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A Theoretical Approach for Open Innovation Implementation in Knowledge-Intensive SMEs in the Middle East: A Dynamic Capabilities Perspective

Neveen Bani-Melhem

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Abstract

Open Innovation (OI) is a relevant research topic in academia; however, its implementation remains a challenge for practitioners. This research proposes an analysis of open innovation organisational competencies and capabilities in Middle Eastern knowledge-intensive SMEs. This study defines open innovation from a philosophical perspective that entails strategy and IT-enabled knowledge. This study's main goals are to identify organisational competencies and capabilities and how they interrelate to find ways in which knowledge-intensive SMEs can successfully obtain open innovation initiatives and sustain their implementation. It also aims to apply the dynamic capability perspective as a theoretical lens to analyse how these SMEs can improve these open innovation-related competencies. The dynamic capability perspective has received significant theoretical attention in recent decades, and its popularity has been reflected in its practical uses in a range of organisations.

Several reasons led this thesis to focus on studying Arab countries in the Middle East. Firstly, the development of the innovation field and the emergence of open innovation as current debates exist on how it contributes to organisational performance. Secondly, the rising attention of scholars, businesses, and policymakers into the Middle East as its economy grows progressively during social and political developments and security related issues. Third, the recent emerging calls to undertake studies on the less-researched regions. Two theoretical approaches were adopted to ground the researcher's interpretations: the dynamic capability perspective and the value-focused-thinking approach.

This thesis uses a qualitative, interpretative, case-based research approach. This approach was selected to capture the rich picture of organisational behaviour related to the open innovation phenomenon. Six case studies were conducted from Arab Middle Eastern knowledge-intensive SMEs drawn from across the region.

This thesis contributes to the existing literature by developing a novel theoretical open innovation two-level capability framework. The theoretical contribution of this thesis was to analyse and propose open innovation as a dynamic organisational capability. This thesis proposed a theory to understand and identify related organisational competencies and capabilities. Deploying the dynamic capability perspective provided profound insights into

how SMEs have been strategically managing their competencies and resource-base to deal with open innovation and how this implementation can be sustained and improved. Thus, this thesis suggests that an SME should develop capabilities at two levels: first, higher-level capabilities to strategically manage and sustain the implementation of open innovation (dynamic capabilities); thus, an SME is required to be able to sense, absorb, seize and reconfigure resources and competencies to capture value through the development of open innovation-related competencies. Second, develop operational level open innovation competencies to efficiently and effectively support the implementation of open innovation. Nine main open innovation organisational competencies were identified. Additionally, this thesis provides implications for practice and policymakers.

Declaration

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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STATEMENT 1

This thesis is the result of my own independent investigations, except where otherwise stated.

Other sources are acknowledged by footnotes giving explicit references. A list of references is appended.

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STATEMENT 2

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Contents

Acknowledgements 10
List of figures 12
List of Tables 13
Chapter One: Research Introduction 14
1.1 Introduction 14
1.2 Research Rationale 14
1.1 Research scope and objectives 20
1.3.1 Research Aim 20
1.3.2 Research Objectives 22
1.3.3 Unit of Analysis 23
1.2 Structure of the thesis 25
1.3 Summary 26
2.1 Introduction 28
2.2. Open innovation contexts: SMEs and developing countries 29
2.3 The Transition Toward Knowledge-Based Economy of The Middle East 33
2.4 Knowledge-intensive enterprises 36
2.5 Summary 37
Chapter Three: Open Innovation – A Literature Review 39
3.1 Introduction 39
3.2 Innovation 39
3.2.1 From closed to open approach to innovation 41
3.3 Open innovation 43
3.3.1 What is open innovation? 43
3.2.2 The dynamic nature of open innovation 46
3.3.3 Open innovation processes 47
3.4 Open innovation adoption challenges 49
3.5 Open innovation definitions: multiple perspectives 53
3.6 Open innovation definitional integration 59
3.7 Summary 64
Chapter Four: Open Innovation Critical Success Factors 65
4.1 Introduction 65
4.2 Critical success factors: Strategy perspective of OI 66
4.2.1 Coherent line of directions 67
4.2.2 Top management support 68
4.2.3 Human resource new requirements 69

4.2.4 Internally designated scout....71
4.2.5 Responsiveness to environmental changes....71
4.2.6 Strategic view of technology....71
4.2.7 More investment in R&D....72
4.2.8 Change in organisational Culture....72
4.2.8 Open innovation governance....73
4.2.9 Open innovation strategy measurement....74
4.2.10 Strong intellectual property protection....74
4.3 Critical success factors: Philosophy perspective of OI....75
4.3.1 Mutual knowledge and interests....76
4.3.2 Long-term orientation....77
4.3.3 Continuous communication....77
4.3.4 Mutual trust and commitment....77
4.3.5 Mutual benefits and awareness of risk-sharing....78
4.4 Critical Success Factors: IT-enabled knowledge perspective....79
4.4.1 IT Flexibility: is....82
4.4.2 IT integration....83
4.5 Summary....83
Chapter Five: Dynamic Capabilities Theory: A View of Open Innovation....89
5.1 Introduction....89
5.2 Open innovation and organisational capabilities....90
5.3 Resources, Capabilities and Competencies definitions....93
5.3.1 Resources....93
5.3.2 Competencies....95
5.3.3 Capabilities....95
5.4 Theoretical views of organisational capabilities....97
5.4.1 The Resource-based view (RBV)....97
5.4.2 From the Resource-Based View to Dynamic Capabilities....98
5.4.3 Dynamic capability approach....99
5.5 Dynamic capability: Open innovation perspective....103
5.5.1 Sensing capabilities:....106
5.6.2 Seizing capabilities:....107
5.6.3 Reconfiguring capabilities:....107
5.6 Summary of the theoretical perspectives....109
5.7 Conceptual Framework....111
5.8 Research Questions....116
5.9 Summary....118

Chapter Six: Research Methodology 119
6.1 Introduction 120
6.2 Research approach overview 121
6.3 Methodological paradigm 123
6.3.1 Ontology 124
6.3.2 Epistemology 125
6.3.3 Research adopted paradigm 129
6.4 Research strategy 131
6.4.1 Adopted research strategy: Case study 134
6.4.2 Justification of case study strategy selection 135
6.4.3 Number of cases and participants selection 138
6.4.4 Case study selection 139
6.5 Research Design 140
6.5.1 Overall strategy 141
6.5.2 Data Collection Method 144
6.6 Pilot study 149
6.7 Data Analysis process 149
6.9 Ethical considerations 155
6.10 Trustworthiness 156
6.10.1 Credibility 156
6.10.2 Dependability 157
6.10.3 Transferability 158
6.10.4 Confirmability 158
6.12 Summary 159
Chapter Seven: Analysis and Findings 160
7.1 Introduction 160
7.2 Case 1: SME A 164
7.2.1 An overview of SME A 164
7.2.2 Within case analysis: open innovation-related competencies revealed in the findings- SME A 164
7.2.3 Summary of SME A's open innovation-related competencies 170
7.3 Case 2: SME B 170
7.3.1 An overview of SME B 170
7.3.2 Within case analysis: open innovation-related competencies revealed in the findings- SME B 171
7.3.3 Summary of SME B's open innovation-related competencies 176
7.4 Case 3: SME C 177
7.4.1 An overview of SME C 177

7.4.2 Within case analysis: open innovation-related competencies revealed in the findings- SME C 178
7.4.3 Summary of SME C's open innovation-related competencies 184
7.5 Case 4: SME D 185
7.5.1 An overview of Case D 185
7.5.2 Within case analysis: open innovation-related competencies revealed in the findings- SME D 185
7.5.3 Summary of SME D's open innovation-related competencies 190
7.6 Case 5: SME E 191
7.6.1 An overview of SME E 191
7.6.2 Within case analysis: open innovation-related competencies revealed in the findings- SME E 192
7.6.3 Summary of SME E's open innovation-related competencies 196
7.7 Case 6: SME F 198
7.7.1 An overview of SME F 198
7.7.2 Within-case Analysis: open innovation-related competencies revealed in the findings- SME F 198
7.7.3 Summary of SME F's open innovation-related competencies 202
7.7 Cross-case comparison- an overview 203
7.8.1 Ability to strategically align open innovation to the overall business strategy 211
7.8.2 Ability to create open innovation supporting culture 213
7.8.3 Ability to get top management support 216
7.8.4 Ability to improve inter-departmental connectedness 219
7.8.5 Ability to perceive the needs and expectations of customers and understand market opportunities 221
7.8.6 Ability to offer product and services that meet customer expectations and reflects external opportunities 224
7.8.7Ability to develop techniques and procedures to govern open innovation 225
7.8.8 Ability to build and manage adequate IT infrastructure to support innovation 228
7.8.9 Ability to build and manage cross-boundary collaboration outside the business 230
7.9 Open innovation competencies relationships framework 231
7.10 An analysis of open innovation from a dynamic capability perspective 234
7.10.1 Sensing opportunities and threats 234
7.10.2 Seizing sensed opportunities 237
7.10.3 To reconfigure capabilities 240
7.11 Summary 244
Chapter Eight: Discussion 245
8.1 Introduction 245
8.2 Open innovation organisational competencies 246

8.2.1 The strategic alignment of open innovation 246
8.2.2 Ability to create open innovation supporting culture 247
8.2.3 Ability to obtain top management support 249
8.2.4 Ability to improve inter-departmental connectedness 250
8.2.5 Ability to perceive the needs and expectations of customers and understand market opportunities 251
8.2.6 Ability to develop products and services that meet customer expectations and reflect external opportunities 253
8.2.7 Ability to develop techniques and procedures to govern open innovation 253
8.2.8 Ability to build and manage adequate IT infrastructure to support innovation 255
8.2.9 Ability to build and manage cross-boundary collaboration outside the business 256
8.3 Open innovation dynamic capability framework 258
8.4 Summary 267
Chapter Nine: Conclusions 269
9.1 Introduction 269
9.2 Summary of the research 269
9.3 Theoretical contributions 273
9.4 Implications for practice 275
9.5 Implications for policy 276
9.6 Research limitations 279
9.7 Future research opportunities 280
9.8 Reflection 281
Reference List 284
Appendices 330

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List of figures

Figure 3.1: Open innovation vs closed innovation models……44

Figure 3.2: Definitional integration of open innovation…… 61

Figure 3.3: Illustration of an integrative understanding of open innovation's perspectives..63

Figure 3.4: The connection between OI concepts, CSFs, and capabilities…… 64

Figure 5.1: Dynamic capability dimensions……..... 101

Figure 5.2: Conceptual framework……... 114

Figure 6.1: Research methods map……... 122

Figure 6.2: Research design……..... 141

Figure 6.3: Content analysis……..... 153

Figure 7.1: Illustration of OI's competencies and capability identification process …… 161

Figure 7.2: Relationships exist between OI competencies……... 232

Figure 7.3: Framework of open innovation dynamic capability……... 243

Figure 8.1: Open innovation capability framework……..... 261

Figure 9.1: Graphical presentation of contributions achieved……...272

List of Tables

Table 3.1: Different perspectives of open innovation……..... 54

Table 4.1: Open innovation tools …… 81

Table 4.2: A summary of open innovation CSFs …… 84

Table 5.1: Categorisation of organisational resources …… 93

Table 5.2: Summary of research potential gaps ……... 114

Table 6.1: Key differences in epistemological stances…… 127

Table 6.2: Case study method among different philosophical perspectives …… 135

Table 7.1: Open innovation identified competencies themes……... 160

Table 7.2: Cases and participants demographics……... 163

Table 7.3: Summary of SME A's findings ……... 170

Table 7.4: Summary of SME B's findings …… 177

Table 7.5: Summary of SME C's findings ……... 184

Table 7.6: Summary of SME D's findings ……... 190

Table 7.7: Summary of SME E's findings ……... 197

Table 7.8: Summary of SME F's findings ……... 202

Table 7.9: Cross-case comparison summary ……... 205

Table 7.10: Selected quotes- sensing capability …… 236

Table 7.11: Selected quotes-seizing capability …… 238

Table 7.12: Selected quotes-reconfiguration capability ……... 242

Table 8.1: Summary of OI organisational competencies and capabilities…… 26

Chapter One: Research Introduction

1.1 Introduction

In the following chapter, I will discuss the rationale behind this study and introduce a brief overview regarding the inception of open innovation in 2003 (Chesbrough, 2003). Moreover, I highlight how this notion is increasingly becoming an imperative for organisations to organise their innovation processes (Bogers, Chesbrough, Heaton & Teece, 2019). In this introduction chapter, I discuss how its implementation remains a challenge despite the importance of open innovation. Additionally, I identify the gap in the literature and the aim and objectives of this study.

1.2 Research Rationale

Innovation has always been a way for organisations to stay competitive (Ireland & Webb, 2007; Kiveu, Namusonge, & Muathe, 2019; Sabatino & Talamo, 2017; Valdez-Bocanegra, 'Maldonado-Guzmán, & Valdez-González, 2020). The traditional approach to innovation stresses maintaining control over innovation processes. The traditional open innovation paradigm highlights the importance of a business to internally rely on its research and development (R&D) operations (Chesbrough, 2004) and owning intellectual property (IP) as means to sustain competitive advantage (Giannopoulou, Yström, Ollila, Fredberg & Elmquist, 2010). However, since the early 2000s, a new 'buzzword' related to a new innovation paradigm has been increasingly presented as a current topic and imperative in both academia and organisations, namely open innovation (Chesbrough, 2003).

This increased interest in adopting open innovation is due to the intersectional relationship between open innovation and digital transformation since both notions significantly affect each other (Arias-Pérez, Velez-Ocampo, & Cepeda-Cardona, 2021; Urbinati, Chiaroni, Chiesa, & Frattini, 2020; Xue & Tan, 2022). As a new digital industrial revolution is being shaped, open innovation has become imperative in today's world (Nambisan, Wright, & Feldman, 2019). Digitalisation was deemed as a critical driver that necessitates the transition

toward this new imperative since it significantly affects the flow and convergence of information (Bogers, Chesbrough, Heaton & Teece, 2019; Strazzullo, Cricelli, Grimaldi, & Ferruzzi, 2022). Moreover, strengthened Intellectual Property Rights (IPRs) stimulated organizations to collaborate and share their knowledge (Davoudi et al., 2018) thus, aiding internal innovation processes (Teece, 2020; Zobel, Balsmeier, & Chesbrough, 2016). Additionally, the short-term investor's focus on demanding cutting costs resulted in the tendency of most firms to reduce their in-house R&D expenditures. Thus, most organisations have shifted to outsource innovation and increased reliance on external knowledge sources for R&D since it is quicker and less expensive (Arora, Belenzon, & Patacconi, 2018; Bogers et al., 2019). All these factors have dramatically affected how organisations conduct their innovation. Open innovation enables organisations to capitalise on efficiencies of their existing knowledge, lower innovation risk and accelerate speed to market, thus increasing innovation returns by allowing organisations to look beyond their organisational boundaries for ideas, technology and knowledge (Chesbrough, 2007; Leiponen & Helfat, 2010; Papa, Dezi, Gregori, Mueller, & Miglietta, 2018; Powell, 1998; Stroh, 2019).

In addition, open innovation enables organisations to find external paths to commercialise internally developed ideas that are not aligned with the organisation's own business competencies (Henttonen & Lehtimäki, 2017; Leiponen & Helfat, 2010; Powell, 1998). Open innovation encompasses inbound open innovation, outbound open innovation, and coupled open innovation (Chesbrough & Crowther, 2006). In subsequent years, open innovation has progressively become an imperative topic on organization's agenda and an emergent field in both academia and practitioners (Bigliardi, Ferraro, Filippelli, & Galati, 2021; Bogers et al., 2019; Chesbrough, 2017; Chesbrough & Bogers, 2014; Chesbrough, Vanhaverbeke, & West, 2014; Sabando-Vera et al., 2022). This increasing interest in studying open innovation was driven by its impact on enhancing organisational performance, growth, and sustainability (Bigliardi, Ferraro, Filippelli, & Galati, 2020; Cuevas-Vargas, Aguirre, & Parga-Montoya, 2022; Gao, Ding & Wu, 2020; Srisathan, Ketkaew, & Naruetharadhol, 2020; Yun, Zhao, Park, & Shi, 2020).

Despite of all the apparent benefits organisations can obtain from adopting open innovation practices, research indicates that the promise of implementing open innovation has stalled

(Chaudhary, Kaur, Talwar, Islam, & Dhir, 2022; D'Ambrosio, Gabriele, Schiavone & Villasalero 2017; Hewitt-Dundas & Roper 2018). Many firms remain challenged to adopt open innovation effectively and are not able to fully embrace it (Brunswicker & Chesbrough, 2018; Chaudhary et al., 2022), as its adoption remains under-invested (Chesbrough & Brunswicker, 2014; Vahter, Love, & Roper 2014; Wynarczyk, Piperopoulos, & McAdam, 2013). Open innovation failure has been associated with several problems. First, with open innovation adoption, a business's primary strategy (including vision and objectives) has to be adjusted to support innovation values and promote openness (Chesbrough & Appleyard, 2007; Vanhaverbeke, Roijakkers, Lorenz, & Chesbrough, 2017). However, while trying to do so, cultural issues might arise as organizations potentially encounter cultural challenges (Boschma, 2005; Lichtenthaler, 2011).

In addition, the failure to successfully implement open innovation might stem from the unsatisfactory integration and limited understanding of the complemented nature of the strategic and technological aspects of open innovation (Bigliardi et al., 2021; Chaudhary et al., 2022; Chesbrough & Bogers, 2014; Chesbrough, Vanhaverbeke, & West, 2014; Cui et al., 2015). Open innovation deployment relies on Information Technology (IT). IT is considered a critical organisational resource that unlocks open innovation potentials and offers an enabling mechanism for effective and efficient adoption and deployment (Adamides & Karacapilidis, 2020; Cui, Tong, & Teo, 2012; Dodgson, Gann, & Salter, 2006; Mubarak & Petraite, 2020). Moreover, top management support is crucial for open innovation success. Their role in developing a clear vision and demonstrating a commitment to open innovation is a prerequisite to its success (Chesbrough & Brunswicker, 2013; Chiaroni, Chiesa, & Frattini, 2011). Thus, their inadequate presence, support and motivation to open innovation initiatives might lead to their failure (Chesbrough, & Brunswicker, 2013; Singh, Gupta, S., Busso, & Kamboj, 2021). In some cases, the lack of top management support to open innovation stems from their failure to fully understand its benefits and underestimating its financial returns. (Ahn, 2020; Ahn, Minshall & Mortara, 2018). Furthermore, performance measurement systems that are used for the traditional closed innovation process are inadequate to evaluate open innovation (Chiaroni et al., 2010). Thus, a specific metric system influences open innovation adoption and effectively supports the appropriate capabilities (Enkel, Lenz, & Prügl, 2009; Michelino, Cammarano, Lamberti, & Caputo, 2014).

A different but related cause of open innovation failure stems from technological aspects (de Mattos, Kissimoto, & Laurindo, 2018; Veugelers, Bury, & Viaene, 2010). One of the main issues to be highlighted while adopting open innovation concerns IT's ability to be integrated into different actors collaborating systems and its effectiveness in integrating various actors when networking (Cui et al., 2015). While open innovation implies exchanging and sharing knowledge, IT systems should provide support to the organization's interest in teaming up with external actors (Chesbrough, 2003, Chesbrough, 2006; Dodgson et al., 2006; Hrastinski, Kviselius, & Edenius, 2010; Santoro, Vrontis, Thrassou, & Dezi, 2018; Vanhaverbeke, 2006). However, a lack of proper understanding of the roles and characteristics of information technologies used to support open innovation might lead to open innovation project failure or perception of failure (Westergren, 2011). A lack of IT flexibility would limit its ability to follow the dynamic nature of open innovation networking and hinder a seamless migration between innovation partners' projects and models (Cui et al., 2015). Thus, IT infrastructures with modular features that are connectable and compatible, which also provide an all-inclusive infrastructure, and are promptly reconfigured are essential for open innovation success (Adamides & Karacapilidis, 2020).

The failure of such proper adoption potentially stems from the inadequate methodologies used to approach open innovation initiatives (Randhawa et al., 2016). Research has indicated that some firms faced difficulties in successfully implementing open innovation and did not achieve the gains they had envisaged (Bogers et al., 2019; Gassmann, Enkel, & Chesbrough, 2010; Gassmann & Zeschky, 2008). A lack of holistic understanding of organisational capabilities that are required to implement open innovation also hinders its full adoption (Hewitt-Dundas & Roper, 2018; Laursen & Salter, 2014). Literature has pointed out the importance of successfully managing the implementation of open innovation (Bouncken, Gast, Kraus, & Bogers, 2015; Randhawa et al., 2016). Thus, Giannopoulou et al. (2010) noted the need to develop a theoretical framework for open innovation adoption to reduce the risk of becoming a managerial fad (Chesbrough & Brunswicker, 2014; Faems, 2008). Consequently, for organisations to successfully embrace open innovation, they must seek to be smart and flexible in restructuring their capabilities and resource base to benefit from its implementation (Chesbrough & Schwartz, 2007).

However, while several studies identified the importance of implementing open innovation (Popa, Soto-Acosta & Martinez-Conesa, 2017; Greco, Grimaldi, & Cricelli, 2016; Santoro et al., 2018), there is minimal literature dealing with open innovation competencies and capabilities (Randhawa et al., 2016). Moreover, there is a lack of research considering the strategic aspect and open strategy values in open innovation, while research focusing on organisational capabilities and the micro-foundations for open innovation implementation is minimal (Randhawa et al., 2016). Consequently, filling the gap in the literature by providing a comprehensive conceptual framework of open innovation is required as it will assist in understanding open innovation. In addition, this framework would act as a roadmap for practitioners and managers who are willing to successfully manage and sustain the implementation of open innovation.

In order to sustain the implementation of open innovation, there is a need to undertake a methodical analysis of its foundation (Bogers et al., 2019). The majority of studies that have explored open innovation from a capability perspective focus on single facets of open innovation like investigating knowledge capabilities (Cassiman & Veugelers, 2006; Hughes & Wareham, 2010; Litchenthaler & Lichenthaler, 2009) or IT-knowledge capabilities (Joshi, Chi, Datta, & Han, 2010). Other capability frameworks are not specific enough to open innovation (Enkel, Bell, & Hogenkamp, 2011) or focus on individual and project levels (Habicht, Möslein, & Reichwald, 2012). While Hosseini, Kees, Manderscheid, Röglinger, and Rosemann (2017) proposed a general framework for open innovation capabilities, they failed to investigate the strategic capabilities required to implement open innovation. Despite the acknowledgement of several scholars regarding the need to understands open innovation from a dynamic capability perspective (Bogers et al., 2019; Lee & Yoo, 2019; Randhawa et al., 2016). Dominant views highlighted the necessity of constantly changing and renewing organisational processes to adopt and sustain an open innovation strategy successfully; thus, studying and understanding open innovation from a dynamic capability perspective (Bogers et al., 2019; Lee & Yoo, 2019; Randhawa et al., 2016; Teece., 2020). However, developing a comprehensive capability framework that adopts a dynamic capability perspective remained under-researched (Randhawa et al., 2016). Thus, all aspects that is related to open innovation adoption failures that have been presented in the literature must be evaluated.

This thesis understands that the fundamental problem of open innovation adoption relies on the organisation's understanding of ‘openness’ and the lack of developing capabilities that have a dynamic nature (Bogers et al., 2019; Randhawa et al., 2016). Dynamic capabilities are crucial for open innovation to achieve its benefits (Bogers et al., 2019). Incorporating open innovation thinking requires organisations to consider their responsiveness to contingencies surrounding it (Wilden & Gudergan, 2015). For organisations to be able to develop a business model continuously, they must develop dynamic capabilities (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen,1997) to enable open innovation. Thus, alternatively, a different theoretical lens, other than the knowledge perspective, should be adopted while considering open innovation: for example, the dynamic capabilities perspective (Bogers et al., 2019, Randhawa et al., 2016; Teece, 2020). Applying the dynamic capabilities perspective provides a new lens for examining open innovation (Randhawa et al., 2016). This perspective enables organisations to capture value from open innovation by developing and deploying capabilities that can help organisations to reconfigure their business model (Chesbrough & Appleyard, 2007).

Another issue that challenges the proper adoption of open innovation is the lack of a holistic and integrative understanding of the phenomenon (Chaudhary et al., 2022). Open innovation has been approached in the literature from multidisciplinary views. These perspectives produced various definitions that hinder developing an integrative understanding of the phenomenon, which consequently challenges the successful implementation of open innovation (Chaudhary et al., 2022; Chesbrough & Bogers, 2014; Bogers et al., 2016). Cui et al. (2015) has demonstrated that information technology strategy is the key link that aligns open innovation strategy and the use of IT. Additionally, in the context of open innovation strategy, openness and networking values need to be considered in business strategy (Chesbrough & Appleyard, 2007; Vanhaverbeke et al., 2017). Thus, this thesis adopts an interdisciplinary perspective that integrates these multidisciplinary views when identifying open innovation competencies.

1.1 Research scope and objectives

In the following sections, I will present the aim and objectives of the study.

1.3.1 Research Aim

This study aims to contribute to the consolidation of the field of open innovation, underlaying a dynamic theory perspective to investigate this notion. It also contributes to the understanding of Small and Medium Enterprises (SMEs) and the application of open innovation in the Middle East. The dynamic capability perspective is applied in this thesis as a theoretical lens to investigate how organisations can promote their open innovation-related organizational competencies. The primary motivation of this thesis is to identify organisational antecedents that enable continuous successful adoption of open innovation in SMEs in developing countries, namely Arab countries in the Middle East.

This thesis aims to identify the fundamental open innovation competencies required in knowledge-intensive SMEs in the Middle East and understand the dynamic nature of such capabilities and how they influence open innovation initiative development. This thesis will analyse how firms build the configurational path of their open innovation-related resources and capabilities. The dynamic capabilities perspective has been widely accepted and applied in the literature (Eisenhardt & Martin, 2000). This theoretical lens mainly focuses on determining ways an organisation can regenerate and innovate its business model in a turbulent environment to sustain competitive advantage (Eisenhardt & Martin, 2000; Helfat et al., 2007; Teece, 2007; Teece et al., 1997). This thesis adopts Helfat et al.'s (2007, p.4) definition of dynamic capability as "*the capacity of an organisation to purposefully create, extend, or modify its resource base".* Their definition implies and reflects strategic features and the degree of the intent of dynamic capabilities; this means that dynamic capabilities are not part of luck and accidents.

The main argument of this perspective draws on organisational ability to develop, throughout their path, high-level capacities to maintain the best development (Helfat & Peteraf, 2003; Marcus & Anderson, 2006). Accordingly, this thesis will adopt this perspective to capture the

dynamic nature of open innovation capabilities that assists SMEs in gaining a competitive advantage in a turbulent environment. Teece et al. (2007) explained that three types of capabilities are more macro-level capabilities, known as 'micro-foundations'. These 'micro-foundations' serve as foundations that form the basis for dynamic capabilities (Bendig, Strese, Flatten, Da Costa, & Brettel, 2018; Kevill, Trehan, & Easterby-Smith, 2017). Barney and Felin (2013, p.149) argued:

> "*Further understanding of organisational capability and heterogeneity ought to rest on questions of micro-foundations on how capabilities are built.*" (Teece, 2007, p.1319)

This thesis responds to the literatures call for the need to incorporate the dynamic capability perspective with open innovation (Bogers et al., 2019; Randhawa et al., 2016, Teece, 2020). It aims to understand how organisational capabilities influence open innovation implementation from a dynamic capability perspective. Thus, filling the gap in the literature by providing a comprehensive conceptual framework of open innovation that provides insights into open innovation's effective implementation in less researched regions (see section 8.1). In addition, this framework would act as a roadmap for practitioners and managers seeking to manage the implementation of open innovation successfully. This thesis contributes to the consolidation of open innovation research by incorporating dynamic capability perspectives to observe this concept. The motivations of this study are to investigate open innovation adoption, identify organisational capabilities that enable open innovation sustained implementation, and supplement the dynamic capabilities research.

Most open innovation literature has focused on large organisations (see section 2.2) and is limited to developed economies (Gao et al., 2020; Santos, 2015). As the investigation of open innovation has been limited to specific contexts, this thesis chose knowledge-intensive SMEs in the Middle East as this study unit of analysis. The rationale behind exploring this specific context stems from SMEs' importance in shaping the world's economic structure, the benefits open innovation can bring to firms in this industry (see section 2.2), and the arguments that open innovation might differ across regions (Cook, 2005) (see section 2.3). A multiple case study strategy was adopted following Yin's (2003) protocol to represent the range of behaviours inherent within the SME population (see section 5). Particular attention was given to Arab SMEs in the Middle East region.

1.3.2 Research Objectives

In this thesis, I aim to contribute to the consolidation of open innovation research by exploring this phenomenon from a dynamic's perspective. Based on the identified research gap discussed in this thesis (see sections 1.3.1, 4.4 and 5.7), this study aims to identify SMEs' organisational capabilities required to sustain open innovation implementation successfully. This would include developing a two-level open innovation capability framework. The overall aim of this study would be attained by accomplishing the following objectives:

- To build an interdisciplinary understanding of open innovation. This thesis integrates various academic disciplines and develops an open innovation integrative perspective.

As a first step towards identifying competencies and capabilities related to open innovation adoption, it is essential to consider challenges that hindered its successful implementation (see sections 3.4 and 3.5). One of the main challenges that open innovation adoption failure is associated with is the various definitions and approaches used in this field (Chesbrough & Bogers, 2014; Bogers et al., 2016). A comprehensive understanding of open innovation that integrates various perspectives is essential to implement open innovation successfully. This research is underpinned by three open innovation perspectives (philosophical, strategic and IT-enabled knowledge approaches). This thesis builds an integrative understanding of these perspectives and proposes an open innovation definition, which this study adopts to develop a common understanding of open innovation.

- To identify critical success factors of open innovation

After identifying factors challenging open innovation and building a common understanding of open innovation, this thesis will look to evaluate critical factors of success for open innovation from a comprehensive perspective, considering the three approaches to open innovation.

- To identify fundamental organisational competencies related to open innovation within Arab Middle Eastern knowledge-based SMEs and how these competencies interrelate.

Underpinning critical success factors will be used in identifying a set of open innovation competencies. This thesis analyses and identifies organisational competencies and capabilities required to successfully adopt open innovation initiatives in knowledge-intensive SMEs in the Middle East.

- To identify dynamic capabilities required to sustain open innovation in Arab Middle Eastern knowledge-intensive SMEs.

This thesis aims to understand and critically evaluate the interrelated open innovation competencies required in Middle Eastern knowledge-intensive SMEs and evaluate the dynamic nature of its capabilities and how it influences the development of an open innovation initiative.

Based on the identified research gaps informed by the literature review in Chapters Two, Three, Four and Five, the main aim of this thesis will be achieved by answering the following research questions:

Q1: What are the organisational competencies required to enable open innovation in Middle Eastern knowledge-intensive SMEs?

Q2: How these organisational competencies interrelate.

Q3: What are the dynamic capabilities required to sustain open innovation business approach?

1.3.3 Unit of Analysis

This research aims at identifying open innovation within SMEs in the Middle East. While open innovation adoption started largely in large multi-national corporations (MNCs) (Ferrary, 2011; Chesbrough, 2003; Chesbrough & Crowther, 2006; Hinteregger, Durst,

Temel, & Yesilay, 2019; Kirschbaum, 2005; Mortara & Minshall 2014; West & Gallagher 2006), literature agrees that open innovation benefits can be utilised in both large firms and SMEs alike (Chesbrough, 2003, Chesbrough et al., 2006). Moreover, some scholars argue that open innovation might be more beneficial to SMEs than larger firms (Vahter et al., 2014).

SMEs ' adoption to open innovation is promising. These businesses have less bureaucratic structures, are more flexible, effectively respond to external changes, and possess more specialised knowledge in comparison to those larger ones (Christensen, Olesen, & Kjær, 2005; Vossen, 1998). SMEs' limitations associated with their size, including the less effective internal capabilities and unstructured innovation processes, can be effectively addressed by open innovation (Chesbrough and Crowther, 2006; Madrid-Guijarro, Garcia, & Van Auken, 2009).

With its apparent potential benefits to SMEs, open innovation has only been examined in specific contexts. Most open innovation literature has focused on large organisations (Brunswicker & van de Vrande, 2014; Bruque & Moyano, 2007; Constantin, 2019; Hoffman et al., 1998; Gassman, Enkel, & Chesbrough, 2010; Vanhaverbeke, 2017; Zafar & Mustafa, 2017). Additionally, the focus of most open innovation literature is limited to developed economies (Gao, Ding, & Wu, 2020; Santos, 2015) despite the argument that open innovation might differ across regions (Cook, 2005). One of the regions that have been widely neglected in open innovation literature is the Middle East (Santos, 2015). Notwithstanding the economic development this region has lately witnessed, the governmental policies to support SMEs and the endeavours of most countries in that region to shift toward becoming knowledge-based economies (Audretsch, 2006; Barkhordari, Fattahi, & Azimi, 2019; Pervan, Al-Ansaari, & Xu, 2015; TechNative, 2020; Saudi Vision 2030, 2020), yet this region has been under-researched, particularly in the open innovation literature. This research focuses on studying open innovation adoptions within Knowledge-based SMEs in Arab countries in the Middle East.

1.2 Structure of the thesis

In this section, I outline the context of each chapter of the thesis. The thesis is structured into the following chapters.

Chapter One: Introduction

The first chapter presents the aims and objectives of this study and explains the rationale behind the choice of the subject and the theories to be applied.

Chapter Two: Open Innovation in SMEs

Chapters two, three, four and five provide a review of key literature on open innovation. Particularly, Chapter two 2 justifies the rationale behind selecting this thesis's unit of analysis in terms of firm size and region.

Chapter Three: Open innovation- A Literature Review

Chapter three reviews open innovation literature and provide an integrative understanding of open innovation from different perspectives.

Chapter Four: Open Innovation Critical Success Factors

Chapter four identifies critical success factors related to the three open innovation perspectives.

Chapter Five: Dynamic capability Theory: A View of Open Innovation

Chapter five reviews the theoretical lens applied in this thesis, namely dynamic capabilities literature. It also discusses the rationale behind the need to approach open innovation from a dynamic capability perspective. Chapter five concludes by presenting the conceptual framework underpinning this study.

Chapter Six: Research Methodology, Philosophical Perspective, Foundation and Research strategy

Chapter six provides an overview of this thesis's adopted research paradigm; it discusses how the research questions, methodology and methods are aligned. It explains how this study conducted the fieldwork and the data collection and analysis methods.

Chapter Seven: Analysis and Findings

Chapter seven provides a description and a brief discussion of this thesis analysis and findings. This chapter first presents a within-cases analysis and then provides a cross-case comparison of the findings to provide additional refinements to develop findings sets that allow for analytical generalisation. The analysis and findings chapter entails two main parts; firstly, it discusses findings related to open innovation-related competencies. Secondly, it discusses findings within the lens of open innovation dynamic capability. Two new theoretical approaches were considered to support the analysis of open innovation and discuss the empirical evidence found, namely, the value-focused thinking (second research question) and dynamic capabilities perspective (third research question).

Chapter Eight: Discussion

Chapter eight discusses the findings of each open innovation organisational competency, highlights the theoretical contributions that emerged, and relates them to the extant literature. The chapter then offers the development of an open innovation dynamic capability framework and concludes by presenting open innovation capability framework.

Chapter Nine: Conclusions

This thesis concludes with chapter nine. This final chapter provides a conclusion for this thesis. It begins with an overview of the undertaken, presents key conclusions and theoretical contributions to knowledge, and offers the practical implications for this thesis. The chapter also outlines the limitations of the thesis and concludes by identifying potential areas for future research.

1.3 Summary

To summarise, open innovation faces several challenges that hinder its successful implementation. As a result, many scholars focus their attention on this issue. However, research dealing with open innovation capabilities and competencies is scarce, especially for SMEs. The Middle East is a region that has not been widely discussed in the open innovation literature. More knowledge on how to successfully implement open innovation in SMEs is required. This chapter has provided the rationale behind this study, its aims and objectives. The following chapters (Chapters 2, 3, 4 and 5) provide a review of key literature on open innovation. Particularly, Chapter 2 provides a justification of the rationale behind selecting

this thesis's unit of analysis in terms of firm size and region. It presents an overview of open innovation in SMEs in developing countries, namely the Middle East.

Chapter Two: Open Innovation in SMEs

2.1 Introduction

The interest of academics and managers in exploring open innovation has only been limited to specific contexts; this includes size and region (Chesbrough, 2003; Galati, Bigliardi, & Petroni, 2016; Gao et al., 2020; Gascó, 2017; Kirschbaum, 2005). Notwithstanding the intense focus of the literature on analysing open innovation in large multinational enterprises (MNEs), notably at the inception of the notion (Brunswicker & van de Vrande, 2014; Gassman, Enkel, & Chesbrough, 2010; Vanhaverbeke et al., 2017), recently, there has been more interest in exploring open innovation in SMEs (Chesbrough & Crowther, 2006; Colombo, Piva, & Rossi-Lamastra, 2014; Theyel, 2012; Tomlinson & Fai, 2013; Van de Vrande, De Jong, Vanhaverbeke, & De Rochemont, 2009). Despite the recognised application of open innovation to SMEs, more research on SMEs is to be required, especially on how to implement open innovation. These demanding calls to explore open innovation in SMEs stem from the idea that literature on this matter is inadequate and also from the fundamental role played by SMEs in the world economic structure (Hossain & Kauranen, 2016; Torchia & Calabrò, 2019; Tchouwo, Poulin, & Veilleux, 2021). Section 2.2 provides a more in-depth discussion concerning open innovation in SMEs.

Regarding the limited geographical context, open innovation has been typically studied in developed countries (Chesbrough & Growther, 2006; Cao et al., 2020; Hossain & Kauranen, 2016; Sabando-Vera et al., 2022; van de Vrande et al., 2009). Recent studies addressed the need to investigate open innovation in different regions as its application might differ accordingly (Cooke, 2005; Torchia & Calabrò, 2019). The Middle East is a region that has received limited attention in the literature to date. This chapter presents open innovation in SMEs in developing countries, specifically Arab countries in the Middle East. The following sections justify selecting this study unit of analysis regarding firm size and geographical region.

2.2. Open innovation contexts: SMEs and developing countries

EU Law defines SMEs as small and medium-sized enterprises. "*The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million"* (Official Journal of the European Union, Commission Recommendation of 24th February 2016). The world's economic structure is primarily composed of SMEs (Bruque & Moyano, 2007; Constantin, 2019; Culkin & Simmons, 2018; Hoffman et al., 1998; Zafar & Mustafa, 2017). SMEs' role in innovation is fundamental; they function as this process's engine. Evidence exists of how SMEs' engagement in different sectors of technological innovation a source of its success is (Hoffman et al., 1998). Acs and Audretsch (1987) argue that SMEs actively participate in producing incremental and radical world innovation. Moreover, many scholars have discussed the benefits that successful innovation brings to SMEs, including its role in increasing SMEs' chances of survival by 22% (Cefis & Marsili, 2006; Golovko & Valentini, 2011; Huang, Lai, Lin, & Chen, 2013).

The global competition, the emergence of a knowledge-intensive economy, and the accelerating technological development require organisations to speed up their innovation processes to cope with market needs and environmental dynamism (Cole, 2001; Turulja & Bajgoric, 2019). While challenges apply to all types of organisations, SMEs are under more significant pressure. This pressure stems from what is known as the 'Liability of smallness' (Acs & Audretsch, 1990; Narula, 2004; Powell, Koput, & Smith-Doerr, 1996; Teece, 1992; Vossen, 1998; Santoro et al., 2018). To illustrate, SMEs generally suffer from inadequate financial resources and limited complementary assets such as marketing capabilities, manufacturing facilities, and global contacts. Moreover, SMEs are restricted by their limited opportunities to recruit diverse and specialised employees and their humble innovation portfolio. This negatively influences their innovation capability and limits their ability to introduce and commercialise innovation to the market. Additionally, Chesbrough and Crowther (2006) claim that SMEs are hesitant to introduce new products to avoid risk. Hutter, Hautz, Repke, & Matzler (2013, p.17) identified the principal areas that act as barriers to open innovation behaviour in SMEs as: '*lack of time, absence of complementary assets in the areas of marketing, distribution and sales, lack of a multi-disciplinary, broad knowledge*

and competence base, limited financial resources, high bureaucracy associated with innovation efforts due to complex institutional processes and policies, and risk avoidance'. Such barriers restrict SMEs from investing in innovation and hinder the sustainment of competitive advantage (Parida, Westerberg, & Frishammar, 2012).

Alternatively, De Massis, Audretsch, Uhlaner, and Kammerlander (2018) argue that SMEs can use their resources and competencies properly due to their limited resources. Subsequently, it allows them to be more innovative than larger firms. Consequently, the way innovation processes occur in SMEs differs from large ones (Bresciani & Ferraris, 2014). Considering their limited R&D capacity, SMEs' innovation processes should take place with hallmarks of more flexibility and less bureaucracy of formality and decision-making (Vossen, 1998; Van; Van de Vrande et al., 2009; Lee, Park, Yoon, & Park, 2010). Thus, SMEs need flexible approaches for radical and incremental product introductions to deal with such circumstances and overcome size-related challenges; such approaches should reflect on obtaining critical resources to support innovation (Bresciani & Oliveira, 2007; Stroeken, 2001). Surprisingly, Brunswicker and Ehrenmann (2013) claim that approaching innovation with such characteristics can help SMEs benefit from innovation more than larger firms. Thus, SMEs' innovation processes are something that warrants more attention.

To boost SMEs' innovation outcomes and overcome SMEs' challenges associated with 'Liability of smallness', SMEs are required to open their innovation processes (Bougrain & Haudeville, 2002; Chesbrough & Crowther, 2006; Laursen & Salter, 2006; Ndou, Vecchio, and Schina, 2011; Parida et al., 2012; Santoro, Ferraris, & Winteler, 2019; Wynarczyk, 2013). SMEs are not fully capable of covering all innovation functions and activities to stay competitive and meet customer changing demands (Brunswicker & Van de Vrande, 2014). Therefore, open innovation practices support SMEs and complement their internal resources to stay innovative (Santoro et al., 2019).

When Chesbrough (2003) introduced the notion of open innovation, the role SMEs would take in this innovation a model was recognised (Lichtenthaler, 2008; Van de Vrande et al., 2009). Notwithstanding this recognition, traditionally, most open innovation studies were concerned with exploring this phenomenon within MNCs, particularly at the beginning of the

inception of this notion (Chesbrough, 2003; Chesbrough & Crowther, 2006; Hinteregger et al., 2019; Kirschbaum, 2005; Mortara & Minshall 2014; West & Gallagher 2006). However, the discussion on how SMEs benefit from external sources of knowledge for innovation purposes has been made earlier in the literature (Jarillo, 1989; Hoffman et al., 1998; Ussman, Almeida, Ferreira, Franco, & Mendes, 2001). Therefore, open innovation scholars started recently to highlight the relevance and importance of open innovation practices to SMEs (Bianchi, Campodall'Orto, Frattini, & Vercesi, 2010; Chesbrough, 2010; Lee, Olson, & Lee, 2009; Santoro et al., 2018; Santoro et al., 2019; Van de Vrande et al., 2009; Wynarczyk et al., 2013). Additionally, considerable results have been found on the benefits open innovation brings to SMEs. While Spithoven, Vanhaverbeke and Roijakkers (2013) initiate that open innovation is likewise crucial for both small and large organisations, Vahter et al. (2014) found that open innovation is proportionately more important to SMEs than to those large enterprises. This is because open innovation allows SMEs to gain access to resources and capabilities at a low cost, and it also supports product development and commercialisation (Chesbrough, 2003; Wynarczyk et al., 2013).

Open innovation enables SMEs to benefit from being part of a cluster of firms of a larger entity, benefiting and stimulating each other to become more capable of innovating and sharing the cost in case of unsuccessful ones (Bougrain & Haudeville, 2002; Piperopoulos & Scase, 2009). Thus, open innovation has become essential to SMEs in invention and commercialization (Henttonen & Lehtimäki, 2017; Gans & Stern, 2003; Van de Vrande et al., 2009). SMEs engaging in open innovation seek market-related benefits, including competitiveness and meeting the dynamic demands of customers (Van de Vrande et al., 2009; Vanhaverbeke et al., 2017). They can also benefit financially and non-financially (Arias-Pérez, Coronado-Medina, & Perdomo-Charry, 2021; Henkel, 2006; Hochleitner, Arbussà, & Coenders, 2017; Lim, Preis, Lee, Mangematin, & Kim, 2021; Varis & Littunen, 2010). Managing open innovation is different from closed innovation as it requires different approaches (Ollila & Yström, 2015). Open innovation success requires a structural process that helps organisations capture and exploit external knowledge and ideas (Gassman, Enkel, & Chesbrough, 2010). Such a structural process of managing open innovation in SMEs urges the support of specific and new competencies (Brunswicker & Van de Vrande, 2014; Santoro et al., 2019). This has not been widely discussed in literature and warrants more attention. Notwithstanding the recent increased interest of scholars in studying open innovation in

SMEs, scholars call for more studies on the SMEs context. Many other scholars suggest that the existing knowledge about SMEs is yet insufficient (Hossain & Kauranen, 2016; Torchia & Calabrò, 2019; Tchouwo et al., 2021).

To summarise, despite the apparent benefits it offers to SMEs; open innovation has been examined in specific contexts, such as in terms of size. The majority of open innovation literature focuses on large organisations despite SMEs' significant role in innovation and the world's economy. Thus, further research is required on SMEs' behaviour in this context. Additionally, open innovation research has been mainly limited to specific regional contexts, namely, developed countries such as America and Europe (Chesbrough & Crowther, 2006; Galati et al., 2016; Gao et al., 2020; Gascó, 2017; Lecocq & Demil, 2006; Sabando-Vera et al., 2022). However, recent research has started to call attention to regional differences that might exist and affect the application of open innovation and highlight the need to investigate differences that might exist due to regional factors, such as in developing countries (Chesbrough & Bogers 2014; Hossain & Kauranen, 2016; Spithoven & Dejardin, 2017; Torchia & Calabrò, 2019; Usman, Roijakkers, Vanhaverbeke & Frattini, 2018; West et al. 2014). Sağ, Sezen, & Güzel (2016) argue that the conflicting results that reflect the level of open innovation adoption in SMEs in the literature stem from conditions differences between various regions, namely, between developing and developed countries.

SMEs represent the engine of innovation in a wide portion of the world's economic structure and represent approximately 99% of the business structure in developing countries (Sağ et al., 2016). In Arab countries in the Middle East, SMEs play a vital role in their GPD and represent the engine of their economic growth (Elseoud, Sayed, Kreishan, & Ali, 2019; Mahate, 2015). Due to the gap in the literature on examining open innovation in SMEs and the minimal knowledge regarding SMEs in developing countries, this dissertation focuses on examining open innovation capabilities in SMEs in the Middle East.

The following sections provide a brief overview of the Middle East region and its transition journey toward building a knowledge-based economy

2.3 The Transition Toward Knowledge-Based Economy of The Middle East

As open innovation literature focuses its attention on developed countries, calling papers highlighted the need to investigate open innovation in developing countries as this aspect has been neglected (Gao et al., 2020; Hossain & Kauranen, 2016; Sabando-Vera et al., 2022; Torchia & Calabrò, 2019; Usman et al., 2018). There is no research examining open innovation in Arab countries in the Middle East. While open innovation has been found more intensively in SMEs, SMEs form most developing countries' business structures (Sağ et al., 2016; Spithoven et al., 2013; Torchia & Calabrò, 2019). Spithoven and Dejardin (2017) have found that open innovation practices and performance in SMEs differ across different regions; accordingly, this section provides a brief overview of the Middle East region and identifies its key industries, economic health and innovation in the region.

The Middle East is a transcontinental region covering a significant part of Western Asia and northeast Africa. This region, throughout history, has remained a critical area strategically, economically and politically (Anderson, 2013). The US Admiral Alferd Mahan introduced the term 'Middle East' for the first time in 1901 and then this term was more popularised to describe an area of more restrictive geographical scope than is accurate. Fisher (2013) posits the commonality among different countries within the Middle East region. This commonality includes natural, climate, cultural and social structure aspects, which justify the one single unity treatment of the Middle East. *It also suggests a degree of internal informality that is unjustified by its diverse reality'* (Ali, 1999, p.103). Despite the obvious controversial definitions to locate the area of the Middle East (Culcasi, 2010; Lewis, 1998), De Blij, Muller and Nijman (2010, p.251) only included Iraq, Jordan, Syria, Lebanon, Palestine and Golf countries in their map to refer to Arab countries in the Middle East. This stems from the communality among these countries in language, culture, religion, social and political structure. While Culcasi (2010) posites the geographical amiguit that exists on defining the boderds of the Middle East, the author clarified that countries of Iran, Iraq, Syria, Lebanon, Jordan, Egypt, Israel and the Occupied Territories, The Arabian Peninsula, Turkey, Cyprus, and Egypt are often included in the definition of the Middle East. This thesis will only consider Arab countries in that region for investigation due to the communality among these countries in language, culture, religion, social and political structure.

Ali (1999) claims that the economic growth and competitiveness in the Middle East require social, political and organisational change. Most Arab countries' market economy fate in this region draws on their leaders' vision, and governments also would interfere correspondingly to manage the market mechanism (Ali, 1995; 1999). Recently, some Arab countries in the Middle East, such as Qatar, Saudi Arabia, United Arab Emirates (UAE) as well as Jordan, have recognized the importance of knowledge and innovation in the knowledge-based economy and have achieved higher ranks on the development index (Barkhordari et al., 2019; Porter, 1990). The new leadership vision for some Arab countries is increasingly oriented toward becoming forces for innovation, expecting to generate $16.9 billion in additional revenue from digital transformation (Cabral, 2017).

Pervan et al. (2015) pointed out the importance of government policies in determining the level of innovation of SMEs in Arab countries. Recently, Abu Dhabi's economic vision 2030, which was a vision of its ruler and mandated by the government, acts as an ongoing long-term roadmap to guide Abu Dhabi's economic progress through to 2030 (The Government of Abu Dhabi, 2021). The vision of 2030 aims at achieving a sustainable high value-adding economy through an effective transformation of its economy and bringing international integration and benefits. This implies broadening the Emirate's economy's sectors and increasing its ability to diversify and instil extra depth in its economic structure by fostering non-oil GDP growth more than the oil sector. Such diversification does not solely rely on increasing the number of economic sectors. It also implies encouraging small businesses and entrepreneurs. The Emirate policy emphasises SMEs development initiatives by providing financial and professional support and assistance to entrepreneurs; this includes low-interest funds, training programmes, and physical facilities. The private sector also provided support and facilities needed for SMEs development. Their effort to increase such diversification will increasingly improve its competitiveness. One of vision 2030's main pillars aiming to increase competitiveness is understanding and adopting new business models; this would happen in concurrence with establishing programmes to support innovation and integrate it with international innovation centres.

Similarly, the economic development Saudi Arabi is adopting, a vision of its Crown Prince - known as Saudi Vision 2030, is a strategic framework that aims to reinforce the economy and investment to become one of the world's largest economies (Nurunnabi, 2017). Saudi Vision 2030 emphasises developing economic diversification to reduce the country's dependence on oil (Nurunnabi, 2017). Saudi Arabia and UAE scored the highest ranks among GCC countries in the handbook of The Global innovation index (GII) in 2016. The report for 2019 shows a high increase in the figures for the UAE (Global Innovation Index, 2019). Additionally, Saudi Arabia is launching various programmes to support and boost SMEs to accomplish its vision by developing the knowledge economy (Amirat & Zaidi, 2020; Tripathi, 2019; Saudi Arabi Vision 2030 report, 2017). Saudi Arabia's overall performance is positive and has progressed remarkably toward shifting to a knowledge-based economy. Additionally, GPD growth is expected under this vision (Amirat & Zaidi; 2020; Nurunnabi, 2017).

Likewise, many other Arab countries like Qatar and Jordan are adopting economic development strategies. While Jordan is a non-oil upper-middle-income country, it aims to achieve strategic and financial developments and transform its economy from a nation-state to a competitive state (Al-Jaghoub & Westrup, 2004; Ul-Haq, 1995; UNDP, 2000). Jordan's economic structure depends almost entirely on SMEs (Elseoud et al., 2019). Such transformation to knowledge-based economies and the moving toward a free market system, with the support of government agencies and multinational firms, has created massive innovation. As a result, this has led SMEs to interact and innovate more collaboratively and openly. SMEs represent the majority of these countries' economic structures economy and significantly contribute to creating new innovations and the development of the local economy (Massa & Testa, 2008).

The actions of individual economics and its national systems affect their integration into the global economy, which in turn impacts its domestic growth rate. In other words, the different integration modes of developing countries to the global economy that mainly is associated with technology and knowledge transfer reflect the increasing economic variation among them (McGrew & Lewis, 1992; Bretherton & Ponton, 1996). By integrating into the global economy, developing countries' market is not automatically incorporated into production networks and technology transfer systems. Radosevic (1999, p.2) suggest that *"The*

endogenous generation of innovation when coupled with the active adoption of imported technologies is essential for long-term growth". In this regard, the transition toward knowledge-based economies emphasises the role of fundamental factors of innovation, knowledge transfer, collaboration and inter-organisational collaboration and linkages (Amirat & Zaidi, 2019; Carayannis, Popescu, Sipp, & Stewart, 2006; Dyker & Radosevic, 2000; Nurunnabi, 2017; Parcero & Ryan, 2017).

Governmental and policy markers' support level is a critical determinant for innovation in the Middle Eastern SMEs market (Carlsson, 2006, Pervan et al., 2015; Zhu, Wittmann, & Peng, 2012). Al-Ansari, Pervan, & Xu (2013) argue that knowledge collaboration, idea sourcing and networking are key factors for successful innovation for SMEs in Arab countries, while innovation is a critical determinant of these countries' performance. A report of the 'Accenture Innovation Maturity Index 2021 – Middle East' (AIMI, 2021) has shown that most businesses in the Middle were affected by disruptive change. Thus, they need to enhance their innovation capabilities and embrace it at their core to achieve growth and remain competitive. Moreover, drawing on observing those who have attained significant economic benefits, the report recommended businesses change their approach to innovation to become more data-driven, inclusive, network-powered, technology-propelled and strive to sense external change (AIMI, 2021; Anaglada, 2021).

2.4 Knowledge-intensive enterprises

This thesis focuses on knowledge-intensive SMEs, which have recently gained a lot of attention as knowledge has become increasingly important for businesses and governments. In many industries, knowledge is displacing real capital as the major factor (see section 2.3). One of the primary qualities of knowledge-intensive enterprises, according to Alvesson (1993), is their ability to address complicated challenges through creative and innovative solutions. This thesis follows Autio, Sapienza, and Almeida's (2000, p. 913) definition of knowledge-intensive enterprises as *"knowledge-intensity reflects the extent to which a firm depends on the knowledge inherent in its activities and outputs as a source of competitive advantage".*

Considering the increasing trend of Arab countries in the Middle East towards knowledge economies, it is essential to shed light on and investigate these relevant industries. In the empirical part of this thesis, high-technology and service SMEs have been selected for this study context as it is considered a typical knowledge-intensive sector (Autio et al., 2000).

Lately, countries' business structure has witnessed an increase in high-technology and service firms compared to manufacturing ones (Jones-Evans & Westhead, 1996; Smith & Romeo, 2012). This increase has led to the emergence of the 'technical entrepreneur' concept (MacKenzie & Jones-Evans, 2000). As discussed earlier in Section 2.3, government policies in some Arab countries support the transition toward building a knowledge-based economy in the region. At the same time, innovation is a critical pillar of this phase. In the case of the high-tech industry, firms need a massive deal of knowledge for their innovation processes as high-tech firms have the highest rate of innovation and level of R&D. Thus, they tend to look for knowledge outside their organisational boundaries (Laursen & Salter, 2006). Escribano, Fosfuri, & Tribó (2009) argue that high-tech firms' ability to acquire and utilise external knowledge is crucial for sustaining their competitive advantage. Thus, open innovation is essential to high-tech firms. Preece, Miles, and Baetz (1999) noted that high-tech SMEs compete in a turbulent environment (Berry, 1998; Covin & Slevin, 1989). Consequently, the high-tech industry offers an interesting research field for the focus of this thesis, open innovation in the Middle East SMEs, which is both relevant and identifiable.

2.5 Summary

Various reasons lead this thesis to focus on studying Arab countries in the Middle East. Firstly, the development of the innovation field and the emergence of open innovation as the current debates exist on how it contributes to organisational performance. Secondly, the rising attention of scholars, businesses and policymakers to the Middle East stems from the fact that its economy grows progressively in the midst of social and political developments and security related issues. Thirdly, the recent emerging calls to undertake studies on the less-researched regions (Gao et al., 2017). Fourthly, the effect of the unique context of the Middle East in terms of social-cultural aspects gained inadequate attention and produced less studies.

Furthermore, ambiguity existed on determinants and antecedents of open innovation adoptions and their relevancy to SMEs operating in such regions. Moreover, the existing absence of robust information creates unclarity on the region's prevalent dominant practices and context-specific nature of innovation. Consequently, the previously mentioned factors produce multiple research avenues in open innovation literature for further theory development and investigation of context-specific nature and factors of open innovation best practices among different regions**.** Notwithstanding that innovation can be considered one of the keys for developing countries to advance and grow their economic base (Jaffe & Lerner 2006), it is still the least explored and needs more examination (Gupta 2009; Vrgovic, Vidicki, Glassman, & Walton, 2012). One of the central regions that stand to be the least explored in the field of open innovation is the Middle East (Santos, 2015). This chapter justifies the rationale behind selecting knowledge-intensive SMEs in the Middle East as a unit of analysis. The following chapter provides a review of the literature on open innovation.

Chapter Three: Open Innovation – A Literature Review

3.1 Introduction

This chapter presents an overview of open innovation literature. The chapter provides an understanding of the emergence of open innovation and discusses its processes, benefits and main adoption challenges. Particular attention was paid to reflect the main theoretical perspectives that have guided this thesis. While the notion of open innovation is considered to be a novel and imperative paradigm (Bogers et al., 2019; Chesbrough, 2003), it is indispensable to review and analyse the different perspectives of this concept from the literature. The chapter concludes by proposing a definition of open innovation that reflects a common understanding of the three perspectives. This holistic proposed understanding of open innovation would help identify the most relevant resources, capabilities and competencies that enable open innovation. The discussion begins by presenting an overview of open innovation as a research topic. In this part of the discussion, the thesis emphasises the phenomenon's essence and its strategic importance.

3.2 Innovation

Innovation is considered a fundamental pillar for competitive success and a key factor for economic growth and development (De Silva, Howells & Meye, 2018; Gómez, Salazar, & Vargas, 2017; Martín-de-Castro, 2015; Martín-de Castro, Delgado-Verde, Navas-López, & López Sáez, 2011, Teece et al., 1997). For understanding the notion of open innovation, a clear definition of innovation is offered. The concept was defined from an industrial perspective in 1939 as new changes introduced to a firm business cycle, resulting in improved product increments (Schumpeter, 1939). Latterly, the concept 'Creative Destruction' was introduced to refer to the industrial mutation that revokes traditional economic structures and revolutionises new ones (Schumpeter, 1942). In modern use, the term 'creative destruction' is used as one of the innovation processes. The diverse contexts and perspectives of the innovation field have produced a variety of definitions of the concept. Schumpeter (2017) argued that innovation assists organisations to create value and supports the industry's evolution. While this spectrum has a strict view of newness, most

literature employs ‘newness’ to reflect innovation within an organisational context (Johannessen, Olsen, & Lumpkin, 2001; Sundbo, 1997). Rogers (1983) highlighted that the perception of newness at any aspect that appears within the organisation context reflects innovation in a particular market firm. However, the definition provided by Baldwin and Johnson (1999) the asserts on necessity of newness solely in the process and products aspects of the organisation. They defined innovation as ‘*the introduction of a new or improved product or process, but not the introduction of aesthetic changes that did not affect the technical construction or performance of the product’* (Baldwin & Johnson, 1999, p. 60). Degadt (2008) clarified this by claiming that any aspect of a business could be subject to imply innovation, thus, affirming Rogers’s (1983) perception of newness. This might include newness in products, services, processes, technologies, methods, practices and internal and external relationships.

Damanpour and Schneider (2006) provided a basic definition of innovation associated with generating or adopting new ideas. While Luecke and Katz (2003, p.2) defined innovation as “*the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services.*” This definition has been extended to move beyond new products and ideas to consider the development of new markets as a dimension of innovation definition (Bhat, 2010). Additional conditions that govern newness have been introduced as a definition of innovation **(**Kontoghiorghes, Awbrey, & Feurig, 2005**).** However, the definition provided by Freeman’s (1982) of innovation remined the most used definition of innovation. Freeman created a new tradition based on a fresh interpretation of innovation, many students have consulted his work often to learn more about the subject and the concepts involved (Godin, 2012). Freeman (1974, p. 15) referred to innovation *as ‘an essential condition of economic progress and a critical element in the competitive struggle of enterprises and of nation-states’*. The author also claimed that technological innovation on enhancing the quality of life. While Freeman (1982, p.18) referred to innovation as *‘the introduction and spread of new and improved products and processes in the economy and technological innovation to describe advances in knowledge’*. The definition of innovation Freeman (1982, p.22) introduce as opposed to invention, which Freeman credits to Schumpeter, is as follows: *‘An invention is an idea, a sketch or a model for a new or improved device, product, method, or system" (...). Only the first commercial transaction results in an innovation in the economic sense’.*

Notwithstanding the various definitions of innovation, it has been largely agreed on the benefits innovation can bring to all organisations (Fartash et al., 2018; Palmer, Wright, & Powers, 2001). Thus, organisations are searching for new strategies and approaches to increase their ability to innovate (Cohen & Levinthal, 1990; Laursen & Salter, 2006). The following section explains how organisations' approaches to innovation have changed over time to meet market demand and competitiveness (Monsef & Ismail, 2012).

3.2.1 From closed to open approach to innovation

Innovation was typically viewed as a closed process that occurs in sequential linear steps inside organizational boundaries, while external entities played a limited role in its development (Cainelli, Evangelista, & Savona, 2004). In the traditional innovation context, most organisations develop their own products related technologies internally with limited interaction with the surrounding outside actors (Wyld, 2010). Consequently, large R&D departments have produced radical innovations that have radically evolved their industries (Chandler, 1962). Therefore, organisations tend to invest in R&D as a key source for business growth and differentiation (Lazonick & O'Sullivan, 2000; Lazonick, 2010). Furthermore, innovation scholars have considered the closed approach for achieving economic productivity for many years (Freeman, 1982).

The perspective of firms' ownership and control that evolved from the linear innovation model, which underlines internal innovation routines that draw on in-house resources and technologies to produce goods and services, has been questioned for being inadequate to keep up with contemporary innovation practices (Teece, 1986; von Hippel 1988). The emergence of the internet and Information and Communication Technologies (ICT) have made knowledge acquisition less exclusive and more distributed across the industry (Cui, Tong, & Teo, 2012). Moreover, career movements and labour mobility have additionally promoted knowledge sharing and allowed knowledge to flow out to other firms, including smaller ones (Almeida & Kogut, 1999; Costello, Donnellan, Gleeson & Rochford, 2007; Kim & Steensma, 2017; Song, Almeida, & Wu, 2003).

As business environment dynamism is increasingly changing in today's world, both managers and academics agree that knowledge transfer and cross-boundary collaboration assist in improving innovation and gaining competitive advantage (Bigliardi et al., 2020; Gao et al., 2020; Yun et al., 2020). While organisations are constantly trying to improve their competitive position and seeking opportunities to deliver value (Gummesson, Mele, Polese, Galvagno, & Dalli, 2014), their internal skills and capabilities might not be enough to support such ambitions (Gassman et al., 2010). A core fundamental principle of open innovation is that knowledge, resources, and ideas are distributed in society. A single firm is not fully capable of standing alone, relying on its resources (Chesbrough, 2006). Thus, firms would try to discover novel ways to network and complement their resource base to evolve their innovation sophistication (Chesbrough, 2003). Through collaboration with stakeholders such as customers, rivals, suppliers, universities, and research centres (Chesbrough & Bogers, 2014). Chesbrough (2003; p. 36) stated, "*Not all the smart people work for us. We need to work with smart people inside and outside our company*."

Pursuing this traditional innovation model has begun to change across industries as firms started to acquire external knowledge and technologies across their organizational boundaries to complement the internal knowledge base (Christensen et al., 2005; Rigby & Zook, 2002). This tendency toward open innovation was illustrated by Saint-Paul (2003, p.3): "*In an industry with, say, 10 firms similar in output and investment in R&D, each member of a nine-firm technology cartel can expect to obtain immediate access to nine times the number of innovations that the remaining enterprise can anticipate on the average.*" Accordingly, neglecting this new model may put the firm in a serious position that would produce competitive disadvantages. This includes decreasing opportunities for innovation, negatively influencing the long-term firm's opportunity to improve its knowledge base and decreasing its opportunity to engage in iterative knowledge sharing in the future (Koschatzky, 2001). Therefore, instead of relying on a closed system of innovation that draws exclusively on internal sources of knowledge and ideas, organisations today are looking to improve their competitive position by relying on external and internal sources for innovation; open innovation (Chesbrough, 2003; van de Vrande et al., 2009; Spithoven et al., 2013).

3.3 Open innovation

The gradual changes in organizations' surrounding environment have pushed for open innovation (Dahlander & Gann, 2010); Globalization and advancement in ICT have foster collaboration between different industries across geographic distances. Digital transformation also allowed for machine learning and convergence, which consequently has changed the linear innovation paradigm to become a process of more openness (Arias-Pérez et al., 2021; Urbinati et al., 2020; Xue & Tan, 2022). These factors enabled stakeholders and the ecosystem to become critical players in determining what the producers should provide and innovate (Bogers, Afuah, & Bastian, 2010; West & Bogers, 2017). The following section discusses open innovation, its main processes, and the main challenges leading to its failure.

3.3.1 What is open innovation?

The emergent trend toward opening up the innovation process was introduced by Chesbrough (2003) due to the raised recognition of the inadequacy of the linear innovation model for keeping up with modern innovation activities (Chesbrough, 2003; Pisano, 2006; von Hippel, 1988). Chesbrough (2006) has captured, for the first time, an original understanding of the continuum of different innovation forms: from one perspective, the closed approach of innovation and the open kind of innovation by contrast. Following Chesbrough's (2003) salient book, explicit research and attention in such a field have emerged from academics and practitioners alike (Bigliardi et al., 2021; Chesbrough & Bogers, 2014; Chesbrough & Bogers, 2017; Chesbrough, Vanhaverbeke, & West, 2014).

