Nine will attempt to give a plausible explanation.

### 8.2.3 Search & Discovery

Cross-case analysis revealed a differential attitude in search and discovery efforts (i.e. gathering market information and probing alternative courses of action) in two forms: cognitive and experiential search (Gavetti & Levinthal, 2000). A number of insights ensued. First, while decision-makers may be highly motivated and risk-taking in engaging with expansion opportunities, the extent and intensity of their efforts in searching for different alternatives and seeking various sources of knowledge and ideas may vary markedly. Second, an observed congruence between management behaviour and the organisational culture in search and discovery efforts suggests that search and discovery abilities are a firm-wide capability that starts at senior management and trickles down to the rest of the organisation. It also suggests that the effective exercise of learning (search and discovery) practices is contingent on supportive management cognition. Finally, the observed congruence suggests that if a capability is not exercised firm-wide, this may be indicative of the lack of the capability firm-wide, or a lack of senior management's belief in that capability to the extent that it is not allowed to be exercised (see Section 8.1.3 for details).

The search for knowledge and novel ways of doing things plays a critical role in firms' efforts to achieve growth, profitability, and competitive advantage. Different strands of literature deal with



search and discovery under different terms. Adaptive systems theory calls it internal variety (Ashby, 1959), the evolutionary theory calls it search (Nelson & Winter, 1982), and organisational learning theorists calls it exploration (March, 1991). Lundvall differentiates search from exploration by saying that ‘exploring’ is less goal-oriented than profit-oriented search (2016, p. 96). Despite the different labels, all these terms broadly speak about the organisational act of searching “for new organisational routines and the discovery of new approaches to technologies, businesses, processes, or products” (McGrath, 2001, p. 118). The words ‘search’ and ‘discovery’ imply that the searched for knowledge could be known, i.e. knowable. We focus in this section on theories that deal with activities that could be carried out to know what is knowable and defer the discussion on the unknowable unknown (uncertainty) to the next section.

Firms may rely on internal search, such as research and development (R&D), or they may search for knowledge and resources from external sources. Search takes various forms, e.g. information gathering, R&D, experimentation, prototyping, and interaction with users and producers. Gavetti and Levinthal (2000) propose the distinction between experiential and cognitive search. Whereas cognitive search can be conducted offline through generating and assessing alternatives without taking implementing action, experiential search can only be accomplished online. Search could address what opportunities to pursue (e.g. what product or service, technologies) or how to pursue them (e.g. what business model or capabilities). In reviewing theories on intensity and variation of search efforts, evolutionary and behavioural theories represent natural areas for this review. In addition, theories from education psychology domain related to learning and performance in achievement settings give valuable insights on the subject.

### *Assuming Continuity & Low Aspirations*

Voluminous scholarly work on what limits decision-makers' search and discovery efforts. Broadly speaking, they could be grouped under two main factors, each introduced by an influential theory. The first factor, 'assuming continuity', is proposed by evolutionary theory, and the second is aspirations proposed by the behavioural theory of the firm and supported as well by scholars of the evolutionary theory.

In the evolutionary approach, economic actors, betting on 'continuity', rely on 'memory' embedded in organisational routines and on 'what worked yesterday' to deal with uncertainty. "In the face of the enormous complexity of that system, our main hope for understanding and predicting it rests on the fact that there is substantial temporal continuity. Accordingly, our task is to understand the structure and sources of that continuity." (Nelson & Winter, 1982, p. 404). In investigating what is behind the factor of 'assuming continuity', while some studies took the path of investigating cognitive biases, other studies investigated the role of emotions.

Cognitive biases affect the forecasting abilities of management. Durand (2003) proposes two main factors: illusion of control and limited attention. Illusion of control is related to overconfidence. Durand (2003) maintains that "overconfidence (or hubris), which occurs when a manager is sure that decision outputs are accurate when they are not (Bourgeois, 1985; Duhaime & Schwenk, 1985), is the failure to know the limits of one's current knowledge due to stress, ambiguity, and complexity (Barnes, 1984; Halman & Keizer, 1994)" (2003, p. 823). The illusion of control may also occur because of attention to cues that were once valid but no longer are. The second factor is attention. Poor attention to environmental cues leads to the failure to explore relevant alternatives.

Studies also show that dominant logic orients individuals' vision, resulting in blind spots and escalation of commitment (Prahalad & Bettis, 1986). Every organisation models how it perceives the environment more or less through its successful and unsuccessful actions (Prahalad & Bettis, 1986). The dominant logic that formed out of previous experiences "would first confirm what was already known and then constrain changes to the basic beliefs that guide sensing" (Dong et al., 2016, p. 102). Tripsas and Gavetti (2000) showed how top management's beliefs constrained Polaroid's market position more than traditional path-dependent capability phenomena (Teece et al., 1997). The authors, in an in-depth case study of Polaroid, showed how senior management's cognitions about how Polaroid competed hindered the firm's ability to develop the new capabilities needed for the company to compete in selling software rather than hardware. Interestingly, the study showed that Polaroid had developed an array of new digital imaging competencies, but that rigidity in existing processes and management's inability to implement a new business model stopped them from successfully entering new markets.

With the emotional factor starting to make inroads into strategic management, Brusoni et al. (2019) propose two forces that hinder people's tendency to explore alternative courses of action: attachment and distance. Each represents a different negative emotion. On the one hand, agents experience "attachment" to choices that proved successful in the past, and hence comfort in these choices and anxiety when abandoning them. On the other hand, they also experience fear of less familiar options, as they lack knowledge about "distant" choices that have not been tried for a long time or ever. High attachment is related to anxiety and high distance to fear. Both of these negative affective states hinder exploration. Hodgkinson & Healey (2011) reanalyse the Polaroid case and argue for the importance of "meta-cognitive capabilities— that is, the ability to develop self-awareness of, and to regulate, cognitive and emotional processes" (2011, p. 1504).

In a different stream of work, the behavioural theory posits that the search for alternatives is guided by the current aspiration levels of decision-makers and thus affected by anything that affects these aspirations. March and Simon (1958) posit that the intensity of search depends on the performance of the organisation relative to aspirations and organisational slack. As March observed, “discussions of search in the limited rationality tradition emphasize the significance of the adaptive character of aspirations themselves.” (March, 1991, p. 72). Along the same lines, Winter (2000) adds that it is the dynamic nature of aspirations that enables (or stems) the generation of new decision alternatives.

Evidence from the cases supports the hindering effects of attachment (Brusoni et al., 2019) and reveals two types of attachment: attachment to the status quo, as evident in the high voltage case, and attachment to the dominant logic in the fibre optic case. As observed in the two cases, the two types of attachment differ in causes and effects on the strategic response. Attachment to the status quo that led to inaction in the high voltage case was a conscious decision to avoid uncertainty. It implies that management, recognizing the uncertainty in the opportunity at hand and the unpredictability of the outcome, deliberately chose not to act. Conversely, attachment to the dominant logic implies an illusion about the limits of knowledge, an illusion about the predictability of the outcome, and an illusion concerning the applicability of past strategies to the new situation. This type of attachment does not hinder action, rather renders it ineffective in dealing with change. As such, it comes as no surprise that the attachment to dominant logic in the fibre optic case was, as Durand (2003) suggests, associated with poor forecasting abilities.

Perhaps the two points that remain puzzling are, first, why some decision-makers seem to escape cognitive biases and a satisficing attitude towards learning, and second, that cognitive biases and emotionally rooted assumptions seem to show resistance to revision and change. In other words,

cognitive biases and emotions block not only information that challenges held assumptions but also information about the cognitive bias that blocks challenging the assumptions. These biases, galvanized by emotions, seem to be embedded in a belief system that provides them with persistence and resistance to change. In his article *Debiasing*, Fischhoff (1982) was perhaps both realistic and optimistic. He was realistic in stating that decision-makers are unable to step outside their own framings of the problem at hand. He was optimistic in proposing group deliberations and discussions as a potential way of revising and correcting wrong assumptions (Hodgkinson & Healey, 2011). Research evidence reveals that the observed congruence between senior management's attitude and established organizational cultures indicates that senior management may not allow the rest of the organisation to crosscheck their assumptions, including their cognitive biases if they themselves are not open to learn something that challenges their assumptions. Consider the role of scenario planning commonly employed to stretch decision-makers beliefs regarding future uncertainties, DN's senior management, who demonstrated unreceptivity to information that contradicted their assumptions, did not permit others in the organisation (e.g. the finance department) to conduct scenario planning and sensitivity analysis to probe their assumptions either.

### *Learning Goals in Achievement Settings*

Borrowing from educational psychology, the highly influential goal orientation theory bears the potential to shed more light on search and learning activities in achievement settings. The theory proposes *why* learners engage in various learning activities and how their goal-orientations influence their learning behaviour and outcome (e.g., Ames, 1984; Dweck, 1986; Elliot, 1999; Elliot & Dweck, 2005; Nicholls, 1984). Researchers have agreed that there are two primary,

contrasting goal orientations: mastery and self-validation (Rusk & Rothbaum, 2010). Different authors refer to the two goal orientations using different terms: mastery and performance goals (Ames & Archer, 1988), task-involved and ego-involved goals (Nicholls, 1984), and task-focused and ability-focused goals (Maehr & Midgley, 1991). We use mastery and self-validation terms to distinguish between the two orientations.

Actors with a mastery goal orientation focus on improving their abilities, mastering tasks, and gaining a better understanding, whereas actors with a self-validation goal orientation focus on demonstrating their ability in relation to others, seeking public recognition for high-level performance, and avoiding judgment for low ability (Ames, 1992; Dweck & Leggett, 1988). The theory proposes that people's goal orientations have a clear impact on their learning behaviour and, thus outcome. Mastery, as compared to self-validation goal, is more likely to lead to cognitive openness, problem-solving, deep processing of information, and persistence in the face of failure. Conversely, the self-validation orientation is linked to a negative set of behaviour and outcomes, e.g. withdrawal of the effort in the face of failure, surface processing of information, and decreased task enjoyment. (Ames, 1992, Dweck & Leggett, 1988). Third, and most importantly, mastery goals, in which individuals seek to increase their competence, were predicted to promote a challenge-seeking attitude, whereas performance goals promote certain forms of risk-avoidance even when the perceived ability was high (Elliott & Dweck, 1988). As Dweck (1986) observes, self-validation goals inhibit challenge seeking.

According to the theory, the self-validation goal interferes with effective learning. As Rusk & Rothbaum (2010) put it, "there is often a tradeoff between pursuing self-validating goals and pursuing learning [mastery] goals" (2010, p. 33). "The tasks that are best for learning are often challenging ones that involve displaying ignorance and risking periods of confusion and errors.

The tasks that are best for looking smart are often ones that students are already good at and won't really learn much from doing" (Dweck, 1999, p. 161). The proposed argument in Chapter Nine gives more details about theories on beliefs that drive decision-makers' search and discovery behaviour.