Latterly, Chesbrough et al. (2006, p1) further clarified those two extremes. Open innovation has been defined as "*the use of purposive inflows and outflows of knowledge to accelerate internal innovation and to expand the markets for external use of innovation, respectively.*" The authors proposed a definition that implies that externally available knowledge can be internalised to develop new goods. Alternately, accumulated internal knowledge and innovation can be externalised through multiple non-traditional channels to provide the market with ideas in a faster way than these firms solely could internally develop them

(Chesbrough & Appleyard 2007; Laursen & Salter 2006). Figure (3.1) represents Chesbrough's (2003) closed and open innovation models.

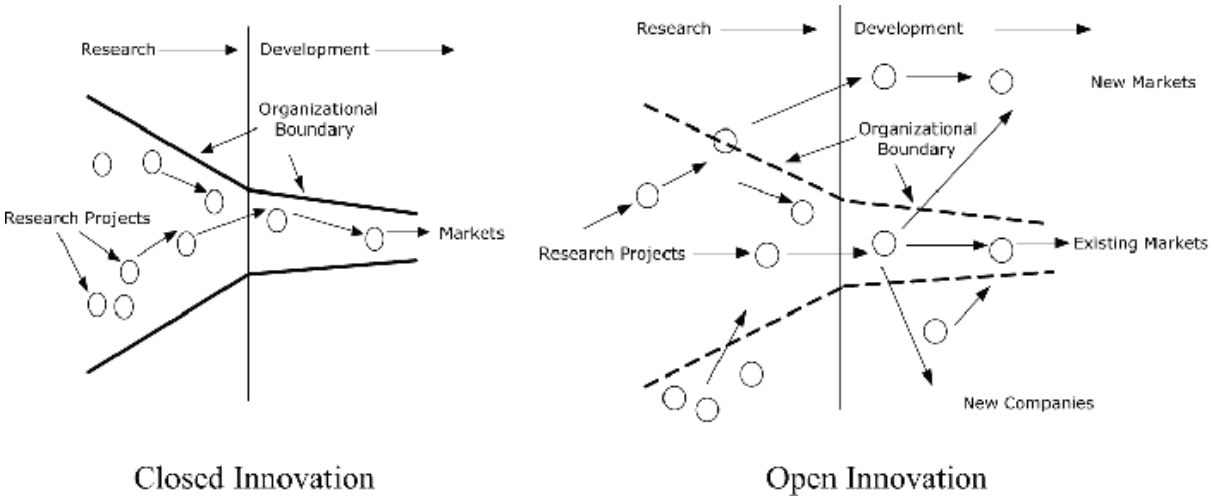

Figure 3.1: Open innovation vs close innovation models (Source: Chesbrough, 2003)

A core fundamental principle of open innovation is that knowledge, resources, and ideas are distributed in society. A single firm is not fully capable of standing alone, relying on its resources (Chesbrough, 2006). Open innovation can happen through collaboration with stakeholders such as customers, rivals, suppliers, universities and research centres (Chesbrough & Bogers, 2014). Utilizing creative customer ideas in product co-creation has gained significant research attention, and there was a consensus on its potential benefits for product development (Piller & West, 2014; Von Hipple, 2005). For instance, Wii, the gaming console provided by Nintendo, was developed over time, relying on customers' inputs and knowledge, allowing Nintendo to gain a competitive advantage in the gaming experience (Ponstiskoski & Asakawa, 2009).

Similarly, IPod, one of Apple's most competitive products, was developed in collaboration with an outside organisation (Ponstiskoski & Asakawa, 2009). Apple does not spend much on market research for identifying market needs, as they internally developed ideas relying on their superior talents and resources (Ponstiskoski & Asakawa, 2009). However, Apple has collaborated with individuals from multiple outside organizations to develop the iPod system technically. Moreover, Portal Player was responsible for managing the iPod's technical design

(Gassman et al., 2010; Ponstiskoski & Asakawa, 2009). Thus, open innovation has moved Apple from standing alone to collaborating and building alliances with different stakeholders to develop and manage its products. These kinds of open innovation projects collaboration allowed Apple to maintain its focus on core capabilities, consequently helping it overcome technology complexity barriers by utilizing outside know-how knowledge (Gassman et al., 2010; Ponstiskoski & Asakawa, 2009).

Another example of R&D collaboration and alliances is Nokia (Ponstiskoski & Asakawa, 2009). Nokia faced challenges in developing and commercialising its products; it only overcame these challenges by reinventing itself and doing things with a new twist to breakthrough again (Ponstiskoski & Asakawa, 2009). As Nokia used to be the reigned in the global phone market, its failure to develop a strategy to boost its innovativeness in the smartphone market had led to losing out on competing with Apple and Google; Nokia's main weakness was relying solely on closed innovation (Yun, Won, & Park, 2016). Nokia recognised the need for external R&D project collaboration and launched its N-series product line drawing on open innovation. Breaking out would have never happened unless Nokia had to overcome the '*Not-Invented-Here'* syndrome (NIH) and combined its internally generated knowledge with different external sources of knowledge to achieve operational excellence (Dittrich & Duysters, 2007; Ponstiskoski & Asakawa, 2009).

Case firms illustrated above show how businesses can possibly overcome the NIH to keep competing in the industry (Lichtenthaler & Ernst, 2006). More importantly, they demonstrate how open innovation is a unique contextual process that varies in its degree and scope of openness. Companies follow distinctive strategies to integrate knowledge and innovation and create value (Ponstiskoski & Asakawa, 2009). Consequently, open innovation is not the other opposite concept of closed innovation; instead, it is more of a continuum of the open style of thinking and behaving and should be viewed as a holistic strategy of innovation (Huizingh, 2011). This means that open innovation is dynamic in nature and far from being a static process; its adopters can exhibit different forms of openness ranging from modest to radical (Appleyard & Chesbrough, 2017). The following section discusses how open innovation must be understood as a dynamic process.

3.2.2 The dynamic nature of open innovation

Firms can migrate and switch their strategic choices regarding the degree of openness. They can even reversion to a close innovation strategy, swing between modes or exhibit hybrid choices (Hautz, Seidl, & Whittington, 2017; Whittington, Cailluet, & Yakis-Douglas, 2011). The varying contingencies that might influence a business decision concerning the level of openness might include general trends such as social, technological, and economic factors or particular applications facing individual organisations (Seidl &Whittington, 2014; Whittington, Hautz, & Seidl, 2014).

For openness to be effective, even at its radical levels, it should enact radical open practices and counterbalancing practices; it might co-exist with variant degrees of open and closed practices (Luedicke, Husemann, Furnari, & Ladstaetter, 2017). This, in return, can help firms cope with barriers resulting from the practical spell over of radical openness (Bogers et al., 2019). This includes issues related to the uneven distribution of information and power and information overload since counterbalancing can overcome the imperfection of radical openness (Luedicke et al., 2017). Certain aspects of closure embodied in procedures and bureaucracy are needed while applying open initiatives to gain greater openness and overcome innovation barriers (Armbruster & Gebert, 2002; Dobusch, Dobusch, & Müller-Seitz, 2019).

Xiaoren, Ling, and Xiangdong (2014, p.62) state, *"…open innovation is truly realized to achieve multi-agent and multi-angle dynamic cooperation in various stages of innovation process.*". Thus, open innovation needs to be understood as a contingent and variable notion that reflects open innovation's dynamic nature. This dynamic nature of open innovation supports the understanding of open innovation from a philosophical perspective (see section 3.5). As this thesis draws on the notion that open innovation is a dynamic process, the following section introduces the different open innovation processes.

3.3.3 Open innovation processes

Open innovation is perceived as a new approach to innovation that aims to enhance a firm's innovativeness (Füller, Matzler, & Hoppe, 2008; Freixanet, Braojos, Rialp-Criado, & Rialp-Criado, 2021; Ovuakporie, Pillai, Wang, & Wei, 2021; Santoro et al., 2018). Open innovation aims to reach out across organisational boundaries (Pontiskoski & Asakawa, 2009), allowing knowledge and resource sharing (Chesbrough & Bogers, 2017). Pooling in outside knowledge and ideas can lower costs and risks associated with R&D functions and outcomes (Prandelli, Verona, & Raccagni, 2006; Rauter, Globocnik, Perl-Vorbach, & Baumgartner, 2019; von Stamm, 2004). Drawing on this perspective of innovation, open innovation scholars have suggested three subsets of open innovation practices: inbound, outbound and coupled practices (Bianchi et al., 2010; Cheng & Shiue, 2015; Chesbrough & Bogers, 2017).

Inbound open innovation

Inbound open innovation seeks to pool external knowledge and technologies from across organizational boundaries to enrich inner knowledge (Cheng & Shiu, 2015). This includes networking with partners and building alliances to bring their knowledge into the firm's internal R&D, collaborating with customers to co-create or participate in product development (Von Hippel, 2005), or cooperating with other parties to develop joint products (Parida et al., 2012). This outside-in process of innovation exploratory learning behaviour entails external knowledge exploration. To enhance their internal knowledge base, firms here seek to acquire external knowledge stemming from external sources such as customers, suppliers, partners, universities, and other external actors. A good example of this type of open innovation is incumbent pharmaceutical firms acquiring technological knowledge from biotechnological firms (Schwartz & Huff, 2010).

Outbound open innovation

Shifting the locus of knowledge exploitation to the outside environment is the essence of outbound innovation. Outbound open innovation is, in contrast, an outside-in process that involves opening up for knowledge exploitation where a firm actively commercialises its technological knowledge by several means such as out-licensing, contractual agreements,

spin-offs, and spin-outs strategic alliances (Chesbrough, 2006; Lichtenthaler, 2009). While inbound-open innovation encompasses exploratory learning behaviour, outbound open innovation involves the purposive outflow of internal ideas, knowledge, and technologies beyond the firm's boundaries (Chesbrough, 2006; Gassmann, 2006). Practising outbound open innovation decisions means a firm no longer locks itself to its own market. Transferring ideas across organizational boundaries to the outside environment aims at generating profits from different streams such as venturing (Vanhaverbeke, Van de Vrande, & Chesbrough, 2008). This exploitation practice aims at earning financial (licencing revenues) and non-financial benefits (access to external technology) through different kinds of agreements such as licencing and patenting (Gassmann, 2006; Grindley & Teece, 1997; Hung &Chou, 2013; Lichtenthaler, 2009). A good example of that is Philips electronics (Alexy, Criscuolo, & Salter, 2009). Thus, outbound open innovation relies on establishing external relationships to commercialise the firm's internally developed ideas and innovation opportunities that fit other organisations' business models and fall outside the firm's existing business model (Chesbrough et al., 2006).

Coupled open innovation

A firm may use inbound and outbound open innovation practices combined by transferring a portion of its knowledge technology to gain external knowledge access and co-create or commercialise innovation (Lichtenthaler, 2008). This practice is recognised as cross-licensing agreements (Gassman & Enkel, 2004; Grindley & Teece, 1997; Lichtenthaler, 2008). However, inbound open innovation practices are used more frequently in businesses than other open innovation practices and are perceived as more prevailing than outbound practices (Chesbrough & Crowther, 2006). Inbound practices can lead and reinforce organizations to adopt outbound open innovation by stimulating new innovation opportunities (Laursen & Salter, 2006). However, combining the two practices and integrating them into one can generate better results than only relying on the firm's own knowledge and technology (Van de Vrande, De Jong, Vanhaverbeke, & De Rochemont, 2009).

Adopting any of the earlier mentioned dimensions of open innovation requires firms to go through a profound organizational change of familiarising, preparing, implementing and sustaining the migration from closed to open innovation to enable knowledge and innovation

exchange with the external environment (Chiaroni et al., 2011). A study conducted on Proctor and Gamble illustrated the significant cognitive, behavioural, cultural and organisational changes required to implement open innovation successfully (Dodgson et al., 2006). While open innovation is a promising notion, its adoption is encountering several difficulties and challenges in implementing it successfully (Huston & Sakkab, 2006; Sarker, Sarker, Sahaym, & Bjørn-Andersen, 2012). Alternatively, an organisation cannot rely only on its own knowledge for competition; thus, external sources of knowledge are pivotal complementary sources of innovation. Bogers et al. (2019) emphasised open innovation as an imperative rather than an option. The following section discusses challenges that hinder the successful implementation of open innovation.

3.4 Open innovation adoption challenges

Literature has pointed out the importance of successfully managing the implementation of open innovation (Bouncken et al., 2015; Randhawa et al., 2016). Although of all the apparent benefits organisations can obtain from adopting open innovation practices, research suggests that the promise of implementing open innovation has largely stalled (D'Ambrosio et al., 2017; Hewitt-Dundas & Roper, 2018). Many organisations that have tried to adopt open innovation did not obtain the returns they were seeking (Van de Vrande et al., 2009). Enkel, Gassmann and Chesbrough (2009) found that nearly 50% of managers showed concerns about the difficulties relevant to implementing and sustaining open innovation. Consequently, several researchers focused their attention on such problems and started to explore the reasons and rationale behind such failures (D'Ambrosio et al., 2017; Hewitt-Dundas & Roper 2018).

One of the main problems that lead to open innovation failure is the lack of strategic alignment. Strategic support for open innovation is very important to its success. For open innovation to be successful, organisations need to rethink their strategy; this includes their vision and objective to be open and innovation oriented (Chesbrough & Appleyard, 2007; Vanhaverbeke, Roijakkers, Lorenz, & Chesbrough, 2017). Chesbrough and Appleyard (2007) argue that organisations need to rethink their strategy to support openness for open innovation to be successful. Lack of strategic alignment of organization vision, mission and

objectives and strategies hinders the adoption of open innovation; this misalignment includes establishing unclear goals and lacking proper communication between different units of the organisation (Hosseini et al., 2017; Tafti, Abdolvand, & Harandi, 2019; Vanhaverbeke et al., 2017). Such changes in strategy imply cultural issues (Boschma, 2005; Lichtenthaler, 2011). When considering moving from the closed approach of innovation to open innovation, an organisational culture that promotes closeness also negatively influences the implementation of open innovation (Mergel, 2018). This might include negative attitudes toward collaboration in the innovation process, such as the NIH syndrome (Hannen, Antons, Piller, Salge, Coltman, & Devinney, 2019).

Another problem that leads to open innovation failure is the failure to adequately integrate and understand the complementary ties of open innovation's strategic and technological aspects (Cui et al., 2015). While open innovation deployment draws on IT, such systems need to drive strategy rather than just work as a standalone part of its deployment (Baka, 2014). Additionally, top management's weak presence and support can lead to open innovation failure; a clear vision and commitment toward open innovation are prerequisites for its success (Chesbrough & Brunswicker, 2013; Chiaroni, Chiesa, & Frattini, 2011). Top management's inadequate presence to open innovation and support might stem from lacking awareness and understanding of its benefits and values (Hewitt-Dundas & Roper, 2018). Top management focusing their concerns on the high cost of open innovation implementation might lead to their failure to engage in such initiatives or the under-investment in developing open innovation partnerships (Hewitt-Dundas & Roper, 2018). Moreover, open innovation failure might result from inadequate measurement systems that rely on measuring traditional closed innovation processes. Adopting conventional measurement systems for open innovation initiatives might lead organisations to be unable to identify what they want to achieve and poorly recognise whether they meet these objectives (Enkel & Lenz, 2009; Michelino et al., 2014).

A different cause for open innovation failure is associated with technological aspects. Westergren (2011) has highlighted the negative role of poorly understanding the characteristics and functions of IT systems in supporting open innovation initiatives; this includes skills required for developing, using and implementing IT-based open innovation.

Additionally, IT systems' effectiveness in integrating various actors' systems is a crucial question that needs to be addressed while adopting open innovation (Cui et al., 2015). Another critical IT aspect is the lack of flexibility. Cui et al. (2015) posit that less flexible IT would limit its ability to follow the dynamic nature and modes of open innovation networking; this might challenge a seamless migration between innovation partners' projects and models (Cui et al., 2015).

Moreover, one of the main rationales for open innovation adoption failure stems from the lack of having proper guidance that helps in developing relevant capabilities, thus leading to a discrepancy between theoretical notion and practical implementation (Chesbrough & Brunswicker, 2014; Faems, 2008; Randhawa et al., 2016). Literature has pointed out the importance of successfully managing the implementation of open innovation (Bouncken et al., 2015; Randhawa et al., 2016). The failure of such proper adoption potentially stems from the inadequate methodologies used to approach open innovation initiatives (Randhawa et al., 2016). Research has indicated that some firms faced difficulties in successfully implementing open innovation and did not achieve the gains they had envisaged (Bogers et al., 2019; Gassmann et al., 2010; Gassmann & Zeschky, 2008). A lack of holistic understanding of organisational capabilities required to implement open innovation also hinders its full adoption (Chaudhary et al., 2022; Hewitt-Dundas & Roper, 2018; Laursen & Salter, 2014). Literature has pointed out the importance of successfully managing the implementation of open innovation (Bouncken et al., 2015; Randhawa et al., 2016). Thus, Giannopoulou et al. (2010) noted the need to develop a theoretical framework for open innovation adoption to reduce the risk of becoming a managerial fad (Chesbrough & Brunswicker, 2014; Faems, 2008). Consequently, for organisations to successfully embrace open innovation, they must seek to be smart and flexible in restructuring their capabilities and resource-base to obtain success of open innovation (Chesbrough & Schwartz, 2007).

Open innovation capabilities have been widely discussed from a knowledge-based perspective, emphasising the role of knowledge capabilities in open innovation (Cassiman & Veugelers, 2006; Gao et al., 2020; Hughes & Wareham, 2010; Litchenthaler & Lichenthaler, 2009). However, a minor investigation has been paid into strategic aspects and the firm's capabilities of open innovation (Randhawa et al., 2016). To sustain the implementation of

open innovation, there is a need to undertake a methodical analysis of its foundation (Bogers et al., 2019). The majority of studies that have explored open innovation from a capability perspective focus on single facets of open innovation like investigating knowledge capabilities (Cassiman & Veugelers, 2006; Hughes & Wareham, 2010; Litchenthaler & Lichenthaler, 2009) or IT-knowledge capabilities (Joshi et al., 2010). Other capability frameworks are not specific enough to open innovation (Enkel et al., 2011) or focus on individual and project levels (Habicht et al., 2012). While Hosseini et al. (2017) proposed a general framework for open innovation capabilities, they failed to investigate the strategic capabilities required to implement open innovation. Despite the acknowledgement of several scholars regarding the need to (Bogers et al., 2019; Lee & Yoo, 2019; Randhawa et al., 2016). Dominant views highlighted the necessity of constantly changing and renewing organisational processes to adopt and sustain an open innovation strategy successfully; thus, studying and understanding open innovation from a dynamic capability perspective (Bogers et al., 2019; Lee & Yoo, 2019; Randhawa et al., 2016; Teece et al., 2020). However, developing a comprehensive capability framework that adopts a dynamic capability perspective remained under-researched. Thus, all open innovation adoption failures and challenges that have been presented in the literature must be evaluated.

Pursuing open innovation requires firms to rethink their existing business model (Appleyard & Chesbrough, 2017; Chesbrough & Appleyard, 2007). Teece (2010, p.157) defined a business model as '*the architecture of revenue, cost, and profits associated with the company delivering the value*'. This cognitive model illustrates how the firm can create and capture value a customer can appreciate (Teece, 2010). According to Chesbrough (2007), opening up a firm's business models can be beneficial. However, such transformation can be challenging likewise, particularly in a turbulent business environment (Chesbrough, 2007; Eisenhardt & Martin, 2000). Thus, firms need to have a unique value proposition and sustain it overtime (Teece, 2007). Organisations must have the right capabilities to guarantee the continuous implementation of an effective model (Teece 2010). Otherwise, a business model would work successfully initially. In contrast, imitation by other competitors and changes in market position and the fast-changing business environment will prevent its sustainment, and firms will struggle in lengthy run implementation (Chesbrough, 2007; Henderson, 2006). Thus, for organizations to maintain open business models, they must create and establish capabilities that help reconfigure the position of their assets (Bogers et al., 2019).

More importantly, one of the main challenges that open innovation research faces is the lack of an inter-discrepancy view that integrates multiple perspectives (Bogers et al., 2017). Chesbrough and Bogers (2014) showed concerns about how open innovation has been approached. Open innovation grasped the attention of many scholars from several fields, thus, producing many perspectives on open innovation (Bogers et al., 2017; Bogers & Chesbrough, 2014; Hossain, 2013). However, while various perspectives and lenses can enrich such notions, disconnection between such views could lead to misunderstanding and a less coherent view of open innovation (Bogers et al., 2017; Teplov, Albats, & Podmetina, 2019; Vanhaverbeke & Cloodt, 2006). This also is argued to be an issue that challenges the proper adoption of open innovation. Chesbrough and Bogers (2014) argued that the different definitions and approaches that emerged from multidisciplinary and disconnected views of open innovation challenge its successful implementation since lacking a comprehensive and integrative understanding of open innovation and its values affect its adoption. Section 3.5 further explains open innovation's different perspectives and proposes a unified understanding of the notion that integrates these perspectives. Building such a holistic understanding of open innovation as this thesis understands that these perspectives seem to influence the development of open innovation organisational capabilities.

To summarise, this section discusses how open innovation's successful adoption requires proper development of organisational capabilities; however, there is minimal literature discussing organisational capabilities from a strategic perspective, specifically in SMEs. However, such capability framework development needs to consider all the above-motioned challenges and arguments discussed in this section. The following section provides a comprehensive view of open innovation that integrates the multiple perspectives underpinning different disciplines.

3.5 Open innovation definitions: multiple perspectives

Open innovation adoption is considered a recent paradigm in organisations and literature. Its theoretical progress draws on multiple theoretical lenses, thus, producing different definitions of open innovation (Bogers et al., 2017; Bogers & West, 2012; Chesbrough & Bogers, 2014).

Kuhn (1962) demonstrates that applying various lenses and perspectives to a phenomenon leads to its research evolution. This schism in open innovation definitions was addressed in literature as a concern that might affect practitioners' understanding of open innovation and dispute matters concerning the development of such an academic field (Bogers et al., 2017; Chesbrough & Bogers, 2014). Christensen (2012) demonstrates their concerns about the confusion that might happen because of the different definitions by which open innovation was approached.

> *"There is also a major downside to being imprecise in the definition of open innovation. An imprecise definition not only makes open innovation more difficult to understand because little research is done on the actual phenomenon, but it also makes it more difficult to implement because there are a lot of people who claim to talk about "open innovation" but are actually talking about something else"* (Chesbrough & Bogers, 2014, p.15)

To summarise, the open innovation field has attracted many researchers from different areas and thus, produced a variety of perspectives (Chaudhary et al., 2022; Chesbrough & Bogers, 2014; Hossain, 2013). While such a broad embrace of open innovation delivers unique insights into understanding such phenomena, a risk of incoherent understanding exists due to the limited connection between them (Bogers et al., 2017; Chaudhary et al., 2022; Chesbrough & Bogers, 2014; Teplov et al., 2019). Therefore, for this research to achieve its aims, a comprehensive definition of open innovation that builds a common understanding of the notion needs to be developed and adopted.

This thesis categorises open innovation definitions into three main approaches based on the revised and analysed literature. Table 3.1 categorises these definitions from the three perspectives: philosophical, strategic, and IT-enabled knowledge approaches. The following section discusses the three perspectives of open innovation.

1) Philosophy of open innovation: this philosophical perspective of open innovation emphasises a bundle of values that influence and must be considered in most organisational aspects, such as strategy, knowledge and technology. Open innovation

philosophy is related to open-oriented culture and is concerned with achieving open values of a collaborative approach to innovation within its ecosystem, keens on cultivating openness and integration to create new outcomes of innovation ecosystems and stresses extensive knowledge exchange.

2) Strategy of open innovation: this perspective views open innovation as an organisational strategy that guides organisational, functional plans, policies and procedures toward achieving its goal of knowledge and information technologies (IT) collaboration for innovation.

3) IT-enabled knowledge of open innovation: this perspective emphasises the role of IT-enabled knowledge exchange in improving innovation. Defining open innovation from a knowledge transfer perspective is dominant in the literature (Gao et al., 2020; Randhawa et al., 2016)

Table 3.1: Different perspectives of open innovation

Perspective	Open innovation definitions and descriptions	Source
Philosophy of open innovation	"*Open innovation initiatives have moved from being short-term arrangements to more long-term collaborative structures (or ecosystems) where a group of companies join forces semi-permanently, develop a common set of strategic plans, and where partners even specialize in particular areas to optimize complementarity*."	Vanhaverbeke et al. (2017, p. 8)
	"*Open Innovation philosophy are those that: (i) enter into inter-organizational relationships with several heterogeneous partners; (ii) open up to these external organizations multiple phases of their innovation process; (iii) undergo a significant re-organization process so as to manage the increased complexity of the Open Innovation process.*"	Boscherini, Chiaroni, Chiesa & Frattini (2010, p. 1069)
	"*Companies that are willing to implement the open innovation "philosophy" need to select specific organisational modes through which to lever their knowledge-abundant external environment.*"	Chiaroni et al. (2010, p. 289)
	"The first step in delivering on the promise of open innovation is for leaders to start making the change from a market-share mindset to a competence-based mindset"	Rufat-Latre Muller, & Jones (2010, p.23)
	"*Open innovation is not a tool to be deployed. It is not a belief about the relative merits of information freedom. It is an attitude, a mindset, an approach, deeply embedded in the very foundation of the organization"*	Gobble (2016, p. 65)
	"*As knowledge becomes the key resource, OI needs to be embedded in an overall business strategy that explicitly acknowledges the potential use of external ideas, knowledge and technology in value creation"*	OECD (2008, p.11)
	"*Open innovation aims at the creation of new outcomes of innovation by the acquisition of external technologies and the discharge of internal technologies not utilized. The open attitude toward new viewpoints and knowledge, ...accept certain ideas and knowledge as truth until they are denied are very similarly contained in the processes of objective setting and maintenance."*	Yun et al. (2016, p. 10)
	"Open innovation must encompass three constitutive elements: (i) Voluntary knowledge disclosure from "participants"; (ii) knowledge being open (which is equivalent to say that "spillovers are not controllable", West and Gallagher, 2006, p. 94); and (iii) continuous and dynamic interactions among "participants" (I put participants in inverted commas since, open innovation being by definition open, it means that anybody can participate and is therefore potentially a participant)."	Pénin (2008, p.8)

	"*When defined as a philosophy, open innovation refers to the idea that organization can't solely innovate. Collaborating with actors of its ecosystem is necessary 'open innovation means that valuable ideas can come from inside or outside the company as well. This approach places external ideas and external paths to market on the same level of importance at that reserved for internal ideas and paths"*	Chesbrough (2003., p.43)
	"*Open innovation calls for a specific organizational mindset, which requires the creation and learning of a new operational culture, including open organization, processes, and products and services.*"	Westerlund & Leminen (2010, p.25)
Strategy perspective of open innovation	*"Open innovation as a distributed innovation process based on purposively managed knowledge flow across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model'*	Chesbrough & Bogers (2014, p. 12)
	Open innovation is a holistic strategy that purposely explores and exploits a wide range of innovation sources through modified paths.	West & Gallagher (2006)
	"Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively."	Chesbrough, Vanhaverbeke, & West (2006, p. 1)
	"*Open innovation requires collaboration among distributed but interdependent actors who rely on each other's capabilities for value creation and capture. Value in open innovation is driven not only by actors' value creation but also by their ability to capture value."*	Chesbrough, Lettl & Ritter (2018, p. 930)
	"*Open innovation is a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with each organization's business model."*	Chesbrough & Bogers, (2014, p.24)
	'*The attractiveness of open innovation as a business strategy is the way it leads to exploiting the benefits from imported ideas from outside the firm and exporting intellectual capital that had hitherto been idle.'*	Coelho (2016, p. 510-511)
IT-enabled knowledge perspective of open innovation	The research on the open innovation process is mainly focused on the acquisition and integration of external knowledge but is merely involved in the sharing of internal knowledge	Gao et al. (2020)
	Information and communication technologies enable the adoption of open innovation strategy as it enables its ability to engage with different sources of knowledge in its ecosystem in the innovation process.	Dodgson et al. (2006)
	"We propose that IT-enabled absorptive capacity, which is defined as a firm's ability to employ IT-based resources with other resources in building organizational capability in knowledge acquisition,	

	assimilation, transformation, and exploitation is a useful theoretical lens for understanding how IT can help overcome the challenges in open innovation."	Cui, Wu, & Tong (2018, p.577).

The following section discusses the three perspectives of open innovation and how these perspectives reflect a complementary understanding.

3.6 Open innovation definitional integration

Open innovation understanding might differ across organisations. Moreover, in some cases, different strategic business units and departments within one organisation might have a different understanding of open innovation and can approach it individually and differently. However, Bogers et al. (2017) highlighted the importance of having a common understanding and an integrative approach connecting different views and lenses of open innovation research to understand and implement successfully. The following section provides an overview of the different approaches to open innovation and how they need to be integrated into a complementary perspective and proposes an interdisciplinary definition of open innovation.

Open innovation is frequently viewed from an IT-enabled knowledge perspective (Gao et al., 2020; Randhawa et al., 2016). Since knowledge transfer has received adequate attention in the literature, this thesis only focuses on the role of IT in this perspective. IT help in the construction of value-creation processes as it provides the potential for stakeholders' involvement and support in overcoming limitations related to geographical distances, thus enabling knowledge transfer (Da Cunha & Orlikowski, 2008; Dahlander & Gann, 2010; Denyer, Parry, & Flowers, 2011; Ziemba, Eisenbardt, & Mullins, 2016; Dávideková & Hvorecky, 2017; Hossain & Lassen, 2017; Lavikka, Hirvensalo, Smeds, & Jaatinen, 2017; Tapscott, 1996). Open innovation technologies also boost employee engagements and community morale (Leidner, Koch, & Gonzalez, 2010) and enhance innovation performance (Freixanet et al., 2021; Ovuakporie et al., 2021; Santoro et al., 2018).

Open innovation's IT include data mining, virtual reality, web 2.0 collaboration, argumentative knowledge construction, informed decision making, social media monitoring and analytics, opinion mining, intellectual property management tool, digital technologies such as the internet of things, and rapid prototyping technologies (Adamides & Karacapilidis,

2020; Dodgson et al., 2006; Santoro et al., 2018). Other scholars referred to open innovations as innovation 2.0, innovation 3.0 and innovation 4.0, which reflects the evolution of technologies used to support knowledge transfer, such as web, information and communication technologies (semantic web), and digital technologies (internet of things) respectively (Hafkesbrink & Schroll, 2011).

However, organisations should not perceive open innovation systems, technologies and tools as only fixed, isolated, stand-alone systems that enable knowledge exploration and exploitation in open innovation practice (Baka, 2014; Cui et al., 2015). Alternatively, such technologies should be perceived as a whole. They should be embedded within the comprehensive organisational strategy that aligns with organisational principles and philosophy and integrated into the corporate website and information system (Baka, 2014). Consequently, this thesis draws on the previous argument that is solely applying the IT-enable knowledge perspective would be meaningless and might lead to open innovation failure if the organisation lacks a philosophical and strategic open innovation approach.

Alternatively, the philosophical perspective of open innovation illustrated in figure 3.2 reflects an organisation's openness's values toward its stakeholder for innovation (Carayannis & Meissner, 2017; Fasnacht, 2018; Saguy, 2016). As openness in innovation involves exchanging knowledge with actors in its ecosystem, a proper understanding of 'openness' is essential (Reim, Parida, & Örtqvist, 2015). Giannopoulou, Yström, & Ollila (2011, p.519) reflect this view by stating*: "OI needs an open culture and an open state of mind, which can be difficult to cultivate and maintain. For many organizations, it might imply an overall change in the mentality of the organization."*

Open innovation philosophy is supposed to drive organisational strategies on both corporate and business levels (Chesbrough & Appleyard, 2007). This perspective implies that instead of approaching open innovation as an emergent strategy framed mainly to promote an organisational level of innovation, it can be viewed as a way for an organisation to capitalise on external sources of knowledge to establish and formulate new strategies and processes (Vanhaverbeke et al., 2017). In this way, open innovation functions as a philosophy for an

organisation more than only an emergent strategy that comes under the closed form of strategy (Chesbrough & Appleyard, 2007; Vanhaverbeke et al., 2017). Consequently, open innovation-related strategies should guide IT applications to enable open innovation implementation (Cui et al., 2015). This means that the philosophical perspective to open innovation entails the other two perspectives: strategy and technology. Figure 3.2 demonstrates this thesis development of definitional integration of open innovation of different perspectives and clarifies how the philosophical perspective acts as a background for the other two approaches.

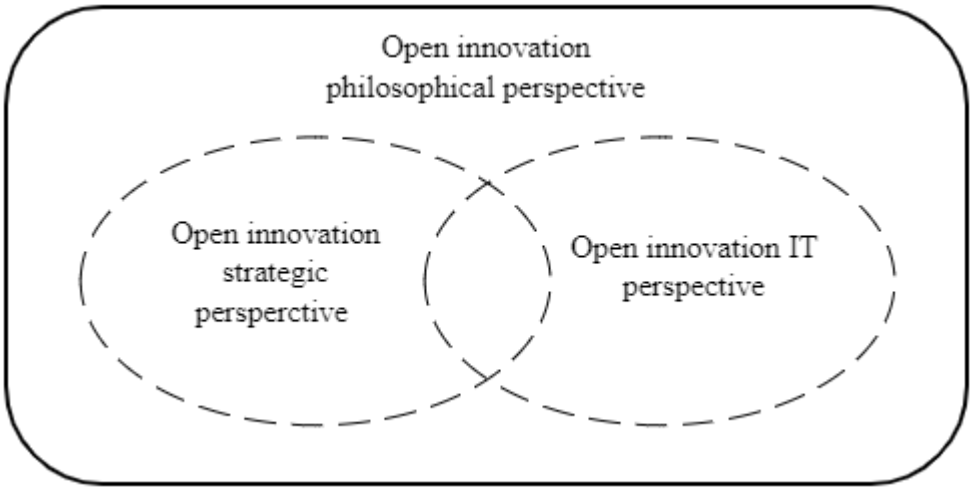

Figure 3.2: Definitional integration of open innovation of different perspectives

As mentioned previously in this section, open innovation could be viewed in different approaches, and organisations can adopt one of these approaches (Chesbrough & Bogers, 2014). However, an integrative and holistic perspective that connects different lenses positively influences open innovation implementation outcomes (Baka, 2014; Bogers et al., 2017; Chesbrough & Bogers, 2014). Hence, this thesis adopts the philosophical perspective as a comprehensive view of the three approaches as a way to gain an integrative understanding of the open innovation definition. To demonstrate, approaching open innovation from a philosophical perspective entail considering both the strategic and IT-enabled knowledge perspectives of open innovation, considering that open innovation philosophical perspectives act as a background for an organisation's strategy and IT. This perspective provides a more integrated and comprehensive understanding of its adoption.

Chesbrough and Appleyard (2007) and Vanhaverbeke et al. (2017) share this integrative understanding and highlight that open innovation is a strategic approach concerned with knowledge sharing and openness as a means of expanding value creation for organisations. They argued that for open innovation to be sustained, open strategy is needed to balance value creation and value capture through the use of the potential of IT. Additionally, Hilmola, Torkkeli, and Viskari (2007) and Lee et al. (2012) posit that open innovation strategy is concerned with creating a lot of shareholder value through knowledge and technology sharing with stakeholders.

> *"As knowledge becomes the key resource, OI needs to be embedded in an overall business strategy that explicitly acknowledges the potential use of external ideas, knowledge and technology in value creation."* (OECD, 2008, p.11).

Therefore, drawing on Chesbrough and Appleyard (2007), open strategy is connected to the philosophical perspective of open innovation. Accordingly, an organisation is guided to build and sustain openness and knowledge sharing with relevant stakeholders drawing on the strategic values of their philosophy. Moreover, open innovation should be linked to open innovation strategy; this means that this strategic perspective covers the other two perspectives; open innovation philosophy and IT synergic effect are needed when adopting the open innovation strategic perspective. Figure 3.3 illustrates this thesis's connection between open strategy and open innovation perspectives.

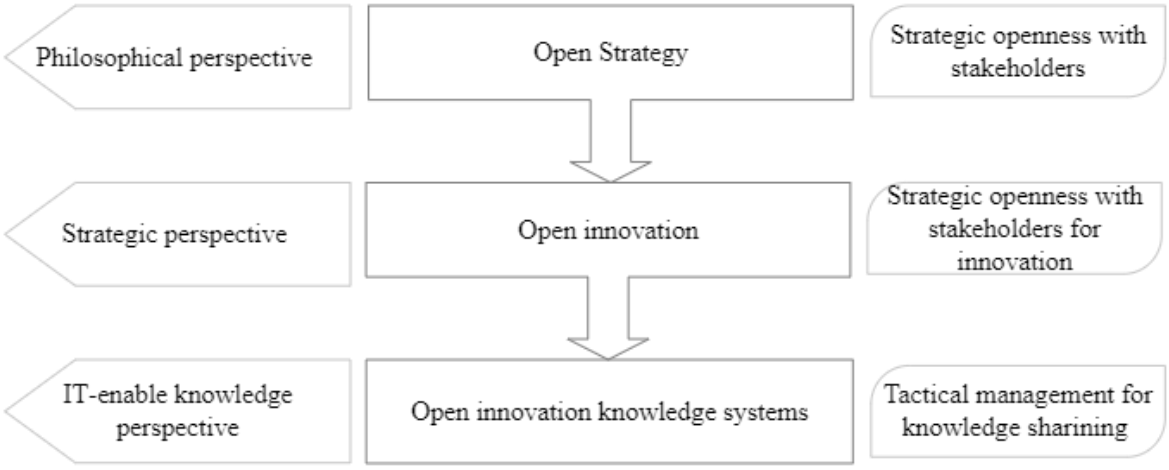

Figure 3.3: Illustration of an integrative understanding of open innovation's perspectives

Analysing the literature demonstrates the multiple definitions of open innovation. Such recognition represents a semantic problem as it influences the understanding, adoption and implementation of open innovation initiatives. To gain a comprehensive view of open innovation, this study understands and defines open innovation as a multi-dimensional concept that includes: (1) a philosophical perspective that drives openness and attitudes toward an organisation's multiple stakeholders within its ecosystem. (2) A strategic perspective that guides organisational plans toward knowledge and technology exchange within actors in its ecosystem, and (3) an IT-enabled knowledge perspective as tools to structure conditions for pooling knowledge in and out of the organization. It is important to mention that each of these perspectives aims at achieving specific results. Bogers, Chesbrough, & Moedas (2018, p.6) offer a similar understanding of open innovation; their definition reflects the three perspectives approach suggested earlier and is in line with this thesis's perspective of open innovation. They defined it as:

> *"Open innovation processes combine internal and external ideas together into platforms, architectures, and systems. Open innovation processes use business models to define the requirements for these architectures and systems. These business models access both external and internal ideas to create value while defining internal mechanisms to claim some portion of that value."*

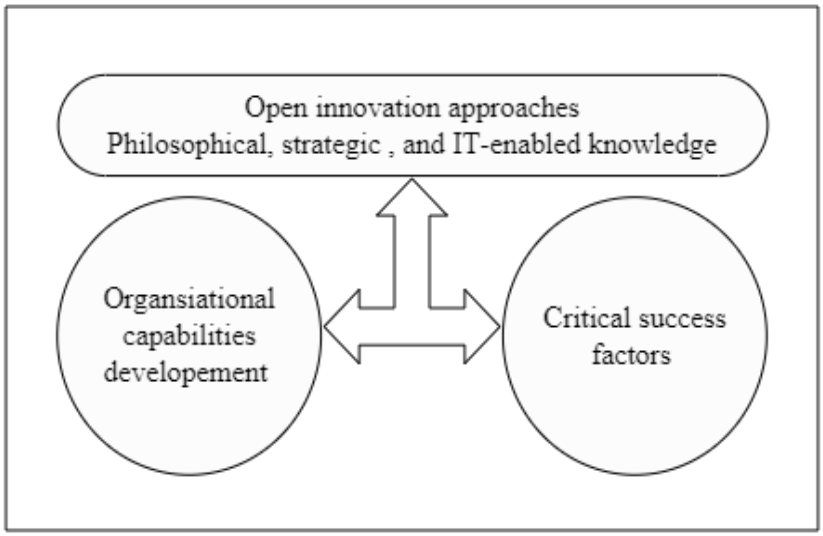

Figure 3.4: This thesis connection between open innovation concepts, critical success factors and organisational capabilities.

This thesis, therefore, utilises the above definition as it allows for a comprehensive and integrated understanding of open innovation, which represents one of the main objectives of this thesis as such perspectives would affect the different organisation capabilities identification and development. Accordingly, it is essential to discuss critical success factors relevant to each of these perspectives. This would provide a more comprehensive and integrative understanding of their related success factors. Such identification of critical success factors functions as means to identify open innovation organisational capabilities. Figure 3.4 clarifies the existed relationship between these concepts.

3.7 Summary

The analyses of the literature demonstrate the multiple definitions of open innovation. This recognition is argued to represent a semantic problem for the success of open innovation understanding, adoption and implementation. This thesis understands and defines open innovation as a multi-dimensional concept to gain a holistic and integrative view of the concept. Developing this inter-discrepancy view that integrates multiple perspectives could lead to better understanding and a more coherent view of open innovation and seems to influence the development of open innovation organisational capabilities. The literature review conducted in this chapter demonstrated that open innovation failure potentially stems

from the inadequate methodologies used to approach open innovation initiatives and the lack of proper guidance that helps develop relevant capabilities. Therefore, building this inter-discrepancy understanding of open innovation would assist in developing a holistic understanding of its required organisational capabilities. In order to build this holistic understanding of open innovation capabilities, critical success factors for each perspective need to be highlighted. The following chapter provides an understanding of open innovation critical success factors related to each perspective.

Chapter Four: Open Innovation Critical Success Factors

4.1 Introduction

Critical success factors (CSFs) are key variables that are required to secure the successful implementation of a business model (Leidecker & Bruno, 1984). It reflects what and how things should be done for a business to flourish. Such factors assist businesses in crystallising their objectives and determining crucial activities to monitor progress. As discussed previously (see section 3.4), open innovation adoption attempts tend to fail (Hewitt-Dundas & Roper 2018). Thus, it is important to identify the critical success factors of open innovation considering this study's proposed perspectives: the Philological, strategic, and IT-knowledge perspectives. However, it is essential to mention that this study is not concerned with identifying knowledge capabilities as these were extensively examined in the literature (Gao et al., 2020; Randhawa et al., 2016). Exploring an organisation's capabilities is associated with considering CSFs. The ability to perform and prosper at the level required to survive and prosper requires organisational capabilities. It is supported by the organisation's resources and competencies. This means that if an organisation can develop proper unique competencies that meet the CSFs in an industry, this would lead to its success.

Lazarenko, Garafonova, Marhasova, Tkalenko, and Grigashkina (2019) state that a successful deployment of open innovation requires integrating various human, IT, leadership strategic value-based competencies. Considering the three approaches to open innovation, a more holistic identification of factors that determine the success of open innovation initiatives can be gained. This would entail strategic aspects, evaluation of human and cultural aspects and IT factors. The following section will identify open innovation's critical success factors from three perspectives: strategy, philosophy, and IT.

4.2 Critical success factors: Strategy perspective of OI

Approaching open innovation as a strategy is a pragmatic perspective that aims to profit from ecosystem collaborations through building tighter and proactive processes to improve innovation (Chesbrough et al., 2018; Chesbrough & Appleyard, 2006). It aims to develop an organisational strategy which guides functional plans and procedures on the way to pooling knowledge and generating value to achieve long-term goals related to innovation (Cheng & Huizingh, 2014). Open innovation strategy aims at increasing an organisation's financial performance (Lichtenthaler, 2009; Rauter et al., 2019), achieve customer satisfaction (Chesbrough, 2011; Daragahi, 2017), and improve R&D performance (Chiesa, Frattini, Lazzarotti, & Manzini, 2009; Freixanet et al., 2021; Ovuakporie et al., 2021; Santoro et al., 2018).

This perspective aims to redefine organisational boundaries with its surrounding environment and internally enable the organisation to be more porous, consequently becoming more capable of embedding loosely multiple networks of different stakeholders. Open innovation strategy entails collective and individual collaboration to create and commercialise knowledge and technologies (Chesbrough, 2006). Referring to this perspective, Cheng and Huizingh (2014) pointed to the importance of the strategic perspective to benefit from open innovation initiatives. Similarly, Chesbrough and Bogers (2014, p.19) defined open innovation as *"a distributed innovation process based on purposively managed knowledge*

flows across organizational boundaries." Their definition provides an understanding of how organisations can harness knowledge exchange for innovation success purposes (Enkel et al., 2009). The following paragraph discusses critical success factors of the strategic perspectives for open innovation.

4.2.1 Coherent line of directions: The coherence alignment of a firm's overall vision, mission, goal and open innovation strategy is required for its success (de Oliveira, Echeveste, & Cortimiglia, 2018). To achieve this, open innovation strategy should be clear, understandable, and works with other strategic objectives in the coherency of line to achieve the organisation's long-term goals (Durst & Ståhle, 2013). Having a strategic line of direction while implementing open innovation will enable employees to have an overall shared vision of all business functions, thus improving the understanding and implementation of this initiative (Peris-Ortiz, Devece-Carañana, & Navarro-Garcia, 2018).

A strategy with a clear set of objectives determines its success (Ritter & Gemünden, 2004). While setting clear objectives for open innovation initiative is crucial for its success (Peris-Ortiz et al., 2018), strategic alignment of innovation objectives to organisational vision and mission contributes is also vital (Audretsch & Belitski, 2022; Gonyora, Migiro, Ngwenya, & Mashau, 2021; Mergel, 2018). Thus, an organisation's vision, mission, and IT coherence are necessary for success in open innovation (Tafti et al., 2019). Lichtenthaler (2011) highlighted the importance of studying the linkages between a firm's strategy, culture and open innovation. For open innovation strategy to be successful, a comprehensive view of the whole organisation should be considered, as all parts of the organisation should follow and support open innovation implementation (Weissenberger-Eibl, Almeida, & Seus, 2019). Consequently, this might imply redesigning business units at first to support strategy implementation, as it will have direct implications on organisation structure and culture (Murray et al., 2012).

Open innovation requires an organisational culture that stimulates knowledge sharing, learning, and networking (Azeem, Ahmed, Haider, & Sajjad, 2021; de Oliveira et al., 2018, Durst & Ståhle, 2013; Singh et al., 2021; Scaliza et al., 2022; Tranekje & Knudsen, 2012; Yin

et al. 2020). It also requires a culture that promotes internal and external openness values such as risk tolerance, adaptability and experimentation (de Oliveira et al., 2018; Herzog & Leker, 2010; Sivam, Dieguez, Ferreira, & Silva, 2019). A culture that encourages individuals to move away from the negative attitudes toward outside view and minimize what is known as the 'not-invented-here' syndrome (de Araújo, Burcharth, Knudsen, & Søndergaard, 2014; Nakagaki, Aber, & Fetterhoff, 2012). Alternatively, a positive workplace culture that encourages diversification, inclusion, social alignment and cohesiveness is necessary for the success of open innovation adoption (de Oliveira et al., 2018). Thus, Lee, Hwang and Choi (2012) highlighted the importance of having specific principles that assist in transforming organisational culture toward an open one. Thus, internal openness makes a difference while considering open innovation initiatives (Kratzer, Meissner, & Roud, 2017).

Along with the cultural changes required to foster open innovation adoption, the integration of business units is necessary. Hong, Zhao and Stanley Snell (2019) argued that team-oriented work settings and job rotation designs are essential collaborative HRM practices fostering knowledge sharing and improving employees' understanding of various activities. Such HRM practices allow for wider knowledge exposure through swapping roles, understanding and knowledge, thereby enabling open innovation as such activities reduce employees' negative attitudes towards external knowledge (Chow, Huang, & Liu, 2008; Lichtenthaler & Ernst, 2006). Additionally, communication and interdependent connectedness are critical influencers of open innovation adoption (Martinez-Conesa, Soto-Acosta & Carayannis, 2017; Popa et al., 2017; Sivam et al., 2019).

4.2.2 Top management support: Like many other organisational initiatives, managers' involvement is crucial for the success of open innovation (Ahn et al., 2018; Sivam et al., 2019).). While open innovation requires the participation of all organisation members, this can never happen without top management 'buy-in' to such initiatives (Peris-Ortiz et al., 2018). Ahn (2020) and Ahn et al. (2018) highlighted that the role of top management's awareness and understanding of open innovation's practices and benefits is associated with their increased support regarding its implementation. Singh et al. (2021) argue that knowledge-oriented leaders tend to undertake practices that support knowledge sharing. Similarly, managers with solid relational skills are able to build multiple relationships with

stakeholders, thus enabling open innovation (Muller & Hutchins, 2012; Peris-Ortiz et al., 2018). Additionally, an empowering leadership style is argued to support open innovation (Naqshbandi et al., 2018). Moreover, commitment and sustainable support of top management are key factors in open innovation success. Strategic monitoring can stimulate employees to undertake open innovation (Brunswicker & Chesbrough, 2018; Tafti et al., 2019). Hansma and Elving (2008) highlighted the role played by top management in championing and promoting any organisational change initiative.

4.2.3 Human resource new requirements: employees play essential roles in the transition stage toward open innovation (Lippitz, Thedieck, & Jost, 2017). Human resources are the building blocks in this process as their skills, behaviours and competencies in knowledge exploration and exploitation are essential (Alassaf, Dabić, Shifrer, & Daim, 2020; Dabrowska & Podmetina, 2017; Oliveira, Sousa, Silva, & Santos, 2021; Soderquist, Tirabeni & Pisano, 2016). Salampasis and Mention (2016) posit the need to align human resource roles to the architecture of open innovation. Highly skilled human resources are the primary source for building an organisational climate of collaboration and knowledge-sharing that enables open innovation climate (Lavrynenko, Shmatko, & Meissner, 2019). For example, employees' characteristics, such as knowledge diversity (Bogers, Foss, & Lyngise, 2017), preparedness and willingness to improve and acquire new skills and mindset (Dodgson et al., 2016; Nakagaki et al., 2012; Teodorescu & Korchagina, 2021), and their level of commitment and motivation (de Oliveira et al., 2018; Feller et al., 2011; Muller & Hutchins, 2012) are all associated with their ability to recognise and observe external knowledge. Engelsberger, Halvorsen, Cavanagh and Bartram (2022) suggest that employees characteristics and human resource management practices influence the implementation of open innovation. Building employees' mindset around openness toward knowledge sharing inside and outside the organisational boundaries is critical to open innovation performance (Engelsberger et al., 2022; Gomezel & Rangus, 2018). Employees' involvement and empowerment are also essential (Behnam, Cagliano, & Grijalvo, 2018; Rehman, Ahmad, Allen, Raziq, & Riaz, 2019). Palumbo, Manesh, Pellegrini, & Flamini (2021) noted the indirect influence of employee involvement and empowerment on nurturing a favourable perception of open innovation.

To overcome the challenge of NIH syndrome and other related cognitive barriers (Lichtenthaler & Ernst, 2006), organisations are required to promote appropriate skills and attitudes fostering firm-level openness and learning (Bogers et al., 2018; Lichtenthaler, 2011; Lichtenthaler, Ernst, & Hoegl, 2010). Open innovation implies exchanging and sharing ideas; thus, organisations need to look inside and promote openness from their people (Salampasis, Mention, & Torkkeli, 2015). Therefore, networking skills such as the ability to interact and network in a global business context, cooperative skills either internally and externally, communication skills and IT skills are the most important skills to support open innovation projects (Dabrowska & Podmetina, 2017). These skills are essential requirements for employees to acquire as they enable building external and internal relationships to share knowledge (Brunswicker & Vanhaverbeke, 2015). Additionally, teamwork and collaboration skills enable shared understanding and reduce uncertainty as team members integrate their bodies of knowledge together (Markovic, Bagherzadeh, Dubiel, Cheng & Vanhaverbeke, 2020; Volberda, Foss, & Lyles, 2010). Choo, Linderman and Schroeder (2007) argue that people who tend to work in teams share and exchange knowledge with each other accordingly would help build absorptive capacity (Lichtenthaler & Lichtenthaler, 2009). Dabrowska and Podmetina (2017) also highlighted other relevant business skills, such as understanding macro trends and developing a big picture perspective.

Internal communication between human resources and partners is deemed to be fundamental for open innovation success (Tafti et al., 2019). Possessing strong relational and communication skills are pivotal for open innovation success as it facilities knowledge shrining and relationship building across different departments and external actors (Kanter, 2006; Lindegaard, 2010; Sloane, 2011). Fleming and Waguespack (2007) ensured the role of individuals' boundary spanning and social brokerage in enabling open innovation. Such social connection skills enable the integration and blinding of different actors together. Additionally, as IT allows for open innovation, employees need to master technology (Hosseini et al., 2017) as technical skills are essential in a technology-led innovation (Fleming & Waguespack, 2007).

Consequently, human resource management practice could assist in achieving such desired ends (Bril et al., 2021; Rehman et a., 2021; Sartori, Ceschi, & Costantini, 2017). For

example, training and education programmes can boost networking and collaboration skills, which would strengthen open innovation adoption (Hong et al., 2019; Sivam et al., 2019; Wang, Vanhaverbeke, & Roijakkers, 2012). Recruitment and selection policy should reflect open innovation needs and requirements, and the rewarding structure that aims at stimulating, supporting OI skills and capabilities, innovative organisational culture, and ultimately supporting openness in open innovation projects should be emphasised (Hong et al., 2019; Paul, Roijakkers, & Mortara, 2017).

4.2.4 Internally designated scout: Internally designated scout is also essential for open innovation success (Slowinski & Sagal, 2010). While open innovation aims to exchange knowledge with stakeholders, a good understanding of existing internal knowledge is crucial; an assessment of the firm's existing knowledge should be utilised to plan how and what kind of resources need to be approached (Slowinski & Sagal, 2010). This can happen through utilising employees' knowledge, database and external expertise consultation.

4.2.5 Responsiveness to environmental changes: for open innovation to be successful, organisations should be able to maintain an eye open to internal and external surroundings (Buganza, Chiaroni, Colombo, & Frattini, 2011). As open innovation is a dynamic process and entails different levels and degrees of openness to match its intended aims, organisations need to be flexible and respond to different contingencies to fit and adapt to open innovation models (Hossieni et al., 2017; Tafti et al., 2019). In open innovation, organisations need to sense contingencies and then reconfigure their knowledge base accordingly (Bader & Enkel, 2014; Lichtenthaler & Lichtenthaler, 2009). This can happen through the establishment of strategic planning to sense the external and analyse the environment.

4.2.6 Strategic view of technology: to benefit from open innovation initiatives, organisations must link the appropriate IT strategy to different open innovation strategies (Cui et al., 2015; Tajudeen, Nadarajah, Jaafar, & Sulaiman, 2021). Such a strategic view of the alignment of IT strategy and open innovation strategy is very important for open innovation success. It allows the organisation to flexibly integrate and pool knowledge from different stakeholders, relying on IT application adjustment and bringing together innovation partners IT infrastructure (Cui

et al., 2015). Thus, open innovation systems should drive the strategy of open innovation. Thus, this thesis understands how an organisation views its open innovation systems and software as a critical success factor.

4.2.7 More investment in R&D: R&D is the cornerstone of any innovation strategy (Mairesse & Mohnen, 2004). In open innovation, R&D presents actively as a crucial tool (Carlsson, Corvello, Inauen, & Schenker-Wicki, 2011; Cheng & Huizingh, 2014). R&D activities contribute to building a firm's knowledge base and developing its internal knowledge (Veugelers & Cassiman, 1999). It also strengthens its ability to use and incorporate external knowledge (Cohen & Levinthal, 1990; Hameed, Basheer, Iqbal, Anwar & Ahmad; 2018; Hung & Chou, 2013; Laursen & Salter, 2006). While open innovation is about pooling external knowledge and technology, internal R&D processes work in conjunction to reduce internal constraints and reform internal processes to support an effective and efficient adoption of open innovation (Almirall & Casadesus-Masanell, 2010). Organisations that emphasise the role of R&D and invest more in research tend to implement open innovation more successfully (Hossieni et al., 2019). Open innovation is seen as a complementary source of knowledge but not a substitute for an organisation's own R&D (Cassiman & Veugelers, 2006; Lu & Chesbrough, 2021; Rothaermel & Hess, 2007; Chesbrough & Brunswicker, 2014; Schmiedeberg, 2008). This complementarity understanding of the relationship between open innovation and R&D is controversial in the literature. Other scholars argue that hence the 'not-invented-here' induces a behavioural resistance to external knowledge; therefore, SMEs are required to choose between investing more in their R&D or adopting open innovation practices; thus, suggesting a substitutional relationship between them (Hess & Rothaermel, 2011; Laursen & Salter, 2006).

4.2.8 Change in organisational Culture: Open attitude toward external knowledge and technology acquisition is essential when shifting from closed to open innovation (Kratzer et al., 2017; Naqshbandi, Kaur, & Ma, 2015). The NIH in Mehrwald's (1999) is attitudes prevents open innovation adoption and impedes collaboration for innovation (de Araújo Burcharth et al., 2014; Dittrich & Duysters, 2007; Herzog & Leker, 2010; Nestle, Täube, Heidenreich, & Bogers, 2019; Lichtenthaler & Ernst, 2006; Lichtenthaler, 2011; Ponstiskoski & Asakawa, 2009). NIH needs to be managed and eliminated (Amann, Granström,

Frishammar, & Elfsberg, 2022). Organisations can overcome this challenge by promoting innovation champions and creating new roles that would facilitate refining external knowledge and ideas (Aquilani, Abbate & Codini, 2017).

Yun et al. (2020) pointed out that a linkage exists between the business founders' values and shaping an open innovation supportive culture. An integrative culture that promotes values of collaboration, employee learning, innovation, customer satisfaction and teams harmony promotes knowledge generation and utilisation (Tsui, Wang, & Xin, 2006; Naqshbandi & Ma, 2015; Naqshbandi & Tabche; 2018). Moreover, an organizational culture that implies integration and tolerance toward risk-taking support open innovation implementation (Hossieni et al., 2017). While innovation always bears uncertainty and risk, open innovation brings a greater level of risk as it relies on external sources of knowledge and technology. Therefore, maintaining a culture that reinforces risk filters would potentially lead to missing innovation opportunities (Cheng & Huizingh, 2014; de Oliveira, Echeveste, & Cortimiglia, 2018; Herzog & Leker, 2010; Hosseini et al., 2017; Paul, Roijakkers, & Mortara, 2017).

4.2.8 Open innovation governance: Open innovation success requires a new governance approach as the traditional ones used for the closed model of innovation are no longer applicable to the new context of innovation as governance modes significantly influence innovation outcomes (Fey & Birkinshaw, 2005; Felin & Zenger, 2014; Hosseini et al., 2017; Slowinski & Sagal, 2010). As open innovation implies varying degrees and forms depending on innovation's intended specific outcomes and aims and encompasses close and open features, organizations should be able to decide on the appropriate governance model. Decisions of when to open and when to close, the degree of openness and the approach for each project need to be well addressed and defined (Chesbrough et al., 2013; Felin & Zenger, 2014; Hossenie et al., 2017). Open innovation strategy, procedures and processes should be well defined and documented (Chesbrough & Brunswicker, 2013). Moreover, managers should ensure that open innovation roles and duties are transparent and understood. This includes the main roles such as boundary spanning, gatekeeper and champions and other complementary roles including idea scout and idea connectors (Chesbrough and Crowther, 2006; Whelan, Golden, & Donnellan, 2013; Whelan, Teigland, Donnellan, & Golden, 2010). Proper governance of open innovation is argued to overcome critical issues businesses might

face related to absorptive capacity problems and idea evaluation issues (Chesbrough & Gowther, 2006; Lüttgens, Pollok, Antons, & Piller, 2014; Whelan et al., 2013).

In open innovation initiatives, organisational governance practices should also consider external partners' search and selection (Feller, Finnegan, Hayes, & O'Reilly, 2009; Guertler & Sick, 2021). Organisation adopting open innovation needs to make relevant decisions on 'Who' would be good potential partners and the 'depth' of collaboration while considering the importance of acquiring a diverse portfolio of collaborates (Dahlander & Gann, 2010). Moreover, as open innovation is about bringing in complementary knowledge, organisations are required to appropriately structure the selection of partners who possess relevant knowledge to ensure the success of open innovation (Aloini, Dulmin, Farina, Mininno, & Pellegrini, 2016; De Groote & Backmann, 2020). The selection of collaborating partners should consider their complementarity to the one organisation's resources and capabilities as well, rather than the substitution of each other, while making sure to stimulate them throughout the process of open innovation to guarantee effective knowledge sharing (Enkel et al., 2009; Kratzer et al., 2017; Nooteboom, Van Haverbeke, Duysters, Gilsing, & Van den Oord, 2007)

4.2.9 Open innovation strategy measurement: proper open innovation strategy planning requires developing and identifying clear metrics-based measures (Al-Belushi, Stead, Gray, & Burgess, 2018; Mastrocinque, Lamberti, Ramirez, & Petrovic, 2022). Open innovation strategy metrics that calculative open innovation effectiveness need to be established (Al-Belushi et al., 2018). Since traditional performance measurements were developed to support the conventional closed innovation systems are inadequate (Chiaroni, Chiesa, & Frattini, 2010). Therefore, for open innovation to succeed, critical success factors need to be considered in evaluating open innovation initiatives. The new context requires the alignment of new applicable metrics under the open innovation approach (Chesbrough & Brunskwer, 2013; Wu & Hu, 2018).

4.2.10 Strong intellectual property protection: As knowledge and technology exchange might be risky and scary, organisations must feel secure and protected to share their resources

(Yuana, Prasetio, Syarief, Arkeman, & Suroso, 2021). Hosseini et al. (2017) highlighted having a well-defined policy regarding IP protection as one of the main aspects to be determined. This well-defined policy includes making appropriate decisions about the amount of information to disclose. Strengthened IPRs stimulated organisations to share their knowledge and collaborate (Davoudi et al. 2018), thus, aiding innovation processes. While IP protection was an issue in open innovation, an effective mechanism to manage IP and IP rights can be considered a vital enabler for organisations to intensify open innovation adoption (Brem, Nylund and Hitchen, 2017; Bican, Guderian, & Ringbeck, 2017; Bogers et al., 2019; Chesbrough & Appleyard, 2007; Davoudi, 2018; Greco et al., 2016; Hagedoorn & Zobel, 2015; Holgersson, & Granstrand, 2017; Uribe-Echeberria, Igartua, & Lizarralde, 2019; Yuana et al., 2021).

4.3 Critical success factors: Philosophy perspective of OI

Approaching open innovation from a philosophical perspective is built around establishing open values toward collaborating with the ecosystem in the innovation process (Slowinski, & Sagal, 2010; Gould, 2012) (see sections 3.5 and 3.6). Its fundamentally evolves around creating an open culture and mindset of open innovation and knowledge sharing (Slowinski & Sagal, 2010). Open innovation draws on open strategy (Whittington et al., 2011). It drives organisations to rethink their leadership position and provokes the basic tenants of their business strategy, focusing on openness with external actors (Chesbrough & Appleyard, 2007).

Thus, organisations adopting this perspective use open innovation to reconfigure their entire business and processes, emphasising the importance of openness as a centre of their values and philosophy. Organisations with this perspective also use open innovation to create shared values for all innovation partners. Additionally, this approach is used as a way for the organisation to capitalise on external sources of knowledge to establish and formulate new strategies and processes. This means that open innovation would not be used as an emergent strategy that relies on short-term projects but to be understood and used as a long-term organisational strategy (Lee et al., 2012; Vanhaverbeke et al., 2017).

Figure 3.2, illustrated earlier, demonstrates how understanding open innovation from this perspective would affect strategy and technology. Therefore, it can be concluded that this philosophical perspective is driving business strategy and other functional strategies such as IT. Sakkab (2002) demonstrated how building an open and collaborative environment intensifies open innovation and results in greater knowledge retention. Building openness is hard to be imitated and challenging to be developed, thus, leading to competitive advantage. In the same sense, Vanhaverbeke et al. (2017, p.11) argued that the linkage between open innovation and open strategy requires building relationships with stakeholders.

> *"Firms not only have to source innovative knowledge from partners, but they also have to invest in relationships with important external partners and involve them in the strategy formation process to secure lasting technological and commercial success. Not relations, per se, but their structure and governance are important and lead to a hard-to-imitate competitive advantage."*

Relational alignment is critical in open innovation to determine the feasibility of open innovation (Emden, Calantone & Droge, 2006). Considering the above arguments, relational factors need to be highlighted to understand this perspective. The following sections discuss critical success factors that foster openness and collaboration with different partners as a way to remain competitive.

4.3.1 Mutual knowledge and interests: Openness in open innovation requires building relationships to enable exchanging knowledge and ideas for innovation (Durst & Ståhle, 2013). Thus, mutuality is considered a critical success factor in supporting knowledge exchange (Durst & Ståhle, 2013; Shamsuzzoha, Al-Kindi, & Al-Hinai, 2018). Partners need to be motivated and share similar interests to participate in knowledge exchange (Aloini et al., 2016; Amrollahi & Rowlands, 2017). Huang, Chen and Liang (2018) posit that heterogeneity among partners participating in open innovation projects is a strong determinate of innovation outcomes. However, several scholars highlighted the necessity for having a mutual cognitive understanding of each partner's differences to utilise collaboration opportunities (Brunswicker & Vanhaverbeke, 2015; Carlsson et al., 2011; Emden et al., 2006; Slowinski & Sagal, 2010; Nooteboom et al., 2007). In addition, a mutual understanding of the importance of such a relationship is required for cultivating open innovation initiatives (Nooteboom et al., 2007).

Several scholars highlighted the importance of partners' compatibility in terms of objectives, missions and philosophy for open innovation success (Durst & Ståhle, 2013; Feller, Finnegan, & Nilsson, 2011; Muller & Hutchins, 2012; Ollila & Elmquist, 2011; Pullen, de Weerd-Nederhof, Groen, & Fisscher, 2012). Dyad knowledge implies a proper understanding of partners' distinctive traits (Bullinger, Rass, Adamczyk, Moeslein, & Sohn, 2012; Colombo, Dell'Era, & Frattini, 2011). Additionally, mutual understanding of the open innovation model, form, and nature of collaboration is a driver of its success. Partners need to organise and develop strategies to guarantee partners collaboration as open innovation paradox might arise (Bogers, 2011; Buganza et al., 2011). Therefore, relationships between open innovation ecosystems should be understood as a two-way relation.

4.3.2 Long-term orientation: the essence of the term relationship is the long-term orientation (Emden et al., 2006). Successful adoption of open innovation initiatives demands potential partners to show a willingness to sacrifice short-term interests for long-term outcomes (Aloini et al., 2016; Vanhaverbeke et al., 2017).

4.3.3 Continuous communication: while internal communication is a crucial determinate of open innovation, maintaining smooth and constant communication between open innovation partners is not less critical (Van de Vrande et al., 2009; Schiele, 2012). Effective communication and knowledge sharing between partners must exist (Holle, Elsesser, Schuhmacher, & Lindemann, 2016). This implies finding suitable and mutual language and protocols among actors to communicate and share knowledge (Sieg, Wallin, & Von Krogh, 2010).