Perhaps the most luminous insight of this theory is in uncovering what shapes people's learning goals. Learning goals and behaviour are determined by a person's beliefs about whether one's ability is fixed, referred to as "entity view," or changeable and improvable, referred to as "incremental view" (Dweck, 1999; Kaplan & Maehr, 2007). Those, who believe that knowledge and capabilities they have are fixed, tend to identify with what they know already. They hold onto it and feel rather defensive and disturbed by new information about a subject because the new puts into question the fixed sum of information they have. Conversely, actors who believe that knowledge continuously grows and changes tend to engage with continuous learning and tend to think that they can never know enough. They also regard mistakes as learning opportunities.

#### 8.2.4 Engagement with Uncertainty

The cross-case analysis resulted in a number of insights related to dealing with high uncertainty (i.e. unknowable unknowns). First, imagination does not seem to play a primary role in dealing with highly uncertain opportunities. Decision-makers could be sufficiently imaginative to sense potential value creation opportunities, but action to explore them may or may not follow, and may or may not succeed. Second, firms, in trying to raise their chances of success in exploiting uncertain opportunities, follow two very different paths. Some firms tend to act only on what is already existing, demonstrable, and obvious as a way to increase the odds of success. In other

words, they rely on the continuity of the present into the future. Other firms, seeking also to increase their odds, use their own actions to direct future developments in their favour.

Making decisions and taking actions in the face of inherently uncertain, even unknowable, futures is one of the most closely held assumptions in behavioural economics, entrepreneurship, and strategic management (e.g., Knight, 1921; Sarasvathy et al., 2003). The focus of this point is to review main theories about decision-makers' taking decisions and actions to deal with unknowable unknowns. We start with biases and heuristics in behavioural economics, which is a widely held theory that has much influence on the economics literature. We then review the discovery-creation debate about entrepreneurial opportunities since it provides conflicting views about key factors behind dealing with the unknowable future and conclude by reviewing the theory of attachment and exploration in psychology.

### *Biases and heuristics*

Biases and heuristics are one of the main theories in behavioural economics. It posits that when operating under conditions of uncertainty, decision-makers make subjective rule-of-thumb judgements that behavioural economists refer to as decision making under heuristics. Kahneman (2011) identifies two fundamental cognitive approaches to decision-making. "System 1" is concerned with quick, unconsidered, reflexive and often impulsive thinking. "System 2" is concerned with slow, rational, and ordered thinking (2011, p. 21). Kahneman characterises decision-makers who take unquantified risks associated with System 1 as irrational, optimistic risk-takers and asserts that a cognitive bias causes them to neglect the role that luck plays in their success and makes them prone to an "illusion of control" (2011, p. 259). He consequently



dismisses their belief in the ability to shape their success. He fundamentally reduces entrepreneurship to serendipitous luck. In advancing this proposition, Kahneman does not take into consideration Knight's (1921) key distinction between risk and uncertainty. In the absence of knowledge about the probabilities of possible outcomes, taking a quantified risk is an option that is not available in these situations (Poole, 2016). Teece et al. (2016) emphasise the importance of System 1 for organisational agility stating that "Kahneman's System 1 thinking can help one react quickly to the environment, and slower and more analytical System 2 thinking to correct mistakes from System 1 thinking." (2016, p. 28).

#### *Discovery versus Creation Debate*

Research on entrepreneurial cognition explores why entrepreneurial opportunities are not immediately apparent. The "core puzzle" of entrepreneurship is as follows: do entrepreneurial opportunities "exist as objective empirical gaps in the "real" world waiting to be discovered? Alternatively, do they arise out of the actions of entrepreneurs themselves (S. Alvarez & Barney, 2007)" (Suddaby et al., 2015, p. 1). The 'discovery' view implies that all unknowns are knowable if some factors are present, like extensive search, alertness, access to critical information, and foresight (e.g., Busenitz, 1996; Gaglio & Katz, 2001; Gavetti & Menon, 2016; Kirzner, 1979; Lanivich et al., 2022; Peterson & Wu, 2021). The 'creation' view, on the other hand, implies that the future is undiscoverable because it does not exist yet. Winter (2000) succinctly explains the difference, saying, "A search for alternatives may be conceived as involving creation, rather than mere discovery and assessment of alternatives that are in some sense preexisting." (2000, p. 984). The literature adopting the 'creation' view emphasises the important factors of creativity, imagination, and effectuation (e.g., Gavetti et al., 2017; Goss & Sadler-Smith, 2017; Lachmann,

1986; Jones & Pitelis, 2015; Sarasvathy, 2001a, 2008) to enact the future. The ‘discovery’ view was discussed in the previous section. This section is dedicated to the ‘creation’ view.

In management and entrepreneurship literature, imagination has often been identified as important. Hamel and Prahalad (1991), for example, argue that corporate imagination is the key to innovation. For the case of new ventures, Bhidé (2000) suggests that new venture entrepreneurs “have to use their imaginations to envision what their firms could become along several dimensions, such as the markets they will serve, the tangible and intangible efforts they will acquire, and their organisation’s climate and norms” (2000, p. 296). Cornelissen and Clarke (2010) explain “How entrepreneurs imagine venture opportunities and how they simultaneously develop and legitimize new ventures to exploit such opportunities” (2010, p. 554). In dynamic capabilities literature, entrepreneurial imagination is identified as critical when there is deep uncertainty about the future. Teece and Leih (2016) maintain, “With deep uncertainty, good management must include the art of imagining a future and endeavouring to build it. Reason and analysis is only one element of the process. Awareness of available opportunities is important, and it is often aided by imagination” (2016, p. 9).

Case study evidence does not support the primary role of imagination. Both KS and DN were imaginative enough to envision the promising better value of the new products versus the existing ones (see Sections 5.3.1 and 6.3.1). While one company (KS) in the solar PV case decided to take preemptive action and economically explore the new product early on, the other company (DN) in the fibre optic case decided to capitalize on the existing demand for the less value-added product. While KS was successful, DN was not. The difference in attitude between KS and DN could not stem from an ability (or inability) to imagine and sense the better value of the new product versus the existing one since the imagination factor was present in both cases and thus cannot account for

the difference. Having said that, it is worth noting that the imagination factor is expected to play a more significant role in the context of developed markets where firms may be unsure about the value and return of new technologies. However, this technological uncertainty is less of an issue in a development context.

The other factor highlighted by literature in dealing with radical uncertainty is effectuation. In her effectuation theory, Sarasvathy (2001a, 2001b) posits an alternative to predictive (causal) reasoning for situations where prediction is untenable, and goals are ambiguous. Entrepreneurs rely on action, not on predictive rationality, to bring new firms and markets into existence. Building on Weick's work (1979) who proposes that organisations shape their environment, Sarasvathy and colleagues (2003) argue that entrepreneurs rightfully believe that the future is yet to exist, and they endeavour to create it through their own actions, knowledge, skills, and available means.

Evidence from the cases shows that successful actors do act as if they believe that the future is not "out there" to be discovered but that it is created through the very strategies of the players. Indeed, KS's decision-makers expressed their belief that the future is created, not discovered. Not only that. They made active attempts to influence the future in areas that are considered unknowable. For instance, regarding the inflexion point of the new product, KS was selective in choosing their first clients by targeting those who were pioneers and exemplars to other companies so that others would follow them, leading to mass adoption of the new product. In the area of regulatory climate, KS also was active in educating and training policymakers about the new product. Whether KS's actions in these areas of unknowable unknowns did, in fact, shape the future could not be claimed, let alone verified. However, their endeavour to influence these areas supports Sarasvathy's notion that entrepreneurs do believe in their ability to create the future. However, this claim of creating the future should not be regarded as some kind of illusionary thinking. Weick (1979), in his theory

of enactment, focuses on the endogeneity of the environment, arguing “people invent rather than discover part of what they think they see.” (1979, p. 166).

To summarize this point, evidence suggests that each of the two views (discovery and creation) emphasises one area of unknowns experienced in the decision to exploit an opportunity. The discovery view focuses on discovering the knowable area of uncertainty, while the creation view focuses on dealing with the unknowable area of uncertainty. Therefore, each view complements its counterpart and is important to theorise about what stands behind the successful exploitation of opportunities. While case study evidence does not support the literature’s emphasis on the imagination factor, it supports the effectuation theory and the contingent view of the future.

The other area of literature that could potentially shed light on the case insights is related to control-versus action-based value capture alternatives. Studies in this area are few but give a fresh look into the subject of opportunity exploitation. Ching et al. (2018) maintain that control and execution represent alternative paths to earning future rents: one is based on exogenous appropriation factors that control distribution of rewards, and the other is based on endogenous abilities to act earlier, learn faster, and create better value. According to a study that compares appropriation strategies adopted by student-led versus faculty-led groups to commercialize their inventions, when confronted with the two alternatives, the authors argue that decision-makers’ choices are derived from their personal preferences and entrepreneurial capabilities. The study reports that, while both groups are imaginative and inventive, they differ in their value capture strategies. Students tend to choose a strategy that depends on acting earlier, learning faster, and creating better value compared to competitors. The faculty-led groups, on the other hand, tend to choose an exogenous appropriation barrier (e.g. intellectual property protection) that blocks future competition.

In sum, as explained earlier, case study evidence suggests that discovery and creation are not mutually exclusive but are complementary aspects of the entrepreneurial endeavour in addressing opportunities. On the other hand, case study evidence seem to support the control versus action alternative paths proposed by Ching et al. (2018). In the fibre optic case, DN could imagine new higher-value combinations (products) but did not endeavour to explore their economic potential since unknowable unknowns were involved. They chose to rely on exogenous factors that control the distribution of reward. On the other hand, KS, in the solar PV case, pursued novel combinations despite existing unfavourable conditions that were beyond their control. Lacking any control over the outcome, they still chose to rely on acting earlier, learning faster, and building their market position ahead of others (first-mover advantage). Ching et al. (2018) argue that choosing one path and not the other seems to be driven by decision-makers individual preferences and capabilities. In this regard, the attachment theory (Bowlby, 1969/1982; Cassidy & Shaver, 1999; Mikulincer & Shaver, 2007) borrowed from psychology makes a number of claims that seem to offer an explanation for individual differences.

According to the attachment theory, there are two main systems that affect individuals' behaviour, the attachment system and the exploration system. While the attachment system exists to bring the child into close proximity with safety and security, the exploration system exists to propel the child into exploring the world. The two systems are "closely intertwined" (Elliot & Reis, 2003, p. 317). Affected by differential experiences in their childhood, adults tend to adopt one of two primary styles: one style characterized by a tendency for exploration and challenge seeking, and another style characterized by a tendency to obsess over security and safety relative to exploration (Elliot & Covington, 2001). The proposed thesis in Chapter Nine will provide more details on the beliefs that drive decision-makers' exploratory behaviour.

## 9 Towards a Theory on Antecedents of Dynamic Capabilities in a Development Context

“[T]heory is needed precisely because reality is so complicated” (Edith Penrose, 1989, p. 11).