4.3.4 Mutual trust and commitment: sustaining information flow between actors-networking is important to foster a culture that supports open innovation (Clark, Baker, Chawla, & Maru, 1993; Patnayakuni, Rai, & Seth, 2006). However, this can only flourish when mutual trust exists among potential partners, as trust facilitates communication and learning (Bacon, Williams, & Davies, 2020; Macaulay, 1963; Lambrechts, Voordeckers, Roijakkers, & Vanhaverbeke, 2017; Nestle et al., 2019). Mutual trust is a nucleus key to

openness in open innovation (Lockett, Currie, Finn, Martin, & Waring, 2014; Stefan, Hurmelinna-Laukkanen & Vanhaverbeke, 2021). Mutual trust between open innovation partners influences the quality of exchange relationships, particularly the exchange of knowledge and resources. Trust is entailing of positive expectations of collaborating actors that help them reduce uncertainty in such relationships and increase their tolerance to risk as they tend to believe that if something happens, other partners will participate in covering the risk (Pratono, 2018; Schaubroeck, Peng, & Hannah, 2013).

A trust-based relationship in open innovation is essential for its success (Colombo et al., 2011; Shamah & Elsawaby, 2014; Schiele, 2012; Westergren, 2011). A trust-based relationship prevails depending on partners' prior shared experiences and history of commitment toward each other's (Slowinski & Sagal, 2010; Tranekjer & Knudsen, 2012). It could flourish by relying on repeatedly collaborating with the same partner (Bogers, 2011; Gulati, 1995; Oldroyd and Morris, 2012).

4.3.5 Mutual benefits and awareness of risk-sharing: While innovation bears risky outcomes, open innovation might be perceived with greater risk and uncertainty as it relies on external knowledge and technologies (Durst & Poutanen 2013). However, collaborating with multiple actors implies risk sharing too. Thus, encouraging organisations to adopt open innovation as they know that other partners will participate in covering the failure (Revilla & Saenz, 2017). For actors participating in open innovation, mutual benefits must exist too for parties to remain committed to participating in knowledge sharing (Bogers, 2011; Tranekjer & Knudsen, 2012; Westergren, 2011). All actors engaging in such initiatives should benefit from open innovation and achieve their objectives, enabling long-term orientation. Consequently, each party of open innovation should demonstrate being a promising desirable partner so the relationship to flourish (Slowinski & Sagal, 2010). For open innovation to succeed, parties should perceive the fairness of such an initiative (Slowinski & Sagal, 2010).

4.3.6 Learning intent: The willingness and intent to teach and be taught to share knowledge is a crucial factor in open innovation. The motivation and commitment of open innovation partners to learn is critical for an organisation to pursue partnerships. The converse is also

true: partners must be involved in learning and knowledge sharing (Al-Salti & Hackney; 2011; Bacon et al., 2020; Pérez-Nordtvedt, Kedia, Datta, & Rasheed, 2008). Organisations must convey their intent and willingness to acquire new knowledge to speed up the knowledge transfer process in open innovation. Pérez-Nordtvedt et al. (2008) highlighted a lack of learning intent as having a negative impact on the information transfer process. If one partner believes in open innovation, other partners have little interest in learning, and the latter is less likely to be committed and devote time and resources to such initiatives (Lawson & Potter, 2012).

4.4 Critical Success Factors: IT-enabled knowledge perspective

IT-enabled knowledge processes are key routines that allow an organisation to manage external knowledge inflow and outflow to establish long-term advantages. Therefore, studying IT-enabled knowledge capability is relevant. However, due to the sufficient understanding built in the literature regarding these specific knowledge capabilities (Gao et al., 2020; Priyono, Moin, & Putri, 2020; Sabando-Vera et al., 2022; Randhawa et al., 2016), this thesis is not concerned with these capabilities; instead, it would focus only on IT CSFs and capabilities as relatively these capabilities received less attention (Del Giudice & Della Peruta, 2016; Santoro et al., 2019). The advancement of IT has increasingly changed how innovation within organisations occurs, leading to a new model of innovation: namely open innovation (Dodgson et al., 2006). For many authors, open innovation is viewed as a technology-enabled open innovation; this approach focuses on the role of IT in connecting and analyse knowledge from stakeholders (Aloini et al., 2019; Cui et al., 2015; Eseryel, 2014). IT unlocks open innovation by rendering organisational boundaries to become porous, allowing knowledge to be transferred inward and outward (Dodgson et al., 2006). Thus, this thesis understands that IT enables organisations to practice ‘openness’ values.

Several specific internal resources are required to support open innovation adoption (Enkel et al., 2009). However, IT is one of the essential keys to unlocking open innovation potentials (Cui et al., 2012; Cui et al., 2015; Lyu, He, Zhu, & Li, 2019; Taghizadeh, Nikbin, Alam, Rahman, & Nadarajah, 2020; Whelan, Conboy, Crowston, Morgan, & Rossi, 2014). Open innovation fundamentally relies on a wide range of external sources of knowledge and its

own knowledge capabilities (Chesbrough, 2006). External knowledge sources include actors in an organisation's ecosystem, such as customers, rivals, suppliers, universities, and research institutions (Chesbrough, 2003). Consequently, the breadth and depth of external search openness depend on the open innovation strategies firms adopt (Dittrich & Duysters, 2007; Laursen & Salter, 2006). IT strategies that support external knowledge integration for innovation should be strategically aligned to business strategy (Henderson & Cockburn, 1994; Queiroz, Tallon, Sharma, & Coltman, 2018; Tallon & Pinsonneault, 2011).

The emergence of new trends such as globalisation, digital transformation, and industry convergence has influenced the economy to become more knowledge and technology-driven (Hanna, 2016; Gold, Malhotra, & Segars, 2001). Accordingly, organisations should adopt mechanisms to manage knowledge to achieve sustainability and improve innovativeness (Argote & Ingram, 2000; Tharsssou & Vrontis, 2008). However, few studies have discussed IT and knowledge system designs required to support knowledge creation and sharing in open innovation literature (Del Giudice & Della Peruta, 2016; Santoro et al., 2019).

IT supports open innovation processes on the strategic and operational levels (Adamides & Karacapilidis, 2020; Majchrzak & Malhotra, 2013). It also facilitates the organisational ability to acquire and integrate external knowledge (Santoro et al., 2018). Thus, IT acts as a catalyst to open innovation strategy since it assists in external knowledge absorption (Gómez, Salazar, & Vargas, 2017). IT tools used to support open innovation are organisational assets engaged in different organisational routines and processes to develop and exploit absorptive capacity (Adamides & Karacapilidis, 2020; Amit & Schoemaker, 1993).

Knowledge management is a crucial process of open innovation as it stimulates organisational learning and innovation (King, 2009). Knowledge management technologies foster knowledge-oriented culture and enable the creation of artefacts, methods, and processes to create, explore, exploit and leverage knowledge (Adamides & Karacapilidis, 2020; Du Plessis, 2007). While knowledge management systems are necessary, it is not solely sufficient to increase organisational innovativeness since other processes and resources complement them (Santoro et al., 2018). Thus, along with the technological aspect of the

system, a good understanding of the resources and processes is required for a successful alignment of open innovation (Santora et al., 2018).

While open innovation business models vary, ICT based-open innovation systems will accordingly vary to match each business model's requirements and aims (Klein & Convertino, 2015). Table 4.1 briefly demonstrates Adamides and Karacapilidis's (2020) open innovation tools.

Table 4.1: Open innovation tools

OI tool	**Description/tools**
Web 2.0 collaboration	These tools enable the engagement of large numbers of actors. It includes sharing and exchanging of knowledge, social networking, group discussions and mind mapping
	Tools: Facebook, linked-In, MindMeister, Mindomo, Debatepedia, Cohere, phpBB *and* bbPress
Argumentative knowledge construction	Tools used to exchange and visualize user's discussion and argument regarding a problem issue and suggested solutions to solve it
	Tools: Araucaria, Reason!Able, Compendium
Informed decision making	Systems used to analyse business data to help users make faster and better decisions regarding a structured or unstructured problem
	Tools: Data warehouses, online analytical processing, and data mining
Social media monitoring and analytics	Continuously tracking social media content and analysing it determine
	Tools: Social-Mention, Sysomos, Hootsuite, *and* Trackur.
Opinion mining	It is an approach to natural language processing, artificial intelligence, machine learning and text analysis to identify, analyse and classify information and documents resulting from human interaction over the internet
	Tools : Rapidminer, sentiment viz WEKA,Socialmention, KNIME
Intellectual property management	Is used to manage and monitor intellectual property ownership database
	Tools: Inteum, Anaqua and FoundationIP

(Source: Adamides & Karacapilidis, 2020)

The above-mentioned IT-based practices and their tools enable most open innovation-related capabilities in the knowledge-sharing paradigm (Dodgson et al., 2006). While organisations can adopt any of these tools solely, a meaningful orchestration and integration of these tools are required to put open innovation strategy into practice (Adamides & Karacapilidis, 2020). Santoro et al. (2018) highlighted the importance of IT in promoting an open environment for knowledge exchange by building a virtual space for the knowledge exchange process between actors. However, the authors emphasised the role of IT as a 'starting point' where IT is necessary but only subservience to other business processes to enable knowledge sharing and collaboration.

> *"Technology alone is necessary, but not sufficient to increase innovativeness. Firms have to strengthen their propensity to collaborate by selecting the right partners and establishing the intensity of the relationships the intensity of the relationship"* (Santoro et al., 2018, p. 352).

Open innovation as a technology-enabled innovation focuses on the role of technology in enabling knowledge sharing for innovation (Santoro et al., 2018). This thesis focuses on highlighting the role of IT in gathering, analysing and applying knowledge to improve an organisation's innovativeness. The following subsections discuss the critical success factors related to IT.

4.4.1 IT Flexibility: is defined *as "the degree to which the IT infrastructure is scalable, compatible, modular, and can handle multiple business applications."* (Bhatt, Emdad, Roberts, & Grover, 2010, p. 342). IT flexibility facilitates economically rapid adaption of IT applications to enable knowledge sharing by allowing knowledge inflow and outflow from various range of external innovation partners (Kumar, 2004; Langdon, 2006). As open innovation implies collaboration with different actors, IT infrastructures with connectable, compatible and modular features would be crucial to support a seamless migration between innovation partners as it would allow to be reconfigured promptly and would provide an all-inclusive infrastructure (Adamides & Karacapilidis, 2020; Bharadwaj, Bharadwaj, & Bendoly, 2007). Ambidexterity of IT infrastructure resides in its ability to extend beyond a single firm to include different collaborating actors by enabling an organisation to use IT to configure and reconfigure information within the business and other collaborating partners

(Cheng, Chen, & Huang, 2014; Shin, Han, Marhold, & Kang, 2017). It enables knowledge sharing and data-driven innovation between partners (Saraf, Langdon, & Gosain, 2007; Tafti, Mithas, & Krishnan, 2013). According to Cui et al. (2015), the alignment of IT flexibility with open innovation strategy positively influences open innovation performance and, consequently, organisational performance.

4.4.2 IT integration: IT integration is defined as an organisation's ability to integrate information, technologies and applications with different search channels and external knowledge sources (Barua, Konana, & Whinston, 2004; Rai & Tang, 2010; Tajudeen et al., 2021). It represents the linkage between different collaborating partners' IT infrastructure (Rai & Tang 2010). Cui et al. (2015) highlighted the importance of IT integration with open innovation. While open innovation might increase the interdependence between innovation partners, as this requires organisations to engage in knowledge and resource exchange, an integrated IT infrastructure that enables information sharing, process alignment, and coordination of activities is needed (Grover & Saeed, 2007).

4.5 Summary

In this chapter, a presentation of the open innovation CSFs framework has been provided to summarise the entire critical factors. Table 4.2 includes all factors that have been considered critical for open innovation success according to each perspective (philosophical, strategic, and IT-enabled knowledge perspectives). The table describes each factor and its referred authors. The next chapter aims to provide a discussion related to fundamental theoretical approaches adopted for open innovation.

Table 4.2: A summary of open innovation critical success factors

Perspective	**CSF**	**Description**		**Authors**
Open innovation strategic perspective	Coherent line of direction	Coherence among organisational vision, mission, objectives and open innovation strategy	Setting clear objectives for open innovation and aligning them strategically with vision, mission and strategy	Audretsch and Belitski (2022), Gonyora et al. (2021), Mergel, (2018), Nakagaki et al. (2012), de Oliveira et al., (2018), Orlitzky et al. (2003), Peris-Ortiz et al. (2018), Ritter and Gemünden (2004)
		Changing organisation culture	Open innovation requires a culture that emphasises openness and collaboration and encourages knowledge sharing, learning and networking.	Azeem et al. (2021), Tafti et al. (2019), Tranekjer and Knudsen (2012), Vanhaverbeke et al. (2017)
		Integration of business units	Interdepartmental connectedness through team-oriented work settings and job rotation designs are essential collaborative HRM practices that foster knowledge sharing and improves employees' understanding of various activities.	AlAbri et al. (2021), Cuijpers et al. (2011), De Luca and Atuahene-Gima (2007), Hong et al. (2019), Martinez-Conesa et al. (2017), Popa et al. (2017), Sivam et al. (2019), Tatikonda and Montoya-Weiss (2001), Troy Hirunyawipada, and Paswan, (2008), Olson et al. (2001), Sivam et al. (2019)
		Responsiveness to environmental changes	organisations need to sense contingencies and then reconfigure their knowledge base accordingly; for open innovation to be successful, organizations should be able to maintain an eye open to internal and external surroundings	Bader and Enkel (2014), Hossieni et al. (2017), Tafti et al. (2019), Lichtenthaler and Lichtenthaler (2009)
	Top management support	Commitment and sustainable support	All organisation members must be involved in the open endeavour, and this can only happen if top management "buys into" the initiative. This aspect represents top management's role in open innovation success.	Barrett et al. (2021), Chesbrough et al. (2006), Peris-Ortiz et al. (2018), Sivam et al. (2019), Naqshbandi et al. (2018)
		Effective leadership skills:	Effective leadership has the ability to implement changes resulting from CRM activities.	Alzoubi and Aziz (2021), Barrett et al. (2021), Chiaroni et al. (2011), Peris-Ortiz et al. (2018), van de Meer (2007)

			Additionally, managers with relational skills are able to build multiple relationships with stakeholders, thus enabling open innovation	
	Human resource requirements	Employees' characteristics and proper human resource management practices influence the implementation of open innovation.		Bril et al. (2021), Engelsberger et al. (2022), Hong et al. (2019), Rehman et al. (2021), Teodorescu and Korchagina (2021)
		Building open innovation mindset	Building employees' mindset around openness towards knowledge sharing inside and outside the organisational boundaries is critical to open innovation performance	Engelsberger et al. (2022), Gomezel and Rangus (2018)
		Networking and collaborating skills	networking and collaboration skills would strengthen open innovation adoption; networking skills enable building external and internal relationships and sharing of knowledge	Brunswicker and Vanhaverbeke (2015), Lazaro-Mojica and Fernandez (2021), Oliveira et al. (2021), Ryu, Baek, and Yoon (2021), Wang et al. (2012)
		Communication skills	Communication skills are also pivotal for open innovation success. Internal communication between human resources and partners is considered key for open innovation success	Tafti et al. (2019)
		Technology mastery	Open innovation is an IT-based kind of innovation; thus, employees should be able to master technology	Hosseini et al. (2017)
		HR empowerment and involvement	Employee empowerment is needed in open innovation	Behnam et al. (2018), Palumbo et al. (2021), Rehman et al. (2021)
		Social connection skills	Boundary spanning (internal) and social brokerage (external) social help in the integration and blinding of internal and external sources of information	Hosseini et al. (2017), Lee Fleming et al. (2007)
	Internally designated scout	An adequate understanding of existing internal knowledge is crucial; assessing the firm’s existing knowledge should be utilized to plan how and what resources need to be approached.		Slowinski and Sagal (2010)

	OI culture	Open innovation necessitates an agile and change-responsive organisational culture. A learning and integrative culture that promotes empowering leadership style promotes knowledge generation, and utilisation is required. While innovation always bears uncertainty and risk, open innovation bears a greater level of risk as it relies on external sources of knowledge and technology.		Naqshbandi and Tabche (2018), Mazur and Zaborek (2016), Scaliza et al. (2022), Yin et al. (2020)
	Open innovation strategy measurement	Open innovation strategy metric that calculative open innovation effectiveness needs to be established		Chesbrough and Brunskwer (2013), Chiaroni et al. (2010), Wu and Hu (2018)
	Strategic view of technology	Alignment of IT strategy and open innovation strategy is very important for open innovation success as it provides an organisation with the flexibility to integrate and pool knowledge from different stakeholders relying on IT application adjustment and brings together innovation partners IT infrastructure		Cui et al. (2015), Cui et al. (2012)
	Investment in R&D	Internal R&D processes work in conjunction to reduce internal constraints and reform internal processes to effectively and efficiently support the adoption of open innovation		Almirall and Casadesus-Masanell (2010), Chesbrough and Brunswicker (2013), Hossieni et al. (2019)
	Open innovation governance	Decision making	Decisions related to when to open and when to close, the degree of openness and the approach for each project need to be well addressed and defined	Chesbrough et al. (2013), Felin and Zenger (2014), Hossenie et al. (2017)
		Documentation of strategy, processes and procedures	Open innovation strategy, procedures and process should be well defined and documented	Chesbrough and Brunswicker (2013)
		Duties and roles	managers should make sure that open innovation roles and responsibilities are clear and understood	Chesbrough and Crowther (2006), Whelan et al. (2011; 2013)
		Structure selection of partners	Organisations adopting open innovation need to make relevant decisions on ‘Who’ would be good potential partners while considering the importance of acquiring a diverse portfolio of partners	Aloini et al. (2016), Dahlander and Gann (2010), De Groote, and Backmann (2020), Guertler and Sick (2021)

	Strong intellectual property	Effective mechanisms to manage IP and IP rights can be considered a vital enabler for organisations to intensify open innovation adoption	Bogers et al. (2019), Greco Grimaldi and Cricelli (2018), Hagedoorn and Zobel (2015)
Open innovation philosophical perspective	Dyad's knowledge and interests	Mutual cognitive understanding of each partner's differences to utilize collaboration opportunities, mutual understanding of the importance of such a relationship is required for cultivating open innovation initiative; partners need to be motivated to participate and exchange knowledge and share similar interests	Amrollahi and Rowlands (2017), Aloini et al. (2016), Brunswicker and Vanhaverbeke (2015), Calsson et al. (2011), Emden Calantone and Droge (2006), Nooteboom et al. (2007), Solwinski and Sagal (2010), Shamsuzzoha et al. (2018)
	Mutual trust and commitment	Trust-based relationship prevails depending on the partner's collaboration experiences and commitment to each other's	Bogers (2011), Bacon et al., (2020), Gulati (1995), Oldroyd and Morris (2012), Slowinski and Sagal (2010), Shamsuzzoha et al. (2018), Lambrechts et al. (2017)
	Mutual benefits and awareness of risk-sharing	Risk understanding encourages organizations to adopt open innovation as they know that other partners will participate in covering the failure. Mutual benefits must exist, so parties remain committed to participating in knowledge sharing.	Revilla and Saenz (2017), Slowinski and Sagal (2010), Shamsuzzoha et al. (2018)
	Continuous communication	Two-way communication is vital, which allows the partners to become acquainted with one another and learn (and educate) about their shared values.	Van de Vrande et al. (2009), Schiele (2012), Holle et al. (2016)
	Mutual learning	The willingness and intent to teach and be taught, to share knowledge is a crucial factor in open innovation	Al-Salti and Hackney, (2011), Bacon et al., (2020), Pérez-Nordtvedt, et al (2008), Lambrechts et al. (2017).
	Uniqueness	Good understanding that each open innovation project is idiosyncratic in terms of relationships. It is difficult to be redeployed as it means unique dynamics and texture and evolves in a unique path that can enable open innovation.	Anderson and Weitz (1992)
IT perspective	Flexibility	Open innovation requires a flexible IT infrastructure that is capable of being adjustable to different dynamics and handles various business application	Adamides and Karacapilidis (2020), Bharadwaj, et al. (2007), Bhatt et al. (2010), Kumar (2004), Langdon(2006)

	Integration	An IT infrastructure that is applicable and capable of integrating different partners and enabling information sharing, process alignment and coordination of activities is needed	Barua, Konana, and Whinston (2004), Cui et al. (2015), Rai and Tang (2010)

The following chapter provides a discussion related to fundamental theoretical approaches adopted for open innovation.

Chapter Five: Dynamic Capabilities Theory: A View of Open Innovation

5.1 Introduction

The previous chapter discusses open innovation perspectives and critical success factors required to achieve open innovation objectives. This chapter provides a theoretical understanding of dynamic capability theory and its adequacy to open innovation analysis (Bogers et al., 2018; Randhawa et al., 2016). It discusses how organisations can reconfigure their resource base, develop open innovation-related competencies, and rearrange resources to support knowledge and technology sharing with its stakeholders to achieve competitive advantage (Teece, 2007; 2010; 2020).

The dynamic capabilities perspective gained wide recognition among scholars as a potential source for obtaining and sustaining competitive advantage (Eisenhardt & Martin, 2000; Teece et al., 1997; Zahra, Sapienza, & Davidsson, 2006). Gaining a competitive advantage can be achieved by adopting a value-creating strategy that none of the business's potential competitors acquires (Barney, 1991). In relation to open innovation, a competitive advantage is parallel to creating, to creating values for openness. Developing and integrating a bundle of strategic activities affect organizations' success (Porter, 1990). In line with these arguments, the discussion and identification of such strategic activities should be together, as otherwise, a standalone activity tends to fail (Grant, 2002).

This chapter presents an overview of organisational capabilities from two theoretical perspectives: The resource-based view (RBV) (See section 5.4) and the dynamic capabilities perspective (See section 5.5). Additionally, it includes a brief introduction of key-related concepts such as resources, capabilities and competencies. Afterwards, the thesis provides arguments to justify why the dynamic capability perspective forms a relevant lens to open innovation.

5.2 Open innovation and organisational capabilities

Over the years, the notion of organisational capabilities as a source for sustaining competitive advantage has caught the attention of many scholars (Barney, 1991; 2001; Moran & Ghoshal, 1999). Effective implementation of any organisational strategy draws on preconditions that might influence such implementation to achieve organisational strategic goals (Barney, 1991). These preconditions are known as organisational capabilities and competencies (Barney, 1991; Gold, Malhotra, & Segars, 2001; Teece et al., 1997; Wernerfelt, 1984).

This field has become a fruitful area for research and produced various definitions of organisational capabilities (Ansoff, 1965; Eisenhardt & Martin, 2000; Grant, 1991; Kusunoki, Nonaka, & Nagata, 1998; Porter, 1985; Stalk, Evans, & Shuman, 1992; Rangone, 1999; Smallwood & Panowyk 2005; Ulrich & Lake 1991; Ulrich & Smallwood 2004; Wethyavivorn, Charoenngam, & Teerajetgul, 2009). Despite the different approaches used for organisational capabilities conceptualization, scholars have a consensus on the potential organisational capabilities can bring to businesses to successfully implement their strategy and sustain competitive advantages (Barney, 1991; Eisenhardt & Martin, 2000; Teece et al., 1997).

While strategy aims to carry out business objectives (Porter, 1985; Prahalad & Hamel, 1990), organisational capabilities and competencies are the cornerstones to developing and implementing any strategy (Barney, 1991; Smallwood & Panowyk, 2005). However, what does the word capability includes? Within the literature, this term has been used under different terms: core competencies, best practices, organisational processes, routines, and collective skills, and all these terms come under the umbrella of organisational capabilities (Barney, 1991).

An organisation is viewed as a bundle of resources and capabilities, and each organisation utilises its resources differently (Penrose, 1959); throughout the process of institutionalisation, businesses develop their own unique capabilities while yielding specific tasks; such capabilities would be a source for its distinctiveness (Selznick, 1957). Organisational capabilities have been defined as a set of processes that enable organisations

to attain specific ends (Andrews, 1987; Eisenhardt & Martin, 2001; Prahalad & Hamel, 1990; Ulrich & Lake, 1991).

The creation of a compatible set of strategic activities is pivotal for organisational success, and this means that the development of such strategic activities per se is not enough; instead, integration between them is required to ensure its effectiveness (Porter, 1980). In this scenario, open innovation adoption has emerged as a response to the competitive, turbulent and fast-moving environment most organisations, particularly knowledge-intensive ones, are facing to stay competitive (Chesbrough, 2003). In an environment characterised by a high level of competition and increasingly demanding customers, organisations must develop and activate dynamic capabilities that aim at resource reconfiguration to maintain competitive advantage (Teece et al., 1997). Accordingly, open innovation appears to be an attractive strategy that fits such a changing environment and provides organisations with sustainable benefits in the face of competition (Lee & Yoo, 2019). Therefore, open innovation needs to viewed as a dynamic process.

Few scholars highlighted the importance of creating activities on the strategic level to support operational ones in open innovation (Adamides & Karacapilidis; 2020; Bogers et al., 2019; Teece, 2020). However, there is a scarce understanding and discussion on what these activities are and how they are needed to be integrated into other operational ones (Randhawa et al., 2016). This research follows Porter's (1980) approach by identifying these two-level capabilities together in an integrative manner. Otherwise, identifying and implementing each of these activities separately and insularity is bound to fail.

Two main complementary theoretical branches have evolved to explain how organisations can exploit their capabilities successfully to implement their strategy and maintain a competitive advantage (Barney, 1991; Teece et al., 1997). Firstly, a static approach that reaffirms the appropriate selection of resources that enable businesses to plan and execute their strategies leads to achieving competitive advantage, known as the resource-based view of strategy (Barney, 1991; Peteraf, 1993; Rumelt, 1984). The RBV emphasises certain criteria for organisation capabilities selections that enable firms to achieve competitive advantage (Barney & Zajac 1994; Smallwood & Panowyk, 2005). It is used to explain differences in performance that might exist between businesses. Such differences are determined by a business's competitive heterogeneity (Hoopes, Madsen, & Walker, 2003). According to this

perspective, firms are viewed in terms of their resources and capabilities, while firms that acquire difficult-to-imitate resources are more of developing and sustaining competitive advantage (Hoopes et al., 2003). Section 5.4.1 further discusses this capability perspective.

Secondly, a dynamic approach that puts into account the resources surrounding contingent dynamic factors, such as how changes in the external business environment can influence resource utilisation and how resources can be developed, integrated and utilised overtime. This approach is known as the dynamic capability perspective. Dynamic capabilities are a reproduction of the development of the resource-based view. Nevertheless, this view is richer as it explains more closely sources for competitiveness and puts into consideration the change effect. *"It is not only the bundle of resources that matter, but the mechanisms by which firms learn and accumulate new skills and capabilities, and the forces that limit the rate and direction of this process" (*Teece et al., 1997, p.11). Teece et al. (1997) proposed a framework of capabilities that puts into account the influence of contingencies. This capability framework is also used to help an organisation sense situation and respond accordingly and promptly. The dynamic capability framework emphasises the need for strategic positioning development of organisational assets and paths. This dynamic approach with the strategic view fits with the nature of changing environment. Section 5.4.3 further discusses this capability perspective.

Section 5.4 provides a comprehensive review of these two theoretical approaches to capabilities to provide a theoretical background. However, a discussion on basic concepts used in strategic theories to familiarise the understanding of relevant approaches is required first. The following section provides an overview of relevant concepts- resources, capabilities and competencies. Afterwards, the chapter discusses these two theories of capabilities: the - Resource-based view and dynamic capability perspective, to familiarise the understanding and appropriate these theories in the discussion of open innovation. Consequently, the present study discusses and argues why dynamic capabilities represent a relevant theoretical lens in approaching open innovation adoption. The following sections discuss these concepts in more detail.

5.3 Resources, Capabilities and Competencies definitions

This section aims to familiarise the understanding of strategic theories related to resources, competencies, and capabilities before discussing the two theoretical capability approaches. Resources are defined as *"stocks of available factors that are owned or controlled by the firm"*. At the same time, capabilities are *"a firm's capacity to deploy resources, usually in combination, using organisational processes, to effect a desired end"* (Amit & Schoemaker, 1993, p.35). However, Barney (1991) considers all firm's assets, capabilities and organisational processes as a firm's resources. Due to this overlapping between these concepts and the lack of agreement of each definition, a discussion on resources, capabilities, and competencies is presented to clarify which perspective this research is adopting before discussing the theoretical approaches to capabilities (see section 5.4).

5.3.1 Resources

Resources are organisational-specific assets that might contain tacit knowledge,which makes these resources difficult to imitate among firms (Teece et al., 1997). The term resource has also been used under different labels to include skills, assets, strategic assets, and stocks (Amit & Schoemaker, 1993; Capron & Hulland, 1999; Grant, 1991). The classification of resources has additionally varied in the literature; Grant (1991) classified tangible and intangible resources into six main categories. This includes financial, physical, human, technological, reputation, and organisational resources. However, other tangible resources were considered the tight between resources and capabilities, such as organisation style, leadership style, organisational values and tradition, as they are considered essential for achieving organisational teams' collaboration (Grant 1991). Pike, Roos, & Marr (2005) provided a more strategic understanding of intangible resources, organisational routines and other types of resources that contributes to driving values to organisations; the authors categorise these resources into five main critical types of resources and clarifies on the dynamics and interaction between those resources. Table 5.1 represents Pike et al. (2005)'s classification of resources, which this research adopts.

Table 5.1: Categorisations of organisational resources

Resource category	Description/ examples
Human	Resources which related to human special characteristics and qualities, such as their creativity, behaviours, education and abilities
	Eamaple: Learning capability, management capability, R&D capability, commercial alignment capability, partnering capability
Organisational	Resources which a business has to create and develop obertime such as the company's brand, image, intellectual property, know-how, culture, processes, and strategy
	Organizational culture, organizational structure, intellectual property, organizational processes, organizational strategy
Relational	External resources that the firm requires such as the suppliers, customers, regulators and partner
	Example:Strategy alliances, regulators, suppliers, customers, influencers, local community, market makers
Physical	The firm land, buildings, IT, equipment, materials and products
	Example: Facilities, Stored products and materials, Service infrastructure
Monetary	The firm's cash or other financial assets which are equivalent to or can be converted to cash
	Example: Budget

(Source: Pike et al., 2004, p.113-115)

All resources mentioned above per se cannot render value for an organisation; what creates value is the services rendered from these resources (Penrose; 1959; Pike et al., 2005). This was further clarified by Grant (2002), who argued that resources should be integrated and work together to develop organisational capability in order to achieve competitive advantage.

> *"The basic units of analysis are the individual resources of the firm: capital equipment, human resources, intellectual capital, and so on. But, in most instances, these resources do not create value for the firm on their own"*
> (Grant, 2002, p.139)

These arguments are in line with Teece et al.'s (1997) perspective, claiming that resources are dynamic in nature and should not be viewed in a mere static view.

5.3.2 Competencies

The concept 'Competence' was defined from different perspectives. To demonstrate, some authors emphasise the convergence between means and ends as a requirement for competence; Lambert and Bytheway (1998) described competencies as the management and deployment of resources in the provision of capability. Moreover, McGrath, MacMillan, and Venkataraman (1995) defined competence as an organisation's ability to achieve and excel in its objectives. A good understanding of business processes and human skills and viewing them in a comprehensive and group deftness perspective are prerequisites to developing a competence (McGrath et al., 1995); this reflects the convergence between objectives and results to identify and build competency.

Alternatively, the terms capability and competencies were used interchangeably, referring to them as "*complex bundles of skills and accumulated knowledge, exercised through organisational processes that enable firms to coordinate activities and make use of their assets*" (Day, 1994; p.38). Developing a fundamental competence that can lead to achieving a competitive advantage is known as 'core competence' (Prahalad & Hamel, 1990). For competence to be core, it must be difficult to imitate, render value, and permit access to a different market (Prahalad & Hamel, 1990). Alternatively, organisations that fail in considering and developing core competencies may be subject to significant risks, such as limited ability to recognise and identify new opportunities and transform tacit knowledge into explicit knowledge. However, competence emerges from a good understanding of business processes and human skills. These two conditions are fundamental and have a continuous two-sided effect on each other; such a continuous correlated process encompasses a new concept: organisational capability (McGrath et al. 1995).

5.3.3 Capabilities

Organisational capabilities are defined as processing organisation skills and knowledge to enable an organisation to coordinate its activities and exploit its assets (Day, 1994). It implies complex patterns of coordination among different resources and individuals. Moreover, it was defined as the opposite of inefficiency (Dutta, Narasimhan, & Rajiv, 2005). While Grant

(1991) described capability as a routine, Makadok (2001) considered capabilities as a special form of resource as it differs by being path-dependent and firm-specific. They are organisationally embedded; consequently, they are non-transferable resources that aim at enhancing other resources' productivity. Thus, they need to be built rather than bought since they draw on the organisation's individuals' expertise and knowledge and integration to other firms' resources. This makes them very complex to be transferable or imitated (Grant, 2002; Teece et al., 1997). Gaining a competitive advantage can be delivered through the organisational ability to manage the interaction between the different capabilities (Bhatt & Grover, 2005). Organisational capabilities use tangible and intangible firm-specific processes to deploy resources as resources per se do not produce value (Grant, 2002; Makadok, 2001).

Understanding the mentioned concepts is essential to understanding how open innovation competencies are embedded in organisational processes. This thesis views open innovation in a comprehensive perspective as a business model that implies philosophical, strategic and technological views. Human resources are considered a critical component and foundation of this broad view of open innovation. Grant (2002, p.148) states that organisational capability depends upon '*the expertise of various individuals to be integrated with capital equipment, technology, and other resources*.'. This present study is in line with the argument of Grant that people's knowledge and expertise are fundamental for the integration of a capability. Thus, aspects of human resources discussed earlier in Pike et al. (2005), such as organisational culture, will be considered in this thesis to study open innovation adoption.

West and Bogers (2014) highlighted the role played by individuals in open innovation as they affect the recognition and integration of knowledge sources. The author also pointed out that little attention was paid to the role of human resources and human resource practices in open innovation adoption. Sourcing external knowledge requires cultural support (Vanhaverbeke, Chesbrough, & West, 2014). A high rivalry environment requires organisations to adjust how they manage their people to produce more flexible and prompt product development processes (Sandberg & Targama, 2007).

Considering the arguments discussed in this section, open innovation resources, including structure, process and roles, should be combined to build open innovation competencies at the organisational (operational) level. At the strategic level, open innovation competencies can create open innovation capability. Thus, open innovation competencies lead to the

achievement of open innovation capability, emphasising the role of people in this development. This means that an organisation needs to develop capabilities at two levels. As this thesis considers philosophical, strategic, and technological perspectives of open innovation, human resource is a fundamental component. The following section discusses the resource-based view to build a base for understanding the orientation toward the dynamic capabilities view.

5.4 Theoretical views of organisational capabilities

This section discusses the two main approaches to capabilities, the resource-based view and the dynamic capability perspective.

5.4.1 The Resource-based view (RBV)

Barney (1991) proposed the RBV as a theoretical framework that focuses on internal tangible and intangible resources, including human and organisational assets within a firm, as a source for gaining and sustaining competitive advantage. From Barney's (1991) point of view, resources must be valuable (in a way that exploits opportunities), rare (among potential competitors), inimitable, and non-substitutable. Similarly, Peteraf (1993) highlighted the role of resource heterogeneity in sustaining competitive business advantage. Thus, the RBV is a strategic theoretical framework that addresses questions of *"why are firms different?*" and "*how do firms achieve and sustain competitive advantage*?" (Hoskisson, Hitt, Wan, & Yiu, 1999, p.437).

The RBV was paved by the prior seminal contribution of Penrose (1959), who viewed the firm as a bundle of resources. This static perspective focuses on organisational assets and processes that fundamentally determine an organisation's competitive position and performance. However, Rumelt (1984) and Teece (1984) were the first to view the strategic position from a resource activities perspective. Rumelt (1984, p. 561) stated, "*strategic firm is characterised by a bundle of linked and idiosyncratic resources and resource conversation activities."* Resources were considered a source of uniqueness as each firm would exploit its resources uniquely. Acquiring a bundle of unique, rare and costly to imitate resources can be exploited in drawing new value-creating strategies that are hard to be duplicated by

competitors (Barney, 1991; Wernerfelt, 1995). Consequently, the ‘Uniqueness’ of organisational resources is viewed as the parameter for organisational ability to compete.

Consequently, this thesis assumes that attaining a sustainable competitive advantage is a function of inimitable, tacit and synergetic resources. However, the RBV rationale has been criticised essentially for being considered static (Priem & Butler, 2001). Priem and Butler (2001) considered Barney’s (1991) view as tautological. In addition, the authors questioned how competitive advantage would be generated if different resource formations would deliver the same values for different firms. Moreover, their disapproval was also for underestimating and neglecting the role of the market and external surroundings in Barney’s (1991) paper.

5.4.2 From the Resource-Based View to Dynamic Capabilities

As discussed in the previous section (see section 5.4.1), the RBV rationale has been criticised essentially for being considered static. It shows an inability to address how an organisation can gain competitive advantages in a turbulent environment (Priem & Butler, 2001; Teece et al., 1997). The failure to cope with external environmental changes can lead to negative consequences on a firm’s performance, regardless of how unique a business resource is (Audia, Locke, & Smith, 2000). The notion of RBV has totally neglected this issue. In the same vein, Eisenhardt and Martin (2000) argued that RBV assumptions break down as they neglect the strategic logic of change and fail to explain time and history's strategic function in building path-dependent capabilities. Moreover, this theoretical perspective has been criticised for being a vague and tautological defined abstraction and a difficult to dispute notion (Priem & Butler, 2001; Williams, 1999).

Firms not only need to obtain a competitive advantage; they need to sustain it over time. The life cycle of competitive advantage has reduced in the last two decades. This is related to "high-velocity environments" (Bourgeois & Eisenhardt, 1988) or "hypercompetitive environments" (D'Aveni, 1994). A firm's competitive position in high-tech SMEs is challenged by successive environmental changes (Covin & Slevin, 1989; Wiggins & Ruefli, 2005). Therefore, firms need to consider newly emerging trends and changes it causes in the

external environment by continuously revising their strategy accordingly (Porter, 1985). The RBV emphasises unique resource selection; it only assumes their existence while neglecting the effect of the surrounding factors of these resources (Teece et al., 1997). This might include how resources are developed, managed, released and integrated. Thus, the resource-based view ignores such factors and only focuses on the existence of unique resources (Barney, 2001). Notwithstanding the importance of the provided discussion of the RBV concepts, methodologically, this perspective has helped in inductive research (Hoskisson et al., 1999). the next section presents a review of the other approach to capability, the dynamic capability theory.

5.4.3 Dynamic capability approach

The dynamic capability perspective is a conceptual framework that highlights the capability of resource renewal and reconfiguration (Eisenhardt and Martin, 2000**;** Helfat et al., 2007; Teece et al., 1997; Teece, 2007). The notion of using organisational processes to generate knowledge resources and apply them in building new strategies and resources was discussed in earlier attempts in the literature with different labels such as '*combinative capabilities'* and *'architectural competencies'* (Henderson & Cockburn, 1994; Kogut & Zander, 1992).
In addition, Penrose's (1959) study has reflected the spirit of dynamic capabilities by referring to the idea that combining resources in new ways can lead to innovation and competitive advantage. However, the proper theoretical conceptualisation of organisational capabilities from a learning perspective acknowledging the impact of surrounding factors has only been built since Teece et al. (1997). David Teece claims that his encounters with graduate students like Henry Chesbrough, who firstly incepted the notion of open innovation, and Gary Pisano, both of whom pursued their PhDs at Berkeley, greatly aided his thinking in building the dynamic capacities framework. While this perspective has been criticised as being tautological (Priem & Butler, 2001), this thesis follows the idea of Boger et al. (2019), Lee and Yoo (2019), Randhawa et al. (2016) and Teece (2020), who claim that dynamic capability perspective is appropriate for analysing open innovation.

The dynamic capability concept can be categorised into three main phases; first, Teece et al. (1997, p.516) defined dynamic capabilities as "*the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments*".

The authors highlighted the importance of management capabilities development to this theory. Moreover, they emphasised that this theory draws on the notion that combining organisational, technological and operational skills is hard to imitate; thus, dynamic capabilities theory represents a new potential framework to sustain competitive advantage (Teece et al., 1997).

In a later attempt, Eisenhardt and Martin's (2000) study expanded the prior conceptualisation of dynamic capabilities. They defined it *as "specific organisational and strategic processes (e.g., product innovation, strategic decision making) by which managers alter their resource base"* (Eisenhardt and Martin, 2000, p.1111). They posited that dynamic capabilities, referred to as 'best practices', are used to match external changes and sometimes create them (Eisenhardt & Martin, 2000).

Finally, subsequent research conducted by Helfat et al. (2007, p.4) proposed dynamic capability as "*the capacity of an organisation to purposefully create, extend, or modify its resource base".* Considering these arguments, this thesis adopts Helfat et al.'s (2007) definition of dynamic capabilities. Their definition implies and reflects strategic features and the degree of the intent of dynamic capabilities; this means that dynamic capabilities are not part of luck and accidents.

The dynamic capabilities theoretical framework that was identified by Teece et al. (1997) adopted an evolutionary perspective by emphasising three categories: 1) The role of current organisational capabilities: this dimension describes practices and learning patterns of the firm. 2) Firm's specific endowment position: The acquisition of a unique resource base serves as the foundation for competition. The position is defined as *"its current specific endowments of technology, intellectual property, complementary assets, customer base, and its external relationship with suppliers and complementor"* (Teece et al., 1997, p.518). And 3) Path dependencies: dynamic capabilities emerge from path dependence processes evolved from repeated practices (Teece et al., 1997). It recognises the role of history and past position.

Dynamic capabilities emerge from path dependence processes outgrown from repeated practices (Teece et al., 1997). Repeated practices, codification, and mistakes are all considered learning mechanisms that accumulate organisation knowledge, thus influencing

dynamic capabilities evaluation and accelerating its development and respondent to market dynamism (Sitkin, 1992). According to the dynamic capabilities' perspective, a firm's strategic posture draws on organisational capabilities and resources and is also determined by the paths a firm has travelled in the past and decisions has been adopted throughout its history. Therefore, a firm's future behaviour resides on its evolutionary paths as firms take years to build their process, by which this combined increase economic growth and returns (Arthur, 1994; David, 1985; Eisenhardt & Martin, 2000; Freeman & Perez, 1988; Teece et al., 1997). Alternatively, Teece (2007) argued that managers need to project operational processes and build a supportive structure to support innovation and renewal to break path dependences. Teece et al. (1997) discussed those three categories act as crucial ingredients in shaping dynamic capabilities. Figure 5.1 is a representation of the dimensions of Teece et al.'s (1997) framework of dynamic capabilities, which assists in understanding how a firm's capabilities can be built and developed dynamically.

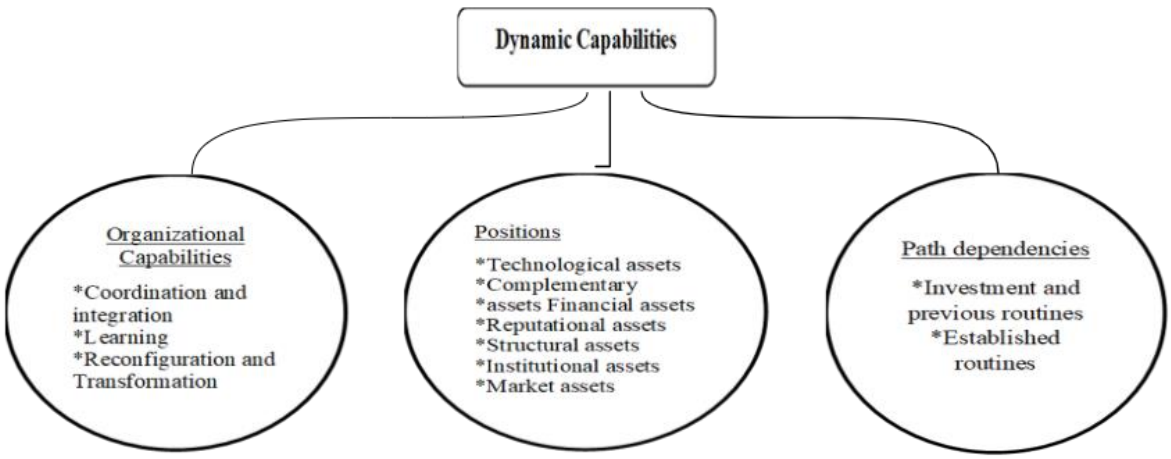

Figure 5.1: Dynamic capabilities dimensions of Teece et al., (1997) Framework

Makadok (2001) suggests economic rent can be generated from two strategic approaches: resource-picking and capability building. Resource-picking draws on the notion of RBV as a firm's unique resource that can lead to economic returns. Whereas capability-building draws on dynamic capability, this perspective claims that businesses gain economic benefits through resource and capabilities development and renewal (Girod & Whittington, 2017; Makadok,

2001). Sapienza, Autio, George and Zahra (2006) posit that the notion of dynamic capabilities revolves around the interchangeable relationship exists between new capabilities development and the entire organisation's growth. This perspective was discussed in Penrose's (1958) prior paper as the author argued that the ongoing investment in renewing firms' resource base would lead to sustaining their competitive advantage. Accordingly, what distinguishes the RBV from the dynamic capabilities is that the latter is being continuously developed and renewed internally. Similarly, Kor and Mahoney (2004) adopted the earlier notion to emphasise resource development's path dependency and stress the interchangeable relationship between individual capacities and resources. Eisenhardt and Martin (2000) posited that dynamic capabilities are common 'best practices' found mostly among effective firms. Best practices refer to the most effective routines.

Most effective routines that shape the commonalities exist in different dynamic capabilities such as product development and acquisition capabilities. Although of such commonalities, Eisenhardt and Martin (2002) pointed to the fact that unique characteristics might still exist within each firm. Effective routines might differ across different firms and industries. Organisations can develop a capability at different starting points and adopt multiple unique paths. These different paths are shaped by organisations' journey of learning and experience yet, ending up with similar key attributions (Sapienza et al., 2006). Accordingly, dynamic capabilities are equifinal, which means that they can be developed at different starting points (Eisenhardt & Martin, 2002). They are also homogeneous and fungible; while commonalities in key features make dynamic capabilities substitutable, they are idiosyncratic in details and vary according to the level of uncertainty of the external environment (Eisenhardt & Martin, 2002).

Capabilities are valuable for firms; however, commonalities that exist along these capabilities among different firms hinder organisations from gaining long-term competitive advantage (Eisenhardt & Martin, 2000). Best practices withstand the core resource-based view backbone of resource endowment heterogeneity across firms. Thus, organisations that possess distinctive processes can gain a competitive advantage over those with less effective ones. Still, those unique capabilities are not enough to sustain a competitive advantage over time (Eisenhardt & Martin, 2000). To counterbalance long-term competitive advantage, an

organisation should build and manipulate a new resource base effectively or enhance and strengthen an already exited one by employing dynamic capabilities as an organisation path enables it to accumulate knowledge (Sapienza et al., 2006).

Alternately, Pisano (2006) proposed a different perspective of dynamic capabilities. The author argued that dynamic capabilities are special types of routines. Regardless of the different categorisation of dynamic capabilities definitions, there is a consensus among the literature that what distinguishes dynamic capabilities is their ability to constantly develop, replicate, and improve organisational capabilities (Gavetti, 2005).

Herein, the dynamic capabilities notion emphasises the organisation's ability to adjust its resources adequately either by utilising the existing resources or by adjusting its resources adequately either by utilising the existing resources or spawning new competencies to sustain competitive advantage (Teece et al., 1997). The ‘dynamic’ qualifier underpinned the concurrency of the organisation's capacity to demonstrate innovative responses and renewal in the rapid uncertain environment. This means that a firm needs to be fixable and innovative to be able to adapt, capitalise, and adjust to the changing circumstances. While the term ‘capability’ stresses the strategic role of building and renewing firms’ endogenous and exogenous resource base frequently. Understanding both terms are crucial to elaborate on dynamic capabilities characteristics. Teece et al.'s (1997) notion of dynamic capabilities does not exclusively comprise abilities. However, it extends to encompass processes and routines to achieve competitive advantage within an organization; manipulating knowledge resources into fresh value-creating strategies is critical (Grant, 1996).

5.5 Dynamic capability: Open innovation perspective

While the ideology of the dynamic capability framework has been criticised as tautological (Priem & Butler, 2001), its application has been widely accepted and adopted by many scholars of different research areas (Ali, Arslan, Chowdhury, 2022; Alsawafi, Lemke, & Yang, 2021; Battaglia & Neirotti, 2022; Chowdhury & Quaddus, 2021; Dangelico, Pujari, & Pontrandolfo, 2017; Green, Larsen, & Kao, 2008; Harreld, O'Reilly, & Tushman, 2007;

Gupta, 2021; Lee & Slater, 2007; Muna, Yasa, Ekawati, Wibawa, Sriathi, & Adi, 2022; Pavlou & El Saey, 2007; Wang & Gao, 2021; Wang & Kim, 2017). Likewise, the innovation field was not an exception (Babaei & Aghdassi, 2022; Hameed, Arshed, Yazdani, & Munir, 2021; Zhang, Gao & Zhang, 2022). However, adopting the dynamic capabilities as a research lens in analysing and observing open innovation adoption is scarce (Randhawa et al., 2016).

Adopting and managing open innovation successfully requires organisations to constantly think over their organisational processes (Bogers et al., 2019). Lichtenthaler and Lichtenthaler (2009) thoughtfully proposed an open innovation capability framework drawing on Campbell's (1960) variation-selection-retention model. The scholars' framework integrates diverse innovation phases and perspectives, this encompassed knowledge exploration, knowledge retention and knowledge exploitation phases of innovation. In addition, it adopts an internal and external organisational boundaries perspective, thus, making it a comprehensive capability framework. However, such a framework was approached from a knowledge management perspective rather than an organisational perspective, neglecting other strategic capabilities that influence the implementation of open innovation and only investigating related knowledge capabilities.

Since the incepted capability framework by Lichtenthaler and Lichtenthaler (2009), only a few other studies later investigated open innovation-related capabilities. However, these capability frameworks focus on single facets of open innovation like investigating IT-knowledge capabilities (Joshi et al., 2010) or mainly focusing on external search capability investigation (Behnam et al., 2018). Other capability frameworks are not specific enough to open innovation (Enkel et al., 2011) or focus on individual and project levels (Habicht, et al., 2012). While Hosseini et al. (2017) proposed a general framework for open innovation capabilities, they failed to investigate the strategic capabilities required to implement open innovation. While dominant views highlighted the necessity of studying and understanding open innovation from a dynamic capability perspective (Bogers et al., 2019; Randhawa et al., 2016; Teece et al., 2020), developing a comprehensive capability framework that adopts a dynamic capability perspective remained under-researched, which this thesis aims to achieve.

Consequently, this highlights the need for a comprehensive, integrated capabilities framework. Scholars call for the need to investigate open innovation capabilities from an organisational theory perspective, specifically, the dynamic capability perspective (Bogers et al., 2019; Randhawa et al., 2016, Teece, 2020). The following section aims at identifying open innovation capabilities from a dynamic capability lens.

Open innovation adopters seek to improve their innovation performance by combining internal and external knowledge and know-how (Bogers & Chesbrough, 2014). Accordingly, a deeper adoption of open innovation philosophy will increasingly put the firm in a position to seek various partners, thus expanding the need to evaluate and manage such partnerships. In addition, partnerships might require an extensive level of collaboration which could potentially put at risk confidential knowledge. Thus, implementing open innovation might be perceived as a challenge (Laursen & Salter, 2014).

Open innovation performance outcomes have been heterogeneous among firms; such heterogeneity was linked to a firm's ability to manage challenges associated with openness (Saebi & Foss, 2015). In addition, while migration to open innovation is an imperative (Bogers et al., 2019), extant research found that many firms are reluctant to fully adopt and benefit from open innovation (De Wit, Dankbaar, & Vissers, 2007; Lichtenthaler & Ernst, 2009). Open innovation adoption failure is associated with many dimensions that have been discussed earlier (see section 3.4). However, a fundamental reason behind such failure stems from the lack of understanding of the open innovation dynamic nature (Bogers et al., 2019). To effectively capitalise on open innovation, organisations must show flexibility in restructuring their own business models to match open innovation strategies (Chesbrough & Schwartz, 2007). Accordingly, smart resource orchestration of a firm business model is a fundamental successful approach to managing open innovation (Teece, 2020).

This thesis presupposes the idea that open innovation adoption and processes are unique to each organisation, and these processes related to its strategy need to be constantly improved overtime. Therefore, this thesis considers dynamic capabilities as a lens to investigate this notion. As discussed earlier, organisations' ability to adapt to external changes affects the

development of their capabilities (Teece et al., 1997). Concerning the earlier discussed literature, Teece's (2007) proposition of breaking down dynamic capabilities perspective into three key processes was one of the most contemporary theoretical understandings of open innovation. The author referred to these categorises as ‘meta-dynamic capabilities.

The dynamic capability perspective implies that human resources are crucial internal actors who pose individual competencies and work within a particular organisational structure. Dynamic capabilities are a function of mobilising an organisation’s resources, processes, and competencies because of the organisation's interaction with its ecosystem. The following section presents an overview of Teece’s (2007) meta-dynamic capability main processes. The following sections discuss these processes.

5.5.1 Sensing capabilities: this meta-capacity is associated with exploring, identifying and shaping environmental signals, capturing ideas, assessing strategic trends, opportunities and challenges and identifying customers’ preferences and emerging technologies (Teece, 2007). Moreover, sensing might imply exploring and shaping industrial evolution, radical changes and stakeholders’ responses. This is linked to scanning, monitoring and learning activities (Teece, 2007). Day and Schoemaker (2008) emphasised the necessity of organisations to become vigilant and considerate of relevant and meaningful signals. The role of top management is pivotal for a strong sensing capability as they are in charge of integrating and analysing information and knowledge from various sources to constantly monitor the external business environment and identify opportunities and problems (Teece, 2007). In open innovation context, Chesbrough (2006) argues that top management should lead such initiatives. Consequently, leadership should possess deep insight into sources for external knowledge; this includes identifying to search depth and breadth (Sofka & Grimple, 2010). This meta-capability encompasses the following activities: 1) activities related to R&D management and choosing emergence technologies, 2) activities to pool developments and science and technology, 3) activities to tap suppliers and complement innovation, and activities related to identifying customers’ needs and innovation and target market segment (Teece, 2007).

5.6.2 Seizing capabilities: organisations need to exploit opportunities and capitalise on technology, complementary resources and processes. This meta-capability indicates firms' prompt responses to identified significant opportunities and trends. In open innovation, this might include processes for new technology commercialisation, capabilities complementary decisions, and designing and reconfiguring business models for product development (Teece, 2017). Once these activities have been delivered, a series of new decisions would arise, such as determining the appropriate type of collaboration (Chesbrough & Teece, 1996). Teece (2007) discussed four main activities related to seizing capabilities: (1) defining customer and business models: (2) identifying organisational boundaries, (3) choosing decision-making protocols and governance methods, (4) developing stakeholders' loyalty and commitment.

5.6.3 Reconfiguring capabilities: this meta-capability is associated with resource orchestration through enhancing, integrating, and reconfiguring, if necessary, tangible and intangible resource bases. Developing dynamic capability is not enough. Such capabilities need to be seamlessly integrated and presented through organisational and managerial processes and routines, structure and incentive schemes. This metal-capability aims at ensuring the coherent inner integration of the organisation's elements with both strategy and environment (Teece, 2007). The driving necessity of transformation capability relies on the degree of change a business model brings to the organisation's design; this means such capability is critical when a business model alteration brings radical change to organization design. However, even in less critical organisational system changes, reconfiguration capability should be applied periodically to ensure future success. Teece (2007) identified this meta-capability's processes as 1) decentralisation and decomposability to deliver dynamic capability sustainability, 2) managing cospecialisation, 3) governance and structure, and 4) knowledge management.

Several scholars highlight the importance of approaching open innovation from a dynamic capability perspective and call for empirical studies to investigate dynamic capabilities micro-foundations that influence open innovation implementation (Bogers et al., 2019; Randhawa et al., 2016; Teece, 2020). Open innovation most likely aims to leverage and promote internal capabilities (inbound open innovation), discover new business models (outbound open innovation) or both (coupled open innovation) (Chesbrough, 2003). Such

processes require building appropriate systems and architecture to purposefully utilise knowledge in useful ways (Chesbrough, 2006).

Open innovation micro-foundations must be valuable and inimitable; they should draw on unique processes and routines to develop unique and significant organisational open innovation-related culture and practices (Gratton & Ghoshal, 2005). Although the literature has developed a concrete conceptual advancement regarding the role of dynamic capabilities, empirical studies in this field are scarce (Randhaw et al., 2016; Zahra et al., 2006). Although open innovation model is applicable to the entire value chain, it is mostly about complementing a business's internal R&D (Chesbrough, 2006). Relevant open innovation processes that aim to achieve such ends are beneficial for enhancing organisational position and competitive advantage. However, a comprehensive perspective into how to successfully adopt open innovation is scarce. The majority of open innovation literature has discussed open innovation capabilities from a knowledge management perspective, while a holistic approach to open innovation is lacking (Randhawa et al., 2016).

Approaching open innovation from a dynamic capability perspective is necessary as this framework implies strategy; dynamic capabilities accommodate and enact strategy. Input provided by dynamic capabilities helps make good strategy-related decisions. It sets parameters for collaboration initiatives, product development, and commercialisation initiatives related. Teece (2017) assured those dynamic capabilities provide firms fitness and coherence versa with its environment and elements of its system decisions.

In relation to open innovation, a firm’s competitiveness is determined by two factors: 1) differences in firms’ capability to deploy resources to deal with the surrounded changing environment and 2) the size of resources a firm has (Makadok, 2001). One of open innovation's main objectives is to assure that the organisation responds immediately to its surrounding environment through information gathering about emergent and changing markets and technologies (Kang & Kang, 2014). Therefore, emphasising the role of organisational ability to sense its environment (Christensen, 1997). Another goal of open innovation is to promote innovation (Inoue & Liu, 2015). While innovation traditionally

draws on R&D capability, which draws on resources a firm possesses (Inoue & Liu, 2015), acquiring knowledge from external sources can lead to a more effective level of innovation (Vega-Jurado, Gutiérrez-Gracia, & Fernández-de-Lucio, 2009). This is particularly due to the product's short life cycle, and the decrease in in-house R&D efficiency (Chesbrough, 2003); Organisational ability is essential to acquire the external sources of knowledge and paths more cost-effectively (Chesbrough, 2003). However, externally gained knowledge must be thoroughly reorganised to prevent open innovation failure. Resource relocation is required to integrate external knowledge into internal one (Hagedoorn & Duysters, 2002).

The dynamic capability enables organisations to recognise external changes, explore knowledge, detect external opportunities and increase their ability to adapt to external market and technology changes (Hill & Rothaermel, 2003), which seems to make this capability crucial for open innovation. As Teece et al. (1997) claimed, the combination of capabilities and the purposeful succession of steps in organisational processes to implement -creating strategies to deal with a rapidly changing environment through internal and external resources is what dynamic capability is composed of. Considering these arguments, dynamic capability is seen to be adopted as the primary capability for open innovation.

5.6 Summary of the theoretical perspectives

This chapter provides a discussion of how the dynamic capability perspective can assist in investigating and successfully adopting open innovation. Based on the provided discussion and analysis of such capabilities, this thesis claims that the dynamic capability related concepts such as ‘resource orchestration’, ‘learning’ and ‘path dependences’ are related to open innovation initiatives. This thesis would use the dynamic capability perspective to investigate open innovation, which supports the dynamic nature of openness to achieve competitive advantage. Firms can hold a competitive edge when the value created by their capabilities and resources is more than those of their competitors (Helfat et al., 2007). The sustainability of competitive advantage and the ability of a firm to appropriate profits from its resources and capabilities are the key factors that determine the returns of such resources and capabilities (Grant, 1991).

This thesis claims that the dynamic set of open innovation organisational capabilities are irreplaceable and cannot be imitated, while the open initiative's features and technological artefacts can. The linkages between these organisational capabilities should be considered when adopting open innovation to achieve competitive advantage (Lee & Yoo, 2019). Attaining a competitive advantage draws on a firm's resources and capabilities and its capacity to manage the dynamic flow. In this respect, profitable innovation that draws on openness seems as a sustainable advantage that arrives from the firm's resource and capabilities orchestration (Helfat et al., 2007). Considering the arguments discussed in this chapter, open innovation resources, including structure, process and roles, should be combined to build open innovation competencies at the organisational (operational) level, and at the strategic level, open innovation competencies can create open innovation capability. Thus, open innovation competencies lead to the achievement of open innovation capability while emphasising the role people played in this development. This means that an organisation needs to develop two-level capabilities to successfully manage and sustain the implementation of open innovation. After the theoretical review provided in the preceding chapters, the next section presents the conceptual framework underpinning this study, emerging from the literature review.

5.7 Conceptual Framework

In a knowledge-based and high-tech industry, innovation is considered a fundamental pillar for competitive success and a key factor for economic growth and development (De Silva et al., 2018; Gómez et al., 2017; Martín-de Castro, 2015; Martín-de Castro et al., 2011; Teece et al., 1997). Notwithstanding the importance of innovation, a single firm can barely innovate successfully in isolation. This is, in particular, applies to SMEs due to their limited resources; or what is known as smallness liabilities (Acs & Audretsch, 1990; Narula, 2004; Powell et al., 1996; Teece, 1992; Vossen, 1998; Santoro et al., 2018). Thus, as SMEs cannot solely cover all innovation functions and activities to stay competitive and meet customer changing demands (Brunswicker & Van de Vrande, 2014), open innovation complement this shortage and help SMEs stay innovative (Santoro et al., 2019).

While open innovation seems to be beneficial to different firms, research indicates that its implementation is more of a challenge as firms are not fully capable of embracing it successfully (D'Ambrosio et al.,2017; Hewitt-Dundas & Roper, 2018; Brunswicker & Chesbrough, 2018; Chesbrough & Brunswicker, 2014; Vahter et al., 2014; Wynarczyk et al., 2013). One of the main internal determinates of open innovation adoptions is an organisational strategy. A firm needs to change its main strategy to emphasise openness and innovation; this includes its vision and objectives and other strategies (Chesbrough & Appleyard, 2007; Vanhaverbeke et al., 2017). While addressing this issue of changing its focus to be more open oriented, cultural problems might arise. Firms would be challenged with their existing culture; alternatively, a culture supporting innovation and promoting openness and integration is needed to successfully implement open innovation (Boschma, 2005; Lichtenthaler, 2011). Another critical determinant to open innovation is an SME's R&D capacity (Hameed et al. 2018). R&D functions play a fundamental role in sensing, incorporating and utilising external sources of knowledge and promoting internal innovation (Cassiman & Veugelers, 2006; Chesbrough, 2003; Lu & Chesbrough, 2021; Rothaermel & Hess, 2007; Schmiedeberg, 2008). As open innovation is a two-way process, R&D functions are also important for generating final ideas for commercialisation (Chesbrough, 2012).

Open innovation technological aspects are also internal determinants. Open innovation's strategic and technological aspects should be addressed in a complementary and integrative approach. Frequently, open innovation technologies need to drive strategy rather than only become a part of the solution (Baka, 2014; Curley & Salmelin, 2013). Thus, an adequate methodology that integrates strategic and technological aspects of open innovation is a crucial determinant of open innovation adoption success.

Moreover, internal actors determine the success of open innovation. The presence and support of top-level management, for example, their role in creating a clear vision and demonstrating a commitment to open innovation is a prerequisite to its success (Ahn, 2020; Ahn et al., 2018; Chesbrough & Brunswicker, 2013; Chiaroni et al., 2011). Thus, their inadequate presence, support and motivation to open innovation initiatives might lead to their failure (Chesbrough, & Brunswicker, 2013; Singh et al., 2021). In some cases, the lack of top management support to open innovation stems from their failure to fully understand its benefits and underestimating its financial returns. Moreover, the appropriateness of performance measurement systems determines open innovation success as the traditional system used to evaluate the closed model of innovation might lead to inaccurate knowledge of what the organisation wants to attain with open innovation adoption or would face a perception of failure (Enkel & Lenz, 2009; Michelino et al., 2014).

A different determinant of open innovation relates to technological aspects. While firms are becoming more dependent on technology, a proper understanding of the roles and characteristics of open innovation-related information technology is crucial; otherwise, it would lead to its failure (Westergren, 2011). Open innovation’s IT-knowledge based systems and collaboration tools allow for teaming up with external actors to exchange knowledge; it enables the firm to gather and analyse external sources of knowledge and accommodate it to internal one (Chesbrough 2003, Chesbrough, 2006; Dodgson et al. 2006; Hrastinskiet al., 2010; Santoro et al., 2018; Vanhaverbeke, 2006).

In the context of the Middle East, external environmental determinants such as the level of government-supported developments in policies, infrastructure and institutional environment

are clearly correlated with the level of innovation (Pervan et al., 2015). Wonglimpiyarat (2011) emphasised linking innovation policies to the overarching economic goals. In the same sense, government policies should support this since building a synergy between industry actors is crucial for market success. World-class distribution networks (Furman, Porter, & Stern, 2002) and institutional support of sound legal and regulatory frameworks (Spithoven et al., 2013) are prerequisites for innovation and growth (Pervan et al., 2015). Thus, government-supported development in policies, infrastructure and institutional environment influences the level of innovation. Additionally, banks and financial institutions' support for funding SMEs determines their level of innovation and growth (Brancati, 2015; Laforet, 2008; Sok & O'Cass, 2011).

Another external determinant of open innovation is market dynamism. The level of market interaction and competition affects firms' level of innovation (Pervan et al., 2015; Martinez-Roman, Gamero, & Tamayo, 2011). In some cases, external changes in market conditions could offer innovation opportunities and meet unfilled niches and needs (Nemet,2009). Therefore, market environment's conditions and the level of its turbulence affect SME's level of innovation (Pervan et al., 2015).

All these discussed determinants should be considered when implementing open innovation to ensure its success. More importantly, this thesis understands that the fundamental problem of open innovation adoption relies on the organisation's understanding of 'openness' and the lack of developing capabilities that have a dynamic nature (Bogers et al., 2019; Randhawa et al., 2016). However, while several studies identified the importance of implementing open innovation (Popa et al., 2017; Greco, Grimaldi, & Cricelli, 2016; Santoro et al., 2018), there is minimal literature dealing with open innovation competencies and capabilities (Randhawa et al., 2016). Figure 5.2 is a conceptual framework that was mooted from the literature to conceptualise determinants of open innovation adoption in SMEs.

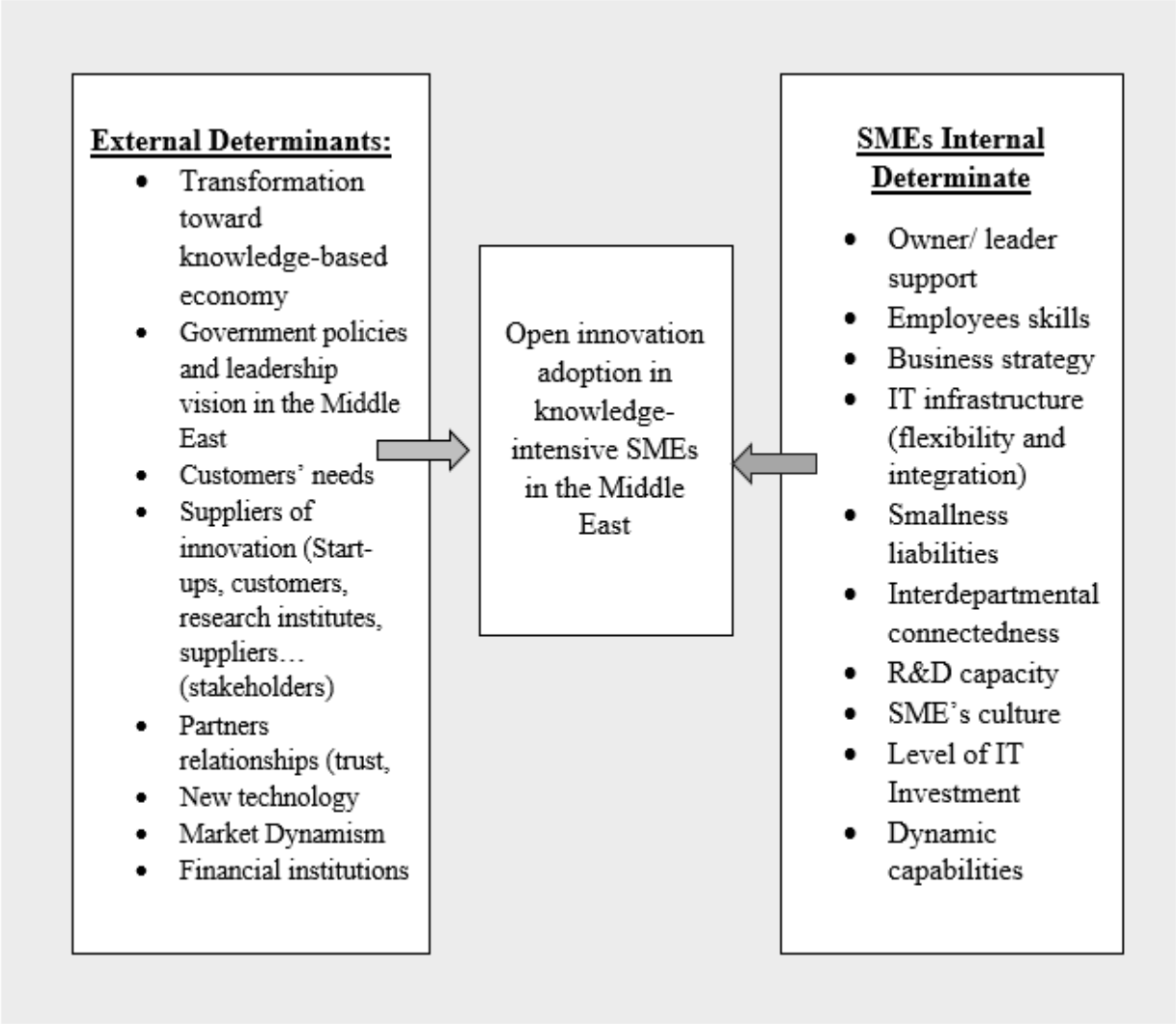

Figure 5.2: Conceptual framework: Open innovation adoption in Knowledge-intensive SMEs in the Middle East

Furthermore, ambiguity existed about open innovation determinants and antecedents and their relevancy to SMEs operating in such regions. Moreover, the existing absence of robust information creates unclarity on the region's prevalent dominant practices and context-specific nature of innovation. Notwithstanding that innovation is considered one of the vital keys for developing countries to advance and grow their economic base (Jaffe & Lerner 2006), this topic is still the least explored and warrants further examination (Gupta 2009; Vrgovic, Vidicki, Glassman, & Walton, 2012). One of the regions that stand to be the least explored in open innovation is the Middle East (Santos, 2015).

Consequently, the previously mentioned factors produce multiple research avenue in open innovation literature for further theory development and investigation of context specific nature and factors of open innovation' best practices in a less researched regions**.** Table 5.2 summaries extant gaps in literature.

Table 5.2: Summary of research potential gaps

Theme	**Potential research gaps**	**References**
Open innovation capabilities	Extant literature: current research focuses on studying open innovation capabilities from a knowledge-based view and RBV. The existing literature emphasises the role of knowledge, R&D and absorptive capacity in open innovation adoption. Strong linkage has been made between the RBV and dynamic theory to absorptive capacity and knowledge theories than with core open innovation studies. Emergent research issues: a need emerges to have a holistic understanding of open innovation strategic capabilities and apply the dynamic capability perspective to the open innovation field.	Boger et al. (2019), Boger et al. (2017), Cassiman and Veugelers (2006), Chesbrough and Crowther (2006), Gao et al. (2020); Hughes and Wareham (2010), Litchenthaler and Lichenthaler (2009), Randhawa et al. (2016), Teece (2020), Parida et al. (2012)
Open innovation definitional perspectives	Extant literature: open innovation has been studied from different perspectives. This might lead to an incoherent understanding of the notion and negatively affect its implementation. Emergent research issue: an interdisciplinary view that connects different perspectives and produces a coherent understanding of open innovation capabilities is required.	Chaudhary et al. (2022), Chesbrough and Bogers (2014), Boger et al., (2017)
Open innovation in SMEs	Extant literature: while open innovation studies have traditionally been focused on MNCs, more recently, research has indicated the benefit it can bring to SMEs, and such this cluster has started to gain more attention. Additionally, SMEs function as the engine of most world's economic structure and innovation is a critical determinate of SMEs' performance and success. Emergent research issues: papers are calling for a more in-depth understanding of open innovation in SMEs, as existing knowledge is insufficient and warrants more attention.	Bruque and Moyano (2007), Constantin (2019), Hoffman, Parejo, Bessant, & Perren (1998), Zafar and Mustafa (2017), Sabando-Vera et al. (2022), Santoro et al. (2018), Santoro et al (2019), Hossain and Kauranen (2016), Torchia and Calabrò (2019)

Open innovation in developing countries: Middle East	Extant Literature: current literature paid attention to open innovation in developed countries, namely the USA, the UK and Europe. Arab countries in the Middle East have recognised the importance of knowledge and innovation in the knowledge-based economy and have achieved higher ranks on the development index. Emergent research issues: Calls for investigating open innovation in developing countries. The effect of the unique context of the Middle East in terms of social-cultural aspects gained inadequate attention and produced fewer studies. Furthermore, ambiguity existed on determinants and antecedents of open innovation adoptions, and their relevancy to SMEs operating in such regions has been neglected. Moreover, the existing absence of robust information creates unclarity on the region's prevalent dominant practices and context-specific nature of innovation.	Barkhordari, Fattahi, and Azimi (2019), Hossain and Kauranen (2016), Ramírez-Montoya and García-Peñalvo (2018), Sabando-Vera et al. (2022), Spithoven and Dejardin (2017), Torchia and Calabrò (2019), Usman et al. (2018), West et al. (2014), Sağ et al. (2016), Gupta (2009), Vrgovic et al. (2012), Santos (2015), Gao et al. (2017), Sabando-Vera et al. (2022)

Drawing on the literature review conducted in Chapters Two, Three, Four and Five, this section has explored the development of the conceptual framework underlying this thesis. It provided a discussion on the conceptualise determinants of open innovation adoption in knowledge-intensive SMEs in the Middle East. The following section underpins the research questions.

5.8 Research Questions

The proceeding chapters provided insights into the aspects of open innovation. This includes reviewing its existing definitions in literature, developing a comprehensive understanding of the phenomenon that integrates these different perspectives, exploring theses perspectives related critical success factors, and highlighting the need of incorporating the dynamic capability perspective as a theoretical lens to investigate open innovation implementation. Throughout the literature review, a discussion has been made on the importance of successfully managing the adoption of open innovation (Bouncken et al., 2015; Randhawa et al., 2016). Thus, research has turned the attention to the need to develop a conceptual framework for open innovation adoption to reduce the risk of becoming a managerial fad (Chesbrough & Brunswicker, 2014; Faems, 2008; Giannopoulou et al. (2010). Chesbrough and Schwartz (2007) posit the importance of seeking smart and flexible restructuring of their

capabilities and resource-base to successfully embrace open innovation. However, studies that examined open innovation capabilities relied on knowledge-based theories to explain the role of knowledge, R&D, and absorptive capacity (Cassiman & Veugelers, 2006; Hughes & Wareham, 2010; Litchenthaler & Lichenthaler, 2009). While minimal literature considered the strategic aspect of open innovation research focusing on organisational capabilities and the micro-foundations for open innovation implementation. Consequently, scholars call for investigating organisational capabilities due to minimal investigation in such areas. In the context of SMEs, this area has, in particular, gained minimal attention and warrants more investigation (Chesbrough & Bogers, 2014; Hossain & Kauranen, 2016; Spithoven & Dejardin, 2017; Torchia & Calabrò, 2019; Usman et al., 2018; West et al. 2014; Tchouwo et al., 2021).

Various reasons lead this thesis to focus on studying Arab countries in the Middle East. This includes, firstly, the development of the innovation field and the current debates that exist into how the emergence of open innovation contributes to organisations' performance, growth and sustainability (Bigliardi et al., 2020; Gao et al., 2020; Srisathan et al., 2020; Yun et al., 2020). Secondly, the rising attention of scholars, businesses and policymakers to the Middle East as its economy grows progressively in the midst of social and political developments and security related issues. Thirdly, the recent emerging calls to undertake studies on the less-researched regions (Gao, Zuzul, Jones, & Khanna, 2017; Gao et al., 2020). Fourthly, the effect of the unique context of the Middle East in terms of social-cultural aspects gained inadequate attention and produced less studies. Hence, this research fills the aforementioned knowledge gaps identified in the literature review and summarised in Table 5.2 in table by linking them to the research questions:

Q1: What are the organisational competencies required to enable open innovation in Middle Eastern knowledge-intensive SMEs?

Q2: How these organisational competencies interrelate.

Q3: What are the dynamic capabilities required to sustain open innovation business approach?

5.9 Summary

Throughout the literature review, it has been found that open innovation adoption faces many challenges that hinder its successfulness and the utilisation of its benefits, despite the promising advantages it can bring to an organisation (Bogers et al., 2019; Brunswicker & Chesbrough, 2018; D'Ambrosio, Gabriele, Schiavone & Villasalero 2017; Gassmann, Enkel, & Chesbrough, 2010; Gassmann & Zeschky, 2008; Hewitt-Dundas & Roper 2018; Wynarczyk et al., 2013).

Hewitt-Dundas & Roper (2018) and Laursen & Salter (2014) argue the lack of a proper understanding of organisational capabilities required to implement open innovation hinders its full adoption. Literature has mainly discussed open innovation capabilities from a knowledge perspective, while other capabilities has been neglected (Randhawa et al., 2016). Additionally, the lack of proper understanding of what is needed to successfully implement open innovation stems from the multi-disciplinary and disconnected view of open innovation (Boger et al., 2017; Chesbrough & Bogers, 2014). Thus, the first question of this study aims at filling this gap by investigating organisational competencies of open innovation in Middle Eastern SMEs from an interdisciplinary and integrative perspective in order to provide ways in which organisations can successfully implement open innovation. While Grant (2002) noted resources and competencies should be integrated and work together to develop organisational capability in order to achieve competitive advantage, the second research question aims to explore the relationships exist between these competencies.

The dynamic capability perspective will be used to evaluate and analyse the aforementioned questions. This conceptual framework focuses on resources reconfiguration of a capability and how an organisation can achieve competitive advantage in a turbulent environment. The theoretical point here is to analyse how SMEs can improve their open innovation-related competences in a daily basis. This is related to the third research question.

The aim of this study is to explore open innovation capabilities, competencies, and resources that are required in the knowledge-intensive SMEs, and to analyse the dynamic nature of

these open innovation related capabilities and observe its influence on the implementation of such initiative. Upon exploring competencies and capabilities for a clearly delineated open innovation process of success, appropriate methods for analysing these constructs will be presented in Chapter Six.

Chapter Six: Research Methodology

6.1 Introduction

Conducting research in the field of innovation is significantly different from those other areas in social science research due to the maturity level of this field as it is considered relatively recent (Chesbrough, 2003; Read, 2000). Additionally, innovation research involves various areas of knowledge such as economics, behaviour, organisation, technology, etc. (Boger et al., 2017; Brem, Puente-Díaz & Agogué, 2016). Such characteristics influence the fact that the innovation field can be viewed from different lenses and embodies a mixture of economic, scientific, organisational, technological and social aspects (Gopalakrishnan & Damanpour, 1997). As demonstrated by the outcomes of this literature review, there is a gap in the current theoretical knowledge around open innovation competencies in the Middle East region and specifically a gap in empirical knowledge. This chapter focuses on the appropriate collection of empirical evidence to support the testing and development of new theoretical contributions in this area to answer the following research questions:

Q1: Evaluate what organisational competencies are required to enable open innovation in knowledge-intensive Middle Eastern SMEs?

Q2: Evaluate how these organisational competencies interrelate.

Q3: Evaluate the role of dynamic capabilities required to sustain open innovation implementation?

The following chapter will overview the adopted research paradigm and discuss how the research questions, methodology, and methods are aligned. This chapter includes in detail how this study conducted the fieldwork and the methods used for data collection and analysis. This chapter is structured as follows: first, an overview of research approaches, including ontology and epistemology. Second, a discussion of the research strategy is provided, followed by a discussion of methodological steps and the research design adopted for the present research.

6.2 Research approach overview

This section summarises the overall research methodology chapter and illustrates the research design (see Figure 6.1). As shown in Figure 6.1, the structure of the overview and the later content of the chapter follows a logical model from research philosophy down to details of data collection and analysis. This is done in recognition of the relationship that each has with the section that follows it. This sub-section allows the reader to appreciate the overall research strategy before focusing on the detailed explanation of the research methodology and methods adopted.

Figure 6.1: Research methods map

Ontological and Epistemological Position

This thesis takes a subjective and interpretive stance as this felt appropriate (see section 6.3).

Overall Research Strategy

This thesis adopts a qualitative multiple case-based strategy, reflecting the chosen philosophical stance and subsequent inductive interpretive stance to the data collection and analysis. Six case studies were selected from the Middle East at different levels of open innovation adoption to capture differences in SMEs' competencies and their effect on open innovation success.

Data Collection

The unit of analysis of this research was the selected Middle Eastern SMEs under investigation. Six case studies were conducted. The primary evidence of these case studies was the SMEs managers' cognition of open innovation competencies and capabilities. The data collection method of these multiple in-depth case studies relied on online semi-structured interviews and document analysis (including one pilot study). This primary data collection method was supported by document analysis. A total of twenty in-depth semi-structured interviews were conducted over a period of six months. Managers involved were those who were felt would be able to provide in-depth information concerning innovation practices and, at the same time, were able to answer most questions. One initial case study was used as a pilot study to sense-check the appropriateness of the research approach and interview questions.

Data Analysis and Presentation

As this thesis adopts an inductive approach, the contents of the interviews were analysed using the content analysis method. This analysis was conducted based on the transcript developed and voice recorded of interviewees with the support of data emerging from document analysis. In addition, after each interview, the researcher noted down impressions and feelings captured that could not be registered in voice recording. Data were coded, stored and analysed using NVivo. Then, the findings were presented in interposed with verbatim, direct quotations and the researcher's interpretations. Two main theoretical approaches were adopted to analyse data: the dynamic capability perspective and the value-focused thinking approach. As this section summarised of the overall research methodology. The following sections provide a more in-depth explanation and justification of the chosen research methods and tools.

6.3 Methodological paradigm

This section underpins the thesis's adopted methodological paradigm concerning ontology and epistemology. The adopted research view, research design, data collection and analysis methods will be articulated and informed in the following sections of this chapter. These

reflect the theory of knowledge and the thesis's perspective of reality which constructs the adopted research methodology and theoretical views.

6.3.1 Ontology

Ontology refers to the nature of being and can be explained by the structure and properties of what is assumed to exist (Marsh & Furlong, 2002). Grix (2001) posits that the world's structure and values are understood and defined from the researcher's perspective. Accordingly, every researcher would have a unique understanding of the nature of being and the nature of the world. Therefore, a researcher's ontological position subsequently shapes the grounds for choosing a particular research methodology.

Thus, this study's ontological positioning explains what is assumed to be real within this thesis. A critical aspect of determining an ontological stance in social science research is whether the organisations under investigation should be treated as independent entities. Following this stance, reality would be understood to exist independently of individuals (objectivity). Or whether organisations should be considered social constructions, thus, possessing weight to social actors and context (subjectivity) (Bryman, 2016). Since the present study takes place in a social setting, knowledge-intensive SMEs, this study predominantly emphasises Middle Eastern SMEs managers' cognitions and perception of open innovation competencies and capabilities (Hill & Wright, 2001). Streubert and Carpenter (1999) argue that participants' cognitions and experience reflects multiple realities. Thus, the approach of socially constructed research was deemed appropriate. Thus, managers' cognitions and experience of knowledge-intensive SMEs in the Middle East affect this thesis's understanding of open innovation competencies and capabilities. This new, open and uncontrollable context requires a research methodology that fits the purpose and nature of this study to obtain an in-depth understanding of open innovation practices that these SMEs adopt and what competencies and capabilities are required for its successful adoption. This thesis embraced the concept of a subjective reality, which accepts that open innovation is a socially constructed reality of the perception and knowledge of Middle Eastern SMEs managers.

Since ontology and epistemology reflect and define a research paradigm's beliefs, they generally emerge together. The following section provides an overview of epistemological stances. Then, section 6.3.3 further justifies this thesis's ontological position in relevance to the adopted epistemological stance.

6.3.2 Epistemology

Whilst ontology reflects the nature of being and reality, epistemology represents the relationship between reality, the researcher and the most effective approaches to determine valid and adequate knowledge about the world (Carson, Gilmore, Perry & Gronhaug, 2001). The theory of knowledge helps provide philosophical grounding to determine what is acceptable, valid and legitimate knowledge (Maynard, 1994). The epistemological approach can be defined as "*the branch of philosophy that studies the nature of knowledge and the process by which knowledge is acquired and validated*" (Gall, Gall, & Borg, 2007, p.15). Consequently, it guides the research design and analysis, including its features, conditions, and proper methods for obtaining knowledge (Iivari, Hirschheim, & Klein, 1998). To summarise, epistemology answers how we can know and learn about reality and what constitutes the basis of our knowledge (Bryman & Bell, 2007). Epistemology is related to the relationship between the reality of what the researcher admits knowledge is and how the researcher can acquire it (Carson et al., 2001). There are two main approaches to epistemology: positivism and interpretivism.

Positivism

Burrell and Morgan (1979, p. 5) state positivism "*explains (s) and predicts what happens in the social world by searching for regularities and casual relationships between its constituent elements."* Those who adopt this philosophy believe in the existence of a single external reality and the distinctiveness of facts and values. Moreover, knowledge is understood in terms of observable facts (Carson et al., 2001; Hudson & Ozanne, 1988). This philosophical stance relates to natural sciences that aim to result in law generalisation and look to it as a key feature to govern the studied phenomena (Lee & Baskerville, 2003; Saunders et al., 2016). According to Saunders et al. (2016), researchers of social sciences who adopt a positivistic philosophy view social entities and organisations as natural

phenomena that are real. Positivism gives rise to objective analysis of knowledge as independent of the human perspective of the researchers (Girod-Séville & Perret, 2001; Levin, 1988; Morgan & Smircich,1980). Thus, a positivist view proposes a single objective reality for any research situation applied (Hudson & Ozanne, 1988).

Alternatively, positivism has issues related to key variable identification, evaluation difficulty, and difficulty interpreting and gaining an in-depth understanding of the research results (Meredith, 1998). Scholars have criticised applying positivism in social sciences and multi-faceted notions (Schön, 1995; Yin, 2013). While positivism fits with large sample sizes typically found in quantitative research, observed data reflects only a partial account of reality and neglects the role of minor enablers and elements (Lincoln & Guba, 2000). Due to the complex nature of SMEs, the positivist approach is not the best option when it comes to building a robust theory (Oppong, 2014), as the aim of this study is not to test a theory or pre-existed hypotheses. Alternatively, it aims to gain an in-depth understanding of open innovation and explore its related organisational competencies and capabilities in a context that has not been investigated before.

This study seeks to explore open innovation's internal and external determinants in the context of the Middle East. This geographical context has not been discussed previously in the literature. The experiences and viewpoints of SMEs' managers are of utmost importance: this will drive a better understanding of the open innovation competencies and capabilities. Thus, positivism does not support this thesis in achieving its objectives.

Interpretivism

Interpretivism is an empathic neutral inductive approach that is concerned with taking into consideration the multiple views of individuals and physical events for constructing meanings to examine observable and unobservable relationships (Saunders et al., 2016). While positivism aims to find casual relationships and generalise results, interpretivism seeks to build new, more in-depth understandings and interpretations of a social phenomenon (Saunders et al., 2016). This epistemological position is about gaining an understanding of reality through social construction. It considers knowledge to be subjective (Walsham, 1993). Indeed, this philosophy was founded in reaction to positivism and the naturalist stance as it opposes the short handing of social sciences and reduces it to natural sciences (Kincaid,

2002; Schutz, 1970). This stance asserts an understanding of the social world from the human perspective of those directly involved in the phenomena to be studied (Burrell & Morgan, 1979). Thus, the assertion here is on understanding the process by which individuals concretise their relationship with their social world, which allows for proposing knowledge from a subjective and socially constructed perspective (Berger & Luckman, 1966). Thus, knowledge is socially constructed and affected by the researcher and participants' views, actions, and interpretations from this epistemological perspective.

Studies that adopt the interpretive philosophy focus on the idea that a phenomenon can be understood by the subjective meanings given by people throughout their interaction with the world around them; thus, knowledge is a social construction (Orlikowski & Baroudi,1991; Walsham, 2006). In this sense, interpretivists are engaged with their research objectives as with the informant participants, and their understandings, interpretations, convictions and conceptual orientation shape and generate the knowledge of a phenomenon (Miles & Huberman, 1994). According to Carson et al. (2001), the complex nature of reality necessitates adopting a flexible research structure that facilitates giving meanings through human interaction. The illustrated scheme of table 6.1 summarises the different assumptions of ontology, epistemology, and related research methods with a claim that the migration between or toward another perspective should happen gradually and represent a spectrum with overlapping characteristics (Morgan & Smircich, 1980).

Table 6.1: Key differences in epistemological stances

Core ontological assumptions	Reality as a projection of human integration	Reality as a social construction	Reality as a symbolic discourse	Reality as a contextual field of information	Reality as a concrete process	Reality as a concrete structure
Basic epistemological stane	Obtain phenomenological insight revelation	Understand how social reality is created	Understand patterns of symbolic discourse	To map context	To study systems, process, change	To construct a positive science

Research methods	Exploration of pure subjectivity	Hermeneutics	Symbolic analysis	Top map context	Historical analysis	Lab experiment and surveys

(Source: adapted from Morgan and Smircich (1980, p.492)

Chosen epistemological stance

When beginning the study process, the individual researchers must choose the philosophical paradigm that appears to correspond most closely with the way they understand the world. This primarily affects their related methodological decisions. This thesis investigates the organisational competencies and capabilities pertaining to the theory of open innovation. The researcher needs to answer these questions: What can we 'know' about those competencies and capabilities? When researching people and the society (which business is part of it), what is the most appropriate way of 'knowing' what is going on? Is it appropriate to objectively measure competencies using tangible or observable characteristics or measurable physical traits? Will the outcome of that measure be the same no matter who measures it? Or is it more subjective, in that the indicator of the competency might be different for every person? Given the geographic context of this study. Are we taking a stance that people in different places might have different 'perceptions' or beliefs around their own competencies and what 'innovation' even is? By addressing these questions, this study attempts to understand the reality of open innovation adoption in the Middle East region and offer insights into how knowledge-intensive SMEs' managers attach meaning to such a phenomenon. It aims to understand this open innovation phenomenon from within (Hofstede & Hofstede, 2005). This requires an understanding of *'the complex world of lived experience from the point of view of those who live it'* (Schwandt, 1994, p.118). The research design of this thesis adopts the interpretivism stance since the constructed knowledge from this study is affected by its social context. This research method allows for interaction between this study's participants and the researcher to build an understanding of open innovation conceptualisation in the Middle East. The experiences and viewpoints of SMEs' managers are of utmost importance; this will drive a better understanding of the open innovation competencies and capabilities in this specific context. Additionally, the researcher's role as a facilitator of the study allowed analysing and

interpreting of data upon what has been discovered and observed in the discourse in data collection.

As discussed in section 6.3.1, the ontological and epistemological perspectives reflect a study's beliefs and shape and identify its methodology. This thesis's chosen philosophical position is further discussed in the following section.

6.3.3 Research adopted paradigm

A further discussion is provided to crystalise the chosen epistemological positioning of this thesis, interpretivism. It is essential to mention that the research paradigm results from a researcher's perspective, proceeding to the discussion of the key difference between ontology and epistemology and their stances. These elements are interconnected as adopting an epistemological position can vary considering knowledge nature, scope and limitation (Creswell et al., 2003; Lincoln & Guba, 2000).

This study aims to interpret issues related to open innovation adoption in Arab Middle Eastern SMEs. The nature of this study is exploratory and deals with participants in social settings in a context that has not been investigated in the literature previously (Hossain & Kauranen, 2016; Santos, 2015; Torchia & Calabrò, 2019; Usman et al., 2018). Therefore, the interpretive philosophy is considered appropriate (Carson et al., 2001; Walsham, 1995). In particular, this thesis investigates actors within SMEs, a social setting, and deals with factors that affect this social setting. Separating the actors from that specific social setting and the factors affecting it, and the relationships formed before or within this social setting would be impossible. Therefore, it is acknowledged that knowledge within this thesis is affected by its social context.

Gartner and Birley (2002) state that interpretive stances are more concerned with generating an in-depth understanding of innovation context, its process, and determinants when it comes to innovation research. As this thesis explores open innovation in Middle Eastern SMEs, where no research has been previously conducted in this context (Hossain & Kauranen, 2016; Santos, 2015; Torchia & Calabrò, 2019; Usman et al., 2018), the epistemological approach adopted allow for the in-depth understanding of such a phenomenon and its context. Lee and

Baskerville (2003) posit that social studies are unique in nature and do not fit positivism as they mandate idiographic theorising. Hence the knowledge developed in this research is socially constructed and affected by social context (Saunders, 2016), making interpretivism the most appropriate research philosophy. In this sense, this thesis addresses actors in a social setting and discusses the factors that determine their adoption of open innovation, where the relationship between actors and factors is not possible to be separated.

Following the interpretive stance, the research design takes the researchers engrossed in the research setting. Their analysis and interpretation of data collected partially create an understanding of the open innovation phenomenon in SMEs in the context of the Middle East. Additionally, the selection of research participants would be purposeful to understand open innovation organisational competencies and their dynamic nature and development. The interaction also would be personal and aims at theory development.

Notwithstanding the existence of some instances of adopting the interpretivism paradigm in open innovation determinants research (Grama-Vigouroux, Saidi, Berthinier-Poncet, Vanhaverbeke, & Madanamoothoo, 2019), recent calls on adopting an interpretivism stance have grown. This is particularly because research typically conducted in this field utilities the positivism stance and its associated research methods and strategies (Arbussã & Llach, 2018; Cheng & Sheu, 2018; Hameed et al., 2018; Gentile-Lüdecke, de Oliveira & Paul, 2019; Jasimuddin & Naqshbandi, 2019; Jespersen, Rigamonti Jensen, & Bysted, 2018; Kapetaniou & Lee, 2019; Yin et al., 2021; Lekovic & Bobera, 2018; Gomezel & Rangus, 2018; Tchouwo et al., 2021; Naqshbandi, 2018). Hossain and Kauranen (2016) note the dominance of the adoption of positivist strategy and its relevance to open innovation research. Thus, adopting an interpretivism stance to investigate the open innovation phenomenon is necessary in order to gain an in-depth and insightful understanding of its adoption in a region that has not been previously studied.

This study is the best fit within interpretivism as it allows reality to emerge from the views and experiences of people (Bryman, 2016). This is because open innovation is a new subject area, and little is known about its adoption in the Middle East. Interpretivism is the most appropriate research approach adopted in this study.

6.4 Research strategy

In order to be able to collect empirical data, the methodological assumption aims to help in indicating appropriate methods and techniques for conducting social science research (Orlikowski & Baroudi, 1991). Matthews and Ross (2010) referred to research strategy as a research plan by which a researcher draws to answer research questions and attain its aims and objectives (Saunders, Lewis, & Thornhill, 2009). It is the part of research design that determines the boundaries of the research and creates a framework for data collection methods and analysis procedures (Bryman & Bell, 2007). More precisely, it aligns the research philosophy with other elements, creating harmony across all aspects, and assuring a high level of the overall research design quality (Saunders et al., 2009). According to Yin (2003), this may include conducting experiments, surveys, interviews, analysis of the history and archival information, and case studies. However, in order to indicate which of these ways bests fit this study, main dimensions are considered. First, the type of questions the study addresses, second, the control level of the researcher on actual behaviour (Yin, 2013). The following section discusses this in more detail.

Quantitative vs Qualitative research methods

When conducting social research, research methods can be quantitative and/or qualitative. What differentiates them are: 1) the purpose of the research (whether it aims to understand or explain events), 2) the role of the researcher in the research (personal or impersonal role), and 3) the type of knowledge (discovered or constructed knowledge) (Stake, 1995). Quantitative research defines and investigates a phenomenon using quantification and numerical analysis (Bell, Bryman, & Harley, 2019; Burkholder, Cox, Crawford & Hitchcock, 2019). This research strategy seeks to generalise results by using numbers for concepts measurement (Zikmund, Babin, Carr, & Griffin, 2010). According to Bell et al. (2019), this strategy seeks to test a theory; involving a deductive approach. Surveys and experiments are considered quantitative research methods (Palvia, Mao, Salam, & Soliman, 2003). Contrasting, when it comes to building a new theory or redefining and extending an existing one, qualitative methods are more appropriate; thus, it encompasses inductive approaches, which fits with the nature of this study (Bell et al., 2019; Shah & Corley, 2006). A qualitative strategy is used to stress words and images in data collection to explicate explanations of the phenomenon rather

than on quantity, numbers and statics (Bell et al., 2019). Additionally, qualitative strategies rely on the role of the researcher who will collect the data, analyse and interpret it to turn it into information rather than following a structural approach as quantitative strategies (Zikmund et al., 2010). This fits with the interpretivism and subjective nature of this thesis (see section 6.3.3).

Qualitative research is the optimum fit research strategy to obtain a more in-depth and complex understanding of a phenomenon (Creswell, 2013). It is the best option when the variable studied cannot be measured (Creswell, 2013). Moreover, the interpretive approach is normally associated with qualitative methods (Bryman & Bell, 2007). This research implements a qualitative strategy since the researcher's desire is to understand the issues regarding open innovation implementation in Middle Eastern knowledge-intensive SMEs. Moreover, since this study is interpretive in nature, research methods should reflect this. Qualitative research may be carried out using several study designs, all of which have the potential to yield rich and thorough data. The following study designs are the most widely used within the qualitative method. Each of the following research methods is overviewed and then discussed in accordance with this thesis's nature and its fitness to support attaining its objectives.

Action research

Qualitative methods include several research methods. The first potential research method is action research. Action research methods are clinical in nature (Baskerville & Wood-Harper, 1998). It was first developed by Kurt Lewin in 1946 and emphasised addressing practical problems by merging research and praxis to produce relevant research findings and solutions to help organisations (Baskerville & Wood-Harper, 1998; Denzin & Lincoln, 1994; Street, 2003). This method is not suitable for the present study for two reasons. Firstly, the research problem being faced is not purely related to the 'practice' of open innovation and seeks to test and build upon existing theory. Secondly, action research requires an iterative cycle of interaction between the researcher and the subject where the findings are used to influence events and gain new insights that are fed back to influence events. This is not possible or practical at the current time.

Grounded theory

The second potential research method is the grounded theory which was first developed by Glaser and Strauss (1967). Punch (2000, p.103) suggests this research method *"offers a comprehensive and systematic framework for inductively building theory."* Suddaby (2006) argues that the main idea of this method is to build a theory from a non-predefined or a non-pre-studied phenomenon where the interaction of actors' constructs meaning. Thus, an interpretive process is used to analyse data from actors' intersubjective experiences.

Case study

The case study strategy is known for its high flexibility (Remenyi, Williams, Money, & Swartz, 1998) in addressing the complexities of a social phenomenon (Yin, 2014). This research strategy provides rich contextual data to generate an in-depth understanding of a real phenomenon occurring in a social context. Hence, generating an in-depth understanding of a phenomenon is not exclusive to this strategy since the grounded theory aims to develop a detailed understanding of a social phenomenon (Klein & Myers, 2009). What distinguishes the case study strategy from the approach mentioned above is its focus on a particular case, cases, in its own right (Bryman, 2016; Stake, 1995; Yin, 2014). In addition, a case study strategy can adapt to different stances (Dubé & Paré, 2003), accommodate a full range of research methods (Denscombe, 2014) and allows for data and methods to be triangulated to achieve a greater level of validity (Eisenhardt, 1989; Bryman, 2016; Stake, 1995; Yin, 2014). Benbasat, Goldstein and Mead (1987) noted case study strategy should be adopted when few studies have been carried out in that research area. These unique features of the case study research method support the nature of the present thesis. It investigates a real-life social phenomenon (the adoption of an open innovation approach) that occurs in a particular social context (within and between Middles Eastern SMEs). Thus, this study adopts a case study method as a research strategy.

After the brief overview provided on qualitative research methods, the following section further discusses in more detail the selected research strategy for this thesis, namely the case study approach.

6.4.1 Adopted research strategy: Case study

In management research, the case study strategy supports the research to gain and capture a holistic and meaningful understanding of an organisation or industry (Yin, 2003). It provides high flexibility (Remenyi et al., 1998), by which it addresses the complexities of social phenomena (Yin, 2014). A case study strategy can be accommodated with any philosophical perspective adopted (Dubé & Paré, 2003). This includes positivism (Yin, 2014) or interpretivism (Stake, 1995). Table 6.3 illustrates different characteristics that distinguish the case study method across positivism and interpretivism stances. In addition, it accommodates a full range of data collection methods and research approaches (Denscombe, 2014). Accordingly, the criteria ruling the case study method in positivism differs from interpretivism (Klein & Mayers, 1999). Thus, it is the researcher's choice to adopt the most appropriate case study research design that best fits the phenomena investigated in-depth and generates answers to research questions and objectives. Researchers can investigate single or multiple case studies (Yin, 2003). This choice is aligned with achieving research objectives; when the aim of the research is anchored on robustness arguments, then multiple case studies are required (Yin, 2003).

While the grounded theory also seeks to generate an in-depth understanding of a phenomenon (Myers, 2009), what distinguishes the case study strategy from the grounded theory strategy is its specific focus and in-depth investigation of a case or cases in its own right (Bryman, 2016; Stake, 1995; Yin, 2014). This focus of the case is what allows for labelling this strategy as a case study (Bryman, 2016). In addition, the data triangulation feature in case study research is considered a unique and important justification for its adoption (Eisenhardt, 1989; Bryman, 2016; Yin, 2014).

Table 6.2: The case study in philosophical stances

Perspective	Characteristics
Positivist	- Evidence existed of formal propositions. - Quantifiable measures of variables. - Hypothesis testing or theory testing. - Use of stated population of a representative sample to draw inferences about a phenomenon.
Interpretive	-knowledge of reality is gained only through social construction. - Meaning assigned by people is used to understand a phenomenon. - It emphasises the complexity of people's sense-making as the events emerge rather than a prior deterministic of research's dependent and independent variables. - aims to increase extrapolative understanding of phenomena. - The research attempts to increase understanding of the phenomenon within cultural and contextual circumstances where there is evidence of a non-deterministic perspective. - The phenomenon of interest is examined in its natural setting and from the perspective of the participants. - The researchers do not impose their outsiders' a priori understanding on the situation.

(Source: Orlikowski & Baroudi, 1991; Klein & Mayers, 1999)

The present research adopts a case study as a research strategy to build knowledge and gain a deeper understanding of this research phenomenon. It allows the researcher to examine contextual conditions of adopting open innovation in SMEs, particularly in the context of Middle Eastern knowledge-intensive SMEs. The following section provides a more detailed discussion and justification of selecting the case study method as a research strategy.

6.4.2 Justification of case study strategy selection

According to Yin (2014), the case study research method allows the researcher to explore a contemporary phenomenon, such as the adoption of open innovation in the case of this research, with its real-life context. Additionally, Ebneyamini and Sadeghi-Moghadam (2018) emphasise the importance of the case study method in innovation studies as a powerful technique that provides high levels of flexibility that exceeds other qualitative approaches. In addition, a case study methodology is ideal when the researcher is looking for a holistic and

in-depth examination of a phenomenon as it is designed to bring out various perspectives using several data sources (Feagin, Orum, & Sjoberg, 1991; Tellis, 1997). Zainal (2007) posit that this research method enables researchers to investigate data within a particular context. Hence, the choice of case study selection as a research strategy is justified by drawing on Yin's (2014) recommendations.

Yin (2014) advocates the reason behind the use of case studies methods to deal with 'why' and 'how' questions since such a method allows for an insightful understanding of the nature of the phenomenon studied. This is in accordance with what the present study is dealing with, i.e. how knowledge-intensive SMEs can successfully adopt open innovation in the Middle East and why open innovation should be viewed from a dynamic capability perspective. Additionally, the case study strategy is a viable research strategy when the focus is on investigating a contemporary phenomenon, namely open innovation in this thesis, and when the context is essential and cannot be separated from the phenomenon (Yin, 2014). Open innovation competencies and capabilities are clearly a contemporary living phenomenon, and its past, present and future are important (Chesbrough, 2003; Boger et al., 2019).

Similarly, Benbasat et al. (1987) advocate using the case study strategy when few studies have been carried out in that research area. For this study, while open innovation is considered a relatively new phenomenon (Chesbrough, 2003), few studies have been conducted in the context of SMEs and developing countries; particularly, the region of the Middle East has been neglected in the literature. Moreover, this thesis explores the phenomenon of open innovation in developing countries' contexts, specifically in the Arab Middle Eastern SME context. Hence, the context of business is not possible to be distinct from the factors of such a phenomenon since influencing and manipulating the phenomenon would be inappropriate as this study aims to examine this phenomenon as is and examine its interaction with its social surroundings. Therefore, a case study is required for data collection.

The adopted research strategy was deemed appropriate as it provides holistic and in-depth data that suits the nature of this research. Notwithstanding that case study could be used with different research methods (Punch, 2000), it is recommended for exploratory research (Saunders et al., 2009; Myers, 2009), and when the aim is to provide a theoretical understanding of a new research field (Eisenhardt, 1989) and when the research context is essential (Yin, 2014). However, adopting a quantitative-based case study would constrain the

accumulated level and nature of data required, leading to difficulties in process analysis since quantitative methods seek statistical representation (Easton, 1995). This is not to say that the quantitative case study method was less important, but to argue that the qualitative case study is more suitable for this research's nature, purpose, and stage. To illustrate, social settings are more complex and harder to generalise, making them difficult to objectively research. In addition, innovation scholars call for a return to qualitative research methods to understand innovation processes in-depth (Gartner, 2007; Gartner & Birley, 2002; Motara & Minshall, 2011; Van de Ven & Engleman, 2004).

Alternatively, quantitative methods usually are steeped in a positivist stance to gain an objective understanding of a phenomenon (Bryman, 2016; Hunt, 1991). Since this research is exploratory in nature and aims to investigate reasons for things and make them more understandable; which usually is associated with answering questions of 'how;' and 'why' questions (Punch, 2000), a qualitative case study is adopted to develop a theory-validation and extension study. First, literature has been utilised to identify critical competencies that are important for open innovation. Second, the study is being carried out in a novel context, where very few studies have examined this theory in the context of the Middle East. That is why this study is one of the first attempts in this direction. In this sense, a qualitative method starts with asking questions related to a specific phenomenon, moves to data, and finally ends up proposing a theory that should be adopted (Merriam & Tisdell, 2015). To summarise, this research adopts an interpretive, qualitative exploratory multiple case study strategy to achieve this thesis's purposes.

Like all research methods, case studies are not without weaknesses. The criticism that addresses case study as a research methodology is associated with its accordance with its interpretivism nature (Yin, 2009; Walsham, 2006). For example, in such a methodology, it is difficult to reduce the level of bias, data is affected by the researcher's interpretation, background and experience, and data produced tend to be difficult to analyse (Cavaye, 1996; Galliers, 1992; Gerring, 2006; Yin, 2009). In order to overcome such issues related to the nature of the interpretivism stance, the researcher undertakes a few procedures to guarantee the validity and reliability of this research; This is explained further in section 6.10. For example, in order to address the issue of not maintaining the researcher's objectivity, a case

study protocol was used (see section 6.10.1). Walsham (2006) argues that interpretive research criticism was mainly devoted to the research topic's substantive content, and less attention was paid to research conducts and methods. Thus, the following section details the research design.

Single vs multiple-case study

A researcher has to decide whether to conduct a single or multiple case study strategy. This decision needs to be addressed before conducting the research (Yin, 2003). A single case strategy is recommended in cases where a specific case is perceived to be particularly interesting or demonstrates a unique suitable context for a particular phenomenon (Saunders, Lewis, & Thornhill, 2009). Similarly, Yin (2003) illustrated that being critical, extreme, typical, revelatory or appropriate for a longitudinal examination of a phenomenon are the potential scenarios to justify investigating a single case. Otherwise, a multiple case study strategy is recommended as it allows for analytical generalisability of the findings (Creswell, 2007). While Yin (2014) advocated using both single and multiple types of case study approaches, the author recommended the use of multiple case study approaches to ensure the robustness and consistency of the findings. Scholars advocating the use of case study strategy agree on the view that replication logic by statistical sampling is not the aim of this strategy; instead, it seeks theoretical replication of findings (Eisenhardt, 1989; Dul & Hak, 2008; Remenyi, 2012; Stake, 1995; Yin, 2003). Therefore, this study adopts a multiple case study strategy

6.4.3 Number of cases and participants selection

Choosing a multiple case study research strategy necessitates deciding the number of cases to be examined (Miles & Huberman, 1994; Yin, 2003). There is no consent in the literature on an optimum number of cases that are considered sufficient for conducting rigorous research. It cannot be ignored that this research strategy requires considerable effort and time. Thus, it is not recommended for research projects constrained by limited time and resources or involving only one researcher (Perry, 1998; Yin, 2003; Baxter and Jack, 2008). However, the chosen number of cases should allow for a full in-depth understanding of the phenomenon and its social context (Creswell, 1998). Eisenhardt (1989) and Rowley (2002) argued that

conducting four to ten case studies is adequate to ensure robustness and consistency and generate reliable findings. Considering these arguments, it was decided that the number of cases used for this thesis was to be six. However, an additional case to pilot the research instrument was conducted. The findings of the first case were confirmed by the remaining cases. This indicates the level of data saturation had been attained.

6.4.4 Case study selection

The present study has undertaken a theoretical sampling to the selection of multiple case studies. This research design adds increased reliability to the findings (Miles & Huberman, 1994), thus, making the overall study outcome more vigorous and compelling (Herriot & Firestone,1983). This is in line with Eisenhardt's (1989, p.536) recommendation of a well-defined focus of the researcher, which reflects the research questions and purpose, before approaching its sample, is necessary in order "*to specify the kind of organisation to be approaches, and, once there, the kind of data to be gathered."* In the case of this study, the researcher selected six knowledge-intensive SMEs based in Arabic Middle Eastern countries. To date, there has been no research that investigates open innovation capabilities in the Middle East (see Chapter Two). The selection of the Middle East region stems from the desire to explore the open innovation phenomenon in a novel context. Most of the previous open innovation empirical studies have been conducted in the context of developed or western countries (Hossain & Kauranen, 2016; Torchia & Calabrò, 2019; Usman et al., 2018; Gebremichael, Hou, & Sun, 2016). Therefore, adopting a multiple case study design would deepen the understanding of open innovation in this specific context (see section 2.2). Consequently, extending the literature on dynamic capabilities and open innovation in developing countries. This follows the scholars' conceptualisation of the critical role of the social context as a constituent factor in the open innovation phenomenon (Enkel et al., 2009; Tödtling, Prud'homme van Reine & Dörhöfer; 2011; Naqshbandi, 2018).

Knowledge-intensive SMEs were selected as the industrial context for this thesis due to open innovation importance for the success of these firms (Enkel et al., 2009; Sekliuckiene, Sedziniauskiene, & Viburys, 2016; Vrontis, Thrassou, Santoro, & Papa, 2017). Case study selection considered the variety of those selected cases in terms of business models and location (see Appendix G). However, few requirements were undertaken to identify potential

case study enterprises to be selected. The definitions used earlier in sections 2.2 and 2.4 to refer to knowledge-intensive firms and SMEs were emphasised to qualify the selection of these cases. In line with Stake (1995), one of the most essential criteria for cases selection was how these cases could generate the most knowledge and to what extent they could achieve this purpose. Therefore, the aim of selecting a particular case is learning maximisation of the examined phenomenon.

In addition, the difficulties the researcher faced in gaining access to SMEs have also affected this decision. Stake (1995) posits that organisations' access ease is a factor to be considered for such a decision. According to Walsham (2006), gaining access to organisations is not easy and might entail luck. A list of candidate firms has been identified based on their industry classification code to achieve the first end. Then, using the researcher's network and connections, several SMEs were contacted to conduct this study. After their initial confirmation of participation, a checklist survey of criteria was developed and emailed to these cases. This developed survey was only used to identify potential SMEs' adoption to open innovation and which open innovation practices these cases were adopting. This criteria survey is presented in Appendix C. This survey included a list of open innovation practices adopted from Chesbrough and Brunswicker's (2013; 2014)' studies. This survey has not been included in the analysis and was only used as a case selection criterion. In this line, the results of the pilot case exercised in this study subsequently confirmed this assumption. Appendix B demonstrate cases contacting stages

6.5 Research Design

Multiple knowledge-intensive SMEs case studies from the Arab countries in the Middle East region were selected for this study**.** This sector is under customer pressure and faces upheaval, environmental changes and intensive global competition (Kropsu-Vehkapera, Haapasalo, Harkonen, & Silvola, 2009). SMEs selected should represent critical cases to permit logical generalisation (Miles & Huberman, 1994). Such a prerequisite would allow capturing the dynamic nature of open innovation and the evolution of its stages. This section will provide an overview of the adopted research design, data collection methods, data analysis methods

6.5.1 Overall strategy

In order to build credibility for the reader, this section provides an overview of how this empirical research is directed. Figure 6.2 is a representation of the overall research design. Firstly, a literature review was conducted to define the present study's scope and questions. Moreover, this part of the study assists in constructing the interview questions. The next part of this study is to conduct multiple case studies on selected knowledge-intensive SMEs. Since this thesis adopted an interpretivism stance, in-depth interaction with SMEs' managers was deemed essential. Thus, knowledge created about open innovation competencies and capabilities resulted from the researcher's interaction with participants in these cases. The objectives of considering multiple case studies were to elaborate on open innovation competencies and observe open innovation dynamic capacities.

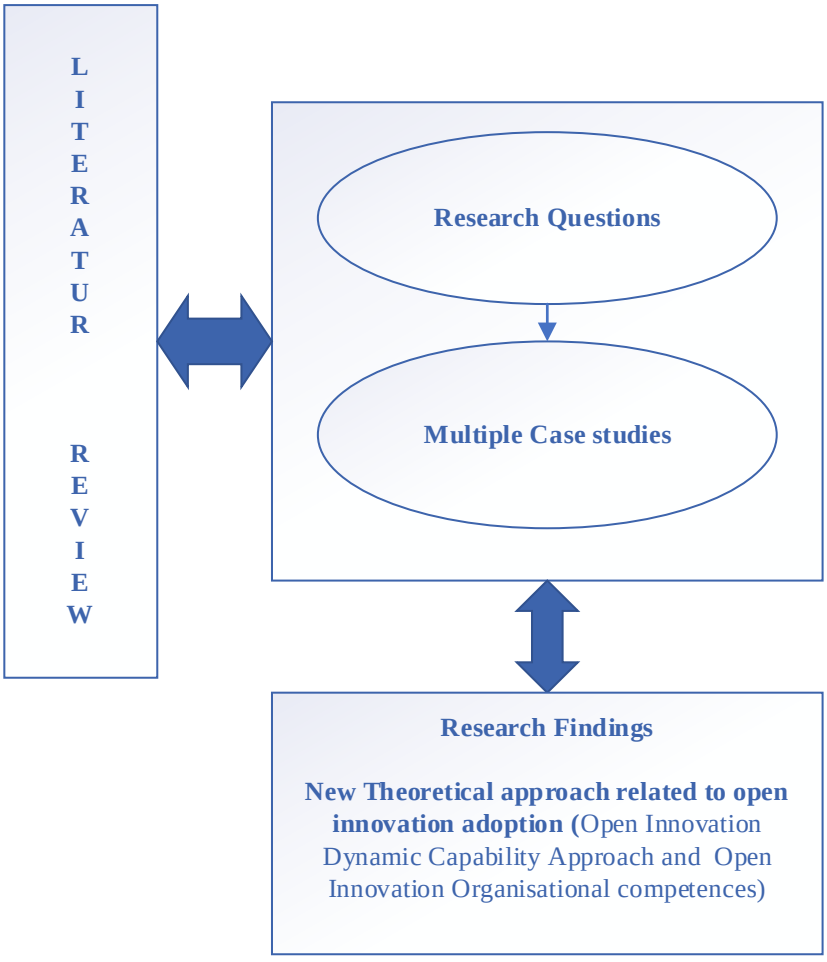

Figure 6.2: Research design

Unit of analysis

One of the main points the research design should address and identify is the unit of analysis (Yin, 2014). This encompasses what the case and research should focus on (Baxter & Jack, 2008; Patton, 2002). Identifying the unit of analysis is essential as it determines the type of data to be collected and collection methods. While the use of the concept *'unit of analysis'* is predominantly coming under the umbrella of studies with a positive nature, which is not in line with the adopted anthological and epistemological stance of the present study; the unit of analysis adopted here is non-positivist in nature. To illustrate further, the focus of this thesis is on open innovation competencies and capabilities. Therefore, the unit of analysis used for this case study is the cognition of managers and open innovation-related actors. This is consistent with the interpretive nature of this thesis and its main objective. Therefore, the researcher considered each of the six knowledge-intensive SMEs' managers and open innovation actors' cognitions as an individual unit of analysis for the multiple case study.

The cognitions of the participants of the six SMEs, including directors, innovation managers, IT managers, and product and development managers, were selected as the units of analysis. This stems from the belief that these managers best understand and reflect the competencies required to adopt open innovation successfully. This belief stands on the idea that these managers are responsible for strategic planning, are in a position to make decisions, or/and are involved in the open innovation processes. Thus, they can be expected to possess comprehensive knowledge of their firms' aspects and socio-spatial surroundings. Additionally, the topic of open innovation is a new research topic (Chesbrough, 2003) that emerged from the area of innovation. Thus, as innovation is a strategic management concern, the selection of these managers' and decision makers' cognitions as a unit of analysis is in line with the open innovation aspects of this study.

Sampling of participants

A sampling of participants becomes imperative when several individuals are in a study's population. Still, the researcher cannot survey them all due to their limited resources and time (Saunders et al., 2009). The present thesis considers a non-probability sampling procedure. As its name implies, this sampling procedure discharges the probability principle and instead depends on the researcher's operationalisation of the purpose of the study as a guide for

participants sampling (Bryman & Bell, 2007; Patton, 2002). Patton (2002) notes that as the researcher operationalises the purpose of the study in terms of critical criteria, participants selection should consider the availability of those deemed essential characteristics and criteria to meet the purpose of the study. In qualitative studies that aim to generate in-depth insights into the investigated social phenomenon rather than statistical generalising of the result, a purposive non-probability sampling practice is the most rewarding sampling procedure (Miles & Huberman, 1994).

This thesis adopted a judgemental sampling as a first-stage sampling design. At the outset of the primary data collection stage, the researcher identified senior managers, namely SMEs owners/managers and innovation managers, as the main targeted participants. Such a decision was made based on the researcher's belief in their close involvement in all strategic planning aspects and innovation practices of their SMEs. Thus, they were assumed to possess a comprehensive and detailed knowledge of the different themes of inquiries investigated. Then, the sampling design evolved to use the snowball technique. Thus, in the second stage of sampling, participants were asked to nominate a member of their enterprise who they believed was suitable for the study, could answer most of the interview questions, and would add a valuable contribution.

Information related to participants' role in the SMEs was explained in Appendix G. Data were gained from different perspectives; however, the focus was mostly on those decision-makers. This includes SMEs managers/owners; hence they were expected to have detailed knowledge about the firm, and the factors examined. Innovation managers and product development directors were questioned as they are mainly involved in open innovation. In addition, other relevant managers who felt they would add to the data's content and were recommended by innovation managers were interviewed, e.g., Human Resource managers and IT managers. According to Eisenhardt (1989) and Yin (2003), this would foster divergent perspectives and strengthen the research grounding.

Additionally, managers were also asked to recommend another relevant participant from their firm who is familiar with the subject and in relation to this area to be interviewed. This snowballing adopted technique was expected to speed up the contracting phase and provide more data insight. Twenty interviews in total were reached and interviewed in all cases

selected, while the aim here of choosing those participants was to capture the interviewees' perceptions and understanding of the open innovation initiative.

6.5.2 Data Collection Method

As discussed in section 6.3.2, this study adopts an interpretivism philosophical perspective. As such, the research methods should reflect this study's stance and nature. The data collection method was based on a multi-qualitative approach. Firstly, semi-structured interviews. This data collection method functions as the primary source for data collection since it is one of the most used methods in interpretive studies that permit accessing the informant's interpretation (Cresswell, 2009; Walsham, 2006). Secondly, the primary data collection method was supported by document analysis, including SME's website and social media content. According to Eisenhardt (1989), using triangulation of evidence strengthens theory building. Throughout the process of data collection, penetrating questions might be asked to obtain a more detailed understanding of the research phenomenon and the organisation's behaviour and patterns. The following sections provide further detail on the chosen data collection methods and justify their adoption.

Semi-structured interviews

This research endeavour is complex in nature and requires a flexible format of the data collection method. Therefore, a semi-structured interview method was conducted (Bryman, 2016). This data collection method encompasses a list of predefined questions; however, it is flexible enough to allow respondents to gain the freedom to respond and will enable the researcher to accommodate to informants' various views (Bryman & Bell, 2007; Rubin & Rubin, 2011). Moreover, it allows the interviewer to modify the interview questions, change their order, or even add further ones in response to a participant's response accordingly as each interview unfolds (Kallio, Pietilä, Johnson, & Kangasniemi, 2016). As new topics emerge within one interview, this structure of interviews permits capturing new topics and using them in the following interviews (Kallio et al., 2016). A further rationale for using a semi-structured format is that it enables the researcher to maintain control over the interview

process to remain oriented toward a specific predetermined subject, maximising learning and insights generated (Patton, 2002; Saunders et al., 2009).

Alternatively, to cover all aspects and gain the required information, certain sets of questions must be asked given the timeframe. These challenges the tenets of unstructured interviews. Therefore, this interview technique was not selected. Structured interview techniques were eliminated too for being associated with quantified data (Polit & Beck, 2006). Consequently, it does not suit the exploratory nature of this study. Exploratory research emphasises asking questions asked that delve into issues deeply, allowing the exploration of new themes and ideas (Gray, 2004). The following section is an overview of the interview protocol followed at each interview.

Interview guide and protocol

Interview questions and themes were developed drawing on a literature review, mainly, the CSFs (see Chapter Four). According to Kelly, Bourgeault and Dingwall (2010), previous knowledge and adequate understanding of the research topic areas are required to develop interview questions appropriately. Carrying out an extensive literature review while emphasising the research purpose creates a concrete conceptual basis for interviews (Åstedt-Kurki, & Heikkinen, 1994; Barriball, 1994; Krauss, 2009). This confirms Kvale's (1996) emphasis on the necessity of semi-structured interview questions to be thematically responsive to the subject of the research inquiry. Additionally, a few other questions emerged from the observation of the host SME. Other questions were developed in responding to interviewees' answers. The researcher ensured that these emerging questions and those asked at the beginning -interview opening questions- were all related thematically to research inquiry, namely, open innovation CSFs, competencies and capabilities. Interview themes are presented below:

1. Open innovation perception.
2. The strategic aspects of open innovation.
    - Coherence in direction
    - Leadership
    - Human resource requirements
    - Investment in R&D
    - The strategic view of technology

- Measurement of Open Innovation
- Open innovation governance
- Strong intellectual property

3. The philosophical aspect of open innovation.

    - Dyad Knowledge and interest
    - Trust and commitment
    - Cultural symmetry
    - learning intent
    - Mutual Benefits
    - Uniqueness

4. The Technical aspects of open innovation.

    - IT investment
    - IT integration and flexibility
    - Training.

Interview questions were worded and ordered in a way that stimulates thoughts sharing. This includes introducing questions to flow in a meaningful sequence. Moreover, the researcher avoided using academic concepts and language and difficult to understand questions, e.g. the concept of open innovation, and replaced it with more simplified language. This was tested and amended according to the pilot study results (see section 6.6).

Following Walsham's (2006) approach, each interview started with a brief introduction of the purpose of the study. The interview's introduction also confirmed the confidentiality of the process alongside the consent form sent to each case and informants before the interview, particularly when their participation was confirmed (see Appendix E). The interview process also started by asking noncritical questions to establish a rapport relationship with the interviewees and ensure they were relaxed. Using common courtesies, providing a brief introduction about the researcher, the research purpose and thanking the informant for accepting the invitation aimed to break the ice that might occur at the beginning of the interview. According to Walshman (2006), such strategies affect the quality of the process and the level of informant honesty.

Interviews were carried out online using the video conferencing platform Zoom. While the researcher is mindful of the importance of conducting face-to-face interviews as it allows for

observing the non-verbal responses of informants (Denzin & Lincoln, 1994; Sarantakos, 2013), the contemporary situation of Covid-19 hindered the use of this medium of communication. Interviews were conducted between the period of November 2020 to April 2021. The difficulty of travel arrangements restricted the researcher's ability to access chosen SMEs' locations. Preventing face-to-face interviews was also deemed for the sake of participants and the researcher's safety. This is considered one of the limitations of the study. However, using a Zoom video meeting assisted in recording informants' emotions and non-verbal language.

All participants went through the same interview instrument and were asked questions under the same themes (see Appendix D). This aligns with Howard and Sharp's (1983) recommendation of utilising a similar interview instrument with all participants to allow comparison. During each interview, the researcher showed interest and listened actively and respectfully to all informants' responses. The researcher asked questions of 'why' and 'how' if required. Interviewees were rarely interrupted and were encouraged to ask questions, inquire about explanations and raise any concerns related to the interview question asked during the process. Bryman and Bell (2007) emphasise on status of the interviewer and how the perception of the interviewer by the participant can influence the data. Interviews were conducted in English; however, participants had the freedom to speak in Arabic if they preferred to during the interview. Leaving the choice open for participants to speak the language they preferred was assumed to make participants feel more comfortable and overcome the language barrier that might hinder gaining elicit in-depth insights. At the end of each interview, informants were asked if they had any further issues and were encouraged to contact the researcher should they have anything to ask, discuss or add. Each interview lasted between 90 to 120 minutes. This section discussed the interview guide and protocol. The following section discusses post-interview protocol.

Post-interview protocol

Each participant was sent a thank you email post to the interview. Participants were asked again to share any comments or add to any previously discussed issue during the interview. The researcher completed a contact sheet. Main themes and contents of the previously undertaken interview were reviewed to check if any themes related inquiries were missed or

requires further investigation. This was noted down to be asked as a follow-up. Then, the interview was transcribed. Thereafter, further interviews were arranged.

Company documentation process

This chosen data collection method is considered supplementary to interviews (Walsham, 2006) and is a widespread practice in case study research (Stake, 1995; Yin, 2003). This secondary source of data provides a wide range of data. Thus, it is considered a cost-efficient technique since it can be accessed easily (Boslaugh, 2007). Any publication on the sectorial context of the organisations is included in SME documents analysis. It also includes internal documents or Web-based data perceived as valuable (Walsham, 2006). Bowen (2009) advocates using this method to ensure rigorousness generation of findings. It helps corroborate other methods' evidence or unfold variance across a set of data. In case study research, documents are mainly accommodated with interviews (Yin, 2003). Bowen (2009) argues that documents are epistemologically relevant for studies in which context appears to be influencing participants; thus, it is an interest to the researcher. Therefore, documents as a data collection method reflect the organisation like those participants in qualitative interviews (Burghausen, 2013). This means that this method is epistemologically and methodologically relevant and is a sound source of data reflecting the organisation's reality aspects (Bryman, 2016). In the sense of this thesis, document analysis is a relevant data collection method.

However, as a secondary data research method, the researcher should be vigilant when adopting it; this in-term of collecting, analysing and interpreting them (Bryman, 2016; Yin, 2003). This research approach regards the firms' website content, marketing brochures, and social media as secondary sources of data used only to corroborate primary data sources. Such a practice is accepted in social science studies (Charmaz, 2006) and is also considered a source for data triangulation (Stake, 1995; Perry, 1998). Thus, this is expected to add more validity (Yin, 2014) and is likely to be *"authentic and meaningful*" (Bryman, 2016, p.547). The use of firms' website content and social media will be used as a secondary source for data within this thesis.

6.6 Pilot study

A pilot study was exercised in this thesis as an exercise to test the research instrument and the interview schedule prior to conducting the case studies. However, prior to the pilot study, the researcher carried out comprehensive desk research to be able to locate knowledge-intensive SMEs in the Middle East. One knowledge-intensive SME was found relevant and initially contacted, relying on the researcher's network. One of the main issues that appeared in the pilot data collection was the difficulty of data collection and gaining access to SMEs. The Palestine-based SME was then contacted via email, introducing the researcher and briefing the research purpose. After the initial confirmation of participation, a few introductory questions were emailed to the interviewees prior to the actual interview to assure their adoption of open innovation practices. Once this was confirmed, consent forms were sent to the case and the participants. The interview involved all questions and themes of the subject inquiry to test the appropriateness of interview questions and the time needed. While Yin (2003) argued that pilot data collection lacks clarity and focus, it was useful for the primary data collection stage. The pilot's primary and secondary data collected were then used later to evaluate the six SMEs. More specifically, it resulted in the development of the checklist survey used to identify open innovation practices SMEs undertake.

Additionally, the challenges encountered by the researcher during the pilot data collection stage also resulted in a more organised data collection protocol. For example, the first challenge discussed in the section is regarding securing access to SMEs. Consequently, this realisation affected how the researcher used informal channels to secure initial access to these SMEs. The pilot data collection highlighted research questions that were felt to be ambiguous and needed to be re-worded, items that provided inadequate data were eliminated, and the format of the interview schedule was amended. Additionally, pilot interviews conducted helped the researcher to create the interview protocol.

6.7 Data Analysis process

This research followed several steps to empirically analyse data collected from the selected case studies to report the researcher's interpretations and strengthen the understanding and

explanation of a phenomenon and its context. Prior to this process, a brief discussion is provided on the data analysis method. According to Stake (1995), this phase in qualitative studies is deemed permissible to start at any moment; since the researcher is required to give meaning and produce understanding from first impressions, interactions, and final compilations. Similarly, Hartley (1994, p.220; 2004, p.329) claims that data collection and data analysis can start simultaneously *'in an iterative process'*. The author noted collecting and analysing the data would allow for theory development relying on empirical evidence. Neuman (1997, p.426) suggests data analysis is concerned with finding "*patterns in data"*. This occurs through categorising and examining the evidence (Yin, 2003). Once patterns are uncovered, it needs to be interpreted into meanings. Thus, moving from describing a specific social setting to determining the general meaning of interpretations (Neuman, 1997) to concluding and constructing theory (Patton & Appelbaum, 2003). The study collected data from multiple sources of evidence which broadened the range to capture many issues related to open innovation projects in each enterprise selected (see section 6.4.2). Using two types of triangulation addresses validity issues (Yin, 2003) and strengthens theory building (Eisenhardt, 1989). Attention was paid to capturing and registering feelings, emotions and other gestures that were not possible to be recorded throughout the interviews. In addition, impressions captured after each interview were noted down.

Transcribing interview

Data was transcribed initially using Zoom. However, in the case of this study, this kind of automated transcription programme was problematic as English is the second language for all participants. Thus, the programme could not recognise many spoken words. This affected the quality of the transcripts. Therefore, the researcher conducted data transcribing gain manually. Before embarking on transcription, the researcher repeatedly watched and listened carefully to each recorded interview. Then the researcher transcribed it while ensuring its accuracy and completion. Zoom software allows video recording. The researcher listened to these recordings and then uploaded them as MP3 to Nvivo. Nvivo allows playing recorded audio at different speeds. This feature helps to listen and transcribe simultaneously. The Mircosoft word software was used to transcribe interviews. These transcriptions were treated with the utmost care. They were repeatedly checked and corrected.

Data management

Both types of data derived from interviews and documentation were organised in a database. This is in line with Miles and Huberman (1994), who asserted the importance of data management and storage in qualitative studies. The data for this thesis was stored in softcopy formats. The video and audio recordings and transcripts were codified and indexed in relation to the SME in which it took place and individual participants. Similarly, online SMEs documents that were found relevant were downloaded and filed in soft folders. The interview notes and memos were treated similarly.

Nvivo software was used in coding and analysing data. Data collected were coded into themes related to open innovation competencies and capabilities (see *Content Analysis* section). With the large amount of data produced from each case, such software facilitates structuring and organising non-numerical data (Hilal & Alabri, 2013). In addition, it enables the process of surfing, browsing and linking data (Leech & Onwuegbuzie, 2011). However, Nvivo has been criticised for being time-consuming when it comes to generating themes and data linkages (Richards, 1999).

Content Analysis

The present study adopts a 'Content Analysis' approach for data analysis. This qualitative approach does not impose having a predefined conceived set of themes; instead, it allows themes to emerge naturally, which is the essence of interpretive studies (Kohlbacher, 2006). The goal of qualitative content analysis is to classify enormous amounts of text into an efficient number of categories that represent related meanings. It goes beyond simply counting words (Hsieh & Shannon, 2005; Weber, 1990). The content analysis approach is concerned with transforming data collected into '*a standardised form'* (Babbie, 2001, p.309). The main essence of this process is text coding (Ryan & Bernard, 2003). The researcher's role is to construct meanings from data collected and build categories from the most substantive sentences, which have proven to be essential steps in data analysis (Hartley, 2004). Similarly, Titsccher, Teddlie and Teddlie (1998, p. 58) defined categories as *"operational definitions of variables"* and noted the importance of coding every unit of analysis to one or more of the categories. This analysis approach follows a sequential model of material analysis (Mayring, 2000).