Change opens up opportunities to expand but also laces exploitation with varying degrees of uncertainty. Abilities to manage change and ensuing uncertainties are hallmarks of firms’ success in seizing expansion opportunities. While the neoclassical approach is typically based on assumptions of perfect information and mitigatable risk, investigation of real-life business situations shows that imperfect information and unquantified risk (i.e. uncertainty) are pervasive. Emergent codes and themes from the case studies undertaken for this research underline the importance of learning and managing uncertainty and their central role in enabling firms to achieve successful expansions of scale and scope.

Based on key research insights detailed in Section 8.1 and how they are situated within the extant literature detailed in Section 8.2, we attempt in this chapter to create a synthesis and propose preliminary propositions (or hypotheses) on the antecedents of dynamic capabilities in a development context. The aim is to address Penrose’s earlier call, “If we can discover what determines entrepreneurial ideas about what the firm can and cannot do, that is, what determines the nature and the extent of the “subjective” productive opportunity of the firm, we can at least know where to look if we want to explain or to predict the actions of particular firms” (1959, p. 42). Propheying the difficulty of attaining that goal, Teece (2007) aptly points out that any attempt to identify the antecedents of dynamic capabilities “must be necessarily incomplete, inchoate, and

somewhat opaque.” (2007, p. 1321) because if they can be cognitively captured, communicated, and applied in different settings, then what we identify as antecedents of dynamic capabilities cannot be the factors behind the observed heterogeneity of firms’ performance.

In reviewing the literature in Section 8.2, we observe that, broadly speaking, research studies can be grouped under three main categories. The first category focuses on managerial and organisational practices and is concerned with examining the relationship between practices (variables and processes), on the one hand, and organisational outcome and performance, on the other. This line of research is premised on the assumption that particular behaviour (i.e. practice), if carried out, would lead to a better outcome (Bromiley & Rau, 2014). The second category focuses on factors of management cognition and cognitive biases and their effect on managerial practices and subsequent outcomes (e.g., Durand, 2003; Tripsas & Gavetti, 2000). This line of research implies that management cognition and cognitive biases could block good practices from taking place or produce “suboptimal practices” (Teece, 2014, p. 347). The third category, which has been gaining more traction lately, highlights the affective and emotional factor that precedes, influences, and complements cognitive processes in decision-making (e.g., Hodgkinson & Healey, 2011; Huy 1999, 2005; Vuori & Huy, 2015). Those three pathways of investigation took place in the form of consecutive and overlapping, more than parallel waves of scholarly investigation. Perhaps the reason is that the initial research work, constrained by what could be observed and measured, largely focused on practices (i.e. behaviour observed at the artifacts level), as they lend themselves relatively easily to empirical observation (see Camerer et al., 2005). On the other hand, studies on cognitive biases relied for some time solely on hypothetical gambling situations, until neuroscience imaging techniques (e.g. “EEG”, “PET”, “fMRI”) made a breakthrough in tracking cognitive and emotional activities (Camerer et al., 2005, p. 12). A fourth stream that is situated

within the domains of social and educational psychology and is yet to make inroads into empirical studies in the strategic management domain highlights the important role of human core beliefs in shaping firms' goals and behaviour in learning and addressing uncertainty.

Based on seminal work in social and educational psychology and management theory, the thesis advanced is based on the factor of core tacit beliefs as antecedents of dynamic capabilities in a development context and proposes four propositions regarding their role in the two areas of concern: learning and managing uncertainty. These propositions are yet to be validated in future theory-testing research. At this level, we only target theoretical generalisability with regard to firm-level dynamic capabilities in a development context (see details in Section 10.3).

We are aware that endeavours to investigate what decision-makers may have believed and intended at the time of making a decision run directly into the wall of lack of observability and measurement. However, scholars should not shirk from making an effort in theorising because the quality of subsequent hypothesis-testing research will be relative to the quality of the hypothesis-generating efforts.

The following sections put forward four propositions that build on key research points and supported by influential theories from multiple strands of management and psychology. In brief, the first proposition aims at disentangling entrepreneurship, understood as the urge to action, from the concept of dynamic capabilities. The second proposition introduces the concept of 'belief-enhanced' capabilities to define dynamic capabilities, in contrast to 'practice-enhanced' operational capabilities. The third and fourth propositions propose the defining roles of the belief in knowing versus possessing knowledge in learning and the belief in exploring against the belief in controlling in addressing uncertainty.



## 9.1 To Act versus to Act Effectively

“Dispositional, and particularly temperament-based, conceptualizations provide a rich explanation of how behavior is energized or instigated but have a difficult time explaining the precise directionality of behavior in specific situations” (Elliot & Thrash, 2002, p. 814)

The first set of insights that came out of the case study analysis is the importance of the willingness to take action. Without the willingness, there is no action, to begin with, and without action, there would be no exercise of dynamic capabilities or any other capability. Case study evidence also reveals that the existence of a willingness to act under uncertainty does not guarantee effective management of change and uncertainty, which indicates that as much as dynamic capabilities are concerned with *effective* management of change and uncertainty, they are separate from, albeit influenced by, the willingness to act.

In light of the above, the first proposition advanced here aims at disentangling dynamic capabilities from the willingness to act under uncertainty. This disentanglement is essential if we aim to theorise about antecedents of dynamic capabilities. First, we briefly discuss below what comprises the willingness to act, drawing on domains of entrepreneurial intentions and psychology. Then, we delineate the area covered by dynamic capabilities and explain in brief the proposed factors behind strong dynamic capabilities.

Virtually all decision theorists agree that values (desires) and beliefs in perceived competence jointly comprise the willingness to act under uncertainty (McMullen & Shepherd, 2006). In addressing opportunities that involve a level of uncertainty, the decision-maker considers what can

be done (belief), but before that, why it has to be done. The decision-maker starts with a desire, which directs attention and leads to receptivity to stimuli. Without a desire, stimuli pass unnoticed. Secondly, based on perceived competence and knowledge, the decision-maker believes that a certain action will lead her to reach her goal (to fulfil her desire). This “belief-desire configuration” is the core of the willingness to bear uncertainty associated with an action (2006, p. 148). However, the belief-desire proposition that dominates the entrepreneurial intentions strand of literature confirms but does not explain this obvious optimism and over-confidence (Bernardo & Welch, 2001) that entrepreneurs have concerning the feasibility of their actions and favourability of outcomes in the absence of any ability to predict results.

Drawing on psychology, the approach-avoidance theory is a fundamental and very influential theory in psychology that has been present in scientific psychology since its inception (Elliot & Thrash, 2002). Elliot and Thrash (2002) maintain, “The distinction between approach and avoidance motivation is fundamental and integral to the study of affect, cognition, and behaviour” (2002, p. 804). In brief, the theory posits that, whereas approach-oriented people would perceive change and uncertainty as a potential opportunity more than adversity, avoidance-oriented people, faced with the same situation, would perceive the opposite. The theory provides an explanation for the entrepreneurial phenomena of action orientation and optimism and the non-entrepreneurial phenomena of status quo bias and risk-aversion. This approach-avoidance distinction could indeed be observed in the research case studies and provide a potential explanation for the different tendencies of actors to respond when facing opportunity situations (see details in Section 8.2.1). The theory explicitly contends that approach-oriented decision-makers are almost hard-wired to be optimistic, and their optimism is less related to an objective assessment of opportunities.

As such, case study evidence clearly shows that the factors behind the willingness to act do not account for the effectiveness of that action. In other words, the approach and avoidance tendencies of actors do not account for the content of the action itself and its effectiveness in reaching favourable outcomes. Accordingly, the willingness to act is different from the area covered by dynamic capabilities, which is concerned with what makes the action *effective*. While acknowledging that superior dynamic capabilities have to include an element of entrepreneurship (i.e. an urge to action), they are more than that. To act in the face of uncertainty is entrepreneurial, but to act effectively requires dynamic capabilities.

The thesis advances two main factors that influence the effectiveness of the action and constitute antecedents of dynamic capabilities, namely the belief in knowing rather than possessing knowledge and the belief in exploring rather than controlling the future. The argument behind the two factors is that change ushers in a new reality. It opens new spaces of learning and spaces of creation. Effective action, as evident in the cases, must comprise learning about objective realities *and* enacting a subjective image of the future. This duality is different from the exploration-exploitation duality introduced by March (1991) and extended by O'Reilly and Tushman's work (2004, 2008, 2013) on ambidexterity. The duality proposed here is required within the act of the exploration itself, in the sense of discovering but also creating alternative courses of action. At a time of change, especially radical change, exploitation, based on leveraging existing knowledge, assets, resources, and capabilities, is not a good option, not because it is not viable, but because it is not competitive enough, as it entails leaving spaces of learning and exploration for the competitor to occupy with new and better value propositions. Penrose (1959) is among the earliest scholars to recognize this duality (learning and exploration). She emphasises managerial learning and equally entrepreneurial services. She stresses the objective reality of resources as well as the

subjective image of productive opportunities. Inspired by her work, Teece embraces both path dependency and imagination effects on the prospects of capabilities reconfiguration, calling it ‘evolution with design’ (Augier & Teece, 2008).

First, we should ask what it means to have antecedents of dynamic capabilities rooted in human beliefs and why we might find it useful to designate some capabilities as ‘belief-enhanced’. The next section focuses on introducing a new construct, ‘belief-enhanced capabilities’, and contrasts it with operational capabilities, which are depicted as ‘practice-enhanced capabilities’.

## 9.2 Practice-enhanced versus Belief-enhanced Capabilities

“Champions aren’t made in the gym. Champions are made from something they have deep inside them” (Mohamed Ali, undated)

The second set of insights that came out of the case study analysis and is consistent with the dynamic capabilities literature, is that operational capabilities acquisition and development are very different from dynamic capabilities, as the latter are arguably more difficult to acquire or develop. The second proposition proposes that dynamic capabilities are a type of capabilities that cannot be enhanced by practice and experience alone. They are engendered and developed by some core human beliefs. Beliefs may be mere conjectures, but they are responsible for how human cognitive and physical capacities are deployed. Human tacit beliefs “determine what we do, how we do it, and how we see our accomplishments in relation to the rest of the world” (Hoffman, 2015).

It seems important to start the discussion by clarifying the meaning of organisational capabilities. There is a huge variety in the literature on labelling: some authors call it absorptive capacity (Cohen & Levinthal, 1990), others call it organisational routines (Nelson & Winter, 1982), and organisational capabilities (Dosi et al., 2000). As a generic concept, “capability” implies “the potential to deliver consistent performance within a specified field by repeated applications of established patterns of behaviour, which constitute “knowledge how.”” (Laosby, 2010, p. 1303).

While organisational capabilities generally ought to persist in order to produce the required consistency and efficiency, their static and recursive features make them ill-suited to serve the changing environmental and strategic demands. The dynamic dimension of the operating context requires a meta-capability that is non-routine (Teece, 2012, p. 1397) and “non-practicing” to provide “a modus of reflection (and not direct acting)” (Schreyögg & Kliesch-Eberl, 2007, p. 927) to overcome the inherent risk of becoming rigid and trapped in old patterns of thinking and acting.