This thesis follows a ‘conventional content’ analysis—this approach of content analysis is adopted for studies with a research strategy that aims to describe a phenomenon or build a theory. When there is a lack of current theory or study literature on a subject, this design is frequently acceptable. Instead of utilising predetermined categories, researchers allow categories and names for categories to emerge from the data (Kondracki & Wellman, 2002). Researchers immerse themselves in the data to allow fresh ideas to emerge (Kondracki & Wellman, 2002). Open-ended questions will be utilised if data is acquired largely through interviews. Following this approach, the researcher of this thesis started data analysis by repeatedly reading all data emergers from primary and secondary sources. This step builds immersion and creates an initial sense of holistic understanding (Tesch, 1990). Then, the researcher would read word by word and highlight the specific phrases that appear to encapsulate key concepts to extract codes (Miles & Huberman, 1994). Following that, the researcher initially analyses and marks initial thoughts and impressions. This would lead eventually to the emergence and development of labels for codes develop that reflect more than one key idea. As this process continues, initial coding schemes will emerge. Emerging codes were then categorised into groups based on how closely they connect to one another. The codes were organised and grouped into meaningful groups using these emergent categories (Coffey & Atkinson, 1996; Patton, 2002). The following step was to create definitions for each category and code. Exemplars for each code and category were identified from the data in preparation for reporting the findings. Following this approach, the study's discussion section addresses its findings relevant to extant literature. Finally, an overview of how this study's findings contribute to knowledge in the field of interest and recommendations for practice and policy and future research were included in the study’s conclusions section. Figure 6.3 illustrates these analytical steps.

Cross case analysis

The previous subsection briefed the within-case analysis conducted using content analysis. This subsection discusses how findings derived from the within-case analysis of the six cases were then compared to establish overarching patterns. For a multiple-case study strategy, this process is deemed a vital requirement. It builds robust conclusions, overcomes biases emerging from the researcher’s initial impressions, and tendency to rely on limited datasets (Eisenhardt, 1989). The cross-case comparison approach is a widely recognised cross-case

analysis technique (Eisenhardt, 1989; Miles & Huberman, 1994; Yin, 2003). This thesis follows Eisenhardt's (1989) recommendation of conducting two levels of comparisons, including category by category and theory by theory levels comparisons. Thus, the researcher compared the different cases' theoretical findings and categories. This would help in highlighting cross-case patterns and building a higher-level theoretical understanding.

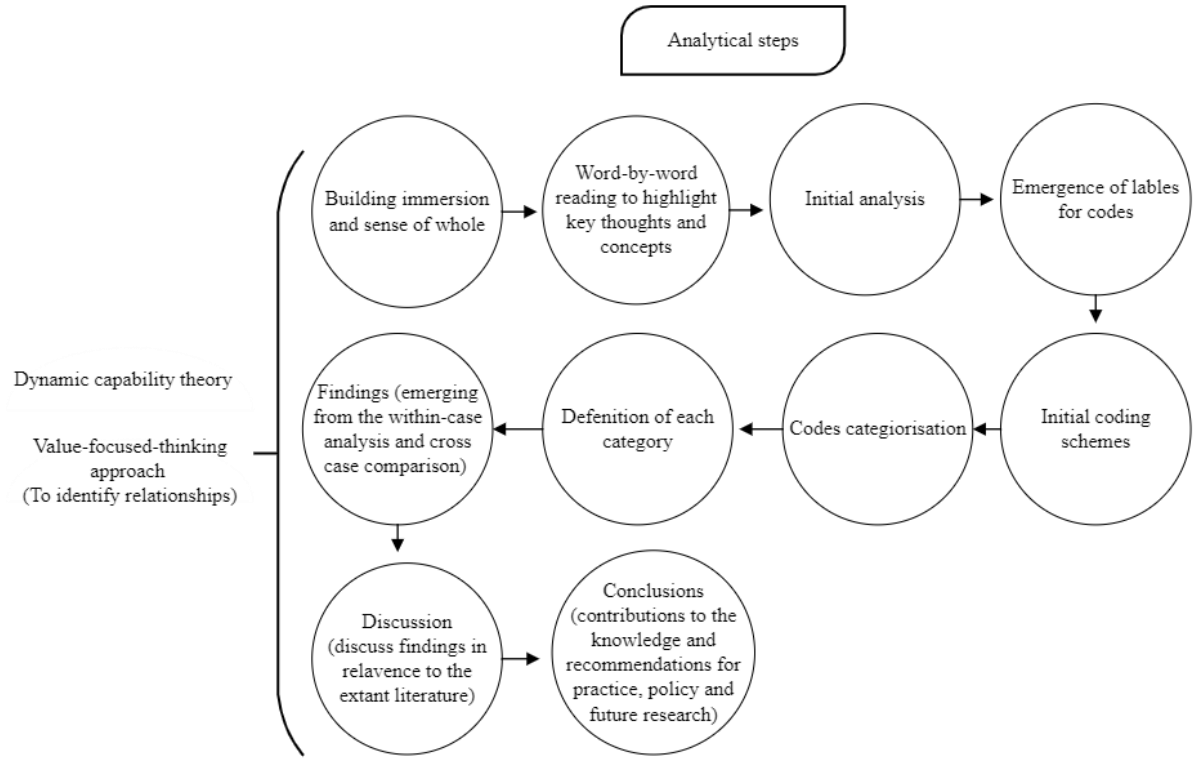

Figure 6.3: Content analysis

The dynamic capability perspective has also been used to help analyse the adoption of open innovation (see section 5.5). In addition, the 'Value-Focused Thinking' approach was considered a relevant theory that helped gain insights while analysing data. It allowed for building linkages between open innovation competencies. A discussion on the 'Value Focused Thinking approach is presented below.

Value-Focused Thinking

As discussed earlier (see sections 3.4 and 5.7), one of the major inhibitors to open innovation's successful adoption is the lack of a methodological framework and a philosophical approach to its competencies. The dynamic capability perspective has been used to help analyse the adoption of open innovation (see section 5.5). In addition, the 'Vale-Focused Thinking' approach was considered a relevant theory that helps in gaining insights while analysing data as it allowed building linkages between open innovation competencies. A discussion on the 'Value Focused Thinking approach is presented in this section.

Keeney (1992) proposed that Value-Focused Thinking is an approach to making better decisions. This approach assists decision-makers in highlighting what they value before considering how to get it. Keeney referred to 'values' as what a decision-maker considers important within the decision-making context. To understand and articulate the relationships between open innovation-related competencies, a deep understanding of ends and means is the key. According to Keeney (1992), values need to be expressed explicitly to help those at stake perform their tasks; thus, individuals' understanding of values should reflect their enterprise's values. Capturing an individual's understanding and identification of conscious and subconscious values, this in turn, would build a profound understanding of real objectives. This study adopts the Value-Focused Thinking approach introduced by Keeney (1992) to answer the second research question related to analysing the linkages that exist between competencies. According to this approach, values are necessary to assess the real consequences of specific actions. It focuses on deeply understanding ends and creating strong linkages with means, thus, understanding how they interrelate (Keeney, 1994). Keeney (1992) highlights the relationship between ends and means, which reflects the relationships between open innovation competencies. This is identified by asking questions like, "Why is that important?", "How could you achieve this" and "What do you mean by that". The answer to such questions would reflect the linkages between competencies. This approach, while incepted in 1994, it is still a widely recognised approach used in multiple disciplines (Lipson-Smith, Churilov, Newton, Zeeman, & Bernhardt, 2019; Parekh, Jaffer, Bhanushali, & Shukla, 2021; Dalal, Carberry, & Archambault, 2021; Shukla, Mohanty, & Kumar, 2018; Small et al., 2017). This thesis's decision-making context was: *What are open innovation organisational competencies, and how do they interrelate?* Considering the value-focused

thinking approach, the decision-maker would consider defining what is important or value in open innovation implementation and how it supports other values (competencies). Appendix I provides an example of open innovation competencies relationship analysis using the WIIT of the value-focused thinking approach.

6.9 Ethical considerations

In line with Swansea University's policy of maintaining the highest ethical standards possible, this research adapts Diener and Crandall's (1978) recommendation regarding the conceptualisation of research ethics (See Appendix A). This section provides a discussion of the main issues that require the researcher's attention to prevent any ethical transgressions. Considering these measures assists in maintaining high ethical standards and meets the requirements of the Research Ethics Committee of Swansea University:

1) While outreaching SMEs, the research purpose was communicated and explained in detail to each case's management and every participant interviewed. This included a brief overview of the research purpose, and factors to be investigated were sent initially by email in the initial phase of contacting cases. Thereafter, a consent form was emailed once a case participation confirmation was approved. In some cases, the purpose of the study was explained orally before participation and confirmed if requested. All individual participants contacted were also emailed an overview of the research purpose and then orally at the beginning of each interview. A section of the consent form mainly discussed the purpose of this study (see Appendix E).

2) Knowledge-intensive SMEs management and individual participants were informed and notified of the need to record the interviews. This happened at the early stages in the contacting phase (see Appendix E) and was repeated and explained orally at the beginning of each interview as participants were asked expressly for their approvals. Justifications for reasons for the need for recording, how these recordings will be used only for transcription and analysis, and who will use such recordings were also explained.

3) Identities of SMEs and their individuals have not been revealed anywhere in the research related documents. Participants were aware of the confidentiality of their participation. A good practice of this was giving alias names to cases and participants. In addition to direct revealing, anonymity and confidentiality were ensured by avoiding any information that might indirectly reveal the participants' identities. For confidentiality matters, the six case studies were referred to as SME A, SME B, SME C, SME D, SME E, and SME F

4) The researcher adhered to and respected the access boundaries and the predetermined time limits.

The use of the consent forms and other ethical considerations prevented any ethical transgressions. Appendix E shows the consent form provided and Swansea University ethical approval.

6.10 Trustworthiness

This thesis follows Lincoln and Guba's (1989) assessment of research trustworthiness. It includes four main criteria: dependability, credibility, transferability, and confirmability. The following sections further discuss these criteria

6.10.1 Credibility

The notion existed of the unease of evaluating the credibility and reliability of qualitative studies having no single or absolute reality but multiple accounts of social reality as it relies on interpretations (Guba & Lincoln, 1998). Thus, precautions were taken to ensure that the researcher's interpretations do not collide and affect the richness of data. Credibility refers to the degree data will be accepted by peer reviewers (Lincoln & Guba, 1985). One technique that was utilised to ensure the credibility of this study and its methodological strategy was the use of multiple sources of evidence to ensure data triangulation and improved constructed validity (see section 6.4.2) (Eisenhardt, 1987; Yin, 2003). Additionally, within-interview triangulation was also conducted. Within-interview data triangulation includes data generated from predefined interview questions and data generated from queries not part of the interview guide.

Moreover, the use of interview transcripts, post-interview notes and protocol and video and voice recording were good practices that provided a chain of evidence (Hirschman, 1986) that 'safeguard' validity (McCracken, 1988; Liedtka, 1992). Other general documentation is used and explained at the different stages of the research. This is regarding the research instrument, case section criteria, participant selection criteria, themes and interview questions development process, and how the data analysis process was carried out. Such documentation established a cumulative flow story, providing clear evidence and justification of the research development steps.

In terms of credibility (Guba & Lincoln, 1998), within-case and cross-case analyses were undertaken (Miles & Huberman, 1994). The use of tables and illustration supported this to enable explanation building (Miles & Huberman, 1994). In addition, internal validity was also assessed by cross-checking findings to ensure coherence between researcher findings and theoretical ideas. External validity for the use of a multi-case study approach was ensured using replication logic (Lincoln & Guba, 1985). Literal replication is deployed to the observed similarity of data results (Eisenhardt, 1989; Yin, 2003). This is in parallel to providing evidence to support or contrast findings from extant literature, thus, highlighting the contribution of knowledge.

6.10.2 Dependability

Dependability, the parallel criterion of reliability in quantitative studies, refers to the stability of the data set overtime (Lincoln & Guba, 1985). Dependability is achieved through the establishment of a sense of auditing. The researcher kept accessible and complete records of the different phases of the present study, either in the main body text or in the appendices (Bryman & Bell, 2007; Guba & Lincoln, 1998), which was already discussed above. Tylor (2005) argued that the practice of keeping records of data collection protocols facilitates other researchers to replication if needed. It also illustrates how the findings were obtained (Merriam & Tisdell, 2015). Auditing was also reflected by the story established from the research introduction to the literature review and the methodological justification for the data conclusions. This provided a clear chain of evidence that helped justify each step adopted in this study. The researcher also followed proper procedures to make adequate research design decisions, namely snowballing sampling technique and measures to protect the

confidentiality of participant SMEs and their individuals (Bryman, 2016). The development of the case study protocol and database and the consistent data collection and analysis procedures ensured the rigorousness of research methods (Merriam & Tisdell, 2015). Dependability was also ensured through the piloting practice of case study, the development of case study protocol and database, and the consistent data collection and analysis processes procedures. These adopted practices ensured the rigorousness of research methods (Lincoln & Guba, 1985). Furthermore, documentations of each data analysis process were kept (Appendix H).

6.10.3 Transferability

This trustworthiness criterion addresses generalisability across social settings (Lincoln & Guba, 1985). Researchers are advised to generate thick descriptions (Guba & Lincoln, 1989). This thesis detailed the rationale behind this research methodology and design and how it was conducted. The findings are also discussed and presented in detail and relate to the analysis methods. Thick description was also provided regarding the methodological decisions, data collection methods and procedures for analysis. This aims to facilitate future replications. Additionally, the adopted research strategy, multiple-case strategy, and the use of cross-comparisons also contribute to the generalisability of this study's findings (Creswell, 2007). The use of six case studies and building this cross-case comparison allowed for reaching robust and overarching patterns of findings. Thus, the findings of this thesis are considered analytically generalisable (Eisenhardt, 1989).

6.10.4 Confirmability

This criterion aims to assure that findings are not fabricated by the researcher (Guba & Lincoln, 1989). Thus, Guba and Lincoln (1989) recommend that the research should act in good faith to ensure the level of transparency. Thus, the researcher practised few precautions to ensure having control over personal values and theoretical inclinations not to affect research conduct or the analysis and interpretation of its findings (Lincon & Guba, 1985). This includes repeatedly assessing the completion and accuracy of each interview transcription. Additionally, the researcher proceeded with a word-to-word analysis procedure for each interview data. Moreover, the researcher followed a category by category and theory

by theory cross-case comparison to avoid bias resulting from the tendency to follow limited datasets or the researcher's initial impressions, thus, improving the findings' analytical generalisability (Eisenhardt, 1989).

6.12 Summary

This chapter has discussed and justified the research design this thesis employs to answer its research questions. The chapter began by presenting an overview of the different philosophical perspectives and then discussed the most appropriate one that fits within this study to answer the research questions. This research employs multiple-case study as a research strategy that adopts an interpretive philosophical stance. Data collection relies primarily on the use of semi-structured interviews with key decision-makers in knowledge-intensive SMEs. The company's documents process was chosen as a data collection method, which was considered supplementary to interviews. Additionally, it adopts two theoretical perspectives to analyse collected data: the dynamic capability theory and the value-focused thinking approach. The chapter discusses the quality of research design and measures employed to meet these criteria to ensure the validity and reliability of findings. Finally, this chapter addresses ethical considerations undertaken relevant to social studies. Following an exploration into the research method and methodology for this research, Chapter Seven presents the results arising from both phases of data collection.

Chapter Seven: Analysis and Findings

7.1 Introduction

A brief discussion has been made on the analytical process this research has followed to analyse research data, namely the 'content analysis' approach for within-case analysis and cross-case comparison to cross-case analysis. A detailed justification of the researcher's methodological choices is introduced in the previous chapter. Such decisions were made to answer the research questions.

The present chapter provides a description and a brief discussion of this thesis analysis and results. It presents how findings were triangulated using primary data (interviews) and secondary data (SME's websites and social media platforms) and discusses them within their context. This would help provide a complete account of the management cognitions of these SMEs' main competencies and capabilities for open innovation implementation. The results of single cases analysis are further cross-compared to provide additional refinements to develop findings sets that allow for analytical generalisation. Table 7.1 provides an overview of these competencies.

Table 7.1: Open innovation themes

Competency 1	SME's ability to strategically align and match open innovation with the overall strategy
Competency 2	SME's ability to develop open innovation supporting culture.
Competency 3	SME's ability to improve inter-departmental connectedness.
Competency 4	SME's ability to perceive the needs and expectations of customers and understand market opportunities.
Competency 5	SME's ability to to develop products and services that meet customer expectations and reflect external opportunities.
Competency 6	SME's ability to get top management support.
Competency 7	SME's ability to develop techniques and procedures to govern open innovation
Competency 8	SME's ability to build and manage adequate IT infrastructure to support innovation
Competency 9	SME's ability to establish cross-boundary collaborations outside the business

The following principles guided the identification of these competencies and capabilities. First, this study emphasised many perspectives on open innovation (see section 3.5). Second, each perspective was linked to a set of critical success factors (see sections 4.2, 4.3 and 4.4). Third, the integration of the critical success factors then was linked to a set of organisational competencies. Data emerging from the six case studies were used to identify these organisational competencies. Forth, these organisational competencies were linked to one another in order to develop a framework that orchestrates their relationships. The data derived from the six case studies were analysed using the content analysis approach. Thus, those processes that explicitly or implicitly emerged from the cases were categorised into different competencies. Nine main organisational competencies were identified. Fifth, in order to strategically manage the implementation of these competencies, the dynamic capability perspective is applied (see section 5.5). Finally, these meta-capabilities are dynamic in nature and can be enhanced through time. Thus, the findings chapter entails two main parts; firstly, it discusses findings related to open innovation-related competencies. Secondly, it discusses findings within the lens of open innovation dynamic capability. Figure 7.1 illustrates this thesis's methodology adopted to identify these competencies and capabilities.

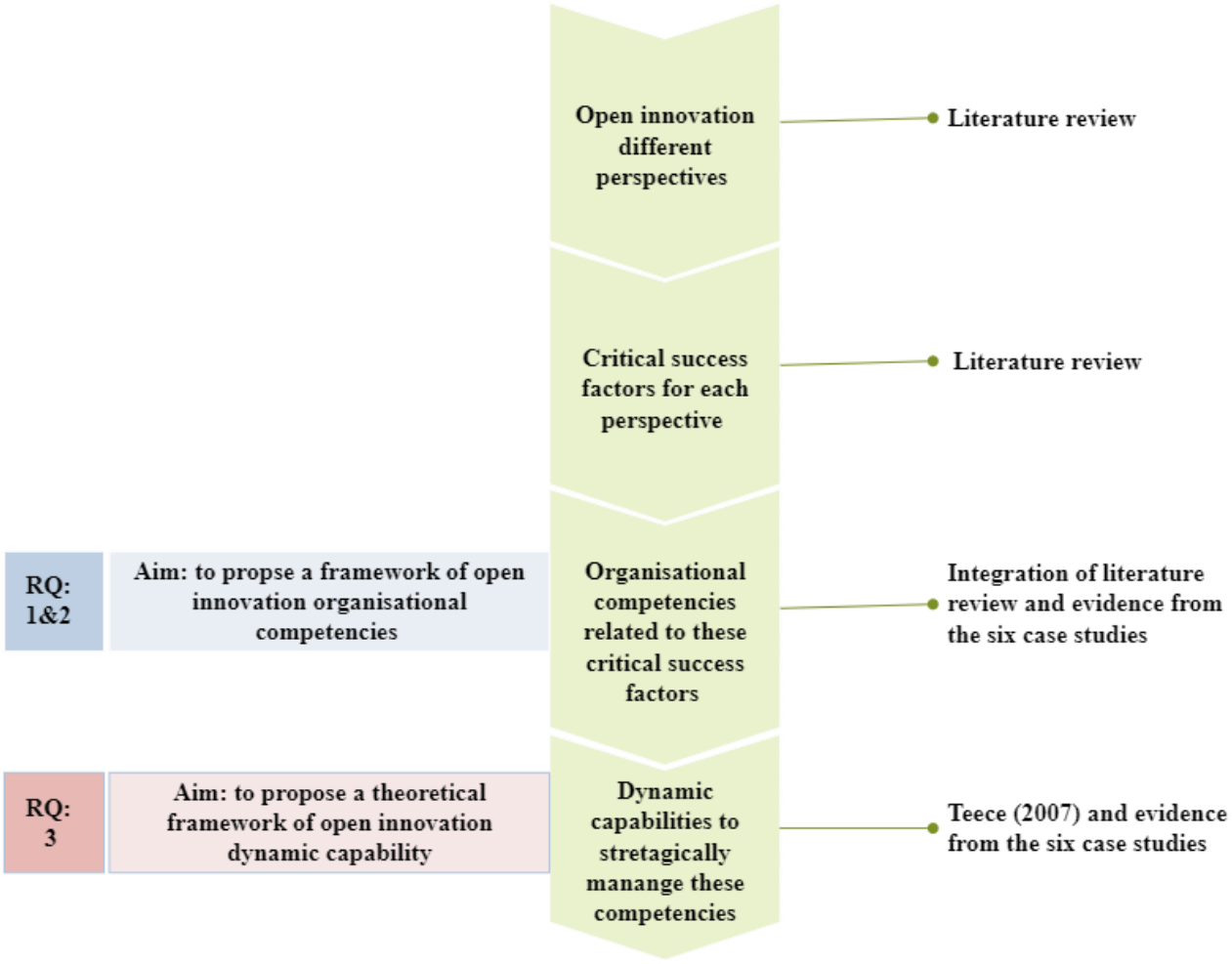

Figure 7.1: Illustration of the identification process of open innovation organisational competencies and capabilities.

An overview of each case is featured in sections 7.2.1, 7.3.1, 7.4.1, 7.5.1, 7.6.1 and 7.7.1. Sections 7.2.2, 7.3.2, 7.4.2, 7.5.2, 7.6.2 and 7.2 discuss the within-case analysis. The findings concerning the nine competencies are discussed in each case. A brief summary table is provided at the end of each case analysis. Then the chapter proceeds to provide a cross-comparison of these identified organisational competencies (section 7.8). Section 7.10 provides findings related to open innovation dynamic capabilities. Additionally, Table 7.2 demonstrates cases and participants' demographics.

Table 7.2: Cases and participants demographics

Case	Country	Industry	Number of employees	Number of interviews	Demographics of participants	
					Manager	Position
SME A	UAE	Online video marketplace	100-150	4	Manager A	VP of business development
					Manager B	COO
					Manager C	Technology Director
					Manager D	CEO
SME B	Egypt	Artificial intelligent computer vision provider	25-50	4	Manager A	Founder and CEO
					Manager B	Managing director and COO
					Manager C	VP, Strategy and Business development
					Manager D	VP, engineering and products
SME C	Jordan	Online education platform	25-50	3	Manager A	Managing Partner and CEO
					Manager B	Product director
					Manager C	HR manager
SME D	Jordan	Business outsourcing provider	200-250	3	Manager A	CEO
					Manager B	Innovation manager
					Manager C	
SME E	Palestine	Telecommunication	150-200	3	Manager A	CEO
					Manager B	Head of innovation
					Manager C	Product development
SME F	Saudi Arabia	Business innovation and marketing agency	25-50	3	Manager A	CEO
					Manager B	Product development manager
					Manager C	Customer relationship manager

7.2 Case 1: SME A

7.2.1 An overview of SME A

SME A was established in 2016 by the CEO and COO. It is an online video marketplace that provides e-learning networks and professional people development. This online video marketplace serves the Middle East and Africa region to inspire and empower people to develop professional and personal skills. Additionally, it aims to provide a learning-based experience using the knowledge and expertise of the world's best instructors and mentors. This includes offering online video courses, motivational and informative talks, books, and curating top reviewed training sessions. These services are provided in collaboration with world-class instructors, distinguished mentors, and expert-created content and are usually supported by a guided curriculum. Since it was launched in 2016, SME A has been able to attract more than 7,000,000 users around 45 countries overall the world with 10,000+ videos, 270+ mentors, more than 2 million successful learning experiences, achieving the highest course completion rate in the online video learning industry, and 80+ enterprise partnerships: leading the video learning industry in the Arab region. SME A currently employs approximately 100 employees. The following section provides a within-case analysis of the first case study: SME A.

7.2.2 Within case analysis: open innovation-related competencies revealed in the findings- SME A

The analysis of SME A yielded nine coding labels, which capture the essence of nine distinct critical patterns of behaviour in the results. This section below discusses and presents these patterns of results using interview data, the SME's website and its social media contents, and a brief description of the SME. This discussion is divided into two parts: the first part focuses on open innovation-related competencies, which mainly discusses nine findings referred to as competencies. The second part presents a summarisation of the overall findings for this case.

***Open innovation*:** SME A has successfully been implementing open innovation initiatives.

Competency 1: SME A strategically aligned open innovation to its overall strategy. Hence, SME A views open innovation as a core pillar to support the enterprise's strategic objectives. The objectives of each open innovation initiative were well-defined and communicated to all employees. Additionally, it has been observed that SME A seeks to align employees' objectives to open innovation initiatives. For SME A, open innovation is deemed an integral part that needs to be continuously considered and appears in the form of systematic processes that influence how the SME operates. Appendix K section1 provides further detailed evidence related to the practice of this competency in SME A.

> *The weight of the strategic innovation partnership as if it is something that will be supporting our strategic objectives and goals*. (Manager A)

***Competency 2*:** SME A is formed on its core values of innovation, free flow of information, employee learning, customer satisfaction, and social responsibility. An incentive system is adopted in the enterprise to encourage new ideas and knowledge sharing. While the SME has adopted open innovation since it was started, it was observed that SME A had faced minimal cultural resistance or what is known as 'the -not-invented-here syndrome'. Additionally, it has been observed that preferences were made to select open innovation projects that would demonstrate improvements to embrace the importance of open innovation to their employees. Section 2 of Appendix K provides further detailed evidence related to the practice of this competency in SME A.

> *The way that we believe in here is to make this process part of the company's culture. So again, it is not part of a cult; it is part of the culture. By that, we really need to be focused on again, it's my humble definition, on conversation, and I believe this is the real sustainability element in this process.* (Manager B)

Competency 3: It was observed that all teams in SME A were cooperating and communicating effectively to achieve their operational and strategic goals. The interaction between teams involved in product development is well structured and highlights regular communication. Moreover, SME A emphasises that different teams work cooperatively under the same umbrella and understand responsibilities, shared vision, and goals. While the

marketing team is responsible for analysing customer behaviour and market trend, the technical teams support their work by understanding the type of data the team is looking for and collecting these required data. Thus, this collaboration between the marketing team and the technical team is essential. Additionally, the technical team and the product team jointly decide how and type such data to be collected. Such collaboration would assist in acquiring the most relevant data and providing the best analysis required Section 3 of Appendix K provides further detailed evidence related to the practice of this competency in SME A.

> *Business requirements and the business details related to the products and project are normally connected through the products team. The products team and the technical products team are well aligned as they have regular meetings to make sure that the different ones are well integrated and aligned.* (Manager C)

Competency 4: SME A constantly conducts processes to search and analyse the market; this includes processes to understand market trends and the needs and expectations of its customers. The SME provides multiple communication channels to help listen to their customers. SME A seeks to proactively listen to their customer's voices as it is a critical source to shaping their strategy. They additionally consider customer feedback and complaints through their app review. Thus, SME A holds this organisational value of customer satisfaction to build its strategy. Section 4 of Appendix K provides further detailed evidence related to the practice of this competency in SME A.

> *We go through old analytics and customer data, we are very data-driven, and we built inside our platform many data collectors to make sure that we understand what we are building and even the user journey; where they click, where does it stop clicking, where they start getting into all these normal stuff. We also look at the horizons of how this industry can go where they can be used.* (Manager B)

> *Understanding customers' needs is embedded in our strategy and culture* (Manager C)

Competency 5: SME A relies on internal and external sources of knowledge to create propositions. SME A seeks to introduce tailored products, services, and campaigns that match

and exceed customer expectations and market trends. It assesses, adopts, and adjusts external knowledge to fit with internal requirements to achieve this end. Section 5 of Appendix K provides further detailed evidence related to the practice of this competency in SME A.

> *We start to make sense of the business case in the first place, and then we dig deeper into the details on how to achieve it. Once we come to that, we assess ourselves. We might have the talent that is needed to look into this inquiry internally. So, we will go internal. We might have it, but we do not have the capacity. So once this is done, and we have a window of opportunity, we start looking outside, we use our knowledge and collaborations to turn this opportunity into a value.* (Manager B)

> *We are very careful that those who interact with our customers have enough knowledge in most aspects of our products and services. Usually, we introduce training and learning sessions for our new services.* (Manager B)

> *This is an indication to what to offer next and our campaigns for the user in order to improve usability. It's also an indicator for when you're introducing a new feature or a new promotion on our side; this also indicates the visibility perspective. The visibility/usability of the new ways that we already provided, if it is good enough or needs to be improved.* (Manager C)

***Competency 6*:** SME A leadership practices have demonstrated significant support to open innovation initiatives. SME A leadership sponsorship to open innovation initiatives was a critical factor that successfully implemented such concepts. Top management past experience related to open innovation helped them pave and build SME's culture towards such initiatives. Additionally, the top management team's understanding of this innovation model and its benefits enabled them to undertake actions and build processes to support open innovation. Their commitment was observed through allocating certain budgets to support investment in innovation and perceiving it as a core part of the business. Section 6 of Appendix K provides further detailed evidence related to the practice of this competency in SME A.

> *Our management strongly believes in the value of collaborating in innovation and supporting it; their experience in Microsoft and Vodafone helps them to understand it better. (*Manager C)

Competency 7: SME A has built an open innovation methodology that structures and governs open innovation practices. This methodology includes assessing each project and opportunity before deciding on the extent of openness and nature of collaboration; such assessment would consider strategic aspects. However, SME A tends to formalise and document any collaboration that occurs with external parties. This includes signing contracts and non-disclosure agreements to protect the knowledge shared between the different parties. Additionally, SME A governs open innovation initiatives by identifying the roles and responsibilities of each party of a project; this would be clarified and formalised in the contract. Moreover, the company includes the defined expectations of such projects in the contracts. Section 7 of Appendix K provides further detailed evidence related to the practice of this competency in SME A.

> *It is a planned process; We have defined all of these issues related to these projects.* (Manager B)

Competency 8: The role played by the technology team to support knowledge sharing amongst the SME's partwas illustrated through their selection of these latest communication tools that allow for instant and real-time knowledge sharing. According to manager C, their mindset in the technology team is to provide support for all other different teams and functions within the SME. SME A chooses and adopts IT solutions that enable supporting knowledge sharing within and outside the enterprise. It embraces a range of IT such as Trello, Google Analytics, Cloud, Smart Log, Pixel Solution. Such IT analytical solutions are used to record the behaviour of users and allow to lock the power of data gained through analysis. Most of the IT solutions adopted by SME A allow for data availability in a real-life mode. SME A selects IT solutions that enable internal and external knowledge sharing to the organisation. The IT strategy of SME A works in parallel with all other business units. The IT department provides the SME with the required tools and software solutions, but they also work cooperatively with the enterprise's business functions to achieve its goals and objectives. Thus, it is apparent that SME A can build and manage an IT infrastructure to support open innovation implementation. Section 8 of Appendix K provides further detailed evidence related to the practice of this competency in SME A.

> *Our core value that we have in the technical team is that we always have that mindset that we are helping other functions, for example, our product team, media team, content creation team and marketing. All these types of functions always come to us to provide them with support.* (Manager C)

> *Real-time availaibilty is a business requirement to measure different aspects including the measure of customer responses to certain offerings and promotions, the analyses of failure and anomalies to respond with corrective actions and to analyse security attacks to isolate any vulnerabilities add extra protective layers.* (Manager C)

> *We can summarize the tools selection process as follows; we define our needs from different involved stakeholders.* (Manager C)

Competency 9: SME A seeks to build strong relationships with its stakeholders. Such relationships are based on extended orientation, trust, and continuous communication. Moreover, SME A is looking to develop a win-win strategy for the SME and its ecosystem partners. Whether this collaboration is initiated informally, relying upon the SMEs network or formally by announcing a Request-For-Proposal, SME A follows some routines to assure collaborating with the most competent innovation. Section 9 of Appendix K provides further detailed evidence related to the practice of this competency in SME A.

> *We collaborate where we see that together we can succeed and deliver something that has value for everyone, the small company, the bigger companies, and the end-users.* (Manager C)

> *We were working on a project for one of the biggest banks in Egypt. We proposed a solution for them to have educational content, even most of our library to be accessed, it was very customized for them and we faced a lot of bureaucracy also some legal and security limitations. But in the end, we were able to deliver what they were looking for. We tried to find a working solution that was able to pass on the measures that they have, but for us, it was one project that would open more room for the future, and this is what we were able to get from an agreement with these stakeholders from the banking sector.* (Manager C).

This section presented findings related to open innovation competencies in SME A. The following section summarises these competencies.

7.2.3 Summary of SME A's open innovation-related competencies

Open innovation practices have been successfully implemented in SME A. The analysis of SME A yielded nine distinct critical patterns in the findings, namely; open innovation strategic alignment, open innovation supportive culture, interdepartmental connectedness, perceiving customer needs and expectations, elaborating products, and services that meet these needs, development of techniques and tools to govern open innovation implementation, the existence of top management support, management of IT infrastructure management and cross-boundary collaborations. Table 7.3 summaries findings of case SME A.

Table 7.3: Summary of SME A findings

Open Innovation initiatives		Succeeded
Competencies related findings		
1	SME's ability to align and match open innovation with the overall Strategy	Yes
2	SME's ability to develop open innovation supporting culture.	Yes
3	SME's ability to improve inter-departmental connectedness.	Yes
4	SME's ability to perceive the needs and expectations of customers and understand market opportunities.	Yes
5	SME's ability to adjust internally and externally developed knowledge to develop products and services meet customer expectations and reflect external opportunities.	Yes
6	SME's ability to get top management support	Yes
7	SME's ability to develop techniques and procedures to govern open innovation	Yes
8	SME's ability to build and manage adequate IT infrastructure to support innovation	Yes
9	SME's ability to establish cross-boundary collaborations outside the business	Yes

7.3 Case 2: SME B

7.3.1 An overview of SME B

SME B is an artificially intelligent computer vision provider in Egypt. The SME provides cutting edge AI solutions and software for analysing online real-time videos and offline video

recording for smart spaces, buildings, cities, automotive sectors, and other markets. SME B was founded in 2014 by five ex-Intel Corp PhDs and engineers. The SME started initially by providing a video analytic algorithm. The SME has evolved into a platform with different technologies that are based on computer vision, deep learning, and big data. SME B offers five main packaged products for face recognition, licence plates and vehicles recognition, video search and summarization, threat assessment, and early caution watch guard, which implements intrusion & crowd recognition, ambling, real-time traffic violation, and movement monitoring newly offered Covid-19 scenarios services. While such technologies provided by SME B are helping the SME to capture significant market value, they are globally competitive and are disrupting the dynamics of video analytics. The SME aims to build ultimate learning machines which provide their customers with all video intelligence insights to optimise their business performance and nurture their growth.

In 2018, The SME won the grand prize for the best AI Start-up at the CES Exhibition in the USA and was selected among 'The Next 100 African Start-ups initiative' by the International Finance Corporation. Additionally, the SME was chosen in 2019 by World Economic Forum as one of the Top 100 Start-ups to impact the fourth industrial revolution in the Middle East and Africa region. SME B was among the top worldwide Big-Data start-ups list for its innovative Open Video platform in 2017. However, the CEO of the SME considers reaching world autonomous vehicles leaders getting their acceptance for the SME products as one of their most significant accomplishments.

7.3.2 Within case analysis: open innovation-related competencies revealed in the findings- SME B

Open innovation: SME B implemented open innovation successfully.

Competency 1: SME B has strategically aligned its innovation strategy with its overall strategy. While SME B aims to build scalable, accurate, flexible, and cost-efficient AI processing solutions, it emphasises continuous improvements and innovation within its core business functions. The SME considers this a pillar to achieve its strategic objectives and future vision of becoming the most preferred artificial intelligence and computer vision provider. Additionally, the SME emphasise the importance of evaluating any innovation effort in terms of market readiness, time to market, market penetration, and financial returns.

Moreover, open innovation was aligned with the overall direction of the SME. Top management referred to open innovation as the SME's philosophy and in the heart of all its processes. Finally, the SME ensured sharing and communicating its open innovation defined objectives with all its employees and built a feedback loop to guarantee their alignment. See section 1 of Appendix L for further detailed evidence related to the practice of this competency in SME B.

> *Innovation could be in the features that we're supporting, the linking between features to get a new use case, the way we do actually develop things, the way we work and take decisions. It should be in all aspects which helps us to move on fast forward. Otherwise, the competition would be product price-based competition, which is like race to the bottom.* (Manager B)

> *First of all, you have to, let's say, strategically align yourself and understand what is strategic and what is not strategic.* (Manager A)

Competency 2: It has been found that SME B culture supports the implementation of open innovation. Since it has launched, SME B culture has promoted values that support knowledge exchange and collaboration. SME B's culture promotes values of innovation, free flow of information, customer satisfaction, and employee development and learning. To promote these values among all aspects of the organisation, SME B shares these values widely and puts them front and centre. SME B was keen on repeatedly communicating and reinforcing its core values with all employees. As such, the role of the SMEs leadership was observed in supporting SME B's core values. Additionally, resistance to open innovation was not an issue in SME B; for example, the SME witnessed a level of rigidity from the front and development team through its collaborative user interference design project. Some team members believed they had enough capabilities to develop this project internally. This resistance level was overcome as the team realised that their skills and knowledge were still considered valuable to the organisation. Thus, maintaining consistent communication with employees was necessary to overcome such resistance. Section 2 of Appendix L provides further detailed evidence related to the practice of this competency in SME B.

> *No matter how brilliant your strategy is, if you do not have a supportive culture, you won't be able to go anywhere.* (Manager C)

> O*pen innovation is a philosophy that does not change from one project to the other, but what changes from one project to the other is the ingredients and the elements of how you are going to deploy the open innovation in fulfilling the customer's needs.* (Manager C)

> *We embrace creativity, flexibility, sense of ownership and courage to assume the risks that lie behind a new business or concept. That was instilled by our founders into our corporate culture, inspiring us to approach each day with passion and enthusiasm. (SME's website)*

Competency 3: The level of connectedness between different teams across the SME is high. All parts of the SME cooperate and communicate to share information related to all projects and products to allow the SME to achieve its objectives. SME B fosters cross different teams knowledge sharing and communication through holding regular meetings; this includes constant meetings across all times and periodic meetings of the top management team with all team members to assure teams alignment. Additionally, the SME facilitates data availability and accessibility to all employees and encourages peer learning and training sessions. Section 3 of Appendix L provides further detailed evidence related to the practice of this competency in SME B.

> *The good thing about our company is that we do not have any separate silos. We have continuously peer learning sessions, training, and conference. We share in our regular meetings this experience and also we document it in a way where it is accessible and available for the rest of all team members.* (Manager C)

Competency 4: SME A searches customer needs and collects data about market trends and opportunities data. This competency was found critical to SME B as the primary strategy of the business revolves around maintaining customer satisfaction. Additionally, the culture of the SME encourages listening to customer voices and involving them in many phases of the product development. Building good relationships with customers was observed as one of the SME's pillars. Manager B argued that continuous interaction with end-users is the primary source of their innovation. Therefore, SME B tries to get their employees to engage with and interact more often with their customers. Section 4 of Appendix L provides further detailed evidence related to the practice of this competency in SME B.

> *We gather sufficient customer information and use business analytics to understand customers and the market.* (Manager A)

Competency 5: The output offered by customers and market analytical processes in SME B is used to offer and create value propositions to the customer that meets their needs and expectations. This includes the development of new technologies, solutions and features for customers. Therefore, SME B prioritises the R&D team in terms of allocating adequate budget and resources to support their work. The SME views this team as a base to support developing products and services that meet customer requirements. The SME also undertake processes such as proof of concept, multiple tests and pilots are conducted to test and adjust its innovation. Section 5 of Appendix L provides further detailed evidence related to the practice of this competency in SME B.

> *We are investing everything that we make into the company. It is invested in our R&D, in new products, it's invested in new innovations and inventions and of course, in new joint collaborations that would help develop our products and bring more value, and we spend a lot of our proceeds on developing proof of concepts.* (Manager A)

> *R&D functions are tools. it is like breathing to our end, but it is not an alternative or complement to open innovation.* (Manager C)

Competency 6: SME B's high-level management has supported open innovation initiatives. Since it started, SME B's high-level management has supported open innovation initiatives. This has been observed through the leadership team's adopted practices to support open innovation. For example, employees were given every week free hours dedicated for ideas storming, discussions, knowledge and expertise sharing to support and improve the learning and innovation of both the employees themselves and the SME. This helped in increasing employees' commitment toward open innovation. Section 6 of Appendix L offers further insights into the observed leadership practices that support open innovation.

> *I stress on the important role of leadership in the company in relation to open innovation and so on; I believe that this is not*

> *disputable by any means. So yes, of course, leadership is very important.* (Manager C)

Competency 7: SME B improved techniques and tools to enhance and govern the implementation of its open innovation initiatives. This includes developing processes to identify how to approach and decide on each project, including identifying measurement criteria and levels of disclosure. Additionally, SME B considers some activities while selecting potential partners. This methodology includes an evaluation of their competency in terms of resources, culture and deliveries. The SME considers choosing an incompetent partner a waste of resources. Thus, SME B conducts a few meetings before signing with potential partners to decide whether such a partner is competent or not. Section 7 of Appendix L provides further detailed evidence related to the practice of this competency in SME B.

> *Open innovation is a philosophy that does not change from one project to another. But what changed from one project to the other is the ingredients and the elements of how we are going to deploy the open innovation in fulfilling the customers' needs; and this is planned and organised. (*Manager C)

Competency 8: SME B is adopting many IT systems that improve the knowledge exchange within and outside the enterprise. The IT infrastructure is built and managed to allow data to be accessible both internally and externally and is flexible enough to permit collaboration with different partners. Manager C pointed out that investing in an IT system should be evaluated strategically in terms of how such systems would support strategic objectives and provide value propositions. Therefore, the SME aligned the role of the IT director strategically. Section 8 of Appendix L provides further detailed evidence related to the practice of this competency in SME B

> *We first assess why we would need to invest in this technology and how it will affect my bottom-line results, and how it will affect supporting us strategically. (*Manager B)

> *Well, it follows a process, or if we can say a procedural technique, that determines why we need to integrate, how this can*

> *happen, who to integrate with, and we set our goals and assess them pre, throughout, and post to the project. And this process has developed over time.* (Manager A)

> *The system that we are using is accessible by our employees. They are public systems so that we actually can add other users. For example, when we integrate with a certain party, we add them to the system. It has like our partner side and our company side they work together. so, we add users to it from other companies and work collaboratively.* (Manager B)

Competency 9: Building strong relationships with different stakeholders has been observed to be necessary to SME B. SME B demonstrated strong evidence of its ability to build external cross-boundary collaborations with different actors. In order to strengthen relationships with its partners, SME C tries to improve trust by providing a proof of concept. This investment, from the SME perspective, proves its intention to deliver. Additionally, according to manager C, providing products with a free trial. This is reported to help build trust between the business and its partners. Additionally, the SME lives up to delivering the value their partner seeks. Section 9 of Appendix L provides further detailed evidence of the observed behaviours related to this competency in SME B.

> *It is not an option not to have a healthy relationship with your other value chain members, like the system integrators and the hardware providers and so on*. (Manager C)

> *How are you going to build a strong relationship, not only with the end customers but also with the other value chain members, is critical. … it is not only for creating demand and maintaining or building a strong relationship with your end customer, but actually, you have to exert equal effort, if it's not more, to build a very healthy relationship with all stakeholders in the marketplace.* (Manager C)

7.3.3 Summary of SME B's open innovation-related competencies

The within-case analysis of SME C has revealed that SME B defines open innovation as a business philosophy they are adopting. Since it started, open innovation has been an integral

part of the SME's strategy. The within-analysis of case B revealed support for all nine organisational competencies. These competencies are summarized in table 7.4.

Table 7.4: Summary of SME B findings

Open Innovation initiatives		Succeeded
Competencies related findings		
1	SME's ability to align and match open innovation with the overall Strategy	Yes
2	SME's ability to develop open innovation supporting culture.	Yes
3	SME's ability to improve inter-departmental connectedness.	Yes
4	SME's ability to perceive the needs and expectations of customers and understand market opportunities.	Yes
5	SME's ability to adjust internally and externally developed knowledge to develop products and services meet customer expectations and reflect external opportunities.	Yes
6	SME's ability to get top management support	Yes
7	SME's ability to develop techniques and procedures to govern open innovation	Yes
8	SME's ability to build and manage adequate IT infrastructure to support innovation	Yes
9	SME's ability to establish cross-boundary collaborations outside the business	Yes

This section presented open innovation-related competencies revealed in the findings of SME B. The following section provides an overview of SME C and presents, interprets and discusses its findings.

7.4 Case 3: SME C

7.4.1 An overview of SME C

SME C is a Jordan-based leading education SME that provides advanced digital solutions, educational programmes, platforms, and resources for school-aged children in the MINA region and beyond. The SME was founded in 2004 by its two founders to provide video-based educational content. Then in 2014, the two co-founders of the SME were joined by a new member responsible for leading the SME's strategy and growth. Since then, SME C has started to transform into providing digital education technologies and platforms. SME C provides leading technologies to support Arabic literacy for three children age categories.

First, for Arabic-speaking children aged between six and fourteen, this programme aims to improve and advance their Arabic language and fluency. Second, for non-native Arabic-speaking children aged between six to twelve years old, this bilingual programme seeks to support their learning journey. Third, for three to six-year-old children, this programme aims to introduce early-stage learners to the Arabic language through fun and engaging topic-based resources. These three designed programmes serve more than 1600 students across 300+ private and public schools in the region currently. While based in Jordan, the SME has remote offices in Dubai and Saudi Arabia.

The SME has recently been declared a grant winner of the Sharjah Entrepreneurship Centre Award (Sherra) and gained first place in Queen Rania Award for education and entrepreneurship. Additionally, the SME has received other awards such as All Children Reading Grand Challenge for Development GESS, Primary Education Resource of the Year, Dubai, 2015. All Children's Reading, USA, 2014, Cartier Women's Initiative Awards Finalist, France, 2014 MIT Business Plan Competition, Egypt, 2014.

7.4.2 Within case analysis: open innovation-related competencies revealed in the findings- SME C

Open innovation: SME C implemented open innovation successfully.

Competency 1: SME C undertakes an innovation strategy that includes several activities to support the strategic direction of the business, including constant scouting of the market, identifying competitors, sensing market needs, and understanding market dynamics. Thus, bringing new ideas, either from internal or external sources of knowledge, would always be linked to the SME's mission of creating advanced digital solutions for students. These innovation actions would be consistently associated with SME's resources and strategic objectives. SME C assesses and analyses innovation opportunities to see their commercial viability. This assessment is made to see if these new features or ideas to develop the product would propose value to the SME and the customer. Manager A explained that ideas are evaluated in terms of feasibility, functionality and sales. Section 1 in Appendix M provides further detailed evidence of the observed behaviours related to this competency in SME C.

> *Innovation affects our mission, so we would always try to look for new ideas as a start-up. We are always trying to bring something new to the table. We have a mission that could change from time to time. If someone brings out a new idea, no matter who that person is, if it is valid, it will get its right resources; maybe it will even get how we operate across the year itself. I think it* [referring to open innovation initiavtives] *directly affects the mission. (*Manager B)

> *Sometimes what the teachers want or what the students want is not necessarily something that helps with the sales process. So, we need to think what are the commercially viable features that I want to push versus the features that teachers will care about, but at the same time will help me sell the software, so sales versus feasibility versus functionality of the software.* (Manager A)

Competency 2: Aligned with SME C's effort on strategically aligning open innovation, they were working in parallel to change the organisational culture to be more supportive to open innovation. SME C initially witnessed a level of resistance upon introducing open innovation practices. The SME maintained a communication loop between the top management, the product development team, and other SME C members to support open innovation adoption. This took SME C six months to be addressed and overcome. The SME then overcame this challenge by emphasising cooperation and sharing among employees. Section 2 in Appendix M provides further detailed evidence of the observed behaviours related to this competency in SME C.

> *Our employees definitely adapt an innovation mindset because we are a tech company, and that's what we do. It is like that is in our DNA… Our culture is quite fast. So, we have to quickly adapt, test and then iterate and adapt according to our surroundings. So, we're quite a lean organization.* (Manager A)

Competency 3: SME C has a high level of dependency between departments. Formal and informal communication was observed to be constantly happening between these departments. All parts of SME C cooperate, communicate, and share information to build a big picture of the SME's innovative processes. Therefore, the SME has lately adopted several communication mechanisms to support and improve dependencies between different teams. SME C holds regular meetings with their all employees. When the product development team decides on developing or changing one of their product features, they include all employees

through big meetings where the product team would explain what needs to be changed. This process is communicated to all employees, and they can give their feedback on it. To support this, SME C created an IT-supported voting system to allow inclusion and transparency of its employees to provide their input and vote on any suggested ideas throughout the product development process. Section 3 in Appendix M provides further detailed evidence of the observed behaviours related to this competency in SME C.

> *We have high dependencies. For example, the content department is very dependent on the tech department. They have a very close relationship in terms of dependencies. And again, communication is very open between them, and they communicate formally and informally together all the time.* (Manager A)

Competency 4: The transformation toward open innovation strategy started in SME C in 2015 due to a change within the management team. The new leadership team played a significant role in pivoting open innovation in the SME. Some of the practices that demonstrate top management sponsorship to open innovation include their commitment to building strong external networks, improving communication mechanisms, creating a teacher reward programme to enable the teacher to be more engaged, and allocating adequate resources and budget to product development collaborative. Section 4 in Appendix M provides further detailed evidence of the observed behaviours related to this competency in SME C.

> *Our CEOs are supportive and accepting of people and ideas. And I think if a different kind of managerial style were there, it would have been more difficult to accomplish what we're trying to accomplish.* (Manager B)

Competency 5: SME C maintains good relationships with their customers to perceive their needs and expectations. The SME has launched many initiatives to support this relationship, including building a teacher reward system, What's App groups, regular health checks, focus groups, and seasonal dinner initiatives. Additionally, SME C adopts a customer relationship management (CRM) system, which builds stronger relationships with customers, restores

customers' data and records, and analyses their behaviour. Therefore, generating customer data regarding their needs and behaviour is necessary for SME C to offer products and services that they value. The SME focuses its strategy around listening to its customers' voices. Section 5 in Appendix M provides further detailed evidence related to the practice of this competency in SME C.

> *One of our priorities is to understand our customers' needs and live up to their expectations; definitely, this is what our strategy stands on.* (Manager C)

> *The leadership team works to maintain very good relationships with our teacher as throughout the year. We realized that the teachers are the most important decision-maker in the sales process and the most important contributor to the collaboration. So, if I want to understand how I can change the product or how can I improve the product, I need to be able to reach and call the teachers and ask for their feedback and ideas. (*Manager A)

> *We use silent surveying, So we're just observing how users, our students, maybe using the platform, what kind of challenges they have, basically through the data that we have without asking them directly. This is one form. The other form is we conduct focus groups with the schools and with the students just to make sure that the application is going well. We do ask for their opinion. Of course, we have surveys for teachers and for students in the application. That appears for them to answer the questions which can help us create or enhance our products in general.* (Manager B)

Competency 6: While SME C does not allocate a specific unit for R&D activities, much of the R&D functions are undertaken through the collaborative work of different teams who works on capturing, identifying, and selecting new ideas to develop and redefine new products. SME C follows a systematic process to build and develop its products according to perceived needs and expectations. SME C widely relies on exchanging knowledge with its customers and end-users to provide relevant products and services that match requirements. The outputs gained through the CRM system and data collected through the What's App groups, regular health checks, focus groups, and the outputs of customers involved in the product ideation stage are analysed and used along with internal ideas in developing products and services that provide value to the customer. According to manager A, SME C views their customer as their innovation and product development partner. Section 7 in Appendix M

provides further detailed evidence of the observed behaviours related to this competency in SME C.

> *We are re-inventing the product again by collaborating with a lot of parents, doing a lot of focus groups, and understanding their needs. And now we are launching a B2C product for the first time. Again, to give the customer what they need*. (Manager A)

> *We exchange knowledge to be very relevant, to give them what they want, to always make them feel like we're listening to them, to make them feel that we're partners. We're not a third party just throwing something with them to get their engagement to get to keep our brand as top of mind. Because we listen to them, so we have them as collaborators rather than customers only, and we develop our products and services accordingly.* (Manager A)

Competency 7: This competency concerns the SME developing a methodology to govern open innovation processes. SME C plans and structures the type of open innovation projects the SME seeks to establish. SME C tends to formalise any open innovation projects through detailed documentation. This includes clear identification of expectations, communication mechanisms, and goals of collaborations. Prior to any product development effort, the SME evaluates the project regarding customer needs and market opportunities. All innovation initiatives were well defined in terms of objectives and assessed strategically to support the SME mission. Most of SME C's open innovation practices rely on integrating customers and end-users in the innovation process as they consider them one of the SME's sources of innovation. The SME integrates students and teachers at different stages of the product development process. This includes the idea development process, product development, market testing and performance testing. In addition to the customer and end-user, the SME evaluates external knowledge and internal ideas through a voting system that allows employees to discuss and evaluate these ideas. The voting system adopted by the SME provides transparency and inclusion to all SME staff. Moreover, the SME evaluates its internal resources to determine its need to integrate with its value chain partners. This requires managing relationships externally with customers and partners and internally with the different SME units. Section 5 in Appendix M provides further detailed evidence of the observed behaviours related to this competency in SME C.

> *Another thing that is just required is to have good documentation and plan; you should have good documentation that is shared with everyone and a plan to guide you to manage it.* (Manager B)

Competency 8: SME C adopts IT systems that support open innovation. These systems allow for seamless communication and knowledge sharing within the SMEs and with external actors. Additionally, these IT systems provide analytical features. The SME's IT system was observed to deliver support to other open innovation-related competencies, specifically supporting perceiving needs and expectations of customers, communicating and collaborating with partners and improving the level of dependency and knowledge sharing between different departments. The SME's IT system allows supportive features that selectively allow for transparency and inclusion in product development, whether internal or external actors while integrating.

> *We do have an IT-supported voting system where everybody has a say in; how the product will look like. This resulted in great interactivity between employees. Now, everybody is involved.* (Manager A)

> *We use CRM systems now for customer relationship management systems. It allows us to send automatic notifications to teachers' automatic notifications and many other features. These tools allow us to collaborate seamlessly with the customer automatically without having to put any time and effort into manuals.* (Manager C)

Competency 9: SME C places considerable attention on its stakeholders seeking to build and maintain effective relationships. SME C builds partnerships based on continuous communication using multiple mechanisms focused on clear and shared goals. Such goals in any relationship consider bringing values to collaborating parties and attaining value for their customers. Additionally, SME C emphasised the importance of keeping a continuous feedback loop that constantly reviews, adjusts, and adds features to the product roadmap to reach a satisfactory status for all parties included. Therefore, SME C has shown its ability to build effective collaboration with external parties.

> *We invest in our partnerships, and we ensure that our partners are aligned. We are keen on providing different*

channels for communication to keep the interaction; we make sure to build a common understanding of our goals and their expectations (Manager B)

7.4.3 Summary of SME C's open innovation-related competencies

The within-case analysis of SME C has revealed that the adoption of open innovation practices has occurred due to the new management team who strongly believed in the importance of the concept. While the SME has been successfully engaged in many open innovation initiatives, it has witnessed a level of resistance that they considered challenging. Thus, the SME thought of a cultural change to support the implementation of open innovation. Additionally, the within-case analysis of case C has revealed support for the other remaining competencies. Table 7.5 summarises the findings of open innovation-related competencies in SME C.

Table 7.5: Summary of SME C findings

Open innovation initiatives		Succeeded
Competencies related findings		
1	SME's ability to align and match open innovation with the overall Strategy	Yes
2	SME's ability to develop open innovation supporting culture.	Yes
3	SME's ability to improve inter-departmental connectedness.	Yes
4	SME's ability to perceive the needs and expectations of customers and understand market opportunities.	Yes
5	SME's ability to adjust internally and externally developed knowledge to develop products and services meet customer expectations and reflect external opportunities.	Yes
6	SME's ability to get top management support	Yes
7	SME's ability to develop techniques and procedures to govern open innovation	Yes
8	SME's ability to build and manage adequate IT infrastructure to support innovation	Yes
9	SME's ability to establish cross-boundary collaborations outside the business	Yes

This section presented open innovation-related competencies revealed in the findings of SME C. The following section provides an overview of SME D and its main findings.

7.5 Case 4: SME D

7.5.1 An overview of Case D

SME D is a business process outsourcing provider established in Jordan in 2007. The SME has a diversified business portfolio which includes customer support solutions, marketing services, sales, strategy and consultancy brand services and training services. The SME provides its services to various industries such as telecommunication, financial, authoritative, retail, and governmental and non-governmental sectors across the Middle East and North Africa (MENA). The SME employs around 240 staff.

The business outsourcing industry in the MENA region, and in Jordan specifically, has been relatively constant for more than three decades and has only experienced marginal changes. Thus, SME D did not perceive the need to adopt innovative practices. However, the high level of competition SME D is currently facing from international firms such as Microsoft and IBM are key drivers to invest in innovation. SME D's limited resources and size drive it towards an open innovation strategy as an innovation model. Therefore, SME D has lately reconsidered innovation as an opportunity to gain a competitive advantage in the market after its realisation that previous methods were largely ineffective.

7.5.2 Within case analysis: open innovation-related competencies revealed in the findings- SME D

Open innovation: SME D has faced many challenges that affected open innovation implementation.

Competency 1: While SME D's vision is to be a leading customer service provider in the Middle East region, it has not considered adopting innovation to achieve its strategic goals until recently. Since SME D is transforming toward investing more in innovation, the top management has defined objectives they were looking for from this strategy. However, this transition to open innovation was not widely shared with all employees as the objectives of the innovation strategy were not effectively communicated by the innovation team. According to manager C, the SME does not share its strategy with all employees; it is limited

to those involved in strategy-making processes. Thus, innovation appears as a one department effort separated from other teams. Therefore, a strategic misalignment of innovation strategy is challenging for SME D. Section 1 in Appendix N provides further detailed evidence of the observed behaviours related to this competency in SME D.

> *Innovation is not a choice anymore for our company. The top management came to this conclusion that it's not only nice or an extra thing to offer innovative products; it's either doing it, or we'll be left behind.* (Manager B)

> *The main challenge we faced was that not all staff knew what we were doing; unfortunately, our innovation goals were not well shared with the rest.* (Manager B)

Competency 2: There was an inadequate integration between different teams within SME D. Since the top management recognised this challenge, few attempts were undertaken to put activities in place to support the collaboration between the teams. These activities aimed to feed information to the product development team that came under the supervision of the innovation director. Manager A claimed that these activities to support inter-organisational cooperation include connecting the product development team with all other team heads to assure continuous engagement with other teams and mandating regular weekly meetings with all departments. However, despite the top management initiative to improve the level of internal communication, minimal communication has been observed between the innovation team and the other teams within SME D. Section 2 in Appendix N provides further detailed evidence of the observed behaviours related to this competency in SME D.

> *We need collaborative work between the departments because otherwise, we wouldn't be able to develop any more products unless everybody is being collaborative. We are currently trying to work on this as we are not well aligned.* (Manager B)

Competency 3: Open innovation was an initiative of the chief innovation director of SME D, who strongly believes in open innovation and has undertaken actions to support knowledge pooling from outside the team. However, SME D's top management has not shown the same

level of commitment to open innovation. Manager B described his role of obtaining top management support to implement open innovation as an internal challenge "*of a continuous struggle*" to win senior-level sponsorship of transformation toward open innovation initiatives. Manager B suggests that obtaining top management sponsorship to open innovation is critical. Therefore, the innovation chief director seeks to win this sponsorship by building a business case (including cost versus benefits) and providing a rationale for adopting the open innovation initiative. This indicates that top management knowledge and understanding of open innovation is essential.

> *When I go to top management, I go with conclusions rather than the process. I define and build benefits realisation of the project; we try to build a business case to win their blessings and support.* (Manager B)

Competency 4: SME D culture was not prepared to support collaboration and innovation. While transforming toward open innovation, SME D encountered resistance. Manager B explained that this restructuring had been faced with resistance from those involved in the change. This was a challenge that hampered the efforts to implement integration projects successfully. The SME is the centre of this tension between adopting the innovation strategy and existing systems; however, the staff gradually becomes more receptive to this change. The resistance has reduced due to SME D's activities to support this cultural change. This includes conducting training and education workshops to familiarise employees with innovation and its importance to the SME and the employees themselves in terms of salary and new roles and positions it requires. Section 2 in Appendix N provides further detailed evidence of the observed behaviours related to this competency in SME D.

> *The main issue we faced was with people who have been at the company for too long and with senior positions. They believed that there is no need for us to change the mentality of our way of doing business because this might threaten so many things. They thought that it might threaten their positions. It might threaten their importance and roles at the company.* (Manager D)

Competency 5: SME D tries to be proactive and understand the needs and wants of their customers. The SME analyses their customers' behaviour and accordingly analyses the

features of products that address these issues. In addition to perceiving customer needs and expectations, SME D analyses the markets they operate, including identifying potential competitors and new technologies. SME D is becoming more adaptable to customer needs and trying to engage customers in product development. The SME collaboratively tests its products and services with customers. Section 4 in Appendix N provides further detailed evidence of the observed behaviours related to this competency in SME D.

> *We start with customer development. We understand the pains and gains, and then we start to analyse what kind of features we should use and add for them; we give them the minimum viable product, so they can test it out. If they like it, we proceed and build upon that. If they don't like it, we get to start something new*. (Manager B)

Competency 6: Currently**,** SME D emphasises the need for R&D activities to support open innovation. According to manager B, building effective R&D activities that identify, generate and evaluate all sources of ideas would give a solid base for initiating any open innovation project. One of the main processes SME D is investing in is searching for new ideas internally and externally. This includes the involvement of customers to identify their requirements and expectations. Then, analysing these requirements and building features around them, then a product model would be developed for the customer to initially test. Thus, SME E strives on identifying a source of value for its customers Section 5 in Appendix N provides further detailed evidence related to the practice of this competency in SME D.

> *We don't just launch it [referring to new products and services]and then try to sell it. We launch it based on the needs.* (Manager A)

> *So, we start first with the customer development process where we meet with potential users of the product, and we gather their requirements and ideas. We try to uncover their pains, expect their pain, and then we build the model of the product or the prototype of the product, and then we start the development process.* (Manager B)

Competency 7: While the chief innovation officer initiated open innovation in SME D, the team seeks to plan the type of innovation they desire, including levels of openness and the main rules and roles of engagement. Thus, any innovation project would be initially assessed in terms of internal resources and capabilities. This assessment will help in identifying levels

of knowledge transfer. Additionally, the objectives of each project should be formulated. Responsibilities and roles played in this project were explained and documented. The SME further seeks to structure frequency and medium of communication and performance measurements. Section 6 in Appendix N provides further detailed evidence of the observed behaviours related to this competency in SME D.

> *I always look at first to the capabilities of departments and my capabilities at the same time, so the first step for me is to evaluate where we stand, do we have the same capabilities? Do they complement ours or are they ahead of us? Do we need them to open doors for us? for example, will they provide a new skill set that we do not have?* (Manager B)

Competency 8: SME D deployed a range of IT tools and solutions considered supportive to knowledge exchange. This included the use of a Sandbox tool which provides channels of communication between the innovation team and external actors. This tool offers real-life information and is considered user-friendly. SME D is also considering adopting Enterprise Resource Planning systems (ERP) to support and monitor communication and knowledge. Manager A considers this system a mechanism to improve communication within the SME. Hence, it was observed that there had been missed cooperation between the innovation team and other teams. The current IT infrastructure does not allow for data integration and needs to be managed more effectively. Section 7 in Appendix N provides further detailed evidence of the observed behaviours related to this competency in SME D.

> *We have a SandBox; it is a communication and knowledge exchange channel to update each other, to discuss what is going on and if anyone is facing any challenge with integrations. It allows for real-time information, it's super user-friendly, and it is super easy.* (Manager B)

Competency 9*:* While SME D has been engaged in many collaborative projects, developing collaborative relationships with external actors is problematic. SME D is keen on maintaining continuous communication channels with its partners. However, the inability of building such partnerships has proved challenging for such collaborations and is affecting their ability to set

clear and shared goals. Section 8 in Appendix N provides further detailed evidence of the observed behaviours related to this competency in SME D.

> *I believe in a win-win situation, but unfortunately, most people here believe that if I win, you lose; this was very challenging.* Manager B

7.5.3 Summary of SME D's open innovation-related competencies

The within-case analysis of SME D revealed the recent adoption of an innovation strategy. Open innovation practices have appeared to be the discreet efforts of the innovation team. While the innovation strategy objectives have been defined and linked to the SME goals, those objectives were not shared widely. Moreover, the results demonstrated that the overall culture of the SME promotes ownership and exclusivity; thus, the SME's culture was not prepared for the adoption of these practices, which caused an ongoing challenge. Additionally, open innovation was a bottom-up initiative that lacked full support and commitment from the top management. Table 7.6 summarises the findings of SME D revealed from the within-case analysis.

Table 7.6: Summary of SME D revealed findings

Open innovation initiatives		SME D face many challenges while implementing open innovation
Competencies related findings		
1	SME's ability to align and match open innovation with the overall Strategy	Open innovation objectives were not wieldy shared across the SME
2	SME's ability to develop open innovation supporting culture.	The SME is going through a cultural change as its culture was not appropriate for open innovation
3	SME's ability to improve inter-departmental connectedness.	Inadequate departmental integration
4	SME's ability to perceive the needs and expectations of customers and understand market opportunities.	Yes
5	SME's ability to develop products and services meet customer expectations and reflect external opportunities.	Yes
6	SME's ability to get top management support	A business case is conducted to gain top management support.
7	SME's ability to develop techniques and procedures to govern open innovation	Yes

8	SME's ability to build and manage adequate IT infrastructure to support innovation	Yes
9	SME's ability to establish cross-boundary collaborations outside the business	The SME was challenged by building a win-win strategy

This section s open innovation-related competencies revealed in SME D. The following section provides an overview of SME E and presents, interprets, and discusses its findings.