Scholars propose several conjectures of the instructive differences that differentiate capabilities that are required for production and self-organisation and those needed to manage change. Winter (2003) defines zero-level (i.e., operational) capabilities as doing more or less the same thing on an ongoing basis to make a living in the present. Dynamic capabilities, on the other hand, are meta-routine activities directed to the development and adaptation of operating routines (Zollo & Winter, 2002). Losaby (2010) differentiates between “capabilities that must be maintained in order to ensure consistent performance, and capabilities that allow performance to be changed, either in response to changed circumstances or to exploit new ideas.” (2010, p. 1304).

While scholars may have a good understanding of key modes of creating and enhancing operational capabilities (e.g. knowledge transfer, practising, repetition), they disagree on what

stands behind the quality and effectiveness of dynamic capabilities. Loasby (2010) aptly points out this problem:

“If all production requires appropriate resources, then it is natural to assume that the production of innovation requires a category of resources that may be called “dynamic”; but specifying the distinctive content and modus operandi of these resources seems to be difficult.” (2010, p. 1303).

Indeed, literature on dynamic capabilities is full of adjectives (e.g. “effective”, “strong”, and “superior”) to account for unidentified factors that “embody a qualitative difference” (Katkalo et al., 2010, p. 1179). David Teece, who introduced the concept with colleagues in 1997, grapples with identifying these factors. In the early days of his proposed framework, he placed more emphasis on processes and routines (Teece et al., 1997). Over time, he started to lean towards a Schumpeterian (Mark I) view, in which he emphasises entrepreneurial capabilities that balance the path-dependent evolution of processes and routines (Teece, 2007).

In this regard, Teece and colleagues make two arguments against claims of routine-based and analytical-based antecedents of dynamic capabilities. Teece (2012) states that dynamic capabilities cannot be rooted in routines and best practices because such routines would “diffuse rather quickly among firms in any environment open to global competition where firms have access to benchmarking data, competitive off-the-shelf technologies, and best practice training” (Teece, 2014, p. 331). Thus, routines cannot be the source of a sustainable competitive advantage. Regarding analytical reasoning, Teece and Leih (2016) rule out both “inductive and deductive approaches” as possible knowledge creation modes that can “help managers cut through the fog that deep uncertainty creates” (2016, p. 6) because they are anchored in the past. Then, the authors

declare that the source of “strong” dynamic capabilities is “the art of imagining a future and endeavoring to build it.” (2016, p. 9).

Several scholars started to propose conjectures that depart from a pure cognitivist view of dynamic capabilities. For example, Hodgkinson & Healey (2011) propose that antecedents of dynamic capabilities are cognitive and emotional capacities that enable firms to “blend effortful forms of analysis” with “deliberate intuitive processes.” (2011, p. 1500). Nayak et al. (2020) propose non-cognitive microfoundations of dynamic capabilities based on a “tacitly-shared substrate of sensitivities and predispositions that precede cognitive representation” (2020, p. 280). Most recently, Baden-Fuller and Teece (2020) highlighted the need to incorporate the emotional dimension into the dynamic capabilities framework, arguing that “the key problem facing most organizations is not economic...rather it is cognitive and perhaps even emotional” (2020, p. 105).

Based on all the above, the thesis puts forward a new proposition that dynamic capabilities are belief-enhanced capabilities. Belief-enhanced capability is a capability which derives its direction, intensity, and quality from an individual’s tacit beliefs. In dealing with change, beliefs about learning new things and dealing with the uncertainties of change have a profound impact on how people engage with opportunities and growth. The practice-enhanced capability, on the other hand, improves and gains quality from explicit actions of knowledge transfer, practising and repetition. While Polanyi (1966) drew attention to the importance of *tacit* knowledge for technology transfer, we propose to recognize the criticality of individuals’ *tacit* beliefs since these beliefs are responsible for how human cognitive and physical capacities are deployed. In the next two sections, we unpack the beliefs that arguably stand behind effective dynamic capabilities.

### 9.3 Belief in Knowledge versus Knowing

“All group learning ultimately reflects someone’s original beliefs and values, their sense of what ought to be, as distinct from what is.” (Schein, 1978, p. 28)

The third set of insights that came out of the case study analysis suggests that people are not equally open to learning, even if they are highly motivated and take risks in pursuing uncertain opportunities (see Section 8.2.3). Moreover, case study evidence shows that senior management’s attitude towards learning reflects on the learning culture of the organisation as a whole, causing senior management’s learning attitude to have a compounded effect firm-wide. The literature highlights the influences of memory (Nelson & Winter, 1982), attachment (Brusoni et al., 2019), the illusion of control (Durand, 2003), and cognitive inertia (Tripsas & Gavetti, 2000), which are all referring to some sort of attachment to the past or to the status quo. However, there is less theorising about why these cognitive biases and attachments seem resistant to change, and why some decision-makers seem to escape these cognitive biases and emotional attachment. On the other hand, the literature highlights the important factor of aspirations (e.g., Winter, 2000) in determining the speed and intensity of learning. The goal orientation theory (Ames & Archer, 1988; Dweck, 1999; Elliot, 1999) borrowed from educational psychology makes a number of claims that seem to offer explanations for research insights.

People have different beliefs about the nature of knowledge and knowledge acquisition. These beliefs can powerfully influence their learning behaviour and its outcomes. The traditional understanding of the nature of knowledge emphasises the “epistemology of possession,” (Cook & Brown, 1999, p. 381) since it treats knowledge as a resource that individuals and firms possess.



Another understanding of knowledge, highlighted in educational psychology, emphasises an epistemology of malleability, i.e. knowledge is continuously extended and altered. While acknowledging the existence of two views in literature concerned with knowledge and capabilities, one emphasises extant knowledge and the other emphasises learning, the relation between knowledge and learning is so inextricable that it is hard to imagine they could be divorced in the minds and strategies of decision-makers. Educational psychology makes critical insight in this regard.

Based on one of the very influential and empirically supported theories of educational psychology (Rusk & Rothbaum, 2010), in an achievement setting (e.g. schools or business ventures), learning goals and behaviour are determined by a person's beliefs about whether her ability is fixed, referred to as "entity view," or improvable, referred to as "incremental view" (Dweck, 1999; Kaplan & Maehr, 2007). Those, who believe that knowledge and capabilities they have are fixed, tend to identify with what they know already. They hold onto it and feel rather defensive and disturbed by new information about a subject because the new puts into question the fixed sum of information they have. Conversely, actors who believe that knowledge continuously grows and changes tend to engage with continuous learning and tend to think that they can never know enough. They also regard mistakes as learning opportunities. It could be argued that while one belief depicts knowledge as an existing resource to leverage, the other belief depicts knowledge as a day-to-day action. The difference could be viewed as a belief in the worth of possessions versus a belief in the worth of efforts. At a time of change, the second belief tends to be more effective in dealing with changing environment because it is inherently dynamic, allowing for revision and updating. Accordingly, those who believe in knowing (i.e. learning) more than possessing knowledge tend to take up challenging tasks based on the belief that they can know what they don't yet know to

carry out the new tasks. On the other hand, those who believe in fixed knowledge approach tasks that leverage what they know already. Those tasks tend to be less challenging, and thus bear less opportunity for learning. As a result, they tend to forego learning opportunities and hold onto extant knowledge, which becomes less and less relevant as the environment changes.

Moreover, the theory claims that beliefs related to knowledge shape people's goal orientations. The entity (fixed) view about knowledge leads to self-validation goals (a focus on proving one's ability to others or versus others), while incremental views lead to learning or mastery goals (with a focus on enhancing one's abilities) (Dweck, 1986, 1999; Dweck & Leggett, 1988). Put together, the combination of people's beliefs about knowledge and their goal orientation can powerfully influence their learning success. Those who have an entity view of abilities and emphasise self-validation goals tend to be vulnerable to negative feedback and likely to disengage from challenging learning opportunities. In contrast, people, who believe ability is changeable (incremental view) and embrace learning goals, tend to rebound better from occasional failures. They also tend to employ existing resources and capabilities in undemonstrated uses, believing they can learn 'what it takes' to carry out the new task.

According to studies, mastery goals, as compared to self-validation goals, are more likely to lead to cognitive openness, problem-solving, deep processing of information, and persistence in the face of failure. Conversely, self-validation orientation is linked to a negative set of behaviour and outcomes, e.g. withdrawal of effort in the face of failure, shallow processing of information, and top-down biasing of attention (Ames, 1992, Dweck & Leggett, 1988). In terms of dealing with challenging situations, self-validation goals, in which individuals seek to prove their ability or want to perform better than others, promote certain forms of risk-avoidance and defensive strategies even when the perceived ability is high (Elliott & Dweck, 1988, Dweck, 1986).

Conversely, mastery goals, in which individuals seek to increase their competence, are predicted to promote a challenge-seeking attitude.

Given the above, the third proposition advanced here is that the belief in knowing and learning versus possessing knowledge is one of the core beliefs that enhances the dynamic capabilities of individuals and firms. The belief in learning promotes cognitive openness, problem-solving, deep processing of information, and persistence in the face of failure. Belief in extant knowledge promotes cognitive inertia, superficial processing of information, and withdrawal. Importantly, those who believe in learning and knowing accept challenging tasks, while those who believe in knowledge are afraid of making mistakes and opt for less challenging tasks (Dweck, 2006).

#### 9.4 Belief in Control versus Explore

“Everything that grows and changes...is not controllable” (Eric Fromm, 1990[1976], p. 25)

The fourth set of insights that flows from the case study analysis suggests that firms are not equally open to exploration, i.e. introducing novel combinations relying on contingencies beyond their control (see Section 8.2.4). The literature highlights the factors of imagination (Jones & Pitelis, 2015), abductive reasoning (Teece et al., 2016), effectuation (Sarasvathy, 2001a), and the belief in the endogeneity of the external environment (Weick, 1979), as factors that enhance exploration. Case study evidence suggests that some actors could imagine new higher-value combinations (products) but do not endeavour to explore their economic potential if unknowable unknowns are involved. Other actors pursue novel combinations despite existing unfavourable conditions that

are beyond their control. They may also demonstrate an ability to establish an exploratory organisational culture, in which staff are daring and challenging of the status quo. The attachment theory (Bowlby, 1969/1982; Cassidy & Shaver, 1999; Mikulincer & Shaver, 2007), borrowed from psychology, makes a number of claims that seem to offer insights about tendencies towards exploration.

The attachment theory, formulated by the British psychiatrist John Bowlby (Bowlby 1969/1982, 1973, 1980), is highly regarded as a well-established and well-researched explanation of individuals' differences in their "internal working models", which comprise a set of beliefs about security and exploration that guide their behaviour in their adulthood. According to this theory, there are two main systems that affect behaviour, the attachment system and the exploration system. While the attachment system exists to bring a child into close proximity with safety and security, the exploration system exists to propel the child into exploring the world. The two systems are "closely intertwined" (Elliot & Reis, 2003, p. 317). Affected by differential experiences in their childhood, adults tend to adopt one of two primary styles: one style characterized by a complementary balance between the two systems, also called secure attachment style, and the other is a tendency to obsess over security and safety relative to exploration, also called insecure attachment style. Growing up, a securely attached individual has a tendency to exploration and challenge seeking, and an insecure individual has a tendency to caution and concern with safety and protection (Elliot & Covington, 2001). Mikulincer and Shaver (2007) explain the exploration system by saying it is "the generator of curiosity and exploratory behaviour, which facilitates the acquisition of life-enhancing knowledge and skills" (2007, p. 139). Those with a secure style have this exploration system fully developed. Several studies reveal links between adult attachment styles and cognitive curiosity, openness to intellectual experiences,

interest in adventurous leisure activities, and orientations to work (Green & Campbell, 2000; Hazan & Shaver, 1990; Mikulincer, 1997). Explaining the reason, those with a secure style are able to regulate their innate fear of unfamiliarity and employ affect-regulation strategies that enable them to deal positively with novelty. Those with an insecure style, on the other hand, tend to seek proximity with what is familiar as an affect-regulation strategy to deal with fear of the unknown and tend to act with high avoidance and anxiety towards what is unfamiliar (Mikulincer et al., 2003).

The theory advances another critical proposition that might explain a firm's organizational culture towards exploration. Bowlby (1979) argues that the individual requires a "secure base" from which to explore the environment because the need for security intervenes with exploration. In the face of threat, seeking security "is activated and the goal of exploration or learning is deactivated" (Rusk & Rothbaum, 2010, p. 33). In light of this, it could be argued that lacking a secure base, management and staff would be very cautious and pursue conservative strategies and opportunities with predictable outcomes in order to minimize chances of failure, loss, and regret, which could damage their sense of security and self-esteem. Decision-makers who have an internalised secure base (Vaughn et al., 2007) tend to better regulate their fear of the unknown; hence, they are more active in exploring new and unfamiliar combinations. They also tend to turn the organisation itself into a secure base for other employees, from which they can explore new combinations.

Given the above, the fourth proposition advanced here is that the belief in 'explore' versus 'control' is one of the core beliefs that enhances the dynamic capabilities of individuals and firms. Belief in exploration enables decision-makers to actively explore the landscape and introduce novel combinations. For actors holding that belief, the possibility of failure is not an anxiety-provoking, distracting concern. Conversely, the belief in control encourages decision-makers to stay in

proximity to what is familiar. For actors holding that belief, the lack of a secure base re-orientes them towards avoidance of unpredictable outcomes and thus discourages exploration (Elliot & Reis, 2003).

## 9.5 Integration and Profiling

The four propositions advanced in the thesis draw on three highly influential theories of psychology: the approach-avoidance motivational system theory (Elliot, 1999), the goal orientation theory of achievement (Dweck & Leggett, 1988), and attachment theory (Bowlby, 1969/1982, 1973, 1980). Each theory contributes to the understanding of one aspect of firms' behaviour in exploiting expansion opportunities. The approach-avoidance motivation system theory explains decision-makers' differences in temperament (positive and optimistic versus negative and pessimistic) in addressing opportunities and change in general. The goal orientation theory of achievement explains decision-makers' differences in engagement with learning (open and engaging versus rejecting and disengaging with challenging information). The attachment theory explains decision-makers' differences in exploring the unknown (seeking familiarity and security versus seeking novelty and exploration). While the first theory (the approach-avoidance theory) explains the tendency of decision-makers to act, the other two theories (goal orientation and attachment theories) explain the content of the action with respect to learning and exploration.

The argument presented here is that goal orientation and attachment theories make the foundations of core beliefs that represent antecedents of dynamic capabilities. The final step of the thesis is to build on the empirical studies of the three theories to identify the different behavioural profiles of individuals with respect to the willingness to act under uncertainty, engagement with learning, and engagement with exploration. These profiles could potentially explain decision-makers' behaviour

in addressing expansion opportunities. The goal of identifying these profiles is to offer a theoretically grounded conceptualization of the adjectives, e.g. “effective”, “strong”, and “superior”, that are commonly used to describe dynamic capabilities to indicate their elusive qualitative content. What supports this profile identification attempt is the commonality in what psychology theorists and dynamic capabilities scholars define as optimal and non-optimal profiles.

A few scholars in the realm of psychology attempted to integrate the three theories (e.g., Elliot & Reis, 2003; Rusk & Rothbaum, 2010). We will build on their attempts. However, a number of caveats need to be made. First, each theory presents its main constructs in the form of contrasting pairs as a way of simplifying the explanation of the differences, but in reality, the two pairs are two opposite ends of a continuum. Meaning, there are behavioural profiles at each point along the continuum. For simplification, we will use only the two pairs as well to designate and explain the different profiles. Second, the full-blown versions of the theories include details on subtypes of main constructs, e.g. subtypes of the insecure attachment style in the attachment theory. For simplification, we will not include these subtypes in our profiling attempt. Third, different scholars use different labels for the constructs. We will fix labels for the constructs in the profiling exercise while referring to different scholarly works so as not to create confusion.

The first point that could create confusion and needs to be tackled is to distinguish between the “approach” and “avoidance” constructs as temperaments (i.e. predispositions), and “approach” and “avoidance” as orientations of achievement goals. For this, Table 31 presents the constructs of each theory and a brief description of the main characteristics. Understanding the labels and descriptions of the constructs is important before going into identifying profiles from the integration literature.

Table 31 Constructs and descriptions of the three theories

<b>The Theory</b>	<b>The Construct</b>	<b>The Description</b>
The Approach-Avoidance Motivation System Theory	Approach temperament	A sensitivity to positive/desirable (i.e., reward) stimuli (present or imagined) that is accompanied by perceptual vigilance for, affective reactivity to, and a behavioral predisposition toward such stimuli. (Elliot & Thrash, 2002, p. 805)
	Avoidance temperament	A sensitivity to negative/undesirable (i.e., punishment) stimuli (present or imagined) that is accompanied by perceptual vigilance for, affective reactivity to, and a behavioral predisposition away from such stimuli (Elliot & Thrash, 2002, p. 805).
The Goal Orientation Theory	Mastery-approach goals	Focuses on the development of competence and task mastery (Elliot & Thrash, 2002, p. 806).
	Self-validation-approach goals	Focuses on attaining competence relative to others (Elliot & Thrash, 2002, p. 806).
	Self-validation-avoidance goals	Focuses on avoiding incompetence relative to others (Elliot & Thrash, 2002, p. 806)
The Attachment Theory	Secure style	Allows for the exploration of the environment in unimpeded fashion (Elliot & Reis, 2003, p. 317)
	Insecure style	Hampers exploration or allows rigid exploration devoid of true interest. (Elliot & Reis, 2003, p. 317)

The second step draws on findings of previous empirical studies of the integration literature to identify the threesomes that were found to be positively associated. While each theory presents two constructs making the total six constructs (with 12 possible combinations), empirical studies carried out to examine associations reported positive associations only in 4 out of the 12 cases. The outcome of this step is presented in Table 32. Those four cases represent the base for our proposed four behavioural profiles that would arguably explain decision-makers differential attitudes in addressing expansion opportunities. To reach this outcome, we start by reporting and



explaining the findings of empirical studies regarding the positive and negative associations found between constructs. Table 32 summarizes these findings.

First, empirical studies have consensus on the positive association between the secure attachment style and the mastery-approach profile. In other words, the mastery-approach profile that promotes high engagement with learning, according to the goal orientation theory, was found to be positively associated with the secure style of attachment, which promotes high engagement with exploration, according to the attachment theory. Studies also reported a negative association between insecure attachment style and the mastery-approach profile. In other words, high engagement with learning is negatively associated with low engagement with exploration.

Table 32 Positively associated constructs

#	Constructs	Empirical findings of previous studies
1	Approach/Mastery-approach/Secure	<ul style="list-style-type: none"> <li>- The approach temperament is positively associated with mastery-approach goals (Elliot &amp; Thrash, 2002).</li> <li>- Mastery-approach goals are positively associated with secure attachment (Elliot &amp; Reis, 2003).</li> </ul>
2	Approach/Self-validation-approach/Insecure	<ul style="list-style-type: none"> <li>- The approach temperament is positively associated with self-validation approach goals (Elliot &amp; Thrash, 2002).</li> <li>- Self-validation approach goals are positively associated with insecure attachment (Kogot, 2004).</li> </ul>
3	Avoidance/Self-validation-approach/Insecure	<ul style="list-style-type: none"> <li>- The avoidance temperament is positively associated with self-validation approach goals (Elliot &amp; Thrash, 2002).</li> <li>- Self-validation approach goals are positively associated with insecure attachment (Elliot &amp; Reis, 2003).</li> </ul>
4	Avoidance/Self-validation-avoidance/Insecure	<ul style="list-style-type: none"> <li>- The avoidance temperament is positively associated with self-validation avoidance goals (Elliot &amp; Thrash, 2002).</li> <li>- Self-validation avoidance goals are positively associated with insecure attachment. (Elliot &amp; Reis, 2003)</li> </ul>

Second, studies also unanimously support the positive association between the insecure attachment and the self-validation avoidance profile. In other words, the self-validation avoidance profile, which dissuades taking challenging tasks for fear of failure, leading to low engagement with

learning, was positively associated with the insecure style, which limits engagement with exploration. Studies also reported a negative association between secure attachment style and the self-validation avoidance profile. In other words, high engagement with exploration is negatively associated with challenges- and learning-avoidance attitude.

Third, studies reported a positive association between the insecure attachment style and the self-validation approach profile (Kogot, 2004 in Rusk & Rothbaum, 2010). In other words, the self-validation approach profile, which focuses on taking up tasks to prove abilities versus others, was found to be positively associated with insecure style, which limits engagement with exploration.

Finally, approach temperament (predisposition) is positively associated with approach goals, and avoidance temperament is positively associated with avoidance goals. In other words, those who engage with learning opportunities, whether for mastery or self-validation goals, have a general willingness to act. Conversely, those who avoid engaging with learning opportunities have a general unwillingness to act. There is one exception, which Elliot and Thrash (2002) call the “override” case (2002, p. 814). In the override case, the decision-maker has a natural avoidance temperament (i.e. unwillingness to act) but may decide to act and take an approach position with a limited engagement fashion as a “coping response” to the situation (see also Elliot & McGregor, 1999).

Based on these empirical studies that investigated relationships between different constructs, the exercise derives four empirically supported profiles. These profiles potentially describe the different behavioural attitudes in addressing expansion opportunities. Based on research findings and extant literature, the argument advanced is that successful exploitation of expansion opportunities usually requires a) willingness to act, b) high engagement with learning, and c) high engagement with exploration. We describe each profile in terms of those three elements.