7.6 Case 5: SME E

7.6.1 An overview of SME E

SME E is a growing telecommunication business, providing cutting-edge technology and solutions to businesses. SME E is the leading Palestinian ISP, with a 60% market share of the Palestinian internet services industry. SME E specialises in internet services for both residential and business customers. In addition, the SME provides a range of services: SMS and hosting services, security services, video and audio broadcasting and anti-virus solutions. It also offers internet services, data communication, and other business solutions. The SME employs around 160 staff.

Over the past years, SME E has continued to move forward with its mission toward a new world that aims to provide advanced technological solutions and applications to the Palestinian market. It has proven this through its contribution and leadership in providing many services in the technology and software sector. In addition, SME E provides hosting services, broadcasting services, advertising messages and added services. SME E's vision is to remain the first choice in the Palestinian market. They emphasise their commitment to the SME's values and principles of investing in new ideas to achieve this. SME E also shows adherence to the highest standards in providing the latest digital services and programs. Accordingly, to produce new products and solutions that meet the market need locally and globally.

7.6.2 Within case analysis: open innovation-related competencies revealed in the findings- SME E

Open innovation: SME E was still unable to embrace it completely.

Competency 1: While SME E has launched an open innovation team in late 2019, the SME does not consider open innovation the central pillar of its overall strategy. While the open innovation team has defined its objectives in terms of the strategic direction of SME E, open innovation is still considered a secondary effort. This has been observed as the main challenge for open innovation implementation. Therefore, SME E has not regarded open innovation as a thrust to its strategy; on the contrary, it thought it a subordinate effort-consuming resource that needs to be allocated to other strategies. This was apparent through the Covid-19 pandemic as the SME reduced the resources and budgets allocated to open innovation projects. Manager C claimed that it would be difficult to change without open innovation reinforcing policies. Such policies might include allowing employees to have dedicated time for ideation processes. Manager C explained that the idea of open innovation is not widely practised in Palestine. Additionally, Manager A elaborated that SME E needs to utilise open innovation and formulate policies to support open innovation implementation and prioritise it to create value. Section 1 in Appendix O provides further detailed evidence of the observed behaviours related to this competency in SME E.

> *We need to have the directors, managers and CEO to sponsor this. They have to start introducing open innovation as part of their strategies. They have to own it. And this is one of our challenges.* (Manager A)

> *The third challenge is probably having to do with the competing priorities. We have got to meet our sales targets; we have got to make the revenue. So, we need policies to address and prioritise open innovation.* (Manager A)

Competency 2: When SME E launched its open innovation initiative, the organisational culture was not prepared for this new concept. A high level of resistance at the beginning was encountered. This resistance started diminishing by the open innovation team's effort of building a well-conducted case of the reward open innovation projects would bring to the

SME. Additionally, the team was keen on increasing the level of knowledge and awareness of open innovation value and the benefits that it would bring to the SME. Such mechanisms were adapted slightly to help reduce the high level of resistance they have faced. However, the resistance level still exists in SME E and represents an ongoing challenge to the open innovation team. As the SME is still going through this cultural change, manager B pointed out that it might take a long time to resolve. However, the managers asserted that continuing evangelism and educating staff regarding open innovation is critical throughout the cultural change process. Section 2 in Appendix O provides further detailed evidence of the observed behaviours related to this competency in SME E.

> *You should have seen the resistance we faced throughout the beginning of making them aware of this. We had to increase the knowledge about open innovation. We have even made financial modelling just to prove applying it and how it will return a better investment if all things work out.* (Manager A)

> *We are still struggling in this because we are changing the mentality of a whole organisation to be open to new ideas and to be open to new innovative ideas that can come from outside the company and you can integrate it inside the company and build new products accordingly. So yes, we are struggling in this because the mentality that we do have here is a risk-averse mentality and all the people are very by the book.* (Manager B)

Competency 3: High dependency level of collaboration was observed between different teams across the SME; however, this does not include the recently established open innovation team. It was reported that the innovation team emerges as a separate team from the rest of the other remaining teams. While this unit is formally presented in the organisational structure of SME D, a lack of informal collaboration and interaction between the open innovation unit and other parts of the SME was observed. To illustrate, the innovation team was not reinforced either formally or informally. It was not perceived as an integral part of the SME. This attitude affects the level of collaboration and interaction between the newly established team of innovation and the remaining portion of the SME.

> *I am telling you, other teams here are well-aligned; it is us as a team we feel we are working in a silo. Again, this lack of collaboration is the first challenge I told you about; we need policies to prioritise open*

> *innovation; how would you expect them to collaborate with us if there are no practical policies to reinforce it*. (Manager A)

Competency 4*:* While SME E states they seek to understand customer requirements, they employ several tools to collect data, including surveys and social media monitoring. This is undertaken to ensure continuous interaction, allowing customer analysis and customer feedback on products and services. However, SME E still believes that this process is overly simplistic, and there is no established process to ensure the robustness of the process.

> *We believe in the importance of our customers. Understanding their needs is essential. Our culture values customer and customer satisfaction, but I think we lack having a proper customer knowledge base. We still seek their knowledge. But we need to be sharing this knowledge across all channels, across all departments. It should not be a silo.* (Manager B)

Competency 5: There is no evidence collected regarding this competency within this SME.

Competency 6: SME E's top management considered open innovation as a subordinate element to the overall strategy rather than being the main element to achieving it. Thus, this has been reflected in the resources and budget allocated to support such a strategy. Manager A noted that the challenges the innovation team faced towards implementing open innovation drove them to consider working on the buy-in of the top management through building a well-conducted business case highlighting the value and importance of implementing open innovation effectively. Thus, the lack of top management support and commitment in SME E was identified as a significant challenge that restricts the implementation of open innovation. Section 3 in Appendix O provides further detailed evidence of the observed behaviours related to this competency in SME E.

> *We had to go back and start working on the buy-in, start working on the policy that putting some incentive schemes, start doing more work, knowledge, what this is all about why we're doing it. So, we have to go back to the drawing board and take it from those aspects.* (Manager A)

Competency 7: While the open innovation team is currently working on gaining top management support for open innovation, the team are developing a plan to structure best practices and techniques to manage the open innovation implementation. Manager A pointed to the importance of elaborating best practices to structure an open innovation model. Otherwise, open innovation would not be sustained. As SME E is delaying open innovation activities, the open innovation team is seeking to build a plan regarding the type of model they wish to adopt. This plan is required to support the strategic alignment of open innovation to the overall business strategy. This would only happen with the sponsorship of the top management. Additionally, this methodology would address the legal aspects of any open innovation project and all other required documentation. Section 5 in Appendix O provides further detailed evidence of the observed behaviours related to this competency in SME E.

> *It has to be based on good practices. If you know them, these good practices, it is great. But if you want to say I want to do open innovation haphazardly, I think that you're not going places with such*. (Manager A)

> *We had to go back and start working on the buy-in, start working on the policy that putting some incentive schemes, start doing more work, knowledge, what this is all about why we're doing it. So, we have to go back to the drawing board and take it from those aspects.* (Manager A)

Competency 8: SME E recently adopted a system that integrates all information coming from other systems and sources of knowledge. However, manager B suggested that this supports operational efficiency rather than open innovation specifically. This is evidence of the poor relationship between the IT department and the open innovation team. The IT team in SME E is not concerned about the external sources of knowledge. According to manager B, the IT team does not perceive the strategic importance of open innovation. Thus, the relationship between the two teams is not strategic or beneficial.

> *IS is the backbone of our operations success, but unfortunately, the IT people are not concerned about open innovation.* (Manager A)

> *The company has faced a problem with the different systems we have internally; that's why we have a unified system for all data as they noticed that issue, but it was not for us, nor we were involved in that decision.* (Manager B)

Competency 9: While SME E was challenged to implement open innovation successfully, the SME encourages building collaborations with external stakeholders. SME E has been able to develop cross-boundary collaborations with outside partners. Manager B highlighted the importance of establishing partnerships built on strong relationships with all stakeholders. For this relationship to be effective, it must consider aligning the interests of those parties involved to assure the success of this partnership. From the manager's perspective, developing an alignment of interests requires understanding the language of a stakeholder and acting upon it. Furthermore, alignment of interests needs to be developed both internally and externally. Thus, trust and commitment between partners were critical for SME E to engage in any cross-boundary relationships Section 6 in Appendix O provides further detailed evidence of the observed behaviours related to this competency in SME E.

> *To develop this alignment of interests between all stakeholders and all parties, we have to communicate and reach out to the right person. So, we make sure to get connected to the right person inside and outside the company.* (Manager B)

7.6.3 Summary of SME E's open innovation-related competencies

The within-case analysis revealed that SME E open innovation initiative has stalled. The findings demonstrated SME E's ability to perceive customers' needs and expectations, build and improve techniques and tools to support the implementation of open innovation and construct and manage cross-boundary collaborations. Furthermore, the analysis demonstrated SME E's inability to align open innovation strategically since SME E does not consider open innovation the central pillar of its overall strategy. Moreover, the results showed that the SME's culture was not prepared to adopt these practices and the cultural transformation undertaken to support open innovation. Additionally, the analysis revealed how the innovation team is working on gaining top management support. However, no evidence was collected regarding SME's ability to develop products and services to meet customers'

requirements and market trends. Table 7.7 summarises findings uncovered from the within-case analysis of SME E**.**

Table: 7.7 Summary of SME E's findings

Open Innovation initiatives		SME E is still unable to embrace it completely
Competencies related findings		
1	SME's ability to align and match open innovation with the overall Strategy	Open innovation is not considered strategically
2	SME's ability to develop open innovation supporting culture.	The SME is required to go through a cultural change as its current culture does not support open innovation
3	SME's ability to improve inter-departmental connectedness.	The innovation team emerges as a separate team from the rest of the other remaining teams.
4	SME's ability to perceive the needs and expectations of customers and understand market opportunities.	Yes
5	SME's ability to adjust internally and externally developed knowledge to elaborate products and services meet customer expectations and reflect external opportunities.	No Evidence
6	SME's ability to get top management support.	Inadequate support and commitment since the top management team consider open innovation a subordinate element.
7	SME's ability to develop techniques and procedures to govern open innovation.	Yes
8	SME's ability to build and manage adequate IT infrastructure to support innovation	The IT team is not concerned with supporting open innovation implementation
9	SME's ability to establish cross-boundary collaborations outside the business	Yes

This section presented open innovation-related competencies revealed in the findings of SME E. The following section provides an overview of the last case investigated, SME F, and its main findings.

7.7 Case 6: SME F

7.7.1 An overview of SME F

SME F is a business innovation and marketing agency established in Saudi Arabia by a Saudi entrepreneur. SME E aims to empower organisations with cutting-edge, strategy-driven, and innovative marketing approaches. The SME provides different marketing services such as branding and rebranding, social media management, digital marketing, video production and event management. Additionally, the SME provides digital business services such as customers software development and web development solutions. The SME was launched in 2017 and is currently employing around 30 staff members.

7.7.2 Within-case Analysis: open innovation-related competencies revealed in the findings- SME F

Open innovation*:* unsuccessful attempts to embrace open innovation.

Competency 1: SMEs lack having a specific innovation strategy that defines their objectives and how they would be accomplished and serves the strategic direction of the SME. The SME has been recently investing in artificial intelligence. Manager C claimed that the top management did not define the reason behind this investment. The objectives of the project were not communicated or understood by employees, and roles lacked clarity. Thus, employees do not perceive the importance of this innovation project. Manager B claimed that the main challenge with this innovation project was the lack of its proper assessment. SME F initially decided to develop this technology internally. However, the top management found out that its internal resources were inadequate to create it successfully. Thus, they collaborated with a sister firm to develop it collaboratively.

> *I wish this project had been clarified enough, and the implementation roles were defined and explained to us.* (Manager C)

> *I think the top management perceives open innovation as an alternative.* (Manager B)

Competency 2: Manager C pointed out that the current culture of SME F was not prepared to support open innovation, and they have faced high levels of resistance, especially from the technical team through the AI collaborative project, and due to the inadequate support from their top management. The resistance toward open innovation was not behavioural as much as it was attitudinal. This was observed as it indirectly affected the successfulness of knowledge integration with partners. According to manager C, this would appear in the R&D team's endeavour to negotiate and argue their team's ability to perform the task solely and question the benefits of collaborating with external sources of knowledge. However, such resistance requires top management's willingness to build a culture that promotes collaboration. The SME's primary strategy focuses on internally developing their product and services. However, the SME is rarely involved in innovation projects based on external sources of knowledge other than its internal product development team. According to manager A, the SME always prioritises its internal team for its innovation projects. An open innovation model is only adopted when the R&D activities are insufficient to support it. Thus, open innovation appears as a discrete subordinate project to the R&D functions. Therefore, a tendency toward resisting the adoption of the open innovation model was witnessed.

> *I think our team just doesn't like it and would always argue about why they don't want to use such external ideas or question its benefits. (Manager A)*

> *As a company, we were not prepared for this kind of project. Our culture is simply not prepared. That's why we face high resistance. It was not why this initiative did not succeed, but it was challenging.* (Manager B)

Competency 3*:* With the recent introduction of new services and the growth experienced within SME F, management has introduced an initiative to improve the cooperation between different teams within the business. This was observed by introducing new software that facilitates interaction across the SME. However, manager C argued that the new software per se is not sufficient to improve the alignment between the different teams. Instead, most employees still use traditional communication methods like What's App and emails.

According to manager C, each team has its objectives and direction and is not sufficiently aligned with other teams. Thus, the interaction between different teams in SME F is not as expected.

> *The relationship between the different teams is not that good; not much interaction is going on between the heads of the teams unless needed; I think top management can improve this lack of interaction. Like we need socialising hours at least.* (Manager C)

Competency 4: SME F claimed to have routines dedicated to perceiving external trends and understanding customer requirements, although the level of commitment was minimal. This observation was carried out by the notion that this responsibility of understanding customer needs and expectations lies within a team that also oversees several other areas. Moreover, this team has no specific strategy related to customer relationship management. Additionally, it was observed that SME F's top management and employees have limited interaction with customers and inadequate involvement in related processes. Additionally, the SME's strategy and culture do not emphasise the importance of customer knowledge.

> *We try to understand our customers' requirements, but this is not driven by our strategy and values. It is not a priority, let's say.* (Manager C)

Competency 5: One of the main problems that led to the failure of SME's F open innovation project was the incompatibility between external knowledge and internal knowledge. Manager B clarified that while both partners tried to adjust their technologies together, they could not work due to the systems' incompatibility. Thus, this mismatch between external and internal knowledge was the main barrier to the success of the collaborative project.

> *They tried to adjust their technology, and we did too, many times actually, but we could not. It was not possible; it did not fit us, and we did not see any improvement.* (Manager C)

Competency 6: Hence open innovation appears as a secondary alternative; it has been observed that top management in SME F was not undertaking adequate practices to support

open innovation initiatives. Manager A argued that the lack of top management support to open innovation projects since they did not receive sufficient information from the market analyst and product development director. Thus, a lack of proper understanding of all aspects of this project was the reason behind this inadequate support of the project.

> *I would not say they are holding back the implementation of these projects [referring to the technical team] as much as the top management not building an environment that will change our orientation to openness.* (Manager C)

> *The technical team fail to prove to the top management why we need to partner! Many financial and technical aspects were not exactly identified.* (Manager A)

Competency 7: Manager B claimed that the main challenge with this innovation project was the lack of its effective evaluation. The SME initially decided to develop this technology internally. However, the top management found out that its internal resources were inadequate to develop it solely. Thus, they chose to collaborate with a sister business to develop it collaboratively.

> *The few projects we have conducted failed somehow; this definitely would make the top management hesitant about it, especially with the fact that we don't have solid processes or defined roles for it.* (Manager C)

Competency 8: The IT infrastructure of SME F supports project management internally, such as features like project timeline, task scheduling and other simple features to internally manage the project. However, the current IT infrastructure is simple and not prepared to support the integration of data emerging from different partners throughout the various stages of the product or service life cycle.

> *We have lately introduced Trello and Slack to improve and manage communication.* (Manager B)

Competency 9*:* SME F was not keen on building its network and relationships with stakeholders. The main collaborative projects the SME engaged in were mainly with a sister business. According to manager C, since the SME priorities trustworthy relationships, it was the reason for selecting this firm to collaborate within their knowledge integration project. Despite this, some challenges through this collaboration were identified; this includes lack of setting shared goals, misalignment between teams, and some communication problems. Additionally, hence SME F limited the collaboration in its knowledge integration project with that specific partner, the SME's sister business. A mismatch between knowledge of the sister firm and internal knowledge of SME F was a primary reason for project failure. Thus, collaboration ability was a major challenge for open innovation projects in SME F.

> *We trust them [referring to the sister company] of course, I would never partner in any sensitive projects but with a company that we know, personally know them, but sometimes things do not go as it was aimed for.* (Manager A)

7.7.3 Summary of SME F's open innovation-related competencies

The within-case analysis of SME F revealed that SME F was engaged in unsuccessful attempts to implement open innovation. The findings revealed support for two competencies, SME's ability to improve interdepartmental collaborations and SME F's ability to perceive the needs and expectations of customers and understand market opportunities. However, the within-case analysis demonstrated SME F's failure to meet other competencies. Table 7.8 summarises the findings revealed from the within-case analysis related to SME F.

Table 7.8: Summary of SME F's findings.

Open Innovation initiatives		Unsuccessful attempts to embrace OI
Competencies related findings		
1	SME's ability to align and match open innovation with the overall Strategy	SME F does not articulate an innovation strategy that aligns collaborative innovation effort to the business's overall strategy.
2	SME's ability to develop open innovation supporting culture.	The current culture of SME F is not prepared to support open innovation, and SME f has faced a high level of resistance.
3	SME's ability to improve inter-departmental connectedness.	Yes

4	SME's ability to perceive the needs and expectations of customers and understand market opportunities.	Yes
5	SME's ability to develop products and services that meet customer expectations and reflect external opportunities.	Incompatibility between internal and external knowledge was the main challenge to developing the new service
6	SME's ability to get top management support	Despite their attempts to improve knowledge sharing across the SME, insufficient support and commitment toward open innovation projects were observed
7	SME's ability to develop techniques and procedures to govern open innovation	The SME lacks a proper and defined process to manage the implementation of its OI project.
8	SME's ability to build and manage adequate IT infrastructure to support innovation	The IT infrastructure of SMEs is not particularly supportive of OI implementation.
9	SME's ability to establish cross-boundary collaborations outside the business	Collaborating issues related to proper communication and identifying the most competent collaborating partner were observed

The findings of the SME F section mark the end of the within-case analysis discussion. The next section of this chapter presents the findings of the cross-case analysis. This section provides an overview of the cross-case comparison process, analysis, and findings.

7.7 Cross-case comparison- an overview

The within-case analysis sections discussed previously (see sections 7.2.2, 7.3.2, 7.4.2, 7.5.2, 7.6.2, 7.7.2) led to the identification of nine main open innovation-related competencies. All these competencies were identical across the cases that successfully implemented open innovation (e.g., SME A, SME B, and SME C). In this section, the findings that emerged from every case analysis are cross compared to consolidate refined clusters of findings. This step is undertaken to build generalisable open innovation competencies analytically (see section 6.7). Table 7.9 outlines the comparative summary findings for the six cases as recommended by Yin (2013) and Stake (2016) for presenting and displaying cross-case comparison findings, which are grouped into nine main competencies. While all these competencies are found in cases that successfully implemented open innovation, this holistic level of conformity differs at the single-case level for these cases in terms of the micro-contextual or SME level they exhibit.

Further to table 7.9, a more detailed discussion of the cross-case comparison findings follows. The following subsections address each competency separately in a narrative that uncovers differences and similarities across cases and explains such differences. Accordingly, following these narratives, the researcher developed a visualisation of open innovation network competencies. This framework presents both open innovation competencies and their linkages. The main goal of elaborating competency networks is to develop a structure that orchestrates open innovation-related competencies and how they interrelate to answer the first and second research questions. In order to build these networked relationships between competencies, the value-focused-thinking approach was utilised. This approach focuses on building means-ends understanding by emphasising what is important. Section 6.7 provided a further discussion of this analytical approach. The next subsection discusses and cross-compares the findings of the first open innovation competency, namely, SME's ability to strategically align open innovation.

Table 7.9: Cross-case comparison summary

Competency identified	**Properties of the competency**	**Comparison of the cases**						**Similarities and differences**
		SME A	SME B	SME C	SME D	SME E	SME F	
Ability to strategically align and match open innovation to the SME's overall strategy	Well defined open innovation strategy/OI is a thrust for the overall strategy/ well-shared and communicated strategy.	Yes	Yes	Yes	No	No	No	<u>Similarities:</u> SMEs A, B and C: well-defined and shared open innovation strategy. SME B: rewards sharing ideas and knowledge and associating it with its KPIs <u>Differences:</u> SME D: not well communicated OI objectives across the SME. SME E: well-defined objectives, but open innovation is still considered a secondary effort. SME D: lacks having a specific/ clear innovation strategy that defines its objectives.
Ability to develop open innovation supporting culture.	Change culture to become OI-focused.	Yes	Yes	Yes	No	No	No	<u>Similarities:</u> SMEs A and B: open innovation supportive culture since establishment. All SMEs have faced a level of resistance toward open innovation at one point at least. However, the level of resistance and how each SME approached such resistance varied across SMEs SMEs A, B, and C faced an uncritical level of resistance.

								Differences: SME C: cultural change happened with the new leadership. SME D: employee resistance toward OI. SME culture revolves around secrecy and confidentiality in strategy. SMEs E and F: both have faced a high level of resistance toward open innovation; the resistance in SME F was more of employees' attitudes rather than being behavioural.
Ability to improve inter-departmental connectedness.	Interdepartmental collaboration/ high level of communication, cooperation, and data sharing among different parts of the SME	Yes	Yes	Yes	No	No	Yes	Similarities: SMEs A, B, C: high level of cooperation and communication across different teams and department within these SMEs. SME B adopts a job rotation policy to improve the connectedness between the teams to expand their skills and get exposed to the work of other functions, it also helps them construct a big picture and understand the SMEs' different processes and objectives. Differences: SME D And E: despite the high level of collaboration between different teams, inadequate integration of the innovation team with the other teams within the SME has been observed. SME F: new advancements have been initiated to improve the level of cooperation between different teams within SME F. However, the level of communication and cooperation was described to be not adequate.

Ability to perceive the needs and expectations of customers and understand market opportunities.	Interpreting and predicting customer behaviour in different stages of their life/ building customer information/ use of analytical processes/building effective relationships with customers/ systemise their needs.	Yes	Yes	Yes	Yes	Yes	Yes	Similarities: All SMEs considered practices to interpret and understand their customer. Differences: These practices differ in the level of effort and complexity and the extent to which it was systemised and rooted in the strategy, culture, and structure of the SME. (SMEs A, B, and C took the more sophisticated and proactive form of practices and were more systemised and embedded in those SMEs)
Ability to develop products and services that meet customer expectations and reflect external opportunities.	Offering products and services that meet customer expectations/ creating propositions/ internal and external mix of knowledge adjustment.	Yes	Yes	Yes	Yes	No Evidence	No	Similarities: SMEs A, B, C, and D were keen on elaborating products and services to reflect customer needs. These SMEs relied in both internal knowledge and externally developed products and services. Differences: SME F was challenged by the incompatibility between internal knowledge and external knowledge.
Ability to get top management support.	Leadership commitment and practices to support open innovation.	Yes	Yes	Yes	No	No	No	Similarities: SME A and B: Open innovation is a top management initiative, and the leadership has demonstrated full support for its implementation. SME C: open innovation was an initiative of the new top management. Differences: SME D, E and F: lack of leadership support to open innovation. However, innovation directors in SMEs D and E are working on developing a

								proper business case to get management support and commitment.
Ability to develop techniques and procedures to governance open innovation	Building a methodology to plan and structure the implementation of open innovation/ identification of roles and responsibilities/ identification for performance measurements/ building good practices/ partners selection	Yes	Yes	Yes	Yes	Yes	No	Similarities: SMEs A, B, C, D: showed evidence of their ability to develop innovation methodology to structure open innovation model for the SME; this includes best practices, models, and OI related processes. SME E is in the process of building this methodology. Differences: SME F: absence of formalised and structured processes, undefined OI process, insufficient preparation for OI.

Ability to build and manage adequate IT infrastructure to support innovation	Select and manage IT to help and support open innovation. IT flexibility/ IT integration/ real-time information/ seamless partner integration/ proper analytical softwar	Yes	Yes	Yes	yes	No	No	<u>Similarities:</u> SMEs A, B, C, and E: adopted IT systems that allow for flexibility and integration and provide data availability and integrability. <u>Differences:</u> SME A: while the SMEs manually integrate different data, the SME believes it is an important feature and is planning to deploy an IT system that allows for data integration. SME D: the IT infrastructure does not allow for data integration and needs to be managed more effectively. SME E: poor relationship between the IT department and open innovation team. SME F: simple IT infrastructure that is not prepared to support the integration of data emerging from different partners throughout product life cycle different stages.
Ability to establish cross-boundary collaborations outside the business	Building good relationships outside the SME/selecting and identifying best partners, managing collaboration successfully/Building trust/ continuous communication/ alignment of interests	Yes	Yes	Yes	No	Yes	No	<u>Similarities:</u> SMEs A, B, C, and E: keen on building strong relationships with different stakeholders and collaboration partners that is based on continuous communication, long-term orientation and win-win situation. Identify most competent collaboration partners, and set clear and shared goals and responsibilities. <u>Differences:</u> SME D: building a win-win situation was a challenge SME F: limited network. open innovation failed due to selecting partners with incompatible competencies to the SME's internal competencies.

7.8.1 Ability to strategically align open innovation to the overall business strategy

As shown in the previous within-case analysis sections 7.2.2, 7.3.2, 7.4.2, 7.5.2, 7.6.2, 7.7.2, this competency relates to the SME's ability to define an innovation strategy that adapts open practices and widely shares this strategy within the firm. Thus, open innovation should be a thrust of the SME strategy (e.g., SMEs A, B and C). The within-case analysis of SMEs A, B, and C revealed the objectives of open innovation initiatives were defined and directly linked to achieving the appropriate strategic direction. Thus, open innovation was considered a central pillar to support achieving these SMEs' strategic orientation. This was also referred to by manager C in SME B as 'relevant innovation'; hence the SME emphasises the importance of defining what is strategic for them and what is not strategic. Thus, SME B focuses on understanding the purpose of innovating and linking it to aggregating values for the SME and its customer. Therefore, the implementation and evaluation of innovation were measured in parallel to attaining the SME's strategic goals and objectives and should not appear as random acts of innovation.

Similarly, Manager C highlighted that it is necessary not to pitfall into the trap of innovating for innovation. Therefore, Open innovation fits the SMEs' strategic direction since overall strategy in SMEs A and B adopts open strategy. Thus, open innovation was considered the philosophy of these SMEs and an integral part of their strategy that needs to be continuously considered and appeared in the form of systematic processes that influences how the firm operates.

By comparison, SME C's innovation activities were focused on meeting customer requirements. The SME was linking open innovation to its business model as open innovation should fit with the business model and vice versa; the business model might be altered or changed as a result of open innovation. SME C assesses and analyses innovation opportunities to see if it is commercially viable. This assessment is made to see if these new features or ideas to develop the product would propose value to the SME and the customer. Manager A explained that ideas are evaluated in terms of feasibility, functionality, and sales.

SMEs A, B, and C widely share and communicate their objectives to ensure employee awareness and acceptance. One of their cores KPIs is to conduct periodic focus groups and surveys with their customers and end-users to identify potential external ideas. Moreover, SME B built a feedback loop to ensure its employees' alignment. It reinforced and rewarded ideas

and knowledge sharing and associated it with its key performance indicators. Similarly, this was observed in SME C, which associated knowledge sharing with KPIs. The content director of SME C explained that once the roadmap is set to achieve the SME objectives, they translate this roadmap in terms of KPIs.

While these SMEs were concerned with open innovation concepts and defined within their strategy, SMEs E and F were the extreme opposite. In SME E, open innovation was observed as a secondary effort rather than a pillar to achieve the enterprise's strategic goals. Yet, while the innovation team had defined open innovation objectives to support the strategic orientation of the SME, open innovation still appeared as a secondary effort. Evidence has been observed on how SME E suspended open innovation projects in the Covid-19 period as it was not considered a strategic priority. Instead, the top management reduced the resources and budget dedicated to these projects. Manager C claimed that without open innovation reinforcing policies, it would be difficult to change; such policies might include allowing employees to have a dedicated time for ideation. Manager C explained that hence the idea of open innovation is not wieldy practised in Palestine. In addition, SME E needed to formulate policies to support open innovation implementation and priorities to create value. Manager A considers that for a successful alignment of open innovation, such policies need to be communicated widely throughout the SME so all employees are aware of it. Additionally, open innovation-related policies should be associated with incentives to allow employees to perceive the importance of open innovation.

Similarly, SME F did not articulate an innovation strategy that aligns collaborative innovation effort to the business's overall strategy; the SME lacked an explicit and clear innovation strategy. SME F did not define the objectives of its open innovation, how it would be accomplished, how it would serve the strategic direction of the SME and what the SME wanted from such an initiative. SME F lately started investing in artificial intelligence. Manager C claimed that the reason behind this investment was defined by the top management neither communicated nor understood by employees; moreover, roles and responsibilities were not well-clarified. Thus, employees do not perceive the importance of this innovation project. Additionally, no evidence has been given on undertaking any processes or routines to assess customer needs or competitive alternatives before investing in this project. Thus, innovation in SME F appeared as a discrete effort that was not strategically aligned to support the SME mission.

Alternatively, while SME D has only recently started integrating innovation into its business strategy, this transformation was not reflected in other SME functions except for the product development team. It was observed that employees within the remaining teams had not perceived the importance of open innovation as the objectives of such initiative were not communicated and neither shared with all employees.

In summary, SMEs who strategically aligned open innovation were the ones who successfully implemented it (SMEs A, B and D). The analysis of these SMEs demonstrated their ability to define open innovation projects strategically, widely communicate these objectives across the SMEs, and align employees' objectives with open innovation objectives. SMEs D, E, and F failed to strategically align open innovation in which open innovation was not a success. Such misalignment was reflected in considering open innovation as a secondary effort. Therefore, these SMEs did not allocate adequate resources and budgets (SME E). Moreover, the strategic misalignment implied miss-defining objectives and wants of open innovation initiatives, affecting how employees perceived its importance (SME F). Furthermore, it resulted from a lack of cascading and sharing of open innovation defined objectives with all other managers and SME's staff (SMEs D and E).

7.8.2 Ability to create open innovation supporting culture

As open innovation entails collaboration with different actors, SMEs need to shift their attention to focus on internal aspects and increase focus on external factors. SMEs that fail to embrace open innovation successfully typically fail to shift their organisational culture to become more innovative and integrative. (e.g., SME D, E, F).

While SME D has recently adopted an innovation strategy, it did not focus sufficiently on the internal integration of resources. This could result from the misalignment of open innovation to the overall business strategy since SME D did not share the objectives of its strategy with all employees. Thus, the lack of having a widely shared vision and the absence of having adequate embracement of these values by all employees led to a misrecognition of open innovation importance. Similarly, this was apparent in SMEs E and F as both misaligned open innovation to the overall strategy; thus, open innovation appeared as a solo initiative within a single department. According to the within-case analysis of SME E, the interviewees agreed that their culture was not prepared for this new initiative as they described it as risk-averse. Thus, in the cases of SMEs E and F, organisational culture appeared as a critical challenge to open

innovation. These findings highlight the linkage between the strategic alignment of open innovation and a supportive organisational culture.

Alternatively, SMEs A and B have an outward organisational culture that values innovation, free flow of information, employee learning and customer satisfaction. Additionally, it emphasises the importance of external actors' inclusion and appreciates outside competencies and knowledge. Moreover, SME A considers social responsibility one of its core values which shapes many of its open innovation projects. The shared values that have been found pivotal to those three SMEs are their orientation toward innovation, customer involvement and satisfaction, employee learning, collaboration and harmony. While the strategic alignment is critical to the success of open innovation in SME B, manager C asserted the role played by the organisational culture and values installed to support its implementation. According to manager C in SME B, the strategy should define and emphasise the importance of open innovation.

While SMEs A and B were established on organisational culture that promotes innovation and integration, SME C has undertaken a cultural shift to become more oriented toward integration and innovation. This cultural change was associated with the new managing team, who emphasised strategically aligning open innovation. In conjunction, the leadership team worked on changing the organisational culture to be more supportive of open innovation. The lean structure of SME C and the education and training sessions held by top management helped transform the culture to value collaboration, innovation, free flow of information and team learning and harmony.

While all the cases in this thesis encountered resistance towards open innovation initiatives, the levels of resistance and the SME's ability to overcome such resistance were associated with the type of organisational culture. To illustrate, SMEs A, B, and C, which shared a more integrative and outward culture, had less resistance and could rapidly overcome these challenges. For example, while resistance toward open innovation was minimal in SME B, the organisational culture considered innovation and collaboration one of the central pillars and was wieldy perceived as the only way to do things. Therefore, SME B was keen on maintaining constant communication, provided briefing videos, and held regular meetings with different employees to highlight and demonstrate its core values. Manager C in SME B clarified that it is necessary to stress these formulated values across the firm through the activities undertaken by the leadership team.

Moreover, SME B accounts for such values for its employee performance appraisal. According to manager A, employees' appraisal considers their competency in terms of skills and their demonstration of the SME's core value. Thus, employees should demonstrate how they hold SME B values. Furthermore, SME B ensured appropriate employee motivation and recognition by rewarding employees' learning and new ideas to enable effective knowledge sharing. Similarly, the resistance SME C initially faced was not only by the technical team. Employees in the SME were initially refusing to share their knowledge with the product development team when asked for their input on features to be changed. Manager B claimed that this resistance was caused because employees were not used to participating and being asked for feedback and ideas to share with other departments, which confused, leading to further queries. Manager B considered this resistance one of the main challenges they faced at the outset. Therefore, SME C worked to communicate between the top management, the product development team and other members to support open innovation adoption. This took SME C six months to be addressed and overcome. The SME overcame this challenge by emphasising cooperation and sharing among employees.

While SME D culture was not prepared to support collaboration and innovation, the SME started to rethink its process with a consistent view of innovation and collaboration. Manager B explained that this restructuring had been faced with resistance from those involved in the change, and this was a challenge that hampered the effort to implement innovation successfully. As the SMEs are in the middle of this tension between the innovation strategy and existing system forms, people are gradually becoming more receptive to this change.

Alternatively, SME E and Fopen innovation implementation have faced high-level resistance. However, what differentiates these two SMEs was the effort undertaken by the innovation team of SME E to build a business case to encourage top management commitment. Additionally, the business case helped increase the knowledge of open innovation benefits across employees through continuous evangelism and staff education, unlike SME F, which took no effort to change and promote values to foster open innovation and reduce attitudinal resistance. The tendency toward resisting open innovation model adoption in SME F was observed to be related to three main reasons. Firstly, management lack support and commitment to this initiative. Secondly, an attitude that innovation must remain a secretive internal job and should not be shared with externals. Thirdly, the R&D team rejected the need for external sources of knowledge due to ego reasons.

In summary, the findings concerning this competency revealed the importance of initiating a cultural change to become more supportive to open innovation. The findings demonstrated that organisational values must promote innovation, employee learning, team harmony, customer involvement and satisfaction, collaboration and social responsibility. Moreover, the findings revealed the importance of strategically aligning open innovation and the top management in building such open innovation supportive culture. The findings also revealed that facing open innovation-related resistance is expected to occur; however, the lower the level of resistance and higher the SME's ability to manage this resistance, the higher the success of open innovation. The next section considers top management support's importance in enabling open innovation to occur.

7.8.3 Ability to get top management support

This competency refers to the leadership practices undertaken to fully support open innovation initiatives across the SME. Since the senior level of both SMEs A and B were previously employed in large corporations within which open innovation had been a success, they had the experience and understanding of its benefits and practices. Thus, open innovation in these two SMEs was part of their business strategy from the beginning, as the top management believed in the importance of open innovation and was committed to it as part of their philosophy.

SME B's high-level management support to open innovation initiatives has been observed through the leadership team's adopted practices to support open innovation. For example, employees were given free hours dedicated to brainstorming, discussions, knowledge and expertise sharing every week to help and improve the learning and innovation of both the employees themselves and the SME. This encouraged employees' commitment to open innovation. Moreover, this strong commitment by top management to open innovation was observed through the overall culture created, which promotes collaboration, innovation, customer integration and free flow of information, which affects how the SME operates. For instance, SME A encourages building good relationships internally and externally. Manager C considered networking of critical importance to business success. As such, the leadership team periodically invited businesspeople, donors, and external consultants to talk about their businesses and their vision. According to manager C, this expanded their networks and improving employees learning and knowledge, thus, increasing the business efficiency and effectiveness.

Moreover, the leadership team were enthusiastic about keeping their strategy close to the customer perspective. Therefore, they engaged employees to interact with their customers whenever possible, especially the R&D and technical teams. This interaction helped improve products and services to meet SME's B customer expectations. Additionally, it offered further opportunities to SME B.

The new leadership team played a significant role in pivoting open innovation in SME C. It was observed that the level of open innovation adoption had increased since SME C's administration team had changed as the new managing partner and CEO believed in the importance of including customers in the product development and innovation process. Thus, the new leadership team's commitment to open innovation was translated into leadership practices that supported open innovation implementation. This includes driving cultural change to build an open innovation supportive culture and the effort of embedding innovation in the overall strategy. Moreover, the top management has built a strong relationship with outside stakeholders to support knowledge sharing. The top management believes in the importance of external sources of knowledge, especially the teachers, as the SME considers them as one of their most important stakeholders. Therefore, they demonstrated commitment to building relationships with them and including them in product development. This commitment toward the importance of open innovation pushed the SME to construct a teacher reward programme to enable the teacher to be more engaged and build a good relationship that enabled knowledge sharing. Moreover, the top management invited them to social events to maintain their involvement.

While SMEs A, B and C have shown an ability to obtain top management support, SME D's top management has not demonstrated the same level of support to open innovation. According to manager B, while the two founders and managing partners of the SME had an entrepreneurial orientation and showed support to open innovation, the innovation team faced challenges dealing with other top-level managers. Manager B clarified that the top management did not demonstrate the same commitment as the managing partners. Thus, SME D needed to develop a thorough business case that the product innovation manager presented to gain the support of top management, as open innovation was not a top-down initiative. According to the innovation manager at SME D, they are required to achieve the leadership buy-in in this transformation initiative to open innovation. Manager B stated that gaining top management support to open innovation was critical. Therefore, the innovation director sought

to achieve this support through building a business case that justified and rationalised the reason behind the adoption of the open innovation initiative, including a cost/benefits analysis. According to manager B, this helped gain top management buy-in to open innovation.

Similarly, SME E has been working on building a business case to gain top management support to open innovation as they initially failed to gain their attention to the strategic importance of open innovation. The lack of top management support and commitment in SME E was found as a significant challenge that restricted the implementation of open innovation. Manager A stressed the importance of top management buy-in and the cultural change toward open innovation. Manager B in SME E associated the lack of strategic alignment to open innovation with limited top management support. As top management was not considering open innovation as one of its strategic priorities, they were not allocating sufficient resources. Manager C clarified that in Covid-19, SME E decided to delay allocating resources to open innovation projects. According to manager C, this was related to the timing of innovation from the top management perspective. Manager A noted that top management's support is an evolutionary process, where the buy-in is accumulated to their realisation of the importance of open innovation. This realisation can only be gained through developing a business case. This highlights the role of tactical managers in obtaining top management support to open innovation.

Additionally, Manager C emphasised the importance of having a top-down change to open innovation implementation. According to the manager, this top-down approach is vital to initiate change in other aspects of the SME, such as culture and nature of work and roles.
As in SME F, while the top manager argued that they noted the importance of open innovation, no commitment or adequate practical support has been observed to be demonstrated by top management to support such an initiative. Hence open innovation appeared as a secondary alternative; manager A argued that the top management of SME F lacked support; hence they did not receive sufficient information regarding the open innovation project from the market analyst and product development director.

In summary, the findings revealed that gaining top management support is critical to open innovation. Such support and commitment of the leadership team are associated with top management knowledge and understanding of the importance of open innovation and its

practices. Additionally, the findings revealed top management support linkages to supporting open innovation strategic alignment and initiating a cultural change to build an open innovation supportive one. Furthermore, the findings demonstrated the role of tactical managers in building a business case to win top management support. The next section cross-compares SME's ability to improve interdepartmental collaboration in enabling open innovation to occur.

7.8.4 Ability to improve inter-departmental connectedness

This competency refers to the SMEs' ability to improve inter-departmental communication and collaboration. This would include formal and informal communication across all teams within the SME. To enhance the level of innovation in the enterprise, all teams involved are required to communicate, exchange information, and interact regularly. This was apparent in SMEs A, B, and C. SME B employs an HR policy that rotates employees between different positions within the business to improve the connectedness between the teams. Employees rotation was part of the SME's hiring strategy. While this strategy allows employees to expand their skills, it also helps them construct a holistic understanding of the SME's different functions and objectives. This finding highlights the role of human resource management practices in improving interdepartmental connectedness in open innovation.

Similarly, SME C has a high level of dependency between departments. Manager A noted that the product and technical team have a dependent relationship. Moreover, Formal and informal communication is constantly occurring between these departments. SME C holds regular meetings with all their employees. When the product development team decides to change product features, they include all employees through meetings where the team explains the nature of the changes. Therefore, any change was communicated to all employees who were given the opportunity to give feedback.

It has been noticed those SMEs with the highest level of interdepartmental interaction and communication have deployed IT solutions that allow seamless and real-time knowledge sharing (SMEs A, B, and C). This creation and deployment of IT-supported communication mechanisms resulted from the continuous collaboration and communication between IT teams and the product and project development teams. The IT manager of SME A works collaboratively with other departmental teams. While each of these teams are dedicated to achieving their objectives, the leaders of each team ensured their business and technical knowledge to have one collaborative pool. SME C created a voting system to allow employees

to provide feedback and vote on ideas. This system allows employees to visualise, browse, suggest, and provide feedback on all ideas. According to manager B, this improved the connectivity and interaction between employees at different levels. Lately, the pandemic has led the SME to introduce a one-hour mandatory coffee break to allow their employees to socialise and encourage organisation wellbeing. These findings highlight the linkages between IT and interdepartmental connectedness. Thus, the collaboration and interaction between the IT team and the other staff are necessary to support knowledge sharing, whether internally or externally. However, the introduction of new IT tools to support and facilitate information flow between teams by the top management of SME F did not improve the level of alignment between teams.

However, the lack of interdepartmental collaboration has been identified as a critical barrier in SMEs D, E and F. To illustrate, it has been observed that the communication channels and collaboration between the innovation team and other teams were ineffective. This was demonstrated by minimal interaction with the innovation team. Thus, the innovation team, which had only been recently created, appeared to work in isolation from other parts of the business. This misalignment of this team with other departments was apparent due to the lack of consideration of open innovation within the strategy. As such, employees did not appreciate the importance of open innovation. Thus, they have not recognised that their interaction and communication with the innovation team were necessary to achieve the strategic objectives. Hence, this was identified as a critical challenge for open innovation implementation in SME D. Similarly, the introduction of new software that facilitated interaction across the SME was insufficient to improve the alignment between the different teams. Instead, most employees preferred to use traditional communication methods like What's App and emails. In addition, in SME F, each departmental team was found to have its objectives not aligned to other teams. While the IT role has been identified to support interdepartmental connectedness, the findings also demonstrated that the strategic alignment of open innovation and the role of top management affect this relationship.

In summary, the findings revealed that the SME's ability to improve inter-department collaboration is a key competency to open innovation. HRM practices was found to be of support to this competency. The findings also demonstrate this competency linkage to SME's ability to align open innovation strategically, top management support and IT. The next section

cross-compares SME's ability to understand customers' needs and expectations and market opportunities as a key competency to open innovation implementation.

7.8.5 Ability to perceive the needs and expectations of customers and understand market opportunities

The findings of this research revealed that this competency refers to the SME's ability to perceive and systemise customer real needs and interpret their behaviour to meet their expectations. All the respondent SMEs considered building good relationships with their customers. Building such long-term relationships was based on maintaining consistent communication with customers to capture their input, behaviour and feedback.

All the respondent SMEs noted the importance of perceiving customer needs and expectations. However, they varied in their approaches. All respondents differed in the level of effort, complexity, and extent to which these practices were systemised and rooted in the business's strategy, culture, and structure. This competency was found to be critical to SME B as it was observed that the main strategy of the business revolved around customer satisfaction. According to manager C, one of the main objectives of open innovation is to satisfy and meet customer needs and expectations. Further, the culture of SME B encouraged listening to customer needs and voices and involving them in several phases of product development. To reinforce a customer satisfaction-oriented culture in SME B, the management team sought to engage the team to interact with end-users. While this might not be possible all the time, SME B sought to engage the product technical development team to sense and understand the market requirements. According to manager C, such engagement and interaction would allow the product development team to more effectively understand customer needs and gain further insights into their behaviours and feelings. Accordingly, to build products and technologies that better match their requirements and expectations. Such practices were constantly adopted by SME B and business analytics models to understand and gain insights into customer behaviour and market trends.

Similarly, SME C launched several initiatives to support this relationship, including teacher reward systems, focus groups, health checks, surveys, and even regular dinner invitations. The CEO of SME C was directly involved with this process as she believed observing customer needs and wants was a pivotal organisational process. The involvement of the SME's CEO and employees in these processes emphasised the importance of building effective relationships for

the SME, its employees and the customer. Additionally, the role of IT played in supporting this competency was observed as the SME used CRM analytics to capture and analyse how their customer interacts with their business. According to manager A, this system is bringing them to build closer relationships with their customer and help pool customer needs and expectations and collaborate with them automatically. However, while the findings demonstrated the importance of IT analytical software, keeping personal contacts with customer is important to preceieve their feelings and gain insights that would not be captured by these IT applications. Therefore, the analysis showed a high level of institutionalism and complexity of practices related to perceiving and generating data from customers regarding their needs and behaviour.

The analysis demonstrated that this competency was observed important to offer products and services that customers value (SMEs A, B, and C). These three SMEs hold their strategy and culture around listening to their customer voices and building their organisational processes emphasising customer relevance and value. This was also evident in how these SMEs build their reward system, matric around customer values, and initiate customer participation and involvement programmes. For example, SME C established a designated team responsible for supervising all the SME's customer relationship-related efforts. This team's tasks were crucial to systematising and embedding such customer-oriented practices in the business. Examples of these practices include laying down specific criteria for evaluating customer ideas and suggestions and initiating a customer reward system. SME C deployed proactive mechanisms to interpret their customer requirements and predict their future behaviour, whilst SMEs D and E used reactive approaches to observe what could be changed based on customer input, namely, customer complaints. Likewise, SME A and B used both proactive and reactive mechanisms to achieve this end. Thus, the practices adopted to support meeting customer requirements were found to be more institutionalised, sophisticated and proactive.

Alternatively, SME F claimed to have routines dedicated to perceiving external trends and understanding customer requirements, although the level of commitment was minimal. The analysis of this competency showed that this business had the least levels of institutionalism and complexity related to SMEs ability to undertake processes to understand customer needs and expectations. This observation was carried out by the notion that this responsibility of understanding customer needs and expectations lies within a team that also oversees several other areas. Moreover, this team has no specific strategy related to customer relationship management or product dvelopement. Additionally, this observation was also born out by the

evidence observed that SME's F top management and employees have limited interaction with customers and inadequate involvement in related processes, compared to SMEs A, B, and C. Thus, in comparison to SME F and E, SME A, B, and C undertook more sophisticated and proactive actions which were more systemised and embedded in the business.

SME A, B and C, and SME F can be seen as representing the two ends of a continuum in terms of the level of intuitionalism as well the level of complexity of practices adopted. Whilst SME D and E was found to be adopting practices in the middle ground. SME D and E sought to be proactive and adaptable to understand the requirements of their customers and accordingly analyse the features of products that addressed these requirements. This was not grounded in the business strategy. While all these SMEs studied undertaken processes to understand their customers. Although this competency was found in all SMEs, despite its varying levels, its relevance to all types of open innovation different practices the SMEs adopted was observed.

In summary, the findings of this thesis provide insights on the importance of perceiving and systemising customers real needs, interpreting their behaviour, and meeting their expectations. This would require SMEs to build long-term customer relationships. the findings suggest that SMEs must proactively undertake processes to understand customer needs in the different stages of their customer life cycle. The findings also suggest that maintaining personal contacts with customers is pivotal in capturing and identifying customer feelings. Insight is provided into the critical role that these relationships play in enabling a greater depth of knowledge than could be provided through the use of IT software alone. While this competency was identified as critical to all SME studies, it varied in its level of institutionalisation and complexity. This new insight suggests that those SMEs who successfully implemented open innovation were the ones in which this competency appeared to be more rooted in the SMEs culture, structure and strategy, and practice a higher-level complex activity. The finings also revealed that an SME's ability to understand customer needs, expectations, and market opportunities is critical for all open innovation model types. The next section cross-compares findings concerning SME's ability to offer products and services that meet these needs.

7.8.6 Ability to offer product and services that meet customer expectations and reflects external opportunities

The findings revealed that SMEs' ability to offer products and services that matches customer expectations and market analysis is critical. Thus, all elements of the SME should work cooperatively to fulfil R&D functions along with the identified valuable sources of knowledge to develop and offer new products and services that meet or exceed customer expectations and reflect new market opportunities. This would encompass reconfiguring and combining the mix of internally and externally developed knowledge.

For example, SME's B strategy is based on leveraging internal and external sources of knowledge to offer products and services that would meet customers' expectations according to market opportunities. SME B gives priority to the R&D team in terms of allocating adequate resources to support their work. SME B does not solely rely on internal ideas and knowledge but goes beyond its internal boundaries to search, harness, and integrate outside knowledge and technologies to improve its innovation capacity. It has been observed that the top management perceived such roles of the R&D functions to be critical as it has been referred to as 'the future of the company' according to manager C. Additionally, the evidence perceived of the importance of the role of R&D activities was observed through the connectedness of this team and top management. The team reporting to the engineering director also report to the managing director. However, the higher-level management is in constant contact with the R&D department. In the case of SMEs A, B, and C, they work on evaluating the compatibility of external and internal knowledge before collaborating.

These three SMEs are undertaking routines that should help them systematically capture, identify, and select internal and external ideas and knowledge to develop their new products or services. For example, SME C follows a systematic process to build and develop their products according to the requirements and perceived expectations. According to manager A, SME C views their customers as their partners in the process of open innovation and product development. The product development director of SME C pointed out a voting system was established to help evaluate and select ideas. Additionally, the output gained through the CRM system and data gathered through what's app groups, health checks, focus groups, and the output of customer involvement in the product ideation stage is analysed and used along with internal ideas in developing products and services that provide value to customers. Thus, SME A, B, and C based their new product strategy on meeting customer needs and market opportunities. SME A additionally evaluates its internal capabilities and then decides on which

external knowledge they seek to use. Thus, incorporating external knowledge into internal knowledge is essential for open innovation success.

SMEs A, B, and C offer proof of concept and products and services free trial; they also seek customer feedback and suggestion regarding these new products. In addition to SME D, these SMEs develop multiple tests and pilots through the different stages of product development. Additionally, as discussed in section 6.9.5, involving different employees, especially those who work on product development, to interact with customers is essential to propose new processes or services (SME B). Moreover, manager B in SME B suggested that employees who directly interact with customers should demonstrate a full understanding of the SME's new products and services while dealing with customers.

A critical barrier SME F faced while conducting its AI project was the inability of the two partners to adjust their knowledge. SME F was challenged by the mismatch or the inability to adapt internal knowledge and external knowledge together. According to manager C, while the two teams saw the potential of collaborating at the beginning of the project, and despite the two teams demonstrating their willingness to adjust and modify the mix of internal and external knowledge, they were not able to collaborate due to this incompatibility. This was perceived as the main reason for the project's failure.

In summary, the findings reveal that SMEsrequired to identify customer sources of value and offer new propositions to meet their needs. Additionally, the findings reveal that this competency was related to other competencies, namely SME's SMEs' ability to perceive customer expectations and market opportunities, as this is the primary source for developing any customer proposition. Additionally, the findings illustrated the linkages of this competency and the SME's ability to build connectedness between different and construct cross-boundary relationships outside the SME. This would be a source to acquire external knowledge. The following section cross-compares findings concerning SME's ability to develop techniques and procedures to govern open innovation.

7.8.7Ability to develop techniques and procedures to govern open innovation

This competency refers to the SME's ability to choose the most appropriate open innovation governance model. This includes decisions regarding the forms of open innovation, levels of search and openness. This was observed in SMEs A, B, C and D. These SMEs were observed

to conduct assessments prior to each open innovation to identify project objectives and evaluate existing internal capabilities, level of openness and forms of collaboration. Another aspect SME A determines regarding any open innovation project is the nature of this relationship. Thus, these SMEs usually plan the form of open innovation it seeks to establish. Usually, this plan is documented and acts as a reference or methodology for the way the SME will innovate and structure the open innovation model.

Similarly, SME C structured open innovation through transparent identification of project expectations, collaboration forms, communication mechanisms, and key performance indicators. Manager A of SME E pointed to the importance of elaborating best practices to structure an open innovation model for the SME to sustain open innovation. As SME D is now delaying open innovation activities, the open innovation team is trying to build a methodology of open innovation competency, which plans the kind of open model the team wishes for, as they have failed to put this so far. Additionally, this methodology would address the legal aspect of any open innovation project and all other needed documentation.

Alternatively, Manager B of SME F claimed that one of the main challenges with this innovation project was the lack of its proper assessment. SME F lacked an appropriate definition and formalisation of the objectives and roles of their open innovation strategy. Additionally, it has been observed that SME F did not effectively prepare for the project, as many aspects were not sufficiently analysed, including technical, strategic and partner compatibility aspects. This was claimed by manager C to be one of the main challenges the SME faced.

However, while the finding demonstrated the importance of developing an open innovation methodology that governs its implementation, none of the SMEs was observed to have adopted a strict policy toward legally protecting their IPs. SMEs A and B justified this finding by the nature of their businesses. According to manager C of SME B, it is challenging to file a software patent in addition to the short life cycle of this type of patent. To overcome this issue and obtain value from their IP, these SMEs tended to follow informal protection approaches. Manager A of SME B clarified that they seek to informally protect their IP through tradesecrets and complexity *"Our streaming architecture is the crown jewel or the secret sauce that we have, and that is a trade secret, like inside the company, and it's a massive thing that has been built over the last six years."*.

A similar behaviour that demonstrates informal IP protection to overcome the challenges of legal IP protection was observed through secrecy (SME D) or relying on speed to market (SMEs A and C). Manager A of SME A claimed that there is a significant gap in the e-learning industry in terms of skills and innovation speed. Thus, the SME believes that building and accelerating the market would require openness, *"Our leadership team are firm believers that buildings a market will help us move, even having more competition will help us more. We are still evangelising a new concept of learning online. This is something new and just go with your memory a year back before Covid-19. People didn't accept this concept easily, now, it's so accelerated. Still, again it's buildings the market more and more, it opens opportunities, more and more having more competition is really good for everyone at the moment, and it pushes us as well to innovate more. So, I said, so now innovation would come as a necessity, and we don't look even as competition will come from the Arab world; we look at competition worldwide. So, we consider ourselves will be contributing to this industry worldwide."* (Manager A, SME A)

Turning to SMEs C, D and E pointed out that the inadequate development of IP laws in the Middle East is associated with several complex and interrelated factors, including legal, economic, political, and cultural factors.

> *There's a lot of piracy, you can see our DVDs all over in Amman.* (Manager A, SME C)

> *To be honest, IP as a culture and as regulation in Arab world is zero, if you are in USA or Europ, yes you can protect you would be right, but here is different, this is not happening."* (Manager B, SME A)

The findings demonstrated the importance of building an open innovation methodology that plans and governs open innovation projects. The findings also revealed that this methodology should include best practices, open innovation models, tools and processes, whilst legal protection of IP was not founded as a critical enabler to open innovation for these SMEs. SMEs tend to undertake practices to protect their IP informally. The next section cross-compares findings concerning SMEs to build and manage a supportive IT infrastructure.

7.8.8 Ability to build and manage adequate IT infrastructure to support innovation

SMEs' A, B, and C within-case analysis has demonstrated their ability to identify, select, and manage a range of information technologies to support open innovation strategy. The IT infrastructure of SMEs B and C allows for different systems and data to be integrated. This turned out to be an important feature for those two SMEs. The findings reveal that integration features enable them to connect with different systems and access alternate external and internal knowledge. Manager B in SME B pointed out the importance of having IT systems that allow data to be easily accessible, internally and externally, and flexible enough to permit collaboration with different partners. Therefore, the IT system in SME B supports collaborative relationships by providing accessibility and allowing for connection and integration with any partner. To support this, SME B uses different tools and software that promotes openness. According to manager B, all SME B's technologies are developed based on open APIs. Additionally, SME C deployed IT tools to support open innovation, including JIRA. This software allows for collaboration and transparency in product development. Manager B considered this software as the SME's knowledge acquisition system.

While SME's A IT infrastructure does not allow for this feature, manager C highlighted the importance of data integration in open innovation. Manager C assured the SMEs need to adopt these features soon, although data integration is currently done manually. Another IT feature that was found in SMEs A, B, C and D was real-time data availability. Manager C in SME A justified the rationale behind IT solutions and software providing data availability as being a business requirement for many other functions. This includes instantly measuring customer response, analysing failure, security attacks, and supporting knowledge and data exchange. Additionally, it has been observed that the process of selecting these technologies was not only conducted by the IT team in these SMEs; instead, such decision is made collectively with those who might interact and use the systems. This hybrid knowledge of the technical people, businesspeople, and users is critical for selecting the appropriate technology.

In SME B, the function of the IT director is aligned to the business development manager, who was formerly an IT director in another business. Manager C argued that accordingly, the IT director would be the same one who is overseeing the strategic direction for SME B. This, in return, will improve the strategic alignment level of the SME. Additionally, Manager C pointed out that investing in an IT system should be evaluated strategically regarding how such a

system would support achieving strategic objectives and providing value propositions. Therefore, aligning the role of the IT director to a senior management position would help achieve this end. This strategic alignment of IT to open innovation was apparent as to how SME B aligned the function of the IT director to the business development manager. According to manager C, this would improve the SME's strategic alignment level, so the director of the IT team is also in charge of SME B's strategic direction.

SME D uses Sandbox software as a communication channel with external actors. This software provides real-time information and is considered user friendly. The SME is also considering adopting ERP software to support and monitor communication and knowledge. Manager A considers this IT system a mechanism to improve communication. However, a lack of cooperation between teams, even after the deployment of this new communication software, was observed. Despite this, the different IT systems adopted in SME D did not allow for data integration.

By contrast, a misalignment between the IT department and the innovation team has been observed in SME E. To illustrate, this competency was identified as a critical issue to SME E as the IT team in SME E did not show sufficient support to achieving open innovation objectives. According to manager B, the IT team does not recognise the strategic importance of open innovation. As a result, the relationship between the two teams was not found very beneficial, as the IT team regards open innovation as not being one of the SME's strategic priorities. SME E's IT team's main objective was to support operational efficiency. Manager A argued that the IT team in SME E was not overly concerned about external sources of knowledge. According to manager B, the IT team did not appreciate the strategic importance of open innovation. While the SME recently has adopted a system that integrates all information coming from other systems and sources of knowledge, manager B clarified that such initiatives were not done to support open innovation. By contrast, it was deployed to support the SME's operational efficiency. Similarly, SME F's IT systems were too basic to support open innovation and were administrative rather than strategic in their value.

Thus, the findings of this research suggest SMEs ' ability to choose, deploy, and manage a bouquet of information technologies to support innovation as a critical competency. Additionally, the findings highlighted the importance of IT strategic alignment to open innovation. This competency was identified as a critical issue to SME E as the IT team in SME E did not show sufficient support for achieving open innovation objectives.

7.8.9 Ability to build and manage cross-boundary collaboration outside the business

SMEs A, B, C and E were observed to be able to establish and manage partnerships with open innovation actors successfully. The three SMEs highlighted the importance of maintaining effective communication while collaborating. Manager C of SME B argued that building cross-boundary relationships were not an alternative. From the manager's perspective, extending the SME's network was necessary. Manager C pointed out that while it is essential to build strong relationships with end customers to help understand their demands, building ties with other stakeholders was equally crucial in maintaining networks.

However, it was observed that the characteristics of the business leader had a critical role in building such relationships. According to manager B, the SME relies heavily on the network and personal contacts of its senior-level management and employees. However, SME B also considered some activities to assure building effective relationships with external stakeholders and open innovation partners built on trust. This includes evaluating how competent this potential partner would be in terms of resources, culture, and deliveries. Manager A noted that choosing an incompetent partner would be a waste of resources. Thus, SME B conducted several meetings prior to signing a contractual agreement with potential partners to decide their compatibility. To strengthen relationships with its partners, SME B sort to improve trust by providing a proof of concept. This investment from the SME's perspective proved its intentions to deliver. Additionally, according to manager C, providing a product free trial would assist in building trust between the SME and partners. Further, the SME commits to delivering the value their partners are seeking. Similarly, SME F prefers to collaborate with a trustworthy partner. According to manager F, this was a primary reason for collaboration with a sister business. However, some collaboration aspects have appeared to be challenging and negatively affect collaboration, such as incompatibility of knowledge, misalignment between teams and lack of frequent communication. Therefore, this competency relates to an SME's ability to choose and manage IT to support open innovation.

Additionally, building a win-win strategy was found as a critical key to the success of these SMEs' collaborations. Manager B in SME E highlighted the importance of establishing a partnership with all stakeholders. This relationship to be strong must consider aligning the interest of those parties involved to assure the success of this partnership. According to manager A, developing an alignment of interests requires understanding the language of

stakeholders and acting upon it. This alignment of interests needs to be developed internally and externally. However, this has appeared as a challenge for SME D as manager B noted building a win-win situation does not work all the time and is usually a barrier to collaboration.

The findings reveal that SMEs' ability to establish and maintain effective partnerships with external actors, including customers, is critical to the success of open innovation. The findings of this thesis suggest that effective building partnership in open innovation requires creating a win-win strategy between collaborating actors.

7.9 Open innovation competencies relationships framework

The within-case analysis and cross-case comparison aim to identify open innovation organisational competencies. Nine main organisational competencies related to open innovation were identified. Further, this study adopts the Value-Focused Thinking approach introduced by Keeney (1992) to answer the second research question related to analysing the linkages between competencies. According to this approach, values are necessary to assess the real consequences of specific actions. It focuses on creating strong connections between means (competencies), thus, understanding how they interrelate (Keeney, 1994). This is identified by asking questions like, "Why is that important?" (WIIT), "How could you achieve this" and "What do you mean by that". The answer to these questions would reflect the linkages between competencies. Considering the undertaking analytical approaches in this thesis, figure 7.2 illustrates open innovation's main competencies and how these competencies interrelate. Appendix I provides an example of how this analysis was undertaken.

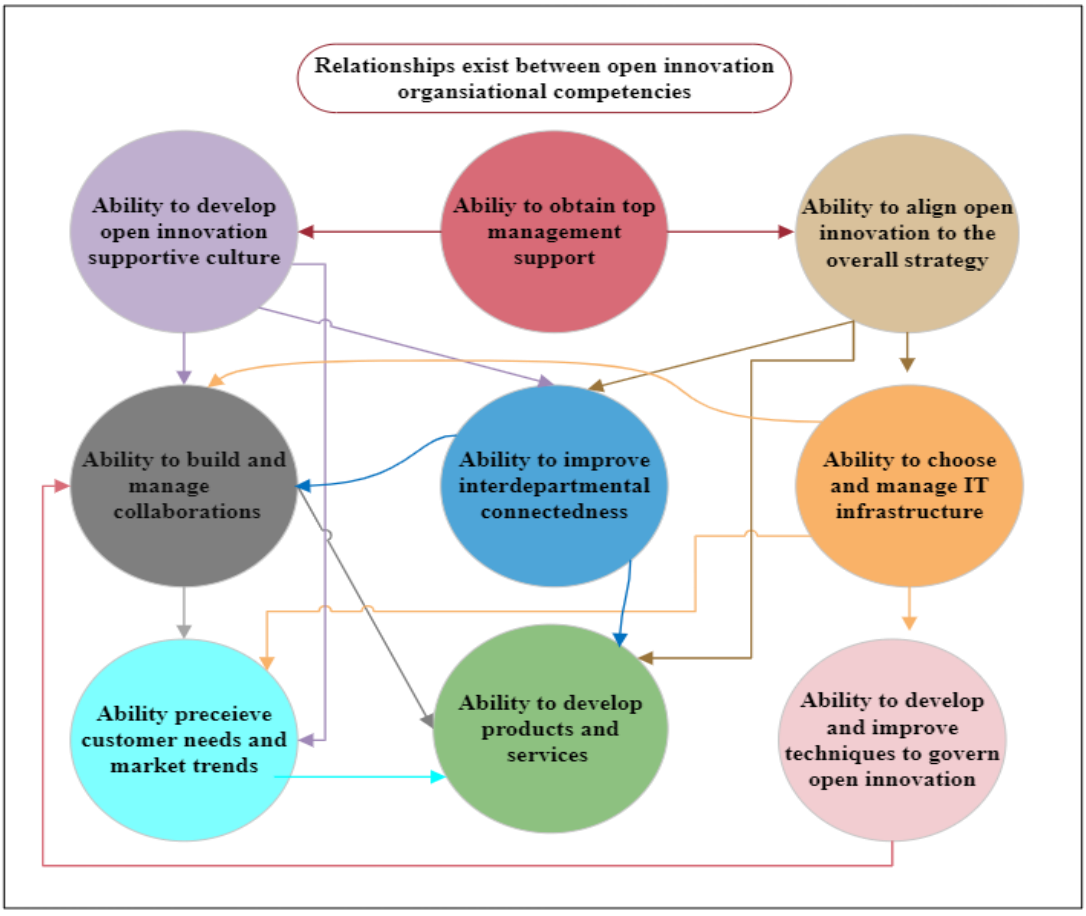

Figure 7.2: Open innovation competencies relationships

SME's ability to obtain top management support is important to support its strategic alignment. Top management can define the open innovation-oriented organisational lines that will govern the SME's overall strategy. Their support is also critical for all employees to understand the relevance of the open innovation and to incorporate its values into their daily routine, thus, gradually building an organisational culture that supports integration and innovation. In return, building an organisational culture that promotes knowledge sharing, team harmony, and employee learning would directly improve internal departmental collaboration and the level of knowledge sharing with business partners. Additionally, If all employees understand the value of open innovation, communication with external partners, especially customers, will increase. Thus. SME's ability to build a culture that supports open innovation and integration would directly affect its ability to improve interdepartmental connectedness, build cross-boundary collaboration, and perceive and understand customers' needs. Then again, collaboration and teamwork amongst departments are critical in demonstrating to customers that the organisation develops open innovation values internally. Collaboration and teamwork amongst departments are critical in demonstrating to external sources of knowledge that the organisation develops

open innovation values internally and its ability to collaborate and share knowledge across its boundaries.