Table 33 Behavioural profiles in addressing expansion opportunities

#	Profile	Characteristics
1	Approach/Mastery-approach/Secure	Action-oriented, Intrinsically motivated, Engage with high uncertainty, Demonstrate extensive learning and exploration.
2	Approach/Self-validation-approach/Insecure	Action-oriented, Driven by competition with others, Require guarantees about investment outcomes, Limited in learning and explorative efforts.
3	Avoidance/Self-validation-approach/Insecure	Inaction-oriented, Driven by competition with others, Require guarantees about investment outcome, Limited in learning and explorative efforts.
4	Avoidance/Self-validation-avoidance/Insecure	Inaction-oriented, Avoid competition, Limited in learning and explorative efforts.

Source: Author's conceptualization

First, profile (1) represents individuals with a secure attachment style and adopts mastery goals. They focus on the challenging task and “immerse themselves in the activity, free from concerns about the broader implications of success and failure.” (Elliot & Reis, 2003, p. 328).

Profile (2) shows actors who have an approach predisposition (i.e. willingness to act) but at the same time have low engagement with learning and exploration resulting from the self-validation and insecure features of the profile.

Profile (3) shows the “override” phenomenon (Elliot & Thrash, 2002, p. 814), in which actors have a natural avoidant predisposition (i.e. unwillingness to act) but may decide to act (i.e. take an approach position) with a limited engagement fashion as a “coping response” to the situation, in what Elliot & Thrash (2002) call “approach to avoid” (2002, p. 814). (See also Elliot & McGregor, 1999).

Profile (4) represents a positive relation between insecure attachment style and avoidance tendency. The explanation is that insecure individuals, being preoccupied with acceptance and rejection, may have heightened fears about the interpersonal implications of failure, leading them

to focus primarily on the avoidance of failure by avoiding taking up the task that involves a possibility of failure.

The four derived profiles could be mapped onto the research cases based on analysed codes and resultant insights in Section 8.1.

#### *Preliminary mapping of profiles to research cases*

First, profile (1) combines an urge to act and a high engagement with both learning and exploration. As such, it could be argued that this is the optimal profile from a dynamic capabilities point of view. This profile is consistent with KS's profile in the solar PV case. KS demonstrated an urge to act amid uncertainty. KS also demonstrated extensive search and discovery efforts and explored new combinations relying on contingencies beyond their control (see full details in Section 6.3 and Section 8.1). KS also demonstrated some secondary features of this profile, for instance, an ability to establish a safe environment inside the organization.

Second, profile (2) represents a willingness to act coupled with low engagement with learning and exploration. This profile supports research insights and the first proposition (see Section 9.1) that the willingness to act is separate from engagement with learning and exploration. This profile is consistent with DN's profile in the fibre optic case. DN demonstrated a willingness to act and exploit the opportunity coupled with limited learning and probing efforts and an unwillingness to explore new combinations given the unpredictability of the outcome (see full details in Section 5.3 and Section 8.1).

Third, profile (3) indicates that decision-makers could be reluctant to act but decide to override their reluctance and pursue approach-oriented learning goals. This could be observed in the high

voltage case. EN, which was initially reluctant to take action regarding the mass exportation opportunity, changed its attitude under crisis conditions and moved to exploit the opportunity to compensate for losses in the local market. It could be argued that profile (4) represents EN's natural profile in normal conditions, and profile (3) is its "override" profile to deal with crisis conditions (see full details in Section 7.3 and Section 8.1).

Concluding this section, the integration of the three theories aimed to identify profiles that potentially explain the three aspects of opportunity exploitation highlighted in case study research insights: the willingness to act, engagement with learning (knowable unknown), and engagement with uncertainty (unknowable unknown). Of course, the profiling specified above falls short of capturing the full spectrum of possible behaviour, but the hope is that the approach set out provides a useful abstraction on which to build future research linking behavioural factors with dynamic capabilities. Since we started the chapter with Penrose's ambitious quote on the importance of theory, we conclude with Simon's (1997) humbling quote:

"Whatever the scientific domain we are concerned with, theory always falls short of describing reality in all of its detail." (1997, p. 61)

## 10 Conclusion and Policy Implications

The thesis has attempted to provide a deeper understanding of what stands behind firms' response to expansion opportunities of scale and scope. This chapter sets out some tentative conclusions, policy implications, research limitations, and suggestions for future research.

### 10.1 Conclusion

“Our dilemma is that we hate change and love it at the same time; what we really want is for things to remain the same but get better.” (Sydney J. Harris in Brusoni et al., 2019)

This study started with an interest to understand what stands behind the differential performance of emerging-market firms in addressing opportunities to expand scale and scope. The subject is examined from a firm-level perspective taking incidents of expansion opportunities and the firm's response as the unit of analysis. The goal is to reach a better understanding of the growth and expansion behaviour of emerging-market firms.

Research data and findings confirm that firms are indeed heterogeneous in learning and capability building, and more so in their growth orientation and strategic capabilities to sense and exploit opportunities. These findings seem to support Teece's (2019) argument that “it is far more complicated to optimize over the space of available opportunities than over the ranges of costs and revenues” (2019, p. 25). The multi-case research with combined subjective and objective data provided fresh insights about what constitutes strong dynamic capabilities. Building on these

insights and supported by an interdisciplinary consultation of the literature, the thesis puts forward preliminary propositions about what influences firms' behaviour in addressing expansion opportunities of scale and scope and what constitutes antecedents of dynamic capabilities in a development context that enable firms to manage change and uncertainty inherent in expansion opportunities.

First, dynamic capabilities depend on firms' willingness to act under uncertainty, but willingness alone does not guarantee the effectiveness of action. The willingness to act is responsible for initiating and sustaining the action, whereas dynamic capabilities influence the effectiveness of that action. Case study evidence highlights two critical areas behind the effectiveness of action, which may separate success from failure at the time of change: one is engagement with learning (i.e. knowable unknowns), and the other is engagement with uncertainty (i.e. unknowable unknowns). We argue that change opens up new spaces for learning and other spaces for creation. Effective action at the time of change must comprise learning about new objective realities *and* shaping these new realities by creating novel combinations. While learning involves being influenced and shaped by the external state, creation involves influencing and shaping the external state. In other words, effective decision-makers need to be equally epistemologically humble and ontologically ambitious.

Second, dynamic capabilities are not similar to other operational capabilities, which gain their quality from knowledge transfer, practising and repetition. Dynamic capabilities are enhanced by some core human beliefs that define how they perceive and engage with knowing and learning and exploring the unknown, which are the two factors behind effective action at a time of change.

Third, regarding core beliefs about knowing and learning, drawing on educational psychology, people adopt one of two beliefs related to knowledge and learning: a belief that one's knowledge

and abilities are fixed or a belief that one's knowledge and abilities are changeable (Ames & Archer, 1988; Dweck, 1999; Elliot, 1999). Those, who hold the first view (entity view), treat knowledge and abilities as resources, which should be leveraged, but not discarded. They accept information that confirms what they know and build on it, and are less ready to accept what could challenge the value of what they have, i.e. know. Conversely, those who hold the second view (incremental view) perceive knowledge not as a resource but more as a process. They usually engage in learning opportunities to achieve a better understanding, increase their competence, and master new abilities. At times of change, those who hold the incremental view are in a better position to manage the new spaces of learning that open up.

Fourth, regarding beliefs about the unknowable unknown, the attachment theory (Bowlby 1969/1982, 1973, 1980) posits that the need for security intervenes with exploring the unknown. The theory proposes two primary styles of attachment, secure and insecure attachment styles: a secure type promotes exploration and challenge seeking, and an insecure type impels caution and concern with safety and protection (Elliot & Covington, 2001). The individual requires a "secure base" from which to explore the environment (Bowlby, 1979). Securely attached people have this secure base internalised in their internal working model, while those who are insecurely attached tend not to engage fully with exploring the environment. They prefer what is familiar because it gives them comfort and a sense of predictability (i.e. control) unless management establishes a safe culture inside the organisation so that the organisation itself would act as a secure base for employees. During times of change, those who are securely attached are in a better position to explore the new spaces of creation that open up.

In summary, the thesis proposes that behind the effectiveness of an action at times of change lies important beliefs that promote and impair dynamic capabilities, and these beliefs affect how the



decision-maker recognizes and manages spaces of learning and spaces of creation at a time of change. The thesis concludes by identifying four behavioural profiles of firms that influence the way they approach growth and expansion opportunities in a development context.

The thesis contributes to knowledge on four fronts. As a first step to theorising about the nature of dynamic capabilities, we disentangled the concept from other neighbouring concepts, like entrepreneurship, understood as an urge to act under uncertainty. Second, we introduced a new construct in the dynamic capabilities literature, which is ‘belief-enhanced capabilities’ to distinguish them from ‘practice-enhanced’ productive capabilities. We believe this construct help elaborate and integrate the so far less explored behavioural aspect of dynamic capabilities. Third, we proposed potential antecedents of the dynamic capabilities pertinent to addressing expansion opportunities in a development context, which advances the theoretical research agenda initiated by Teece (2007), and answers Zollo and Winter’s (2002) question concerning where dynamic capabilities come from. Fourth, the proposed behavioural profiles of firms that influence the way they approach growth and expansion opportunities in a development context inform policy making discourse and open the door for integrating a behavioural dimension in policy design.

Finally, we admit that the problem addressed in this study, though practical, turned out to be “messy” and complex, in the sense that it is not confined to one discipline and the research does not lead to clear and tight solutions, like for instance recommending specific management practices or policy interventions. Nevertheless, more than seeking immediate relevance, we aimed to improve the understanding of, not necessarily solve, the problem of firms’ behaviour and performance in addressing expansion opportunities of scale and scope.

## 10.2 Policy Implications

“Policymakers must strive to carry multiple models of organizational behavior in mind as they make judgments about possible emerging avenues of intervention.”

(Teece, 2019, p. 24)

At the outset, it is important to clarify two points. First, the proposed implications are based on case studies of only three companies located in one country. Given this empirical thinness, the section lays down only some high-level observations derived from research findings without making any claims of generalisability. Second, focusing on firms’ behavioural profiles in addressing opportunities does not imply any underestimation of other important factors that should contribute to shaping policy design, including but not limited to sectoral characteristics (Malerba, 2005), linkages (Hirschman, 1958), and technology cycles (Lee, 2013). The aim is to help policymakers have a better understanding of firms’ behaviour and drivers of behaviour with respect to activities that are deemed important for the economic welfare of the country.

Based on evidence from the research case studies, firms are different in the way they address expansion opportunities. Their differences are presumed to be captured in four psychologically grounded behavioural profiles highlighted in Section 9.5. What is required from policymakers is not to psychologically profile economic actors and identify their behavioural profiles. What is required is for them to understand that firms operating in each industrial sector represent a mix of those four profiles (see Table 34). The aim is to intervene in a way that optimizes over the existing mix while taking the peculiarities of each sector into consideration.

Table 34 The four identified business profiles

#	Profile	Characteristics
1	Approach/Mastery-approach goals/Secure	Action-oriented, Intrinsically motivated, Engage with high uncertainty, Extensive learning and exploration
2	Approach/Self-validation-approach/Insecure	Action-oriented, Driven by competition with others, Require guarantees about investment outcome, Limited in learning and explorative efforts
3	Avoidance/Self-validation-approach/Insecure	Inaction-oriented, Driven by competition with others, Require guarantees about investment outcome, Limited in learning and explorative efforts
4	Avoidance/Self-validation-avoidance/Insecure	Inaction-oriented, Avoid competition, Limited in learning and explorative efforts

Source: Author's conceptualization

The first observation is that profile (1) is the only profile that has the combination of action orientation, less dependence on external factors, engagement with high uncertainty, and extensive learning and exploration. Usually, but not always, this profile is attracted to green fields (e.g. new technologies), in which markets do not exist yet, and demand is latent. While the temptation for policymakers is to provide incentives to promote investments into these green fields by compensating for uncertainties, such a policy, if carried out too early, might be suboptimal in terms of learning and exploration outcomes because it would attract many players into the field very quickly before profile (1) manages to build its capabilities and market position. More importantly, those who are attracted by these incentives are profiles (2) and (3) who seek guaranteed rewards but, at the same time, are less able to create competitive value for the customer and trigger mass adoption because they have lower engagement with learning and exploration. In other words, incentivising investors in green fields by shielding them from uncertainty is a sort of punishment and disincentive to the first movers, whose capabilities in learning and exploration are more tuned

to the requirements of such opportunities. The better policy would be to set regulations that legitimize entry into these fields while postponing giving direct incentives to enterers.

The second observation is that profiles (2) and (3) require *ex-ante* guarantees about the likelihood and size of reward to take investment decisions. The policy short-cut normally taken is to intervene and provide them with these guarantees (e.g. by guaranteeing demand and/or limiting competition) (Chang & Andreoni, 2016). However, this intervention will promote and enlarge firms which are limited in their learning and exploration. They will stay dependent on protectionist policies and forego real-life expansion opportunities, which do not involve guarantees on the reward. The better intervention is to incentivize only those who are doing better than others in expansion of scale and scope, i.e. learning and exploration. Since profiles (2) and (3) are competition-driven, as their profiles show, they will strive to be among the leaders. This striving will enhance the combined outcome of learning and exploration more than if incentives are given indiscriminately to all local players.

The third observation is that profile (4) is not action-driven or competition-driven. Policymakers make the wrong assumption that if incentives manage to incentivize all players (including profile 4) into action, the intervention is effective. However, profile (4), with its satisficing attitude, will act only if generously incentivized, and the outcome is guaranteed. Given the characteristics of this profile and other profiles, it could be argued that any incentives given to profile (4) will automatically generate a suboptimal outcome from the whole mix because it will end the striving of profiles (2) and (3) to be leaders in learning and exploration since they will receive incentives in all cases. Second, it will attract more players of profiles (2), (3), and (4) into the industry, which will weaken profile (1) market position, who do not need incentives anyway to learn and explore. Arguably, the better intervention is not to incentivize profile (4) at all but to create a threatening

environment in which its satisficing attitude can lead to major financial losses. Firms with this profile will either exit the market or adopt profile (3) to survive. Their urge to survive presumably would override their satisficing attitude.

These suggestions hint at important behavioural dynamics among industry players that are usually overlooked in designing interventions. Nevertheless, the suggestions are very consistent with evolutionary theory with its behavioural roots. Winter (2000), in his article on capability learning, should be recognized for articulating these dynamics very well. It could be argued that his depiction of the dynamic adjustment of learning aspirations includes references to the profiles this thesis proposes. Winter (2000) argues that among firms, there are those, who are internally driven, have high aspirations, and persist longer in overt learning. He also talks about those who have low learning aspirations, but their “learning flame might be re-ignited” as a response to a subsequent “wake-up call”, which could be made by superior performers (Winter, 2000, p. 987). Finally, he argues that what others accomplish has a profound effect on learning aspirations of some players, especially if their achievements construe a competitive threat.

Could this be the start of research work under a new heading, ‘behavioural policymaking’, which encompasses the dimension of firms’ psychological behaviour in dealing with issues of growth, innovation, learning, and change? Could we also hope to integrate these important theories into the syllabus taught in business schools?

### 10.3 Limitations and Future Research

It is important to acknowledge the limitations of the study to be taken into consideration when interpreting the results. The overarching problem is one of learning from and utilizing detailed

qualitative inductive research based on a few case studies, which makes generalisability of the findings is necessarily limited. We also recognize the limitation introduced by the centrality of interview data in our study, which is a subjective type of data subject to sorts of biases. We discuss those two limitations in detail and shed more light on credibility and transparency.

### *Generalisability*

A key question that the reader would normally ask is the following: *to what extent do findings and propositions apply in other companies with similar or different contexts?* To clarify the issue of generalisability (i.e. extrapolating results to different settings), it is important to highlight a few points. First, generalization is targeted within the research level of analysis, which is a firm-level investigation within a development context. Second, “by its very nature, qualitative research is particularistic” (Yin, 2011, p. 98). Meaning, the cases are not meant to be a sample representing a specific population. Therefore, statistical generalization is not one of the goals of this research from the beginning. As such, the researcher cannot conclusively determine the extent to which the specific outcomes observed were determined by the proposed factors relative to other lucky contingencies. Third, in an inductive research method, the outcome is an argument confined to the level of analysis and consisting of a number of hypotheses that are subject to verification in future hypothesis-testing research. Put differently, the researcher makes no claim that findings could be extrapolated in this stage to situations other than those examined. The main goal of the researcher is to propose a strong argument and working hypotheses about dynamic capabilities on the level of emerging-market firms in a development context that could be tested in subsequent studies. That said, the hypothesis-generating goal and approach of the researcher should not downplay the significance of the research findings. Numerous qualitative studies became influential in their

disciplines while depending on a few case studies and sometimes even a single case study. Penrose's Hercules case study (1960) and Tripsas and Gavitti's (2000) single case study on Polaroid are just a few examples.

While statistical generalization is not the target of the research, theoretical generalization is. We selected cases purposefully following a theoretical sampling method, focusing on a single developing country and selecting firms from different industries addressing different types of expansion opportunities. Meaning, we claim that research findings and propositions potentially explain antecedents of firm-level dynamic capabilities in a development context, i.e. in developing countries. In other words, we allowed diverse cases of opportunity exploitation within a single development context. It follows that generalizing findings is confined to this level of analysis which is the development context.

Besides theoretical sampling, we compared findings with similar and conflicting literature in Section 8.2 to sharpen generalisability of findings (Eisenhardt, 1989) and tied propositions to established theories and existing literature as detailed in Chapter Nine. Nonetheless, we acknowledge that further replication studies in alternative contexts would enhance the reliability and generalisability of our findings and propositions.

### *Interview Data*

We recognize the limitation introduced by the centrality of interview data in our study, which is a subject to sorts of biases. For instance, participants may give versions of historical events which exaggerate their role and downplay other factors. Moreover, retrospective inquiry about the past, as the case in this research, usually has an element of post-rationalisation. To counter these biases,

we followed established protocols for effective case study research, including triangulating interviewees, probing findings with key participants after elapsed time, and connecting emergent findings with literature (Eisenhardt, 1989)

Nevertheless, it would have been helpful to use a mix of subjective and objective data. Examples of objective data are firms' financial statements and internal reports. However, under the Egyptian law, private companies without publicly traded debt or equity are not required to disclose publicly financial statements (Cross-Border Listings, Baker McKenzie, 2021), and none of the participating CEOs was willing to share financial information. They were not convinced by any assurances of anonymity and confidentiality. This does not come as a surprise since the three cases are for two small firms (KS and DN) and one big enterprise (EN). Small firms are "notorious for their inability and unwillingness to provide desired information" (Fiorito & LaForge, 1986, p. 11). On the other hand, according to research, big enterprises with block-holder ownership, like the case of EN in the high voltage case, are unlikely to make voluntary disclosure (Elfeky, 2017).

That being said, non-financial data were more than adequate to fulfil the research objective for several reasons. First, the study is concerned with a specific expansion project that the firm has undertaken to exploit an opportunity. General financial information about the financial performance of the company would be of less help in this study since it is not specifically related to the incident under study. The company might be performing very well financially, but it demonstrated poor performance in responding to the expansion opportunity at hand. Second, objective financial data on the three firms were not publicly available, making it impossible to check the accuracy of any shared financial performance figures. Third, the three companies operate in different industries; each has its financial benchmarks. As such, comparing the objective financial data of the three companies would be misleading. Fourth, since we adopt a theory-



building method, instruments of data collection are constructed to gather as much information as possible about the phenomenon in question. As such, the subjective views of research participants represented a rich account of how and why firms responded to opportunities the way they did more than financial figures.

### *Transparency and Credibility*

Since we employed interpretive code analysis, there might be some scepticism about proposed interpretations and the role of subjectivity and reflexivity embedded in interpretations. We admit that there could be multiple valid interpretations for the same empirics. Having lived in close connection with the interview material and interacted with research participants for a long time, our hope is that we have landed on one of those. Real-life events are much richer than any one study could capture. To some degree, however, the way we demonstrated to the reader the interpretation work we made on the level of initial interview passages all the way to proposing abstract propositions hopefully, promotes transparency of the process and credibility of the researcher.

Despite the limitations, we hope we provided a complementary view to the dynamic capabilities discourse and made a genuine contribution to improving the policymaking discourse.

### *Future Research*

The thesis pursued an ambitious objective of bringing together influential but segregated theories of psychology and strategic management to address an important problem: firms' performance at

times of change. In light of the proposed theory and discussed limitations, subsequent research may take up a number of issues.

First, proposed hypotheses contain concepts and possible relationships that offer new insights grounded in empirical data and need to be verified in subsequent hypothesis-testing research. Given the tacit nature of beliefs, management research studies in these areas have to borrow data collection instruments and techniques from the original domains of psychology and educational psychology. Of course, a collaboration between scholars of these domains would be optimal.

Second, this study paves the way for more research on the combined influence of beliefs related to learning and those related to exploring the unknown on the dynamic capabilities of firms. While the thesis does not claim that those are the only antecedents of dynamic capabilities, we claim that as much as dynamic capabilities are concerned with managing unknowns and uncertainty, the learning-related and exploration-related beliefs of actors have an important role to play.

Third, while it was not adequately addressed in this study, the domains of psychology and educational psychology provide a huge scholarly work on interventional techniques to shift beliefs from self-validation to mastery goals and from insecure to secure attachment styles. In other words, actors are not complete prisoners of their beliefs, nor can they change them instantly. Drawing on this literature in management research studies can contribute to improving decision-making and innovation inside firms.