As open innovation is closely related to sharing knowledge to improve an SME's innovation capacity, effective collaboration and knowledge sharing between departments is critical for providing new offerings. While the value-focused-thinking approach demonstrated the linkages between SME's ability to improve interdepartmental connectedness with its ability to collaborate and provide new products and services, it also demonstrates the relationship between these last two competencies. Similarly, as open innovation is closely related to sharing knowledge to improve an SME's innovation capacity, effective cross-boundary collaborations are crucial to improving SME's ability to offer new propositions. Additionally, after perceiving customer needs and expectations, an SME conceptualises and provides products and services that meet their expectations. Strategic alignment also affects SMEs' ability to offer new propositions.

While open innovation strategic alignment affects SMEs ' ability to offer new products and services that meet customer needs, it also affects the level of interdepartmental connectedness. The level of knowledge sharing and collaboration across the department will be defined and strengthened in accordance with open innovation strategy. IT infrastructure should also be redefined in accordance to open innovation strategy. IT software and systems exist internally, and the ones available in the market affect open innovation techniques and procedures and how SMEs listen to their customer and understand their needs. This includes technologies related to connecting, communicating, and analysing external knowledge; thus, it is crucial to conduct cross-boundary collaboration and understand customer needs. Appendix I provides an example of the WIIT of the value-focused thinking approach to determine open innovation competencies relationship analysis. This part of the chapter has provided the findings related to open innovation organisational competencies analysed by undertaking the within-case analysis, cross-case comparisons and the value-focused-thinking approaches. The following section analyses the findings related to open innovation capabilities from a dynamic capability perspective.

7.10 An analysis of open innovation from a dynamic capability perspective

The preceding part of the chapter provided an analysis of open innovation competencies and illustrated how these competencies interrelate. This section analyses open innovation capability from a dynamic capability perspective. Teece (2007) proposed the dynamic capability framework which is applied in this thesis to propose a similar theoretical framework for open innovation capability. This meta-capability framework is proposed by adopting open innovation concepts and empirical evidence that emerged from SME C. While this dynamic framework has been analysed considering evidence that emerged from SME C, it is worth mentioning that the cross-case comparison provided for each competency and the evidence in with-case findings and Appendixes (K, L, M, N and O) reflect the dynamic nature of these capabilities too. However, since these capabilities are process and path-dependent, focusing on one case would provide more in-depth insights. Thus, the following is a discussion of each meta-capability considering evidence from SME C.

7.10.1 Sensing opportunities and threats

This meta feature enables businesses to conduct ongoing market and new technology evaluations to identify and shape opportunities and threats. Threats, in general, indicate any changes in the business ecosystem. SME C recognised the ecosystem movement represented by the new technological advancement and emergence of a new rivalry. Recognising this ecosystem movement, SME C had to rethink its organisational processes to operate in the market. However, interviewees in SME C claim that recognising the desirable necessity to change took a long time until the new leadership took over in 2015. After then, the SME recruited new professionals to support the collaborative innovation projects.

Interviewees of SME C reported that adopting open practices in innovation was a priority for the new leading team and was fully committed to its implementation. Their support was reported as an essential requirement for the change toward the new paradigm. However, manager B said this change did not go smoothly as it clashed with the SME's existing culture. Additionally, the manager claimed that this occurred due to the development and change in organisational processes the SME had to undertake. Therefore, employees who worked in certain ways, in which it was governed by values that promote exclusivity, showed resistance toward open innovation concepts. Thus, they needed to introduce employee training to overcome this issue.

Since SME C started to adopt open innovation practices in 2015, several efforts were undertaken to improve this initiative continuously. Interviewees reported unanimous affirmation on how SME C has been enhancing knowledge exchange within the business, between employees themselves, different departments and external actors. Furthermore, several business-related, behavioural and technological initiatives were initiated to improve open innovation implementation. This unanimous affirmation on the introduction of several improvements to support open innovation was also sought on how SME C aligned employees' objectives with knowledge sharing and open innovation.

While the Covid-19 pandemic was perceived as a threat to many businesses, SME C sensed this as an opportunity. With the closure of all schools resulting from the consequences of the pandemic, SME C launched a new app to support all school learner and their parents in the middle east with home-based learning. This app was customised and aligned according to each country's curriculum. Additionally, SME C collaborated with the ministry of education in Jordan to move the SME's digital library to the ministry's online portal to be available to school students. Additionally, the Syrian war resulting in the world's most remarkable refugee and displacement catastrophe was sensed by SME C. As a result, SME C collaborated with the UNICEF along with the ministry of education in Jordan to create a platform and digital resources to promote social cohesion and literacy for refugees. This platform was transformed later to a digital library to support those Arabic speaking children with less-resources context.

Endogenous and exogenous elements, according to Teece (2007), might offer opportunities for an SME. SME C product development team seeks to effectively observe internal new ideas and stimulate their employees to initiate brainstorming to support its innovation processes. The team created a voting system that allows employees across the SME to propose ideas and evaluate and vote on them. In addition to the voting system, the team invites internal and external people willing and able to contribute to specific issues to brainstorming meetings. Additionally, the IT system that the team used allows for transparency and inclusion in several product development stages. This team adopted a well-structured methodology to observe opportunities and assess them regarding benefits and risks. Additionally, this methodology highlights the role of including external actors, especially customers, in its different activities.

Considering the arguments discussed in this section, the sensing capability includes several activities. This includes processes monitoring R&D and assessing and selecting external knowledge, processes to tap into advancements in external science and technology, and processes to systematically identify market segments and customers' changing requirements. Moreover, the evidence that emerged from the cases demonstrates that applying constant improvements to open innovation processes is necessary. Firstly, processes of choosing SME's employees and new partners. Secondly, identifying external sources of knowledge. Thirdly, knowing partners over time. Fourthly, observing external innovations to aggregate value to build profitable collaboration for all parties, and finally, deploying and using IT to improve knowledge sharing.

The dynamic capability framework states that a consolidation step is required after recognising, absorbing, and shaping new opportunities. The following section discusses the seizing capability in SME C. Table 7.10 represent selected quotes related to 'Sensing' meta-capability.

Table 7.10: Selected quotes relating to the 'Sensing meta capability' concept

Market-related cluster characteristics, distinct market trends, and different opportunities or collaboration opportunities must all be kept in mind. We must keep an open mind and be willing to partner to provide greater value to our customers. (Manager B)
We conduct competitive analysis. We have to always keep researching. Keeping an eye open on what kind of services and products they are launching, how to beat that or even keep up with it. We would have scenarios on how to respond in case X or Y if happens. (Manager A)
We are changing, right, so we started with something, and we're pivoting. And when you do that, I wouldn't say that everyone was aligned, but the change takes time. So when that happens, people need to be trained; people need to be on the same page and aligned with the objectives; this is what we were doing. (Manager A)
Any idea, knowledge, and innovation have to go through what we call a value proposition document, which contains a brief about the idea itself. It contains any document of the template that you have to sell; what does it contain, why would this idea succeed, why it might fail? What kind of potential does it have, its impact, how does it fit with everything else? Once this is finished by anyone who wants to present any kind of idea, we take it internally as a product, and we have a prioritisation system. Where we define each, let's say, opportunity by itself. Its strengths and weaknesses, and many other things, and we assess each idea. And then we have to weigh and score. We have a scoring system. Okay, well,

which idea to go first? And this is well documented and shared with everyone. Yes, the evaluation apart and the value proposition is shared within the team. (Manager C)

I think it [referring to open innovation] does in a matter of speak. Maybe it also affects our mission, right, so being a start-up, we would always try to look for new ideas. We're always trying to bring something new to the table. So that's why we do have a mission. It could change from time to time, which is a very nice thing about startups. If someone brings out a new idea or technology, no matter who that person is, if it's valid, it will get its right resources; maybe it will even get to how we operate across the year itself. I think it affects our mission directly. (Manager B)

7.10.2 Seizing sensed opportunities

This meta capability refers to the SME's strategy and infrastructure ability to seize sensed opportunities. Manager A asserted the effort SME C undertakes to know its customers, partners, business environment, and the SME ends users. This would include processes to employ business models and develop products and services to propose customer value. Manager C in SME C described how the SME seeks to maintain effective ties with its customers and other partners. These strong ties were observed to be built and maintained by the involvement and support of SMEs' different managerial levels, using several mechanisms through business meetings, health checks, surveys and social events. Moreover, SME C undertakes processes to promptly relate to any identified knowledge, evaluate their potential value and make decisions to utilise them.

Observing and understanding customers' perspectives of the business and working collaboratively on helping achieve its objectives was reported as vital by all interviewees. Furthermore, the proper understanding of the competing market position of the SME was also reported as essential. According to manager A, SME C is systematically sensitive to market trends, clients, and competitors and works collaboratively with partners to enhance its internal resources and knowledge. Manager A suggested that SME's leadership role is critical in building these networks. Moreover, leaders' knowledge and understanding of the current internal resources and capabilities are the foundation for initiating any partnership. Thus, a deep understanding of both external surroundings and SME's internal resource base is required to change and respond effectively.

> *It's about getting the new ideas that fit in the right, let's say, resources that we have not just as a company but also as a region. So basically, you can come up with something like artificial intelligence or machine learning, and you go with that, and then you will try to implement it in the region.* (Manager B)

Another sought critical process to SME C is the definition of open innovation-related decision-making rules and protocols. According to manager B, this was deemed essential to how employees would perceive open innovation as an important initiative that is fully supported by top management actions. Furthermore, developing identified decision-making protocols related to open innovation would allow employees empowerment while maintaining working under the same umbrella, ensuring decision consistency. SME C resorted to building a partnership network to address market issues. This includes writers, illustrators, filmmakers, publishing houses, and all individuals and businesses that provide services to the SME. Manager C explained that this partner network is taking a form of interdependency; this requires following formal and identified rules for decision-making that would address this network's complexity. These interdependent relationships between open innovation networks are complex and imply technological interdependency. This technological dependency appears as networking actors use, even if partially, each other's technological infrastructure.

SME C has shown its ability to promptly respond to market growth, especially in the pandemic, and utilise it to provide new products and services. Manager B clarified that the moving toward adopting a B2C business model was a proactive respondent to the market. This required effective leadership and communication with all stakeholders. Manager B pointed to the SME's social commitment and its effort to build partnerships with the Jordanian government. Table 7.11 presents selected quotes related to 'Sensing' meta-capability.

Table 7.11: Selected quotes relating to the 'Seizing meta capability' concept

We cannot survive in a silo unless the teachers want what we offer, and unless the students are engaging with the platform and learning from it, and that is proven through studies, we will not be able to sell. We have to constantly be very close to the users, who are the teachers and the students. So, we do a lot of market research, through focus groups, through surveys, to actually watching our students play on the end and interact with the program to see where their eyeballs are at, where and what their fingers use in order to keep improving the product and sometimes throwing out some product and reinventing them all over again to make sure that we are still very relevant for the student and the teacher. (Manager A)
So, for example, we used to have 'I read Arabic', which is a native speaker program. So, for native speakers. It's used to have a story-based, that covers all the learning outcomes of the

curriculum, etc. But then we realized that in many gulf countries, where Arabic is mandatory, most children are non-native speakers and actually have to take the Arabic language. So, we had to come up with a whole different product to address the non-native speakers. So, we had to look at studies and understand how the brain works at that age where you have to learn a language that has not spoken a term. And how do you teach it through technology? So, we had to break that down into many steps and do a lot of focus groups. These techniques worked before we actually built them into a full-fledged program. (Manager A)

We want to be very relevant, stay relevant, give them what they want, and always make them feel like we're listening to them to make them feel that we're partners. We're not a third party just throwing something with them to get their engagement to get to keep our brand as top of mind. Because we listen to them. So, have them as collaborators, rather than customers only. (Manager B)

We have protocols that rule our decision-making. Okay. So we do have a lot of templates that we need to fill in to justify what new features we're going to do or what we should prioritise so we do collaborative decision-making. Okay, so we do have some kind of documentation, and we rank it, and we have points that translate into like the highest-ranking features to be which we go with forward and so on. (Manager A)

In the technology industry, specifically, a leader needs to be very aware of the trends that are happening in the markets, to be very well-read on o how this company adds a lot of value through collaboration, how this company went to market much faster because of partnerships. To be able to build networks. So I think a good leader will be very well-read; understand the tech industry very well. This means understanding what products are out there now; open-source and SAS products are now ruling the market, and these are very much collaborative tools, right. So management should be very aware of, we think, to enable the organization to go fast and not be slow and old school, specifically in tech. If you're not on that bandwagon, you're out. Okay, so I guess just knowledge reading, being very immersed in the industry and the trends. (Manager A)

So if I want to understand how I can change the product or how can I improve the product, I need to be able to call the teachers and tell them, can you do this focus group with me and I need to have them excited today. Yes, of course I will. So I have to maintain a very good relationship with them throughout the year WhatsApp groups, the teacher reward program we invite them to Ramadan IFtarss, we invite them to Christmas lunch, just to keep them very involved with the brand. And to be able to call on them whenever we need that externally. And also, we do a lot of social media coverage for our school to keep the header of the school is very interested in engaging as well. (Manager A)

It's about getting the new ideas that fit in the right, let's say, resources that we have not just as a company but also as a region. So basically, you can come up with something like artificial intelligence or machine learning, and you go with that, and then you will try to implement it in the region. (Manager B)

7.10.3 To reconfigure capabilities

This meta capability refers to the ability to renew and rearrange SME's resources and competencies that interfere with open innovation. Sensing and seizing opportunities would remain an abstract unless the SME provides appropriate conditions to execute them. As open innovation entails collaboration with different actors, SMEs need to shift their attention to focus on internal aspects and increase focus on external factors. This integration of external knowledge requires SME realignment. Thus, this meta-capability is necessary to maintain internal coherence as the adoption of open innovation projects would result in a significant or minor change to the SME's design. Manager B mentioned the routines SME C undertake to introduce changes to its culture to strengthen the implementation of open innovation. As discussed in section (7.2.2), the introduction of open innovation was encountered resistance. Therefore, regular meetings, constant communication, training sessions, and incentives were initiated to change its culture and build it to support knowledge recognition and integration, innovation, and promptly respond to the market.

Corporate governance is critical to open innovation as of the importance of intangible resources to SME's success. In this sense, as the SME integrate with different partners in an open innovation project, it is also necessary to incorporate outside knowledge (Teece, 2007). Teece (2007) considered the primary issue associated with corporate governance is the need to constantly alter the SME products and business models and adjust to organisational structure and its boundaries. Manager B affirms that open innovation both required and resulted in similar changes.

SMEs working in a dynamic market should demonstrate their ability to innovate, orchestrate their business capabilities and affect the competitive environment (Teece, 2007). SME C has shown a significant impact on the market structure by demonstrating its competitive position. This was determined by the spins-off of SME C. Manager A asserts, "*We are part of changing the ed-tech industry in the Middle East; we are participating in setting up and leading the competition game here.*" Considering this, when SME C proposed its new business model (B2C) to lead the market, this new market position necessitates the implementation of open innovation as a top priority. To conduct this project, SME C worked on aligning its staff and gaining their motivation toward its implementation. Manager A pointed out the importance of showing the financial returns of this project as soon as possible to gain more support.

While starting this project, it was important to analyse old mistakes and practices and determine what should be improved and what needed to be eliminated as if they do not aggregate any value. One critical factor was to be analysed at that stage is path dependency. Teece (2007) states that reconfiguration requires evolution maintenance and changing any unfavourable path dependence. Manager C suggested '*we re-evaluate our processes internally before any change and make decisions accordingly.'* The dynamic capability perspective acknowledges how an SME is structured and functions depending on its past. However, it recognises the necessity that repeating the same mistakes must be avoided. This SME C's open innovation project would bring new opportunities; thus, an effort must be made to analyse them, define priorities and make appropriate decisions to orchestrate this project effectively.

Since the Covid-19 pandemic resulted in a restructuring of the educational systems in many countries in the region, particularly in Jordan, and with the increased demand of ends users, SME C pursued a transformation to reorganise and converge itself internally and the market it functions in. One of the critical resources SME C ensured reorganising its resources around is technological ones. Manager A confirmed that for a high-tech SME, technological resources are the essence for transforming many other organisational resources. Thus, Manager A noted that organisational development occurs due to the SME's information technology architecture.

To reconfigure competencies, top management must modify their view regarding their business; otherwise, the change would not be possible (Sandberg & Targama, 2007). This was apparent in how the change in SME C's leadership team resulted in the transformation of their business. This new understanding of the business must be cascaded to all other staff. Therefore, the role of entrepreneurial leaders in sustaining dynamic capabilities is necessary to help implement open innovation (Abu-Rumman et al., 2021; Schoemaker et al., 2018). Their ability to sense and seize opportunities is a prerequisite. In open innovation context, entrepreneurial management includes processes that would assist in recognising problems and accordingly configuring resources, culture, structure and competencies. Thus, considering dynamic capability related to open innovation will help SMEs to put into consideration all required organisational changes needed to support the implementation of this initiative. Table 7.12 presents selected quotes related to 'reconfiguration' meta-capability.

Table 7.12: Selected quotes relating to the ‘Reconfiguring meta capability’ concept

This is how our business works. We keep conversations around, reward all knowledge exchange all the time, and show the results of these collaborative innovation projects. (Manager B)
We re-evaluate our processes internally before any change and make decisions accordingly. (Manager C)
I wouldn't say that everyone is aligned, but the change takes time. So when that happens, people need to be trained; let's say, people need to be on the same page and aligned with the objectives. So, they need to calibrate this entirely. (Manager A)
There was some sort of resistance at the beginning where, for example, I'll give you a real example. We wanted to change something in the product itself…..and people did not want to do that…it took over six months to gradually change. (Manager B)
So, you just can't go to an employee and tell them you need to share X and Y…I think as a leader; you have to be an enabler. So, you give space for everyone, trust them, and trust their decisions. So, delegation is important. (Manager C)
Another thing is just to have good documentation because when you have good documentation and make sure it's shared with everyone, for example, my folders and documents are shared with everyone. Anyone in the department can see even my doodles. (Manager B)
The training programs that we have for employees, we insist that we have to apply it somewhere in the company, or at least share it with everyone and see how we can benefit from it. Most of the knowledge, in general, it's complex. Right. So, it's not just affecting one department or one person. So, when you want to move or to change something on a company level, usually it takes time. (Manager B)
Allowing people to have the autonomy to make decisions, not micromanaging and getting into everybody's business. Trusting that these managers have done their work, whatever they come back with you trusted, you go with it—and making sure that there's communication across the company. So, everybody communicates with each other. And making everybody feel that they are part of this team, so nobody is doing it alone. We are all part of a team. We are all heard; we all have equal pay and respect each other's opinions, thoughts, and ideas. (Manager C)

In conclusion, this thesis adopts Gao et al., 2020), who suggested that developing open innovation capabilities requires managers to orchestrate a series of deliberate and consistent investments in human, technological, and business-related capabilities. The dynamic capability theory assists in understanding and analysing how SMEs can manage their resources and competencies to manage, improve and sustain the implementation of open innovation. While the empirical evidence used from SME C demonstrated the possibility of analysing SME's characteristics as components of dynamic capabilities, such analysis is not comprehensive or complete as such processes are unique and path dependent. The dynamic capability perspective was utilised to support the analysis related to open innovation. Employing the dynamic capability perspective into the open innovation framework assisted in gaining insights on how SMEs reconfigure their resources to respond to the changing environment. It also provided insights into how SMEs' managers are required to effectively identify market opportunities for open innovation and reconfigure their business models to capitalise on these opportunities. Open innovation necessitates great organisational agility and extensive market understanding for knowledge-intensive SMEs. From a dynamic capability perspective, the findings demonstrated that open innovation success requires the combination of the three types of capabilities: first, exploring and gathering information about the surrounding environment and responding swiftly accordingly, which is known as the sensing capability. Second, acquiring knowledge and seizing sensed opportunities, which is known as seizing capability. Finally, the rearrangement of resources to achieve competitiveness; is known as reconfiguration capabilities. Considering the analysis undertaken above, a conceptual framework which develop open innovation dynamic capability is presented in figure 7.3.

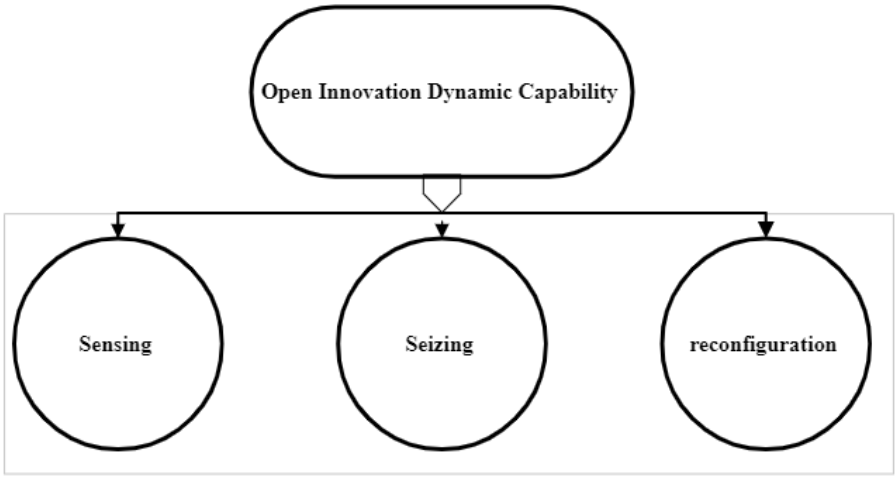

Figure 7.3: Framework of open innovation dynamic capability

7.11 Summary

This chapter has reported findings and provided a discussion, interpretation, corroboration and visualisation of these findings. The first set of the findings for this thesis, which are related to open innovation-related organisational competencies, were derived from the interview data of the six case studies. These data were analysed for each case and then cross-compared to synthesise findings. Nine organisational competencies and their relationships were identified as critical to open innovation implementation. These relationships were identified by following Keeney (1994)'s value-focused-thinking approach, namely, WIIT. The second set of findings was related to open innovation capabilities. This chapter concludes by introducing a theoretical framework for open innovation dynamic capability. With evidence that emerged from the within-case analysis and cross-case analysis, the dynamic capability framework was applied to analyse open innovation adoption. The following chapter provides a discussion of the significance of these open innovation competencies and capabilities findings in comparison with the existing literature and seeks to answer research questions identified in section 5.8.

Chapter Eight: Discussion

8.1 Introduction

The findings of the within-case analyses were reported, interpreted and discussed in chapter seven, which was then cross-compared to arrive at the synthesised findings. The findings demonstrated that the SMEs evidenced nine organisational capabilities related to open innovation implementation. The identification of these open innovation competencies and the presentation of the relationships that exist between them were underpinned by the following: first, this thesis highlighted the different perspectives of open innovation. Second, each of these perspectives discussed in the literature review chapter (see section 3.5) is related to a set of critical success factors. Third, these critical success factors, identified in sections 4.2, 4.3 and 4.4, relate to a set of organisational competencies. These organisational competencies were identified from data that emerged from the six case studies. Forth, these organisational competencies are interrelated and have an impact upon each other. Earlier, figure 7.1 (see page 162) demonstrates the identification of these competencies and their relationships. Fifth, developing these competencies at the organisational level can create open innovation capability at the strategic level. To strategically manage and sustain the implementation of open innovation, the dynamic capability perspective is applied (see section 5.5). Finally, these meta-capabilities are dynamic in nature and can be enhanced through time.

The first part of this chapter answers the first and second research questions. It discusses the findings of each open innovation organisational competency, highlights the theoretical contributions that emerged, and relates them to the extant literature. The chapter then offers an illustration of the relationships that exist between these competencies. This was developed using the Value Focused-Thinking approach, specifically by adopting the WITI test (Keeny, 1994) (see sections 6.7 and 7.9). The second part of the chapter then presents the development of an open innovation dynamic capability framework. It addresses the third research question as it applies the dynamic capability perspective to describe open innovation capabilities. Finally, The chapter concludes by presenting the open innovation capability framework as a development of the initial conceptual framework provided in section 5.7.

8.2 Open innovation organisational competencies

The following section of the discussion chapter answers the first and second research questions as it provides a discussion and presentation of open innovation organisational competencies and their relationships.

8.2.1 The strategic alignment of open innovation

The findings provide insights into how SMEs build and articulate an open innovation-focused strategy and sharing this strategy with stakeholders is a critical competency that affects open innovation success. Thus, the findings of this thesis agree with the literature on the importance of aligning and integrating open innovation with the business strategy (Audretsch & Belitski, 2022; Gonyora et al., 2021; Mergel, 2018; Peris-Ortiz et al., 2018). Similarly, one of the critical insights gained is that those who successfully implemented open innovation thought of it as a critical focus for their strategy rather than a subordinate element. Thus, these findings increase the understanding of Bogers et al. (2019), who considered open innovation practices imperative in today's world.

Furthermore, it was found that open innovation was unsuccessful for those SMEs (D, E, and F) who failed to align open innovation to their business strategy. The findings provided further insights into why this misalignment occurred and how it could be avoided. This included considering open innovation as a secondary concern which resulted in not allocating adequate resources and budget (SME E). Another reason behind this misalignment was the failure to define open innovation adequately, affecting how employees perceived its importance (SME F). Whilst this misalignment in some SMEs resulted from the lack of cascading and widely sharing open innovation objectives with all other staff (SMEs D and E). Thus, this finding offers novel insights into the importance of considering open innovation strategically. The study suggests that managers should define what they seek from open innovation. This must be done to ensure the strategic alignment of open innovation. These objectives must be cascaded to all parts of the SME to ensure that all staff understand open innovation's importance. This confirms the findings of Gonyora et al. (2021). Additionally, this thesis extends Ateş et al.'s (2020) study by noting the importance of managers' strategic alignment on teams' commitment toward implementing an open innovation strategy.

While Naqshbandi and Tabche (2018) emphasise the relationship between organisational culture and leadership in open innovation, the findings of this thesis offer further understanding by suggesting the interplay between these two aspects and SME's ability to strategically align open innovation. The key insight gained is that SMEs should pay careful attention to leadership practices and organisational culture to align open innovation to the overall strategy. Moreover, the findings provided insight into how considerable attention must be given to training programmes and performance measurement and appraisal methods; this finding confirms the knowledge of Hong et al. (2019), Markovic et al. (2020) and Oliveira et al. (2021). While these authors highlighted the importance of these practices in open innovation, this thesis offers a novel contribution by proposing them as critical antecedents to develop an SME's ability to align open innovation to the overall strategy. For example, by providing a reward and incentive system that reinforced knowledge sharing.

Thus, concerning this competency, the research findings agree with the extant literature regarding the importance of integrating open innovation with the overall business strategy. However, this thesis contributes novel insights into open innovation strategic alignment as a critical competency that directly affects the success of open innovation adoption, given that it forms a base for the other open innovation competencies.

8.2.2 Ability to create open innovation supporting culture

The findings provide insights into whether SMEs need to change their perspective on only focusing on internal factors and considering external sources of knowledge to implement open innovation successfully. The findings of this study highlighted an SME's ability to change this perspective and become more focused on innovation and integration as a critical competency that affects other competencies and the success of open innovation. This adds to the knowledge of Tsui et al. (2006) and Naqshbandi and Ma (2015) by proposing that high integrative culture is critical to open innovation implementation in knowledge-intensive SMEs in the Middle East. This open innovation supportive culture should promote core values such as innovation, free flow of information, customer satisfaction, employee learning, within and across teams' harmony, and social responsibility.

One of the main challenges SMEs had to deal with while introducing open innovation was resistance related to what is known as the NIH syndrome. The findings revealed that while SMEs are expected to approach this attitudinal or behavioural resistance in open innovation, keeping evangelism and continuous communication with all employees is necessary. This finding aligns with Engelsberger et al. (2022), Lichtenthaler and Ernst (2006), and Ponstiskoski and Asakawa (2009), who highlighted that businesses are required to overcome the NIH syndrome in open innovation to keep competing in the industry.

While the extant literature highlighted organisational culture as a critical success factor to open innovation (Azeem et al., 2021; Hosseini et al., 2017; de Oliveira et al., 2018), the findings of this thesis provide novel insights into how SMEs can improve their ability to develop such a supportive culture. To illustrate, the findings suggest that open innovation implementation starts with a careful definition of the SMEs strategy that grounds integration and emphasises its importance. Then, the SME must determine ways to differentiate itself. The finding reveals that this vision must be shared among all parts of the SME and ensure all SME staff embraces it. Thus, the findings provide novel insights into the relationship between open innovation strategic alignment and an SME's ability to build a supportive culture in open innovation competency; section 7.8.1 also offers more insight into the interplay between these two competencies.

Additionally, the findings provide insights into open innovation by highlighting the role of the top management level in paving a supportive culture, which is critical to the success of open innovation. This ownership of open innovation at the upper levels of the SMEs affected how staff observed open innovation as a philosophy of the SME rather than a single department initiative. Moreover, the findings of this thesis increase understanding of Yun et al.'s (2020) knowledge of how organisational values are strengthened if open innovation is embedded within the values of its founders.

Thus, concerning this competency, the research findings agree with the extant literature regarding the importance of organisational culture in open innovation and propose how an SME's ability to build an open innovation supportive culture is a key competency. Moreover, it adds to the knowledge by suggesting that an SME's ability to create an open innovation supporting culture depends on top management support. It additionally proposes this

competency is essential to enabling SMEs' departmental connectedness regarding open innovation. This competency is also critical for allowing external collaborative relationships, something that is not currently considered in the extant literature.

8.2.3 Ability to obtain top management support

The findings highlight that an SME's ability to undertake leadership practices that support open innovation initiatives was one of the most important factors influencing its implementation. The findings regarding this competency confirm the understanding of Ahn et al. (2018) and Sivam et al. (2019) into the importance of top management support in open innovation.

This study adds to the literature by proposing the fundamental effect of this competency on other open innovation competencies. Leadership commitment and support is essential for SME's staff to perceive and realise the importance of open innovation and reinforce them to adopt its values, thus affecting SMEs' ability to develop an open innovation supportive culture. This adds to the knowledge of Naqshbandi et al. (2018). Additionally, the findings provided new insights into how top management practices can aid in defining open innovation-oriented organisational lines to direct and guide the SME's overall strategy. The findings add to the literature by highlighting this competency as forming the basis for all other open innovation-related competencies, thus providing the foundation for open innovation implementation.

The findings also provide insights into the role played by top management in championing and promoting any organisational change initiative. This aligns with Hansma and Elving (2008). The findings also highlight the role of top management in adopting essential practices to support open innovation; this includes organising social events that encourage knowledge sharing. Additionally, the findings provide insights into how an increase in top management awareness, understanding and perspective of open innovation practices and benefits is associated with their increased support regarding its implementation. Thus, leaders' awareness, attitudes, and personal characteristics' role in supporting the implementation of innovation must be highlighted; this confirms the findings of Ahn (2020) and Ahn et al. (2018). This research agrees with the findings of Singh et al. (2021), who argue that knowledge-oriented leaders tend to undertake practices that support knowledge sharing. However, this research

adds to this knowledge by highlighting the role of knowledge-oriented leaders to open innovation. Another novel contribution of this thesis was finding the critical role of tactical managers in enabling open innovation through the presentation of open innovation business cases to top management to gain their support. Building open innovation business case can increase top management's understanding of the project. The extant literature currently neglects this and focuses on the role of top management (Chesbrough & Crowther, 2006; Peris-Ortiz et al., 2018).

Thus, concerning this competency, the research findings agree with the extant literature regarding the importance of top management support and commitment. It also provides profound insights into how the level of top management support is associated with either of the following: first, top management characteristics and traits, as to whether they are knowledge-oriented or not. Second, top management awareness, understanding and knowledge of open innovation processes and value. Additionally, the findings provide novel insights into how building a well-conducted open innovation business case can help obtain top management support. Moreover, the findings suggest that this competency fundamentally affects other competencies, such as an SME's ability to strategically align open innovation and build an open innovation supportive culture.

8.2.4 Ability to improve inter-departmental connectedness

The findings support the extant literature regarding the importance of collaboration and knowledge sharing amongst teams in order to enable open innovation success. This role of inter-departmental collaboration in facilitating the exchange of innovation-related information is recognised in the literature (AlAbri et al., 2021; Cuijper et al., 2011; De Luca & Atuahene-Gima, 2007; Tatikonda & Montoya-Weiss, 2001; Troy et al., 2008; Olson et al., 2001; Sivam et al., 2019).

This research confirms the findings of the extant literature regarding the importance of HRM practices to open innovation implementation (Cabrera & Cabrera, 2005; Hong et al., 2019). However, the findings provide more profound insights into how employees are the building blocks of any innovation; therefore, it is essential to consider human resource management practices that would foster knowledge sharing across the departments. The research specifically

adds knowledge as to how HRM practices help improve inter-departmental connectedness in open innovation initiatives.

Additionally, one of the key insights concerning this competency is how the strategic alignment of open innovation affects SMEs' interdepartmental connectedness. The misalignment of the innovation team and remaining teams was identified as a critical challenge to open innovation adoption. Where open innovation is undertaken as a single team effort, this results in issues with communication and collaboration with other teams in the organisation. The strategic misalignment of open innovation led to this misalignment between teams since the SME did not communicate open innovation objectives widely enough. Thus, all staff did not perceive the importance of knowledge sharing for open innovation.

In summary, concerning this competency, the research findings agree with extant literature on the importance of interdepartmental collaboration in open innovation (Cuijpers et al., 2011; De Luca & Atuahene-Gima, 2007; Tatikonda & Montoya-Weiss, 2001; Troy et al., 2008; Olson et al., 2001; Sivam et al., 2019). The findings additionally provide novel insights into how aligning open innovation strategically and undertaking collaborative based HRM practices can increase SME's ability to improve this collaboration.

8.2.5 Ability to perceive the needs and expectations of customers and understand market opportunities

This thesis provides novel insights into the importance of an SME's ability to understand customer needs, expectations and market opportunities. It was discovered that this is a critical open innovation competency. While the findings agree with Wen, Wu, Kang, Wan and Zeng (2020) on the importance of managing customer knowledge in open innovation initiatives, it extends the knowledge as to how SMEs need to build solid and long-term relationships with them. The findings also provide profound insights into how this competency must be systemised and rooted in the business's strategy, culture and structure and practised at a higher level of complexity. Section 7.8.5 provided more detailed evidence regarding this finding.

The extant literature mainly considers the importance of managing customer knowledge specifically for customer-open innovation projects (Wang & Xu, 2018; Wen et al., 2020). However, this thesis goes above and beyond this to highlight the importance of using this knowledge in all open innovation model types. Additionally, the findings add to the extant knowledge by suggesting that an SME's ability to understand customer needs, expectations, and market opportunities is critical for all open innovation model types. Thus, the findings suggest that SMEs must proactively undertake processes to understand customer needs in the different stages of their customer life cycle.

Moreover, the findings support the existing literature by highlighting the role of software and analytical processes in analysing customer's data and the use of the outcome of these processes to identify needs and future behaviour (Randhawa, Josserand, Schweitzer, & Logue, 2017; Santoro, Vrontis, Thrassou, & Dezi, 2018). However, this thesis adds to this knowledge by suggesting that maintaining personal contact with customers is pivotal in capturing and identifying customer feelings. Insight is provided into the critical role that these relationships play in enabling a greater depth of knowledge than could be provided through the use of IT software alone. The findings suggest that these relationships can be built through top management direct involvement or through tactical managers and employees. Furthermore, this thesis provides insights into the role and linkages of this competency with certain other competencies. The competencies that this one link to include an SME's ability to build and manage cross-boundary collaborations and develop and offer products and services that meet customer needs. Moreover, the findings regarding this competency fill a theoretical gap proposed by (Wen et al., 2020) concerning investigating this competency in less researched regions.

Thus, concerning this competency, the research findings provide specific insights regarding the importance of building good relationships with customers and understanding and systemising their real needs and expectations in all models of open innovation. Furthermore, the findings suggest that this competency links with the SMEs' ability to offer products and services to meet their needs.

8.2.6 Ability to develop products and services that meet customer expectations and reflect external opportunities.

The findings provide insights into how an SME's ability to offer products and services according to customer expectations and market analysis is a critical open innovation competency. The findings suggest the importance of reconfiguring and combining internally and externally developed knowledge to create new offerings. This finding builds on the extant literature as to how open innovation improves innovation performance (Cheng & Huizingh, 2014). Additionally, it highlights the importance of R&D activities as it contributes to building a firm's knowledge base, developing its internal knowledge (Veugelers & Cassiman, 1999), and strengthens its ability to use and incorporate external knowledge (Cohen & Levinthal, 1990; Hameed et al., 2018; Hung & Chou, 2013; Laursen & Salter, 2006).

This thesis provides new insights into how R&D activities such as searching external market trends and reconfiguring and combining internally and externally developed knowledge to develop new offering**s** are critical functions of open innovation. This is in disagreement with the extant literature (Cassiman & Veugelers, 2006; Lu & Chesbrough, 2021; Rothaermel & Hess, 2007; Schmiedeberg, 2008), which finds that open innovation is complementary to a firm's R&D. Furthermore, this thesis disagrees with Hess and Rothaermel (2011) and Laursen and Salter (2006) study, who claim the substitutional relationship between them. Moreover, the findings were inconsistent with Lokshin et al. (2008), who reported no significant interaction between the R&D functions and open innovation. Conversely, the findings of this thesis suggest that all SME departments must work collaboratively together, acting as R&D to capture external knowledge. Additionally, they must reconfigure and combine internal and external knowledge to develop new products and services in line with customer expectations. Therefore, the findings propose that this competency relates to an SME's ability to understand customers to provide appropriate value.

8.2.7 Ability to develop techniques and procedures to govern open innovation

The findings suggest that SMEs are required to plan and structure the most appropriate governance model to implement open innovation successfully. The findings provided insight into how this would entail developing an innovation methodology that includes best practices,

open innovation models, tools and processes. Furthermore, the findings indicate that this methodology would address critical aspects of the implementation of the open innovation initiative itself, such as level of search, openness, the definition of roles and responsibilities, identification of project expectations, forms of collaboration, mechanisms for communication, and key performance indicators. The findings concerning this competency are in agreement with Hosseini et al. (2017) and Slowinski and Sagal (2010), who highlighted the importance of establishing an appropriate mechanism to ensure continuous development of innovation performance. Similarly, to the extant literature, this research found that identifying roles and responsibilities as necessary, which the literature argues is required to prevent open innovation-related issues, like absorptive capacity problems and idea evaluation issues (Chesbrough & Gowther, 2006; Lüttgens et al., 2014; Whelan et al., 2013).

Hosseini et al. (2017) highlighted having a well-defined policy regarding IP protection as one of the main aspects to be determined. This well-defined policy includes making appropriate decisions about the amount of information to disclose. The findings add to the knowledge by suggesting that adopting a legal IP protection policy is not critical to open innovation success. The findings provided insights into how SMEs did not perceive IP protection necessary to their businesses. Therefore, the findings of this research disagree with extant literature on the importance of IP protection in implementing open innovation projects (Bican et al., 2017; Brem et al., 2017; Chesbrough & Appleyard, 2007; Davoudi, 2018; Hagedoorn & Zobel, 2015; Holgersson, & Granstrand, 2017; Uribe-Echeberria et al., 2019; Yuana et al., 2021). These findings provide an enhanced understanding of how IPs protection might be difficult in some industries, such as the software industry (knowledge-intensive SMEs). This is consistent with the findings of Goyal (2011), Hu and Jiang (2019) and Menell (1994), who highlighted the difficulty of legally protecting software inventions.

Moreover, the findings provide new insight as to how this lack of a strict orientation toward IP protection could be related to the regional context of these SMEs. Several scholars have discussed IP rights and regulations in the Middle East, and a consensus was made that formal IP protection was not integral (Birnhack, & Khoury, 2018; Carroll, 2000; Stovall et al., 1999). This tendency returns to the collectivist nature of the culture in the Middle East, which shapes people's attitudes regarding abiding by intellectual property rights and their enforcement (Malkawi, 2012). Inadequate embracement of existing IP laws in these countries (Stovall et al., 1999) also contributes to the lack of IP protection. Similarly, Birnhack and Khoury (2018)

noted that the inadequate development of IP laws in the Middle East is associated with several complex and interrelated factors, including legal, economic, political, and cultural factors.

Whilst the findings revealed that SMEs studied do not follow formal strategies to legally protects their IP, it agrees with the argument of Freel and Robson (2017), who noted that some SMEs might follow informal mechanisms while engaging in open innovation initiatives. The findings provided further insights into these informal IP forms of protection, which might include secrecy, complexity and speed to market. The findings agree with Leiponen and Byma (2009) and Brem et al. (2017), who noted the preference of SMEs to adopt informal IP protections over formal ones, which involve legally binding patents. The existing literature highlights resource scarcity as being one of the reasons why SMEs do not pursue formal IP protection. This argument can also provide support as to why SMEs do not adopt strict and legal mechanisms to protect their IP. Additionally, Bayoumi et al. (2017) argue that the Islamic religion coexists with the notion of IP. Thus, while Al-Shari'ah does not explicitly provide legal protection for IP, it is protected through norms and notions held by people's faith, which is comparable to today's laws and rights.

In summary, the findings provide insight into how this competency is vital for SMEs to build and manage effective cross-boundary relationships in open innovation. Thus, the findings concerning this competency agree with the extant literature on the importance of building an innovation methodology that includes best practices, open innovation models, tools and processes. However, the findings disagree with the need to adopt legal strategies to protect an SME's IP.

8.2.8 Ability to build and manage adequate IT infrastructure to support innovation

The findings of this thesis provide insights into how an SME's ability to choose, deploy, and manage a range of information technologies to support innovation is a critical open innovation competency. While the ability of SMEs to construct and operate their IT infrastructure is not widely discussed in open innovation, this research adds knowledge by providing a context in which to situate IT management in conjunction with its linkages with other competencies. In agreement with existing literature, managing SMEs'IT infrastructure was found to be one of

the most critical competencies influencing open innovation. This finding is in line with the extant literature, which highlights the importance of IT in enabling open innovation (Hosseini et al., 2017; Lyu et al., 2019; Taghizadeh et al., 2020; Whelan et al., 2014). The findings provide insight as to how an SME's IT infrastructure must 1) allow data integration as this allows the SME to connect to other systems and access knowledge, whether internally or through external collaboration projects; 2) allow data availability in real-time mode; and 3) include information analytic tools to utilise the power of data through information analysis.

The findings also provide insights into the importance of IT strategic alignment to open innovation. Therefore, investing in an IT system should be evaluated strategically in terms of how such a system will aid in the achievement of strategic objectives and provide value propositions. The findings additionally offer insight into how aligning the IT director roles and responsibilities with a strategic position in the SMEs contributes to achieving this strategic alignment. Thus, the findings suggest that this integration of business and technical knowledge was found to be critical to open innovation success. The findings of this thesis enhance the extant literature (Cui et al., 2015; Tajudeen et al., 2021) by providing insights into how creating a shared understanding between IT people and business executives allow for more effective resource allocation. This, in return, would help to collaboratively respond to environmental threats and opportunities and improve innovation performance.

Thus, concerning this competency, the research findings agree with the extant literature regarding the importance of selecting, deploying, and managing information technologies to support the implementation of open innovation. However, this study has increased the knowledge as to how SMEs need to strategically align the IT department with open innovation to achieve success.

8.2.9 Ability to build and manage cross-boundary collaboration outside the business

The findings provide insight into how an SME's ability to establish and maintain effective partnerships with external actors, including customers, is critical to the success of open innovation. This finding is in line with Bogers et al. (2019), who highlighted the role of building and managing external cross-boundary collaborations. The findings suggest that

effective open innovation partnerships require creating a win-win strategy between collaborating actors. While this was identified as a main relational challenge to one SME, this research agrees with the findings of Wayne (2012) into how building a better understanding of stakeholders' requirements and expectations would help attain this end.

The findings suggest that the feasibility of creating a win-win strategy increases the commitment and motivation for all parties and is considered viable for business model sustainability. Thus, a win-win strategy might vary concerning the nature of the relationship, varying from increasing profit, new market edge, knowledge gain, or even future and long-term opportunities, which is in line with Pisano (2006). Therefore, the findings suggest that when an SME crafts an agreement with their open innovation partners, this should be strategically aligned with business goals and values.

In addition, this thesis's findings agree with the literature that developing trustworthy relationships is critical to effectively building and maintaining cross-boundary collaborations (Stefan et al., 2021). However, the findings provide new insight that the emphasis on building a relationship grounded on mutual trust can negate the need for strict and well-established IP policies and regulations in those SMEs (see section 7.2.7). Accordingly, the findings suggest that SMEs must carefully identify and select competent partners. This includes assessing culture, values, functional aspects such as resources and knowledge compatibility, and trustworthiness. Therefore, the findings confirm prior literature that suggests it is important to collaborate and build relationships with partners who are well matched to the SME (Almirall & Wareham, 2008; Bogers et el., 2019, Santoro et al., 2018; Westergren & Holmström, 2012; Wynarczyk et al., 2013). However, this thesis provides new insight into the critical linkage between the cross-boundary collaboration competency and the open innovation governance competency.

Additionally, the findings give insight into how selecting and managing appropriate IT infrastructure would help maintain effective communication based on constant interaction between partners. Accordingly, collaborating actors should have an IT system that supports monitoring knowledge sharing and operations in real-time mode; this would help in allowing them to interact and respond instantly. Therefore, the findings of this thesis suggest the

linkages of this competency to an SME's ability to choose and manage IT to support open innovation.

This part of the chapter aimed to identify and discuss organisational competencies related to successful open innovation adoption in accordance with previous literature and the research findings. Additionally, this subchapter aimed to observe and analyse how these competencies are interrelated. Thus, answering the first and second research questions. The following subchapter seeks to discuss the open innovation findings in relation to the dynamic capability perspective to develop open innovation capability perspective.

8.3 Open innovation dynamic capability framework

This section of the chapter builds on the findings and discussion provided in sections 5.5 and 7.10 that aimed to analyse open innovation capability from a dynamic capability perspective to answer the third research question, which refers to *'What are dynamic capabilities SMEs required to be developed in open innovation initiative?'* It is important to mention that this thesis's open innovation capability framework has evolved from the initial conceptual framework developed earlier at the end of the literature review chapter (see section 5.7) in light of this study's findings. The dynamic capability perspective has been used in the extant literature as a higher-level order capability (see section 5.5), which is used to analyse the change in operational level competencies and is considered essential to innovation activities (Jantunen et al., 2012). This thesis contributed to the extant literature by addressing the theoretical gap identified by Bogers et al. (2019), Randhawa et al. (2016) and Teece (2020) by identifying the strategic organisational capabilities required to sustain the implementation of open innovation by applying the dynamic capability perspective. The deployment of the dynamic capability perspective provided novel knowledge into how SMEs can sense, seize and reconfigure their resource base and competencies across open innovation to sustain its implementation (see section 7.10). This is especially important considering that knowledge-intensive industries are functioning in a turbulent environment. Additionally, the dynamic capability perspective was utilised to support the analysis related to open innovation. This thesis understands that SMEs adopt open innovation to gain a competitive advantage and improve their innovation performance (Popa et al., 2017). The dynamic capability concept was recognised for its potential to gain and sustain competitive advantage (Eisenhardt & Martin

2000, Teece et al. 199; Zahra et al. 2006). SMEs need to implement value-creating strategies to achieve a competitive advantage (Barney, 1991). In the same sense, Chesbrough and Bogers (2014) defined open innovation as a strategic approach concerned with creating and improving values through the purposeful inflow and outflow of knowledge and technologies.

The intersection between open innovation and dynamic capability theory was observed in this thesis through Teece's (2007, p.1339) definition of dynamic capability as *"Integrating know-how from outside as well as within the enterprise is especially important to success ... Good incentive design and the creation of learning, knowledge-sharing, and knowledge-integrating procedures are likely to be critical to business performance, and a key (micro)foundation of dynamic capabilities".* This research follows Bogers (2019), Randhawa et al. (2016) and Teece (2020)'s idea of the imperative need of incorporating the dynamic capability approach for analysing open innovation. While the sustainable development of open innovation depends on organisational resources and competencies, these competencies need to be constantly reconsidered.

The analysis provided a profound understanding of how the dynamic capabilities' microfoundations play a role in transitioning toward open innovation since the SME is required to adjust its resource base, which requires the development of dynamic capabilities. The findings of this thesis supplement Teece's (2020) study by providing novel insight into how SMEs are required to have strong dynamic capabilities to adopt open innovation and also provide a profound understanding of the specific sensing processes required to sustain its implementation.

Figure 8.1 represents this thesis's developed open innovation capability framework. It is important to mention that this framework evolved from the conceptual framework proposed earlier in section (5.7). This initial conceptual framework represented internal and external factors that determine open innovation implementation in knowledge-intensive SMEs in the Middle East. This thesis understands that for these SMEs to embrace open innovation completely, they are required to develop organisational competencies and capabilities to manage and utilise their resources, knowledge, and tools to achieve open innovation objectives.

This thesis provides novel insights by suggesting that an SME should develop capabilities at two levels: first, higher-level capabilities to strategically manage and sustain the implementation of open innovation (dynamic capabilities). Thus, an SME is required to be able to sense, absorb, seize and reconfigure valuable knowledge and opportunities to capture value through the development of open innovation-related organisational competencies. Secondly, develop operational level organisational competencies to efficiently and effectively support the implementation of open innovation. The following offers an explanation of this thesis's developed open innovation capability framework and a justification of its construction.

The identification of these capabilities and competencies required an understanding of these internal and external determinants. The following principles guided the development of this thesis's open innovation capability framework represented in figure 8.1:

1) This study emphasised many perspectives on open innovation (see section 3.5).

2) Each perspective was linked to a set of critical success factors (see sections 4.2, 4.3 and 4.4).

3) The integration of critical success factors was then linked to a set of organisational competencies. The data that emerged from the six case studies were used to identify these organisational competencies.

4) These competencies were linked to one another in order to develop a framework that orchestrates their relationships. The data that emerged from the six case studies were analysed using the content analysis approach and the value-focused-thinking approach. Thus, those processes that explicitly or implicitly emerged from the cases were categorised into different competencies. Nine main organisational competencies were identified.

5) In order to strategically manage the implementation of these competencies, the dynamic capability perspective was applied (see section 7.10).

6) These meta-capabilities are dynamic in nature and can be enhanced through time.

Figure 7.1 presented in section 6.1 is a graphical illustration of the identification process for these open innovation organisational capabilities and competencies. Thus, the findings chapter entails two main parts: firstly, it discusses findings related to open innovation-organisational competencies and how they interrelate. Secondly, it discusses open innovation capability using

the dynamic capability lens. This process led to the development of the open innovation capabilities framework identified in section 8.3 and represented in figure 8.1. following is a discussion of the capability framework developed.

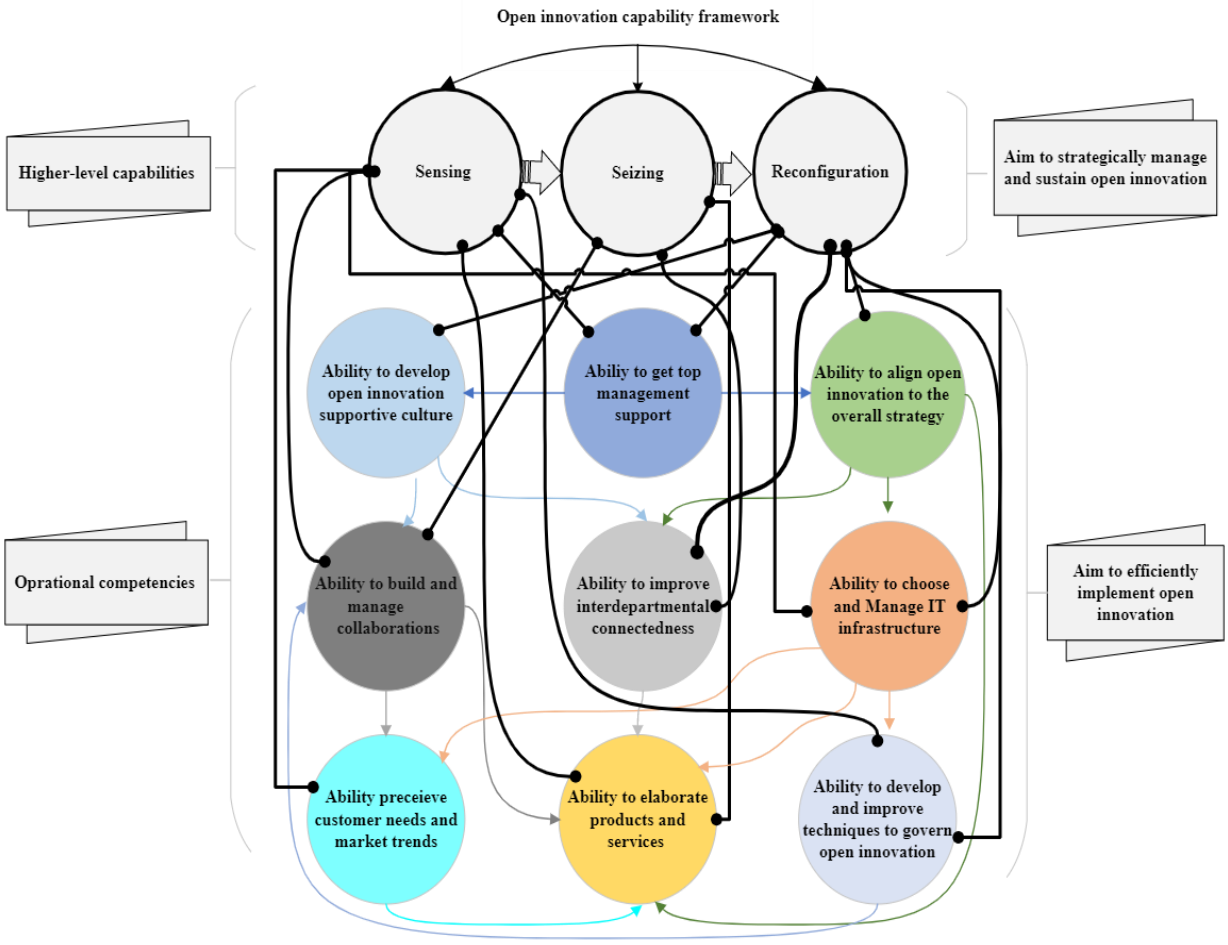

Figure 8.1: Open innovation capability framework

Sensing opportunities

This meta-capacity is associated with exploring, identifying and shaping environmental signals, capturing ideas, assessing strategic trends, opportunities and challenges and identifying customers' preferences and emerging technologies (Teece, 2007). The findings provide novel insights into how the sensing capability assists SMEs in obtaining valuable innovation proactively. This occurs through the development of means and mechanisms to recognise, evaluate and acquire new opportunities, whether generated internally or externally. The thesis findings revealed that for knowledge-intensive SMEs to implement open innovation successfully, they are required to develop a sensing capability to assist them in attaining open innovation capabilities. In the early stages of open innovation, SMEs need to be able to identify opportunities and threats, evaluate such sensed opportunities, and make sense of their

anticipated value and how this identified knowledge and opportunities can be utilised. Open innovation requires sensing capabilities to explore and evaluate external knowledge and develop external collaboration. This finding aligns with (Bogers et al., 2019; Lichtenthaler & Lichtenthaler, 2009). Knowledge-intensive SMEs are required to build a sensing capability to successfully implement open innovation as it supports understanding customer needs and expectations (see section 6.9.5). Effective understanding of customers in terms of their requirements, expectations and behaviours would assist in identifying new opportunities. For SMEs to improve their ability to perceive and understand customers' requirements and expectations, they should proactively undertake routines that are embedded within SMEs' culture, structure and strategy to sense and search for these. This requires an SME to build strong relationships with customers and other stakeholders, provide multiple communication channels, and foster different SME members to interact more frequently with customers. Such engagement and interaction would allow an SME to effectively sense customer needs and gain further insights into their behaviours and feelings. Consequently, this would improve the SME's ability to sense and build anticipation of what products and technologies need to be developed to match their requirements and expectations effectively. It also requires an SME to create an organisational culture that encourages listening and appreciating external knowledge and integration, listening to customer needs and voices, and involving them in several phases of product development. Similarly, an SME is also required to deploy an IT system that would support building closer relationships and collaborations with external actors and customers, help pool customer needs and expectations, and collaborate with them automatically (see sections 7.8.5 and 7.8.9).

Furthermore, an SME is required to undertake routines that should help them systematically capture, identify, evaluate and select both competent partners (see sections 7.8.9 and section 7.8.7) and internal and external valuable knowledge and opportunities (see section 7.8.6). While it is essential to attract external ideas, knowledge and technologies, SMEs are required to evaluate such knowledge and select which would be the most relevant (see sections 7.8.6 and 7.8.9). Thus, an SME's ability to assess and understand how this identified external knowledge and information can be used and utilised improves an SME's ability to offer value propositions, accordingly, affecting SME's ability to seize such knowledge. The role of top management is pivotal for a strong sensing capability as they are in charge of undertaking processes that would assist in integrating and analysing information from various sources to constantly monitor the external business environment and identify opportunities and problems

(Teece, 2007). Chesbrough (2006) argues that top management should lead open innovation initiatives in the open innovation context.

Top management's role in undertaking processes to build and extend its innovation network is essential, whether through personal contacts or by organising social events that would facilitate meetings, interaction and knowledge sharing with potential external sources of knowledge (see section 7.8.3). Consequently, leadership should possess deep insight into sources for external knowledge; this includes identifying to search depth and breadth (Sofka & Grimple, 2010). Top management support is also vital to successfully sense external knowledge and potential opportunities.

Seizing sensed opportunities

After recognising, absorbing, and shaping new knowledge and opportunities, SMEs are required to seize them by creating and capturing values by offering value propositions (new products, services or processes). Seizing capabilities are essential to integrating valuable knowledge that has been sensed and filtered. This is in agreement with (Bogers et al., 2019). Therefore, organisational resources, capabilities, and competencies are needed to successfully support and deploy externally identified opportunities and external knowledge (Foss, Laursen, & Pedersen, 2011).

Teece (2007) pointed out that SMEs need to develop products and services and employ business models to aggregate value to the customer. Otherwise, the valuable knowledge identified does not contribute meaningfully. However, the development of these new products and services must consider an effective understanding of their customers. Therefore, an SME's ability to develop and offer products and services according to customer needs and expectations and market trends is required. Additionally, seizing external knowledge requires reconfiguring the mix of internal and external knowledge (see section 7.8.6). An SME should also demonstrate the ability to build and manage effective collaboration with all stakeholders. Such a collaboration is critical to gaining knowledge about selecting and developing the most appropriate products and services.

Additionally, an SME may test and evaluate potential products and services with partners (see section 7.8.6). Such tests can be done at different stages of product development, which assist in providing offerings that meet customer needs. Such sensing capability related to the rapid and continuous ability to assess and integrate their feedback would assist in capturing value. Additionally, to successfully seize external knowledge, an SME needs to develop techniques and tools to make timely and appropriate decisions related to utilising this knowledge. This is important as it was found formal IP strategies are not critical to open innovation. SMEs also needs to make appropriate decisions on how it manages their IP properly (see section 7.8.7). Furthermore, SMEs also need to ensure the alignment of their employees and different teams, thus, developing evaluation and incentive systems to reinforce and reward ideas and knowledge sharing (see sections 7.8.1 and 7.8.4).

Reconfiguring

After integrating and seizing knowledge, reconfiguring and aligning organisational resource-base is required; this refers to reconfiguration capability. Externally sensed opportunities and gained knowledge have an impact on an SME's competence; thus, SMEs are required to develop processes that allow them to approach, align and exchange knowledge and resources internally and externally. This is in agreement with Lee et al. (2016). As SMEs open their innovation process, an externally integrated source of knowledge needs to be utilised. Thus, the SME's design should allow for its prompt integration and use. Thus, reconfiguration capabilities are required to assure evolution. Integrating external knowledge requires SMEs to realign themselves strategically. The implementation and evaluation of external knowledge should be measured in parallel to attaining the SME's strategic goals and objectives. Thus, the SMEs are required to reconfigure their resource base to be able to link external knowledge to their business model and vice versa since the business model might be altered or changed as a result of open innovation (see section 7.8.1). Additionally, an SME is required to select and identify the right partners; this includes an evaluation of how competent this potential partner would be in terms of resources, knowledge, culture and deliveries. While choosing the right partners is critical to carrying out open innovation, it is also necessary to ensure their motivation, commitment and engagement. This can be achieved by aligning interests, developing trust, and maintaining communication (see section 7.8.9). An SME must develop an open innovation methodology that identifies different roles and responsibilities to achieve this. Such a methodology should also structure communication protocols between partners and set

key performance indicators. This methodology would help improve open innovation capability and monitor its implementation (see section 7.8.7).

The findings of this thesis highlight that leaders' role in sustaining dynamic capabilities is necessary to help implement open innovation; these insights align with Abu-Rumman et al. (2021) and Schoemaker et al. (2018). An SME is required to undertake top management practices that demonstrate full support to open innovation across all SME levels. Such practices would ensure top management support through allocating adequate resources. This means that an SME is required to work on gaining their top management support (see section 7.8.3). For example, cultural changes are needed to support and promote collaboration, and is considered essential to overcome one of open innovation's main barriers, the NIH syndrome. This finding adds to the knowledge of Chesbrough (2006). Similarly, top management must modify their view regarding their business; otherwise, the change would not be possible, which is in agreement with Sandberg and Targama (2007).

Additionally, integrating external knowledge requires cultural change especially if the SMEs culture is not prepared for open innovation. Promoting an organisational culture that overcomes the 'not-invented-here' syndrome is critical. Thus, an SME is required to build a culture that supports values of collaboration, innovation, customer satisfaction, employee learning, team harmony and social responsibility (see section 7.8.2). Additionally, in order to integrate this external knowledge, an SME needs to build an IT infrastructure that must support collaborative relationships by providing seamless accessibility and allowing for connection and integration with any partner (see section 7.8.8).

Table 8.1: A summary of the organisational competencies concerning the dynamic capabilities

Organisational competency	Sensing	Seizing	Reconfiguration
Open innovation strategic alignment			✓
Open innovation supportive culture		✓	✓
Top management support	✓		✓
Interdepartmental collaboration		✓	✓
Understanding customers' needs and expectations.	✓	✓	
Developing products and services that meet customer needs and market trends	✓	✓	

Improve techniques and tools to govern open innovation	✓	✓	✓
Building a supportive IT infrastructure	✓		✓
Building and managing external collaborations	✓	✓	

Open innovation micro-foundations must be valuable and inimitable; they should draw on unique processes and routines to develop unique and significant organisational open innovation-related culture and practices (Gratton & Ghoshal, 2005). Although the literature has developed a concrete conceptual advancement regarding the role of dynamic capabilities, empirical studies in this field are scarce (Randhaw et al., 2016; Zahra et al., 2006). Although open innovation model is applicable to the entire value chain, it is mostly about complementing a business's internal R&D (Chesbrough, 2006). Relevant open innovation processes that aim to achieve such ends are beneficial for enhancing organisational position and competitive advantage. However, a comprehensive perspective into how to successfully adopt open innovation is scarce. The majority of open innovation literature has discussed open innovation capabilities from a knowledge management perspective, while a holistic approach to open innovation is lacking (Randhawa et al., 2016).

This thesis responds to the literature calls and addresses gaps into how to adopt open innovation successfully. Adopting a dynamic capability perspective to analyse open innovation implementation provides a comprehensive system-level understanding of resources, capabilities and competencies necessary for effectiveness in a dynamic environment (Teece, 2018; Jantunen, Ellonen, & Johansson, 2012). A more recent perspective of dynamic capabilities implies its importance regardless of the prevailing change degree of the business environment (Teece et al., 2016). Teece (2014) pointed out that the dynamic capability framework assists in accommodating disconnected theories among disciplines, while many other scholars call for the need to approach open innovation from a dynamic capability theory (Bogers et al., 2019; Randhawa et al., 2016; Teece et al., 2020). Considering these testaments , this thesis aims at providing a holistic framework for adopting open innovation drawing on the dynamic capabilities' perspective and the resource-based view.

Teece (2007; 2014) argued that dynamic capabilities reside in managerial decisions and organisational routines and processes. To illustrate, dynamic capabilities come at the top of the capability hierarchy, while other processes, routines and capabilities that come to support

dynamic capabilities are called micro-foundations (Teece, 2007). What distinguishes such micro-foundations from competencies is their use to enable the firm to create, integrate, and reconfigure its resource base; otherwise, if used incrementally, they would be ordinary capabilities rather than micro-foundations (Teece, 2020). As discussed earlier (see section3.5), competencies are processes that utilise assets to carry out strategy efficiently. However, these competencies lack the strategic orientation on looking ahead to future. Additionally, they tend to be measured and benchmarked, making them immutable and transferable; thus, they are not a vital source of unique advantage. However, they are developed to support the achievement of dynamic capabilities.

The thesis filled this theoretical gap by developing an open innovation capability framework (see figure 8.1) which also aims to assist SMEs in considering all organisational changes required for implementing their open innovation initiative. The relationships between open innovation competencies are previously explained in more detail in section 7.9. Table 8.1 summarises the organisational competencies in relation to the dynamic capabilities to successfully implement and sustain open innovation implementation.

8.4 Summary

This chapter discusses the findings of open innovation organisational competencies and capabilities, highlights the theoretical contributions that emerged, and relates them to the extant literature. The first section of the discussion chapter relates to the first and second research questions as it provides a discussion and presentation of open innovation organisational competencies. The second section of this chapter refers to the third research question regarding open innovation dynamic capability and its relationship with other competencies. The chapter concludes by providing a discussion of the developed open innovation capability framework.

This study supports Gao et al.'s (2020) suggestion that managers must coordinate a sequence of purposeful and persistent investments in human, technological, and business-related competencies to establish open innovation capabilities. These aspects are discussed in each meta capability in the dynamic capability framework. Therefore, in order to successfully implement open innovation, previously discussed organisational capabilities and competencies must be considered in SMEs aiming to successfully implement open innovation and achieve its

objectives. Thus, this thesis suggests that an SME should develop capabilities at two levels: first, higher-level capabilities to strategically manage and sustain the implementation of open innovation (dynamic capabilities). Thus, the SME is required to be able to sense, absorb, seize and reconfigure valuable knowledge to capture value through the development of open innovation-related organisational competencies. Secondly, develop organisational competencies at the operational level to efficiently and effectively support the implementation of open innovation. Figure 8.1 illustrates this thesis's developed open innovation capability framework. The following chapter will conclude the thesis and present the theoretical contribution, research limitations, scope for future research and implications for policy and practice.

Chapter Nine: Conclusions

9.1 Introduction

This final chapter provides a conclusion for this thesis. It begins with an overview of the undertaken thesis and a brief summary of all chapters (Section 9.2). Section 9.3 presents key conclusions and theoretical contributions to knowledge. Section 9.4 offers the practical implications for this thesis. The chapter outlines the limitations of the thesis (Section 9.6). The chapter concludes by identifying potential areas for future research to further understand this phenomenon (Section 9.6).