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# Appendices

## Appendix A: Consent Form Template

### Research Participation Consent Form

Research title: \_\_\_\_\_

Researcher Name: \_\_\_\_\_

Funder: \_\_\_\_\_

### Research Participant Declaration

<b>Please tick the appropriate boxes</b>	<b>Yes</b>	<b>No</b>
I have understood the research project and I have been able to ask questions about the project		
I agree to take part in the project and understand that taking part involves sharing information about the company that is not in the public domain, and involves allocating time and effort of staff and management to provide and elaborate on collected data		
I understand that I can refuse to answer questions		
I understand that the information I provide will be used for the PhD thesis, academic conferences and publications.		
I would like my organization to be named in publications, reports, conferences, and other research outputs.		
I agree to waive copyright and other intellectual property rights in the material I contribute to the project.		

Name of Research Participant [Printed]

Signature

Date

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Appendix B: Fibre Optic Case Tables and Figures

Table 35 List of interviewees of the fibre optic case

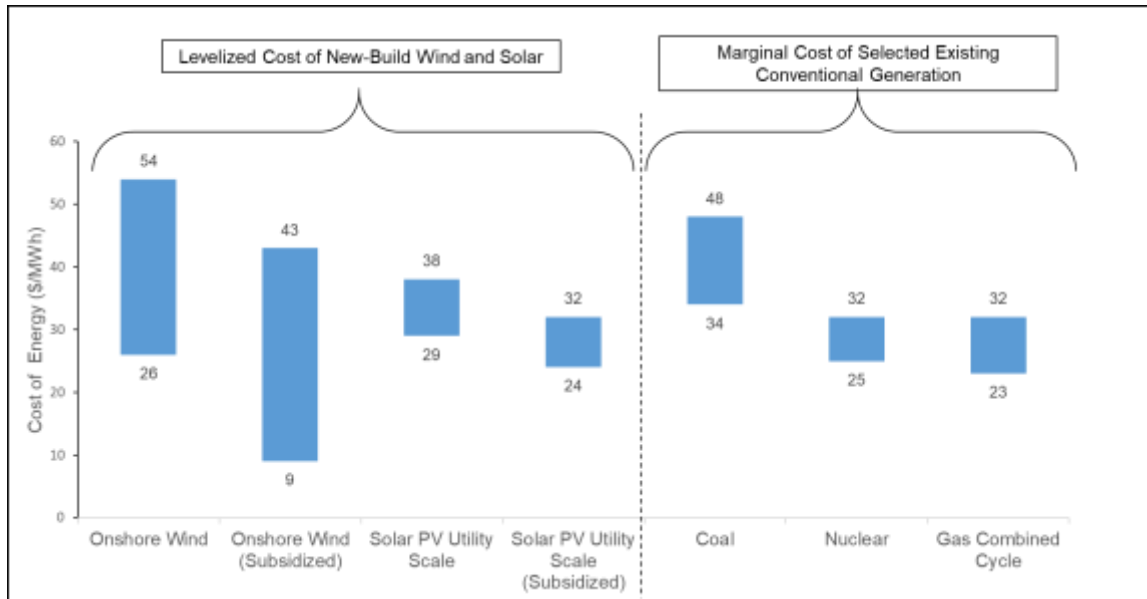
#	Title	Stakeholder	Date
1	DN CEO	Founder & Owner	Jun-20 –Jan-21
2	DN CMO	Employee	Jun-20 –Sep-20
3	DN CTO	Employee	Jun-20
4	DN Financial Director	Employee	Jun-20 –Sep-20
5	DN Production Director	Employee	Jul-20
6	DN Services and Engineering Director	Employee	Jun-20
7	DN Foreign Purchasing Specialist	Employee	Jul-20
8	DN System Engineer Integrated Solutions	Employee	Jul-20
9	DN Sales Account Manager	Employee	Sep-20
10	DN Quality Control Manager	Employee	Jun-20 –Sep-20

## Appendix C: Solar PV Case Tables and Figures

Table 36 List of interviewees of the solar PV case

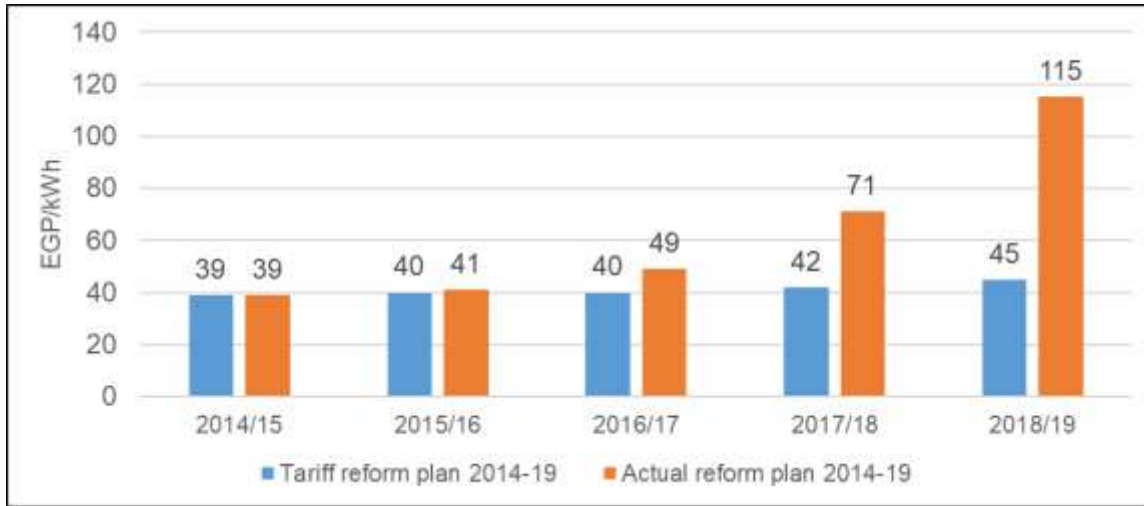
#	Title	Stakeholder	Date
1	KS CEO	Co-founder and Shareholder	Feb-20
2	KS CTO	Employee	Jan-20
3	KS General Manager R&D	Co-founder and Shareholder	Jan-20
4	KS General Manager Power	Employee	Nov-19
5	KS Technical Manager	Employee	Nov-19
6	KS Senior Financial Analyst	Employee	Dec-19
7	KS Ex-employee R&D	Ex-Employee	Dec-20
8	Managing Director –Red Sea Resort	Key Customer	Dec-19

Figure 16 Levelised cost energy comparison, 2020



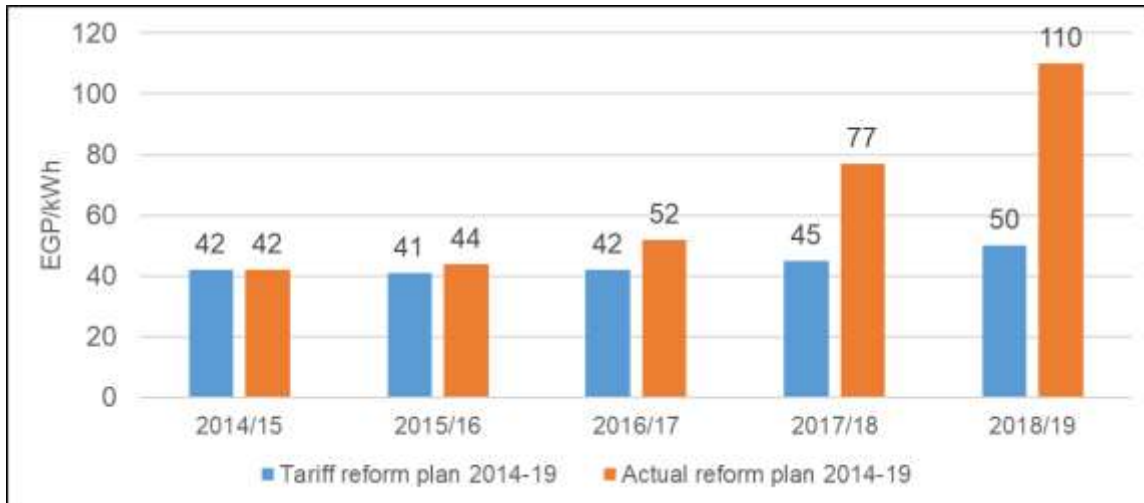
Source: Lazard.com

Figure 17 Consumer tariff subsidy removal plan and actuals, 2014-2019



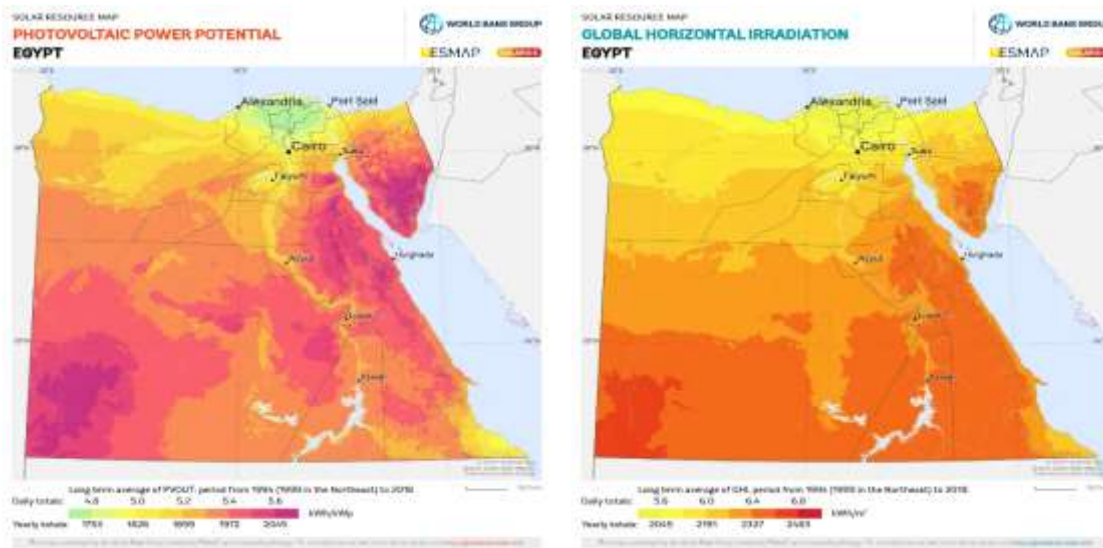
Source: IRENA (2018b), Renewable Energy Outlook: Egypt Report

Figure 18 Industrial tariff subsidy removal plan and actuals, 2014-2019



Source: IRENA (2018b), Renewable Energy Outlook: Egypt Report

Figure 19 Egypt Photovoltaic Power Potential and Irradiation



Source: IRENA (n.d.), Global Atlas for Renewable Energy ([www.irena.org/GlobalAtlas](http://www.irena.org/GlobalAtlas)), World Bank ESMAP.

## Appendix D: High voltage Case Tables and Figures

Table 37 List of interviewees of the high voltage case

#	Title	Stakeholder	Date
1	EN Vice Chairman	Owning family member	Mar-20
2	EN CFO	Employee	May-20
3	EN CCO	Employee	Mar-20
4	EN Export Engineer	Employee	Mar-20
5	EN Technical Office Manager	Employee	Mar-20
6	EN Costing Manager	Employee	May-20