9.2 Summary of the research

Over the past two decades the area of open innovation has attracted growing attention from both management and organisational scholars and practitioners (Bigliardi et al., 2021; Chesbrough & Bogers, 2014; Chesbrough et al., 2014; Sabando-Vera et al., 2022). *Therefore, a firm's future behaviour resides on its evolutionary paths as firms take years to build their process, by which* The study of open innovation was primarily focused on understanding antecedents (Asgari, Zakery, & Pishvaee, 2021; Chaudhary et al., 2022; Kratzer et al., 2017), processes (West & Bogers, 2014) and outcomes (Gao et al., 2020; Sabando-Vera et al., 2022) towards open innovation. Moreover, several streams of open innovation research have emerged, resulting in constantly evolving theory (Gao et al., 2020). Despite all the apparent benefits open innovation can provide, research shows that the promise of implementing open innovation has stalled for many businesses (D'Ambrosio et al., 2017; Hewitt-Dundas & Roper, 2018). Many businesses are still unable to embrace it completely (Brunswicker & Chesbrough, 2018), and its adoption remains under-invested (Chesbrough & Brunswicker, 2014; Vahter et al., 2014; Wynarczyk et al., 2013). Therefore, businesses that adopt open innovation to stay competitive must develop organisational competencies and capabilities to manage and utilise their resources, knowledge, and tools to achieve open innovation objectives (Jantunen et al., 2012). Several scholars answered this gap and investigated competencies relevant to open innovation implementation (Hosseini et al., 2017).

However, these capability frameworks focus on single facets of open innovation like investigating knowledge capabilities (Lichtenthaler & Lichtenthaler, 2009) or IT-knowledge capabilities (Joshi et al., 2010). Other capability frameworks are not specific enough to open innovation (Enkel et al., 2011) or focus on individual and project levels (Habicht et al., 2012). While Hosseini et al. (2017) proposed a general framework for open innovation capabilities, they failed to investigate the strategic capabilities required to implement open innovation. While dominant views highlighted the necessity of studying and understanding open innovation from a dynamic capability perspective (Bogers et al., 2019; Randhawa et al., 2016; Teece et al., 2020), developing a comprehensive capability framework that adopts a dynamic capability perspective remained under-researched, which is resolved within this thesis.

Therefore, this thesis aims to develop an understanding of the strategic capabilities and organisational competencies required to successfully implement open innovation in knowledge-intensive SMEs. Particular attention was given to exploring and assessing open innovation-related capabilities and competencies in SMEs in the Middle East. With the apparent benefits it offers to SMEs, open innovation has been examined in specific contexts; most open innovation literature has focused on large organizations, although SMEs forms the engine and majority of nations' economic structure; especially in the Middle East (Brunswicker & van de Vrande, 2014; Bruque & Moyano 2007; Constantin, 2019; Hoffman, Parejo, Bessant, & Perren, 1998; Gassman, Enkel, & Chesbrough, 2010; Vanhaverbeke, 2017; Zafar & Mustafa, 2017). Moreover, the focus of most open innovation literature is limited to developed economies (Sabando-Vera et al., 2022; Santos, 2015) despite the argument that open innovation might differ across regions (Cook, 2005).

Considering all arguments discussed earlier, three research questions were developed to guide the structure of this thesis.

- What organisational competencies are required to implement open innovation in Middle Eastern knowledge-intensive SMEs?

- How do these organisational competencies inter-relate to help implement open innovation?

- What are the dynamic capabilities required to sustain open innovation business approach?

In terms of the research design (see Chapter Six), knowledge-intensive SMEs in the Middle East were selected as the geographic context of this study. Six case studies were developed following Yin's (2003) protocol to represent the range of behaviours inherent within the SME population. For confidentiality matters, the six case studies were referred to as SME A, SME B, SME C, SME D, SME E, and SME F. Within this process, semi-structured interviews were conducted with 3-4 managers per SME, in addition to the utilisation of secondary data available through their websites and social media platforms. The data collection process was revised as a result of the Covid pandemic, as physical SME site visits were not possible. The content analysis method was employed for within-case analysis and cross-case comparison to cross-case analysis. This thesis considers two theoretical perspectives to analyse open innovation implementation: value-focused thinking was deployed to analyse the networked relationship between open innovation competencies and the dynamic capabilities was applied to discuss the empirical evidence emerged from the findings.

In order to build a comprehensive framework of open innovation competencies and capabilities, this thesis considers the following issues: open innovation was approached from different perspectives in the literature. Each of these perspectives was related to certain critical success factors. A set of organisational resources and competencies were related to these critical success factors. Moreover, strategic management's dynamic capabilities were seen as essential in appropriately adapting, integrating, and reconfiguring resources and competencies. These capabilities are dynamic in nature and can be enhanced over time. Therefore, this thesis integrates two main constructs, critical success factors discussed in sections 4.2, 4.3 and 4.4, and the dynamic capability perspective addressed in section 5.5. Figure 9.1 is a graphical representation of the contributions achieved within this thesis.

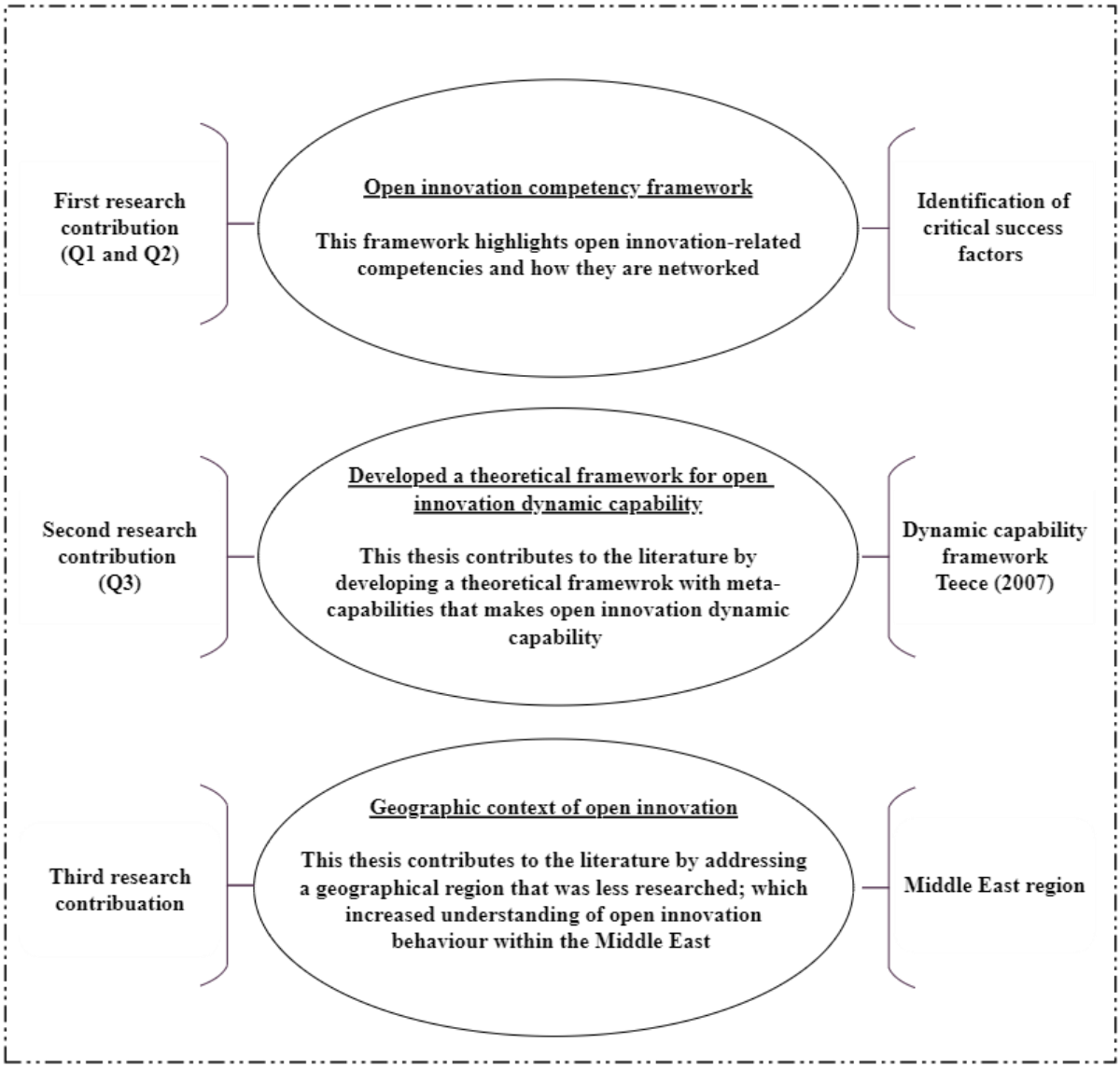

Figure 9.1: Graphical representation of the contributions achieved

The first and second research questions aim to identify a set of open innovation net competencies to efficiently and effectively manage its implementation. This research contribution is presented in section 8.2. Additionally, as knowledge-intensive enterprises that adopt open innovation strategy function in a competitive and turbulent environment, a dynamic perspective must be adopted to analyse how to strategically manage and improve open innovation to succeed; this answers research question three (see section 8.3). The aim of this research question is concerned with analysing the dynamic nature of open innovation capabilities. This thesis analysed SMEs' configurational and learning paths of resources and competencies in open innovation initiatives. Thus, an open innovation dynamic capability framework is developed concerning this research question. This research contribution is presented in section 8.3. This thesis also contributed to the knowledge by filling a regional gap concerning the open innovation research field (Sabando-Vera et al., 2022; Gao et al., 2020).

9.3 Theoretical contributions

The theoretical contribution of this thesis was to analyse and develop open innovation as a dynamic organisational capability. This thesis developed a theory to understand and identify related organisational competencies and capabilities. Deploying the dynamic capability perspective provided profound insights into how SMEs have been strategically managing their competencies and resource-base to deal with open innovation and how this implementation can be sustained and improved. Thus, this thesis suggests that an SME should develop capabilities at two levels: first, higher-level capabilities to strategically manage and sustain the implementation of open innovation (dynamic capabilities); thus, the SME is required to be able to sense, absorb, seize and reconfigure resources and competencies to capture value through the development of open innovation-related competencies. Second, develop operational level open innovation competencies to efficiently and effectively support the implementation of open innovation. Nine main organisational competencies were identified. These are SME's ability to strategically align open innovation, SME's ability to develop open innovation supportive culture, SMEs ability to develop interdepartmental collaboration, SME's ability to get top management support, SME's ability to understand customer, SME's ability to develop products and service that meet such needs and market trends, SME's ability to improve techniques to govern open innovation, SME's ability to build a supportive IT infrastructure, and SME's ability to build and manage collaborations. This thesis developed open innovation capability framework (see figure 8.1). This open innovation capability framework evolved from the conceptual framework presented in chapter five (see section 5.7) in light of this thesis's findings and discussion. Section 8.3 addressed this contribution in more detail.

Most of the extant literature focuses on investigating open innovation from a knowledge theories perspective, while less attention was centred on connecting open innovation to the RBV and dynamic capabilities (Gao et al., 2020; Priyono et al., 2020; Sabando-Vera et al., 2022). In their review papers, Randhawa et al. (2016) and Gao et al. (2020) demonstrated how open innovation was mainly addressed by drawing on the absorptive capacity notion, which is used as a lens to investigate knowledge capabilities for search and acquisition in open innovation. While Lichtenthaler and Lichtenthaler (2009) adopted the dynamic capability perspective, their incorporation of this theory was limited to investigating resources and capabilities from a knowledge perspective. Thus, the incorporation of RBV and dynamic

capability theory in this thesis provided a profound enhanced understanding of how SMEs can sense, seize, and reconfigure their resources and operational competencies across open business models to capture value through open innovation in order to respond to a dynamic environment (Wilden & Gudergan, 2015). Additionally, adopting the dynamic capability theory helped analyse and understand the processes SMEs require to transition from closed to open innovation; since the development of dynamic capabilities aims to adjust a business resource base (Dougherty & Dunne, 2011; Zott et al., 2011).

The dynamic capability perspective was utilised to support the analysis related to open innovation. This thesis understands that SMEs adopt open innovation to gain a competitive advantage and improve innovation performance. The dynamic capability concept was recognised for its potential to gain and sustain competitive advantage (Eisenhardt & Martin 2000, Teece et al. 1997; Zahra et al. 2006). In order to achieve a competitive advantage, SMEs need to implement value-creating strategies (Barney, 1991). Similarly, Chesbrough and Bogers (2014) defined open innovation as a strategic approach concerned with creating and improving values through the purposeful inflow and outflow of knowledge and technologies. This research follows Bogers (2019), Randhawa et al. (2016) and Teece (2020)'s idea of the imperative need of incorporating the dynamic capability approach for analysing open innovation. While the sustainable development of open innovation depends on organisational resources and competencies, these competencies need to be constantly thought over and renewed. Whilst this thesis has used empirical evidence to help understand the possibility of analysing SME's business structure, human skills and technology as essential elements of dynamic capabilities, it is necessary to mention that this analysis is not comprehensive or complete as such processes are unique and path dependent. According to Teece (2007), dynamic capabilities have their own nature, are highly subjective, incomplete, complex, and extremely difficult to objectify and automate.

While several scholars have reviewed the current open innovation research status (Bogers et al., 2018; Gao et al., 2020; Huizingh, 2011; Randhawa et al., 2016; West & Bogers, 2017), this thesis contributes to the literature by categorising the definitions of open innovation into their respective philosophical, strategical, and knowledge IT-enabled knowledge perspectives. This thesis contributes to the existing knowledge by proposing open innovation as a complex concept that needs to be addressed in a more comprehensive approach that integrates these three perspectives. Given that open innovation has been addressed from different perspectives, this resulted in the absence of a unified definition of its successful implementation. Several

scholars stressed the importance of developing an integrative and comprehensive understanding of open innovation that connects different lenses as it would positively influence the success of its implementation outcomes (Baka, 2014; Bogers et al., 2017; Chaudhary et al., 2022; Chesbrough & Bogers, 2014). This thesis defines open innovation from a philosophical perspective that entails considering both the strategic and IT perspectives of open innovation. The open innovation philosophical perspective acts as a background for an organisation's strategy and IT. This perspective provides a more integrated and comprehensive understanding of its adoption. This thesis developed a comprehensive definition of open innovation, which represents a development in the literature.

Furthermore, this thesis's qualitative case study methodology approach provides additional contributions. Gao et al. (2020) noted the need for further qualitative case study methodology studies. According to the authors, most open innovation research adopts statistical quantitive methods. Thus, a qualitative case-based approach is required to investigate open innovation adoption in less researched geographical contexts. Additionally, the unique geographical context of this thesis offers a further significant contribution to the existing literature. The geographical context of open innovation research was limited to developing countries, particularly Europe, UK and USA (Barkhordari et al., 2019; Gao et al., 2017; Gupta, 2009; Hossain & Kauranen, 2016; Ramírez-Montoya & García-Peñalvo, 2018; Sabando-Vera et al., 2022; Santos, 2015; Spithoven & Dejardin, 2017; Torchia & Calabrò, 2019; Usman et al., 2018; West et al. 2014; Sağ et al., 2016; Vrgovic et al., 2012). Thus, several studies have called for an increased understanding of open innovation in less developed countries, particularly the Middle East (Gao et al., 2020; Hossain & Kauranen, 2016; Torchia & Calabrò, 2019; Usman et al., 2018). One of the main theoretical contributions of this thesis, which is related to the novelty of this thesis's geographical context, was that legal protection of IP was not founded as an enabler to open innovation.

9.4 Implications for practice

The findings of this thesis provided other novel insights related to open innovation capabilities that affect open innovation management and are considered helpful for practitioners to implement such initiatives successfully. Open innovation must be grounded first in the SMEs strategy, and then this vision needs to be widely shared across all parts of the SME. This also requires careful consideration of organisational culture, structure and processes. Analysing

these three elements must address past problems that are not very obvious. While the findings provided insights into how building a supportive culture is strengthened if open innovation is embedded within the values of its founders and top, top management sponsorship can affect how employees perceive this initiative and influence their commitment toward it. Such support will promote open innovation as not being a siloed effort of one team. While top management's awareness and characteristics of open innovation affect their level of support, this thesis provided insights into the role of tactical managers in presenting well-conducted business cases to win such support.

SMEs also need to create and capture value from the whole SME by managing open innovation over time. This requires the SME to develop a supportive culture that reinforces employees' learning and supports and reinforces all SME staff members in capturing and sharing knowledge and resources that can help provide value for the business, partners, and customers. Thus, developing employees' evaluation and rewarding systems is critical while adopting open innovation. Moreover, the alignment of an SME's vision, mission, goals, and technology is also a critical open innovation adoption issue. Open innovation should not appear as a silo team effort; open innovation values should be well understood, shared and demonstrated by all staff. Thus, SME's goals should reflect both different teams' and employees' objectives and metrics. The implication of these findings indicates that in order to aggregate value from open innovation, an SME needs to develop appropriate strategic policies and guidelines, appropriate philosophical values, and adopt a proper technological infrastructure. Thus, this thesis developed an open innovation capability framework that would serve as a roadmap for open innovation practitioners to implement this initiative successfully.

9.5 Implications for policy

The findings of this thesis provided other novel insights related to open innovation capabilities that affect open innovation management and are considered important for policymakers to consider assisting in implementing such initiatives successfully. The fact that the world's economic structure is primarily composed of SMEs (Bruque & Moyano, 2007; Constantin, 2019; Hoffman, Parejo, Bessant, & Perren, 1998; Zafar & Mustafa, 2017), and considering the fundamental role these SMEs play in producing incremental and radical world innovation (Acs & Audretsch, 1987), is a testament on the urgent need of researching them thoroughly. This is particularly relevant to SMEs in the Middles East, considering that most countries in that

region have recognised the importance of knowledge and innovation and are transiting toward a knowledge-based economy (Barkhordari et al., 2019; Porter, 1990).

The new leadership vision for some Arab countries is increasingly oriented toward becoming forces for innovation and is expected to generate $16.9 billion in additional revenue from digital transformation (Cabral, 2017). Thus, knowledge into this area of innovation provides important information to apply to SMEs in this particular region. Pervan et al. (2015) pointed out the importance of government policies in determining the level of innovation of SMEs in Arab countries in the Middle East. Section 2.3 SMEs shows that innovation in SMEs is now at the forefront of policy decisions and economics. However, as there is a lack of traces to open innovation in the Middle East region, the factors required to enable successful implementation of open innovation mean that policy introductions are not founded upon an in-depth understanding of how SMEs implement open innovation in reality. This thesis adopted an in-depth multiple-case study strategy to overcome this problem. This thesis's strategy assists in gaining a detailed understanding of open innovation-related factors, which consequently would aid in gaining insights that would help policymakers in introducing more grounded policies.

This thesis's open innovation capability framework provides insights into how policy decisions should be oriented to provide guidance on each capability highlighted in the framework. While such policies need to consider that their guidance and support need to be provided for each factor in the capability framework, a holistic understanding of the two levels of the capability framework, how each level of capabilities is oriented toward achieving specific aims, how these two levels are related, and how the different factors are interrelated is necessary. Thus, these policies should provide individual support to each factor while considering a holistic understanding of the framework and the internal and external factors affecting SMEs.

This thesis also provides insights into the need for policymakers to encourage and invest more in open innovation. Such investment improves many SMEs' resource base. Accordingly, the following recommendations are being suggested for policymakers to ensure adequate attention and successful implementation of open innovation strategies:

1) policymakers should introduce programs that would promote networking, training and seminars. Such programs should increase SMEs awareness and appreciation of the

positive outcomes of open innovation in terms of performance and competitiveness. In line with this, higher education institutions such as universities and professional development agencies, such as technical and managerial training centres, can provide the necessary infrastructure for these programs to start and grow. For example, technology transfer offices and departments at universities can play an important role in this direction. Also, innovation and entrepreneurship and business development centres that have become integral to the structure of higher education institutions are founded on the premise that they can provide essential know-how and technical expertise that are helpful for SMEs.

2) Additionally, open innovation adoption in SMEs could be encouraged by benefiting from the wide support of some Arabs governments. In line with this, governments should allocate enough resources (financial, human, technological, etc) that are conducive to the enrichment and expansion of the necessary infrastructure for open innovation and small business development. For example, ministries of commerce, economics and international affairs can provide structural accommodation for programs that reinforce the creation and development of open innovation capabilities SMEs need to compete and prosper at both local and global levels. In line with this, Arab governments should adopt a taxation code that accommodates tax break for R&D spending and innovation investments to encourage them to install and sustain individual and partnerships endeavours that lead to innovation. Further, while the findings revealed that one of the main reasons SMEs in the Middle East do not follow formal strategies to protect their IP legally is the inadequate embracement of existing IP laws in these countries. Thus, governments in the Middle East should introduce policies to develop and embrace IP laws adequately, facilitating the adoption of open innovation in that region.

3) Most of the Arab and Middle East countries are developing countries. Developed and industrial nations such as Europe and the United States offer a wide spectrum of international development programs that are designated to enhance the business and environment infrastructure in less developed countries. For example, OECD programs, Erasmus partnership and exchange opportunities, USAID funding programs, and United Nations sustainability initiatives are international development programs that aim at enhancing and furthering joint partnerships that lead, in some respects, to technology and innovation transfer from developed nations to developing countries.

9.6 Research limitations

Despite the efforts undertaken to maintain rigorous standards throughout the research project, its contributions are restricted by some limitations. This section is a reflection of the present research process, which aims to analyse and identify problems, opportunities and room for improvement. As reviewed in Chapter Six, this thesis methodology consisted of an in-depth multiple case study strategy. This methodology was adopted to specifically enable the open innovation capability framework to develop specifically. This strategy included data collection from both primary and secondary sources of data. This included semi-structured interviews and SMEs document analysis. While this thesis methodology also aimed initially to conduct participants observation, the data collection process was revised due to the Covid pandemic, as physical SME site visits were not possible. This was identified as a limitation of this thesis.

Additionally, the open innovation topic should be addressed with a more profound research strategy. A longitudinal perspective research strategy would help establish real sequence events and overcome bias and risks of not remembering events correctly. Hence this research addresses strategic issues related to open innovation, considering that knowledge-intensive SMEs are competing in a turbulent environment; a longitudinal perspective would assist in more effective capturing of the dynamic nature of open innovation capabilities over time (Miles & Huberman, 1994). Therefore, a longitudinal research design would assist in mapping the evolution of these open innovation-related capabilities.

Another research limitation is related to the nature of the interpretative research paradigm adopted for this thesis, which is subjective and not free of bias. Data collected for this thesis represents managers' cognition of open innovation in their SMEs. As such, the findings of this thesis should be understood only in light of the participants who provided the data and the reason for which it was collected and consider that these cognitions may alter over time due to time-related factors. Furthermore, the quality of this thesis's findings was affected by participants' availability and sincerity, which the researcher did not have control over. While this thesis investigated six case studies, which is acknowledged to be adequate (Eisenhardt, 1989), it was not possible to explore all these cases in the same depth. Additionally, the findings of this thesis are limited to specific regional and industry contexts. Such a specific

context case study imposes limitations on the generalisability of this thesis's findings. While this thesis aimed to provide a deeper understanding of open innovation-related competencies and dynamic capability, interpretive research does not provide statistical theoretical generalisability. The findings of this thesis should also be read to provide new insights for future research topics. The following section provides recommendations for future research.

9.7 Future research opportunities

To the best of the researcher's knowledge, this thesis is the first of its kind for two key reasons. This is the first thesis to explore open innovation-related capabilities and competencies and their relationships through the dynamic capability theoretical lens. Moreover, it is the first to study the open innovation phenomenon within this specific institutional, industrial and social context. Such contexts are SMEs, knowledge-intensive sectors, and developing countries' social contexts in the Middle East. As a result, the nascent research area can be considered a steppingstone for future research within these particular contexts. It can be deemed fertile for further exploration by applying different theoretical and methodological stances.

While the methodological approach adopted for this research is very appropriate, adopting a profound research strategy, such as a longitudinal perspective, would help establish real sequence events and overcome bias and risks of not remembering events correctly. This is because this research addresses strategic issues related to open innovation. Additionally, future qualitative research can be conducted to re-examine this thesis developed open innovation capability framework within other industrial and social contexts. Such in-depth qualitative research with a broader focus would provide further support to this thesis's developed framework. This in-depth qualitative research strategy would provide valuable contributions to this thesis's limited knowledge of open innovation. Such research would support, expand or adapt this thesis's findings.

Future research also can contribute to this thesis's limited knowledge by exploring open innovation from a broader perspective of other stakeholders. Incorporating different perspectives provides a holistic understanding of the open innovation phenomenon. This could include the perspective of open innovation external actors such as open innovation project external partners and customers, and other internal actors such as lower-level management

teams. Since this thesis focused on investigating dynamic capability at the firm level, future research should focus on investigating individual dynamic capabilities. Additionally, future research should focus on exploring how to reconfigure individual competencies to reach an organisational level. Another potential avenue would be to explore micro-level dynamic capabilities related to open innovation.

A further avenue would be to examine relationships identified between open innovation-related organisational competencies quantitatively. While this thesis provided new insights regarding the relationships between different competencies, further research that examines the direct and indirect connections between these factors would give a deeper understanding of the relationships. This also includes investigating the short, med or long-term nature to them Additionally, future research could explore specific findings of this thesis, such as the role of tactical managers in obtaining top management support to open innovation, the importance of customer knowledge across the different open innovation types, and the role of employees in the success of open innovation initiative.

Finally, as this study paid attention to the region of the Middle East. The MENA-OECD Initiative covers Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestinian Authority, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates and Yemen. While countries such as Egypt, Qatar and UAE are more engaged with the OECD committees and instruments, other countries such as Palestine where there is paucity of reliable data. Future research can focus on studying these countries individually.

9.8 Reflection

My journey in academia and graduate studies started in 2010 when I was awarded a scholarship to complete my MBA at Bridgewater State University-USA. I was sponsored by Yarmouk University in Jordan in recognition for my outstanding performance in undergraduate study. After completing my MBA in 2011, I returned to Yarmouk University where I taught for seven years. During my teaching and interaction with faculty members in the department of business administration at Yarmouk University, I have developed a great sense of passion for academia and research. The

role I played in the lives of my students in their career developments and the research that I was exposed to ignited growing interest and motivation in pursuing doctoral studies in business management. At first, my interest was in the area of human resource management. Later on, Yarmouk University started offering a master's degree in entrepreneurship and leadership. That is when I started developing particular interest in the role of SMEs in economy. As a result, I started looking for PhD programs in business management that focuses on entrepreneurship and innovation. My search in this regard landed me at Swansea University.

During my journey at Swansea University, I have been through a variety of experiences that have developed me to the person who I am now. The person who presented herself in the thesis that you are reading now. This journey lasted for four years that I consider the most influential in my entire tenure in academia. The preparation that I went through in the second orientation year provided me with both the conceptual and methodological foundations for conducting academic and practical research. I chose to work on open innovation as a result of the exposure to literature and research in this area, specifically the role of dynamic capabilities in developing and promoting innovation in business organisations. The four years of working on my thesis has made me a different person. A person who can introduce change in the lives of people and organisations. My belief on how innovation can revamp businesses and sustain their growth, dynamic adaptability and performance has become my guiding philosophy in my teaching content and research orientation. I look forward to continuing to develop my knowledge and experience in this area and pass it on to my students in my teaching assignment at Yarmouk University in Jordan. The interactions with my supervisors and thesis committee have transformed me into a person who should be considerate to the context that I work in the profession that I have chosen for myself.

Over the past two years and a half, the world has witnessed an unprecedented pandemic that has impacted every aspect of life, including academia. The challenges that higher education faced as a result of Covid-19 pandemic has led higher education institutions to develop dynamic capabilities to cope with the lockdowns and the move to the on-line education. As part of this I personally utilised these capabilities to conduct my research in this thesis. This includes interviewing my research subject and interacting with my supervising committee.

Working on my thesis and the challenges that I have gone through made me a person of inspiration for students who pursue their graduate studies. As a single mother, I learned how to not give up and surrender to the challenges that I faced. My supervising committee gave me the opportunity to realise the importance of having positive people in my life. No words can describe how much I appreciate the support, sympathy, and understanding my supervising committee has provided me through this journey. To them I say thank you. I will always cherish these four years and they will last forever with me. The experience that I took with me from them will keep their positive and supporting presence present with me and my future students.

At the conclusion, the day I defended my thesis is the day that made me feel the responsibility that I will perform until the last day in my profession in higher education. I look forward to the next chapter in my life at Yarmouk University where I will start my career as an assistant professor of business management.

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Appendices

Appendix A: Ethical approval

SCHOOL OF MANAGEMENT, SWANSEA UNIVERSITY

FIRST STAGE ETHICAL REVIEW FORM

To be completed for all research involving human subjects OR datasets of any kind OR the environment

Name of PI or PGR Student	Neveen Talal Bani-Melhem
Staff Number or Student ID	[redacted]
Supervisors*	First: Professor Paul Jones. Second: Dr. Louisa Huxtable-Thomas. Third: Dr. Samantha Burvill
Date Submitted	22/10/2020
Title of Project	Open Innovation Adoption in Middle Eastern knowledge Intensive SMEs
Name of Funder / Sponsor*	Yarmouk University-Jordan
Finance Code / Reference*	
Duration of Project	Around 3Yrs

Research aim:
The aim of this study is to contribute to the consolidation of the field of open innovation, underlaying a dynamic theory perspective to investigate this notion. It also contributes to the understanding of Small and Medium Enterprises (SMEs) and the application of open innovation in the Middle East. The main motivation of this dissertation is to identify organizational antecedents that enable continuous successful adoption of open innovation in SMEs in developing countries, namely Arab countries in the Middle East. The dynamic capability perspective will be adopted in this research as a theoretical lens to investigate how organizations can promote their open innovation related organizational competencies

** Complete if appropriate*

***Risk evaluation**: Does the proposed research involve any of the following?*
*✓**Tick** those boxes for which the answer is **YES***
*✗ **Cross** those boxes for which the answer is **NO***

Participants

✖ Will the study involve recruitment of patients or staff through the NHS or the use of NHS data or premises and/or equipment? If this is the case, the project **must** be reviewed by the NHS. Please see the following NHS online tools for help with this http://www.hra-decisiontools.org.uk/research/ and http://www.hra-decisiontools.org.uk/ethics/

✖ Does the study involve participants aged 16 or over who are unable to give informed consent? (e.g. people with learning disabilities: see Mental Capacity Act 2005. All research that falls under the auspices of the Act **must** be reviewed by the NHS)

✖ Is pain or more than mild discomfort likely to result from the study?
✖ Will the study involve prolonged or repetitive testing?
✖ Are drugs, placebos or other substances (e.g. foods or vitamins) to be administered to study participants, or will the study involve invasive, intrusive

or potentially harmful procedures of any kind? (If any substance is to be administered, this **may** fall under the auspices of the Medicines for Human Use (Clinical Trials) Regulations 2004, and require review by the NHS)
✖ Will tissue samples (including blood) be obtained from participants? (This would fall under the terms of the Human Tissue Act 2004. All research that falls under the auspices of the Act **must** be reviewed by the NHS)

this thesis deals with actors in a social setting, organizations in the context of this study, and factors that determine these organizations to adopt open innovation, where the relationship between actors and factors is not to separated, hence, recognizing that knowledge gained for this research is socially constructed and affected by social context is essential. Thus, this research adopts an interpretive, qualitative exploratory multiple case study strategy in order to achieve the purposes of this research. The sample was chosen from Arabic Middle Eastern countries. Case study selection considered the variety of those selected in term of business models and location. few requirements were undertaken to identify potential case study enterprises to be selected where only companies with less than 270 employees were selected.
Recorded semi-structural interviews will be adopted for data collection. this data collection method functions as the primary source of data collection. In addition to the analysis of companies document, such as their website. Interview question were developed from literature review. However, some other questions might pop up from the observation of the host company and others might be developed in respondent to interviewees answers.

Data Storage and anonymity

✖ Will the research involve administrative or secure data that requires permission from the appropriate data controllers and/or individuals before use?
✖ Will the research involve the sharing of data or confidential information beyond the initial consent given?
✔ Will the research involve respondents to the Internet or other visual/vocal methods where respondents may be identified?

Some of the interviews will be conducted through online due to the location of some of the participants and the COVID-19 situation. All interviews will be recorded using mobile phone as a recording instrument. The collected data shall be stored until the project complete. The data will be handled confidentially and autonomously.

Safety and Risk

✖ Has a risk assessment been completed?
✖ Is there a possibility that the safety of the researcher may be in question? (e.g. *in* international research: locally employed researchers)
✖ Will the research take place outside the UK where there may be issues of local practice and political or other sensitivities?
✖ Could the research impact negatively upon the reputation of the University, researcher(s), research participants, other stakeholders or any other party?
✖ Do any of the research team have an actual or potential conflict of interest?

- ☒ Will the research take place outside the UK where there may be issues of local practice and political or other sensitivities?
- ☒ Could the research impact negatively upon the reputation of the University, researcher(s), research participants, other stakeholders or any other party?
- ☒ Do any of the research team have an actual or potential conflict of interest?
- ☒ Are you aware of any other significant ethical risks or concerns associated with the research proposal? (If yes, please outline them in the space below)

Please describe the health and safety considerations in relation to both participants and researchers *(250 words max): If there are significant concerns an appropriate risk assessment and management plan must be attached* **Not applicable**

*If any answer to the questions above is **YES**, then a **Second Stage (Full) Ethical Review MAY** be required.*

*If the project involves **none of the above**, complete the **Declaration**, send this form and a **copy of the proposal** to* **Amy Jones the School of Management Research Support Officer: amy.e.jones@swansea.ac.uk**. Research may only commence once approval has been given.

***Declaration:** The project will be conducted in compliance with the University's Research Integrity Framework (P1415-956). This includes securing appropriate consent from participants, minimizing the potential for harm, and compliance with data-protection, safety & other legal obligations. Any significant change in the purpose, design or conduct of the research will be reported to the SOM-REC Chair, and, if appropriate, a new request for ethical approval will be made to the SOM-REC.*			
Signature of PI or PGR Student		Neveen Bani-Melhem	
Signature of first supervisor (if appropriate)			
Decision of SOM-REC		Approved	
Ethical Risk Assessment	Green ☒	Yellow ☐	Red ☐
Signature of SOM-REC Chair or SOM-REC deputy Chair		[redacted]	
	Date	05/11/2020	
SOM-REC Reference number (office use only)		SOM-REC PGR 054	

Appendix B: Cases Contacting Stages

First stage (Outreaching Knowledge-intensive SMEs in the Middle East).

My name is Neveen Melhem. A researcher student at Swansea University in the UK.

I am exploring the Open innovation phenomenon (A new innovation trend that promotes collaboration with people and partners outside the company). My research explores the innovation practices, competences and capabilities to open innovation adoption.

I am contacting you to request politely to carry interviews with your organisation for a research purpose.

Allowing me to carry your company as a case study would help to accomplish my research objectives which in return will help academics, industries and governments to understand the phenomenon better and identify eventually strategies to implement Open Innovation effectively to benefit businesses and societies.

Note: This project is part of my research and results will be confidential and not disclosed for any business purpose.

Looking forward to hearing from you.

Regards,
Neveen Melhem

Second stage: (Introductory questions)

This involves few introductory questions about the interviewee and the company.

- General information about the interviewee and his/her (position, academic background, experience, years in the company).
- General information about the company
- Case selection criteria for open innovation practices adoption: Does your organisation practice/ implement any of these practices? (think about a recent product or service your company has developed lately). (SMEs sent an initial questionnaire of of adopted innovation practices to evaluate their applicability to the study. See Appendix)

Third Stage (Upon on the interviewee's request for further details)

This would include the main research themes that would be discussed during the interviews, such as alignment and coherences between organisation vision, mission and strategy, top management support, human resources requirements, etc.

Appendix C: Case selection criteria for open innovation practices adoption (Checklist survey)

Which of these practices your firm has implemented?

- ○ Customer participation in product or service development or creative process
- ○ Subcontracting R&D (hiring/ outsourcing an external firm to develop a certain part of your R&D project to another company)
- ○ Crowd-sourcing (involving a large group of people from outside a company's boundaries (online community) into very specific tasks or steps of the innovation)
- ○ Startups contest/ idea competition (Asking innovators, participants, start-ups to submit ideas that could represent an interesting opportunity for the firm to in an award in return)
- ○ Systematic scanning for external ideas
- ○ Using external networks for idea (e.g. associations, intermediaries, knowledge brokers)
- ○ Collaborative innovation activities with external partners (e.g. suppliers, universities, competitors, etc)
- ○ Participation in standardization (public standards)/(influencing industry standards)
- ○ Free Revealing (e.g. Ideas, IP) to external parties (your firm has invented any new product/services as a result of the knowledge exchange)
- ○ Active IP out-licensing patents
- ○ Identification and Integration of Lead Users
- ○ Spin-offs
- ○ External technologies acquisition
- ○ Selling unutilised/unused technologies
- ○ Strategic alliances and joint R&D research programs
- ○ Technology transfer offices
- ○ Open sourcing (free revealing of information on a new design/software with the intention of collaborative development of a single design/software or a limited number of related designs/software for market exploitation)

Appendix D : Semi-Structured Questions (Guidance)

Semi-Structured Questions (Guidance)

My name is Neveen Melhem. A researcher student who is exploring the open innovation adoption phenomenon. The main purpose of this interview is to answer the research questions for my PhD thesis. (Brief introduction about open innovation)

• Interview Introduction

Length: 60-120 minutes. Recording. Confidentiality. Open innovation Challenges, organisational enablers and processes.

• Background Information

General information about the interviewee and his/her position

- What does innovation mean for you?
- What is the role of open innovation in your organisation?
- Were there any challenges when your company adopted open innovation?
- What are the company's benefits from exchanging knowledge and technology with other ecosystem partners? What benefits do ecosystem partners usually seek when engaging in knowledge exchange and open innovation initiatives?
- What is your company's vision? What is your company's mission? Is your open innovation strategy written, published, or communicated to your employees?
- Has open innovation imposed a new organisational culture? How are your employees responding to open innovation adoption? Has there been any resistance?
- What is the role of employees to support successful open innovation?
- How was the top management/owner response to open innovation idea? Did they consider it an important initiative? How did they support that (have they allocated resources and budget for it)?
- What kind of a relationship exists between the innovation team and top management?
- Has your organisation adopted a communication mechanism to facilitate communication with those who are outside your organisation?
- How would you describe the relationship among the departments in your business? Is there open communication across different management levels?
- What characteristics of lead do you think helped adopt and maintain open innovation? (leadership skills, characteristics of leaders)
- What skills people need as your business embraces open innovation?
- Networking skills are the ability to build and maintain relationships within and outside the organisation. Explain its importance when coming to open innovation?
- What kind of training programs has been conducted for employees in relation to open innovation initiatives? Was it mandatory? Are these consistent training? How was it conducted?
- What is your view regarding whether employees should have good Information Technology (IT) knowledge in order to be able to work within open innovation? If Yes, what kind of IT-related training programmes has your organisation focused on?
- How may IT impact open innovation? Level of IT infrastructure
- What are the current technologies relevant to open innovation in your company?
- How were the open innovation technologies and software chosen? Who participated in this process?
- What is the investment plan for IT supporting techniques? (in case of the existence of a plan)?

- How does your organisation gather data from its partners? (is it in real-time? / does it allow for real-time information exchange with collaboration partners?) Are the IT/IS systems related to ecosystem partners integrated?
- Is the R&D department connected to innovation personnel in term of relationship and coordination**?** Do you think R&D can strengthen open innovation? Why? Open innovation and R&D
- How would your organisation decide if an open innovation practice succeeded or not? What measures are considered to evaluate this?
- How you decide on what level of knowledge to share with open innovation partners? (limits) Whose decision is this?
- How you decide on 'Who' would be good potential innovation partners?
- How do trustworthy relationships with ecosystem partners affect the success of open innovation in your organisation? Do your ecosystem partners show an interest in solving any conflict coming along? Does your organisation collaborate/ invest in a relationship with an ecosystem partner who did not show enough respondents?
- Do ecosystem partners usually insist on a relationshipAAAAAAAA with the company?
- How can IP influence the adoption of such practices?
- To what extent do you think your organisational culture matches your ecosystem partners?
- What does the company learn from ecosystem partners? How you make your company's data available to your innovation partners?
- Can open innovation replaces R&D?
- Is there anything else would you like to add?

Appendix E: Case Participant Consent Form

Case participation consent form

I, …… Herby authorises the participation of my organisation…… As a case study in the research study conducted by Neveen Melhem for her study: Open innovation adoption in Middle Eastern SMEs.

I understand that our organisation's information may be used in publication and that the name of our organisation and participant will remain confidential.

Name: Position:

Signature: _____ Date:

Consent for participation in research interview
(Open innovation adoption in Middle Eastern Knowledge-intensive SMEs)

• I…… voluntarily agree to participate in this research study.

• I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.

• I understand that I can withdraw permission to use data from my interview within two years after the interview, in which case the material will be deleted.

• I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.

• I understand that I will not benefit directly from participating in this research.

• I agree to my interview being audio-recorded.

• I understand that all information I provide for this study will be treated confidentially.

• I understand that in any report on the results of this research my identity will remain anonymous.

• I understand that signed consent forms and original recordings will be retained in a well-secured PC until 01/01/2023.

• I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.

• I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

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Signature of participant Date

I believe the participant is giving informed consent to participate in this study.

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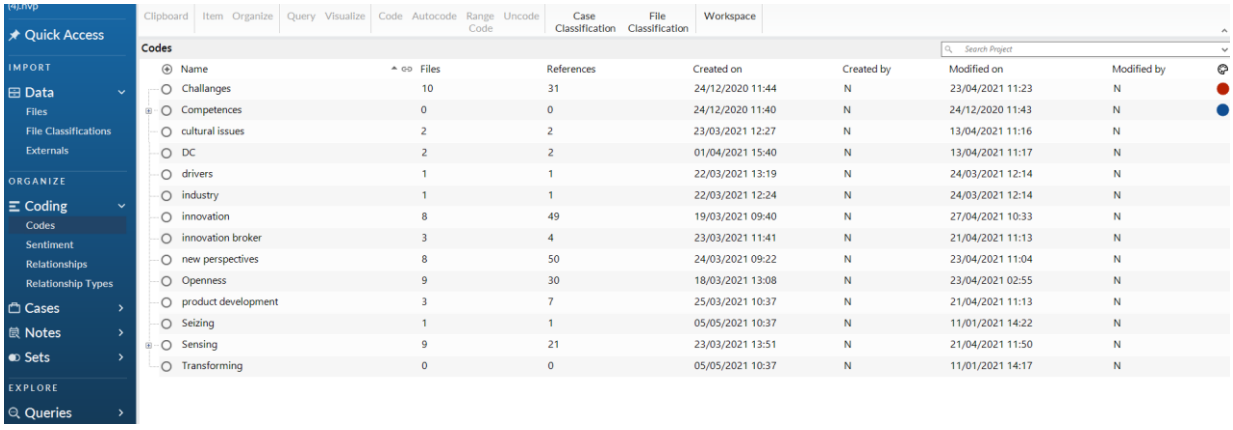
Signature of researcher Date

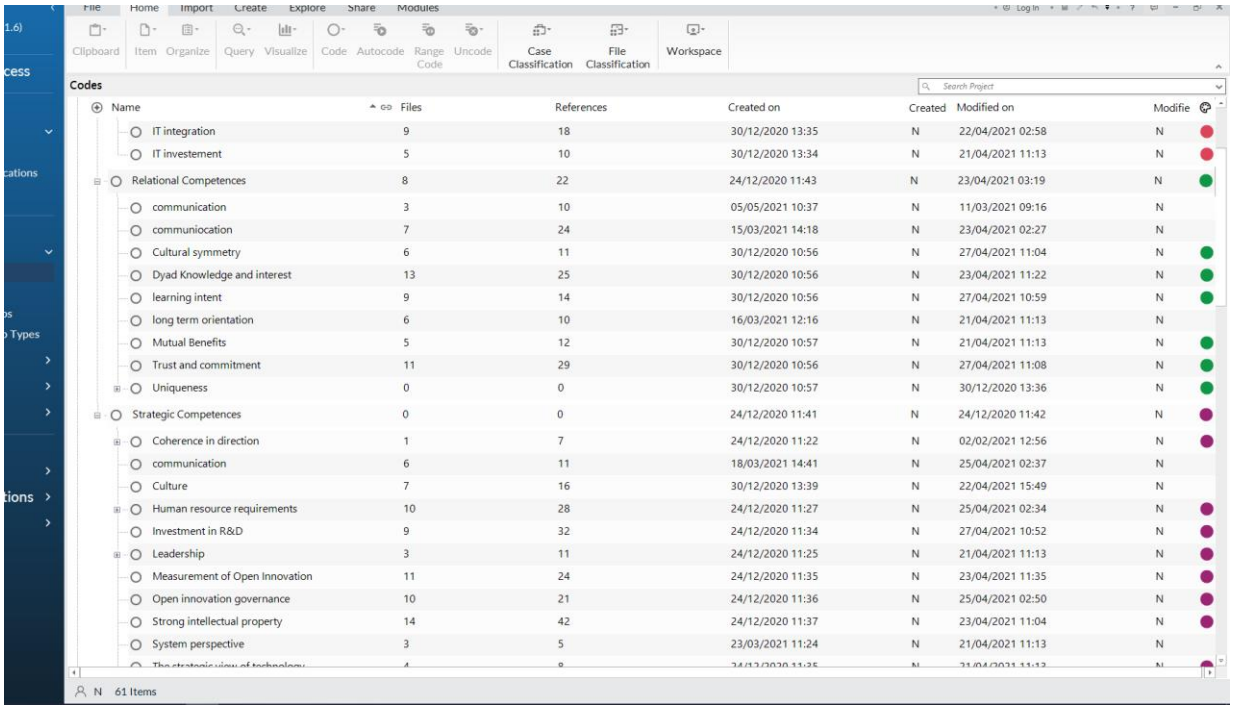
Appendix G: Cases and participants' demographics

Case	Country	Industry	Number of employees	Number of interviews	Demographics of participants	
					Manager	Position
SME A	UAE	Online video marketplace	100-150	4	Manager A	VP of business development
					Manager B	COO
					Manager C	Technology Director
					Manager D	CEO
SME B	Egypt	Artificial intelligent computer vision provider	25-50	4	Manager A	Founder and CEO
					Manager B	Managing director and COO
					Manager C	VP, Strategy and Business development
					Manager D	VP, engineering and products
SME C	Jordan	Online education platform	25-50	3	Manager A	Managing Partner and CEO
					Manager B	Product director
					Manager C	HR manager
SME D	Jordan	Business outsourcing provider	200-250	3	Manager A	CEO
					Manager B	Innovation manager
					Manager C	
SME E	Palestine	Telecommunication	150-200	3	Manager A	CEO
					Manager B	Head of innovation
					Manager C	Product development
SME F	Saudi Arabia	Business innovation and marketing agency	25-50	3	Manager A	CEO
					Manager B	Product development manager

					Manager C	Customer relationship manager

Appendix H: Example of the Analysis using Nvivo Software





Appendix I: Example of open innovation competencies relationship analysis (Value-focused thinking approach)

'WIIT'- Value-Focused-Thinking analysis- Keeney (1994)

Open innovation competency	Why is it important?	Description
SME's ability to obtain top management support	To strategically align open innovation	Top management can define the open innovation-oriented organisational lines that will govern the SME's overall strategy
	To build an open innovation-supportive culture	support is also critical for all employees to understand the relevance of the open innovation and to incorporate its values into their daily routine, thus, gradually building an organisational culture that supports integration and innovation

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Appendix K: SME A- Within-case analysis (further evidence)

SME A
Within-Case analysis (further Evidence)

Theme	Analysis and evidence
1) Ability to Strategically align and match innovation to the enterprise overall strategy.	SME A views open innovation as a way to support the strategic objectives of the enterprise. Thus, any innovation effort has to be evaluated in terms of its defined objectives and how it will lead in supporting goals and vision of the SME. '*The weight of the strategic innovation partnership that we're doing post as if it something that will be supporting our strategic objectives and goals in there.' Manager A*.
	open innovation is deemed as an integral part that needs to be continuously considered and appears in form of systematic processes that influence how the SME operates. *'I would say that we have some good common rules that govern how we operate and innovate that's very well known in the team now.' Manager A*
	The complexity of the online-video learning industry necessitated adopting innovation strategy to stay competitive. Thus, innovation has been considered as a thrust of the SME strategy rather than a just a discrete or a secondary element. *'Innovation is not something that sits on the side site is money. Yeah. So, since the DNA so it comes in each and every action.' Manager B*
	However, while manager A agrees that innovation is embedded in the SME's different process, the manager believes that they lack having systematic process to promote innovation. *'Innovation it's somehow embedded in different processes, but it doesn't have a dedicated process to encourage innovation, from within the employees or inside the organization.' Manager A*
	According to manager A, the reason behind this could be coming from nature of SMEs which usually are based on accelerated growth plan. Thus, innovation should rely on well-identified processes that support its implementation rather than way of thinking that is not well identified and documented in term of actions. *'The nature of a start up on a very accelerated growth plan doesn't give proper focus to innovation' Manager A*
	Despite this, innovation is embedded and aligned to SME's A overall strategy. As the SME keen on consistently researching and analysing the market, an assessment of any sensed opportunity for a room of innovation would take place. This assessment would evaluate this innovation opportunity strategically, financially and additionally in term of scalability and internal capabilities**.**

	‘*whenever a question pops up which might include an opportunity or lead opportunity that we see, we start to imagine how big opportunity around it is first, so we start to make sense of the business case in the first place’ Manager A*
	Innovation does not appear as a random or a discrete effort, the SME aligns it to its strategic direction. *‘we think about any innovation opportunity or a lead opportunity and see the scalability element and the cost element going down and making sense of numbers and we build a business case. Once this comes to our attention we come together, and we go implement a core inquiry’ Manager B*
	Such alignment of the innovation strategy to the SME’s overall strategy occurred since the beginning. According to the growth manager of SME A, such early adopting of innovation happened because of the nature of the industry the SME is in now. The design industry is an intersection of three different but related industries, namely media, education and technology industry. The complexity of this multi-disciplinary industry pushes for adopting innovation strategy to successes. ‘*Because I believe that this industry is a bit of a complex, we decided a long time ago to actually build the market and by building, I mean that we tend to be as open as possible….so for us as a company trying to help others to understand what we do would help us innovate’ Manager B*
	The innovation strategy the SME is adopting depends to a large extent on openness of its practices. The realisation of the top management of the complexity of their industry was a main driver for such openness. as according to manager B their willingness to build the market pushed for adopting open innovation practices as they realised, they cannot do this alone, they needed to be more inclusive to succeed in this complex industry. *‘We believed that being more open would increase our chance to succeed, we didn't look at them as competition we have them to come as a better and much better quality’. Manager B*
	While any innovation effort is defined in term of strategic objectives, such objectives would be always communicated and cascaded to all SMEs employees. This occurs through regular meetings with the support of IT tools. *‘it's been done with the whole organization through like Webinars like Zoom and things like this in order to cascade how our vision is being like achieved, what are the objectives for the upcoming period things like this, so first strategic and global objectives and vision’ Manager C.*
	Manager B pointed out that the SME is keen to link employees’ goals and rewards with achieving open innovation objectives. Thus, building a continuous communication and incentive system and are a requirement for an effective alignment of open innovation to the overall business strategy.

	'this how our business works, we keep conversation around, and we rewarded all knowledge exchange all the time, and we show the results of what happened of this collaborative innovation projects.' Manager B
2) The ability to develop open innovation supporting culture.	SME A appears to have support for innovation and knowledge sharing behaviour. This was obvious how the SME emphasises on the importance of having free flow of information. Manager B pointed to the importance of keeping conversation around to sustain open innovation. '*The way that we believe in here is to make this process part of the culture of the company. So again, it's not part of a cult, it is part of the culture. And by that we really need to be focused on again, it's my humble definition, on conversation and I believe this is the real sustainability element in this process*.' *Manager B.*
	The manager believed that the free flow of information through constant conversation would always bring new ideas and new questions which accordingly would lead to better result. This ownership of the top management of the importance of open innovation was observed to have a huge impact on how employees embrace such value. '*when the conversation is all the time around, this is seeing the opportunity in each and every moment, in each and every problem, each and every question; you will start getting even better results than what you did yourself. So now we depend on the new ideas and new questions to come from our colleagues and even from our junior colleagues' manager B*
	While the SME has adopted open innovation since the it was started, it was observed that SME A has faced minimal cultural resistance (NIH). *'The product team sometimes believe we could do anything; we could deliver' Manager A*
	Manager B rationalised this minimal degree of resistance with the size of the SME as with such smaller number of employees, cultural change would be easier. The manager clarified that having only 100 employees while 70% of them has jointed but recently *'I would not say we reach the stage of much resistance yet in our company because again we are a young organization. A year and a half ago we were only 30 people now we are 100 people so 70 people amongst our colleagues are here, less than two years they didn't reach this moment.' Manager B*
	While SME has witnessed minimal level of resistance toward open innovation initiative implementation, yet the management views this kid of resistance as a source innovation. The cultural competence was not a big challenge of this company since the company was from the beginning based on openness and promoting a supportive knowledge sharing culture.

	'I believe that we are endorsing in the company at the moment because disagreeing and resistance are the points where innovation is born. When good questions come out as now when you disagree, you need to bring a strong argument to make your mind stronger and you'll think better. So we encourage this kind of things' Manager B
	SME A work on changing such attitudes by focusing showing result of implementing open innovation, however, such resistance is very minor. According to manager B endorsing on open innovation supportive culture throughout the whole SME require highlighting positive result of open innovation performance. *'we say results speak, So, one way of endorsing culture and the way you want people to act all of that, not only to enact it; enactment is one piece, but also we need to show results.' Manager B*
	Manager C clarified that when the SME decide on an open innovation project, they fundamentally consider time to result. Hence, SME A prefers projects that would give faster results as this would be reflected on employees' endorsement and embracement of this culture. *'we focus on some quick once to show people what we can better achieve together and with collaboration with external parties. So, when there is a choice between three projects, we choose the ones that will bring results a bit faster.' Manager B* *'Because one after one people would start to believe more and more in it. once you do that, people will believe in the decision-making process that you make as they see the results of it. Then, they come along easier'. Manager A*
	This value has been reflected in many of the partnership project the SME has lately been engaged in. For example, the project of 'Hesas.eg' or 'Egypt classes' which is an online platform that has been created in collaboration with the ministry of education in Egypt. This platform provides curriculum, revision and inductive exams for different aged level students for free. *'Our company's whole idea was established based on this value. It was an idea of our founder as he had a lot of knowledge in the management and provide consultant services to the government, so he decided to create free content on YouTube channel. After a short time he found the channel had about 40 K followers so he felt the need to provide good education in an affordable way, so now we try to pay back to the Community, we're trying to change the mindset of Arab people to learn.' Manager C*
	One observed value that SME A endorses along with free flow of information and innovation, is social responsibility. In Fact, this value was the essence of the establishment of SME A since the founder of SME A initially wanted to create a free learning video content on YouTube to provide good education to Arab community, then this educational video channel rapidly expanded to a business. However, this value remained entrenched since the establishment of SME A until now as one of the criteria the SME consider with its project is providing value to the community.

	'When we try to partnership, we need to consider things like if are leaving value to that community.' Manager C *'The main aspect is that we all believe that we are doing something very good to the community' manager C*
	The SME has been engaged lately in a new project that was a result of two main value: innovation and social responsibility. The SME innovated a new business model called 'Mawadda-eg'. This online platform aims to raise the awareness of Arab youth who are about to get married and provide them with the skills and knowledge to build a happy and successful family. This business model awareness campaign was created after an opportunity sensed as a result of the market analyse of the increasing level of divorce rate in Egypt. *'Divorce rates are very high in the Arab world…… so, we build a learning experience platform to help people prepare for marriage, this includes not only learning on a video but also our psychological assessment as a beginning. You can even book a timing with a doctor or someone to get a legal advice that helps you understand what your rights are and how can you prepare for marriage. We sold that to the Ministry of solidarity in Egypt, and this was a nationwide projects' Manager B*
3) The ability to improve inter-departmental connectedness.	SME A is divided into main four well-integrated teams. The interaction between departments that are involved in product development is well structured and shows regulate communication between such departments. Moreover, the SME emphasise not only on having regular communication and interaction between various teams but working cooperatively together under the same umbrella and are having a mutual understanding of responsibilities, common vision and goals. *'Business requirements and the business details related to the products and project is normally connected through that products team. The products team and the technical products team are well aligned as they have regular meetings to make sure that the different ones are well integrated and aligned.' Manager C*
	Business information that is related to the SME's strategic objectives, vision and potential projects and products are regularly communicated and shared with all members of the SME. This happens through regular meetings between the top management through the different teams' heads to all different members through weekly, monthly and quarterly meetings. *'Business related information how our vision is to be achieved, what are the objectives for the upcoming period is being cascaded from the top management through all the heads and leads and it's being cascaded that into a different individual members' and this could be done either like through The operational meetings that we have every two weeks, and monthly or quarterly online meetings' manager C.*
	The technical team works jointly and supports other business teams and tries to anticipate and resolves any operational issues. This technology team is divided into two teams. One of these teams work with the product team which is mainly focused on business-to-

	customer and the other technology team works with the project team which is focused on initiatives and special projects. The way these different are grouped together shows how aligned they are. *'the technology team is divided into two main teams, one for products and one for projects. We do lots of sharing between the different teams in order to make sure that we are using the latest technologies to support these teams we work with' Manager C*
	The two teams offer the latest technologies for other teams they work with to support a smooth and real-time information flow between departments. While these product tech team and the project tech team are dedicated on their track, they manager C pointed out the that they are structured to in a way that allows to exchange and rotate team members between the two teams. Additionally, the director of both teams assures technical and knowledge sharing between the two teams to maintain a collative pool of knowledge *'Both teams are dedicated on their tracks with the flexibility to exchange team members between both teams' Manager C* *'The directors of both teams make sure to share business and technical knowledge to ensure that we have one collaborative knowledge pool' Manager B*
	The role played by the technology team to support knowledge sharing amongst the SME was illustrated through their selection of these latest communication tools that allows for instant and real-time knowledge sharing. According to manager C, the mindset they have in the technology team is to provide support for all other different teams and functions within the SME. *'Our core value that we have in the technical team is that we are always have that mindset that we are helping other teams in the organization all these types of functions always come to us to provide them for support.' manager C*
	Such alignment between the different teams within SME A allow them to construct this holistic picture of the SMEs innovation processes. However, the role played by the top management of SME A was observed to support information sharing across the SME. As discussed earlier (see section) the top management focuses on the importance of keeping the conversation around which created a unique culture that consider communication a core organisational value. *'We regularly meet, and whenever a concept is briefed to different team members from technology and design department. I can say they are all open to any improvement in the product that we are discussing.' Manager A*
4) Ability to perceive the needs and expectations of customers and	SME A constantly conducts processes to search and analyse the market; this includes processes to understand market trends and the needs and expectations of its customers. This includes observing competitors and understanding customer life cycle. *'We run market research or competition analysis to understand the market size and the competition; how far are they filling the gap, the consumers gap.' Manager A.*

understand market opportunities.	*'We need to do analysis and understanding of similar competitors or similar website or platforms and also do some analysis regarding the psychology of the persona of these users to summit this rigid, is how we how we going to attract you.' Manager C* *'We go through old analytics and data and we are very data driven and we built inside our platform. A lot of data collectors to make sure that we understand what we're building and even the user journey where they click, where does it stop clicking, where they start getting into all these normal stuffs. We also look at the horizons of how this industry can go where they can be used' Manager B*
	Such activities are conducted in parallel to processes which aim to assess SME's internal resources and capabilities. According to such assessment, the SME will leverage its innovation capacity by collaborating with external sources of knowledge to support internal development of its innovation. Thus, building this deep understanding of the market opportunities and customer needs help determining which outside ideas, skills or knowledge the SME should bring in-house. *'And then we decide accordingly, if there is an opportunity for us as a SME, given our capabilities and skill sets, to compete in this market or not It could be a big product or a micro product we sometime amend small features on the course level and sell this course independently and we call this like a micro product it's a customized course targeting'. Manager A* *'basically, we are driven mostly by market opportunity. We are based on our regular research' Manager B*
	This market research would include assessment of market trends and partnership opportunities mainly to bring value to customer. Thus, SME A holds this organisational value of customer satisfaction to build their strategies. *'We have to keep an open eye on different market trends, different opportunity or partnership opportunities. we have an open mind, maybe to collaborate with any of our competition to deliver more value to any of our consumers. This is basically essential.' Manager A*
	According to manager A, such SME orientation to perceive customer needs and expectations and capture market opportunities is done through constant orientation toward research and cooperation with partners and customers. *'for example, if we can meet one of our partners had a business opportunity, we could understand his perspective on the market and opportunity and really make our research and we decided to go for it or not to go forward.' Manager A*
	The SME provides multiple communication channels to help listen to their customer and end users. For example, the SME has a 24/7 customer support channel and their platform.

	'We are getting it turns from many channels. First, our support channel, we have a 24 by seven support For 10s of thousands of users, we are serving as a moment in our B2C platform and we are listening carefully to a lot of what they are saying, and they are giving us a lot of good ideas' Manager B
	Moreover, SME A uses social media, official accounts and emails and, additionally, they provide a chat widget to keep this communication with customers. SME A is keen to proactively listen to their customer voice as it is a critical source to of shaping their strategy. They additionally consider customer feedback and complaints through their app review. Keeping these communication channels permits the SME to understand customer behaviour and the type of products and services they prefer and use and accordingly, introducing tailored or products, services and campaigns that matches what customer observed and analysed behaviour. *'We have right now is the social media they communicate with us through Facebook Twitter Instagram, LinkedIn accounts our Official accounts and our support to email. There is also some kind of chat widget on the websites the customers could also use.' Manager A* *'We actually see a lot of comments and feedback from our customers on our website and the app review' Manager C*
	SME A relies on multiple information and communication technologies that are built in place to capture, record and analyse customer's life cycle. This includes analytical tools such as Google Analytics, Pixel Solutions like SmarLook which provides many insights on users' behaviour. '*We use Google analytics and other platforms, like pixel Facebook, pixel solution it is called SmartLook which is a very intelligent application that we use to record users behaviour; it gives us a much more insights about how the user is in the beginning of the website and not only the different pages also how they been getting inside the page' Manager C*
	Manager C clarified that such analytical processes that the SME undertake is strategically aligned as it is a main indicator for any innovation effort. *'This is an indication to how to find like what is next and campaigns for the user in order to improve usability, it's also an indicator for when you're introducing like a new feature or a new promotion our side, this also indicates the visibility perspective. The visibility/usability of the new ways that we already provided, if it is good enough or needs to be improved.' Manager C*
	Additionally, it was observed that this competency requires reorganisation and alignment between the SME's different processes namely marketing team, technical team, product development team.

	'Most of these platforms and software are used by the marketing team in order to do that analysis. also, SMARTLooks would help the product team to assess the features or scenarios added navigated or processed by users' Manager C
	While the marketing team is responsible for analysing customer behaviour and market trend, the technical teams support their work by understanding the type of data the team is looking for and collecting these data required. Thus, this collaboration between the marketing team and the technical team is essential. Additionally, the decision on how and type of such data to be collected is made jointly by the technical team and the product team. Such collaboration would assist in acquiring the most relevant data and providing the best analysis required. *'in order to support them to do market analysis, this would require multiple steps, first of all these through collecting specific data for them in order to be able to do that analysis and the data could either be collected by us live through our platform and through certain customizations, or this data can be collected using certain third party tools and solutions that is being discussed with the products team in order to agree on which could provide them with the best analysis or data that can be useful. The other thing, we help view and assess the technical of different designs.' Manager C*
5) Ability to to develop product and services that meets customer expectations and reflect external opportunities.	SME A builds its new products or services around customer expectations and market opportunities. As the SME has dedicated processes to analyse customer behaviour and understand market trends and opportunities, once a potential opportunity identified, it would be assessed in term of strategic measures. For example, SME A evaluate the scalability and cost of answering such opportunities. Once a business case is built, brainstorming sessions and meeting would take place to gather ideas from all around the SME. Manager B pointed out that the SME implement a core inquiry mode to seek ideas from all departments to build a product or service that addresses market opportunities and meets customer expectations. *'if there is a pop-up question or a big opportunity that grabs our attention, then we have two ways of approaching each opportunity, either traditional way or we jump and try to do something that's beyond that. And we think about it and see the scalability element and the cost element going down and making sense of numbers and building a business case. Once this comes to our attention we come together, and we go implement a core inquiry mode, it's like a group in choir and we have many forums for that sometimes we call for it. So, we call for brainstorming sessions around the topic and this is very common in our organization and this happens by the support of all of our departments'. Manager B*
	SME A does not solely rely on internal sources of knowledge to create propositions, it assesses, adopts and adjust external knowledge to achieve this end too. Thus, while elaborating SME's A products and services is basically built on external analysis and data coming from customers, it additionally relies on external sources of knowledge to define and build these new products and services. Thus, open innovation output supports these processes.

	'*We start to make sense of the business case in the first place, and then we dig deeper into the details on how to achieve it. Once we come to that we assess ourselves. We might have the talent that is needed to look into this inquiry internally. So, we will go internal. We might have it, but we do not have the capacity. So once this is done and we have a window of opportunity to reach we start looking outside we use our knowledge and collaborations to turn this opportunity into a value' Manager B*
6) Ability to get top management support.	SME A leadership practices has shown to demonstrate a large extent of support to open innovation initiatives. Top management and co-founder team all had work experience in multi-international corporation who already implemented open innovation. Therefore, the top management team understood and believed in this innovation model. '*the three partners were working with big companies, including myself, so we all come from a long experience, more than 25 years in average and in many multinationals, so we have seen a lot of situations. So, there is a bit of wisdom here and focus on what we are trying really to achieve, we have seen how innovation requires collaboration' Manager B.* *Our management strongly believes in the value of collaborating in innovation, their experience in Microsoft and Vodafonehelp them to understand it better' Manager C*
	Their previous experience helped in shaping an organisational culture that supported innovation, collaboration, communication and knowledge sharing. Their experience and recognition of open innovation long-term gains not only helped them pave and build the culture towards such initiatives, but additionally it enables them to take actions and build processes to support open innovation. Top management highlights the importance of open innovation. They support innovation by allocating certain budget to support investment in innovation and perceive it as a core part of the business. *'we overcome such resistance by highlighting the importance of the project to our company and the what the company and the individuals could learn and gain from this project or from this learning path.' Manager A*
	One of the leadership practices that have been adopted to support open innovation is giving the employees the freedom to express and share their ideas. Ideas from all employees across the different levels of the SME are welcomed all the time. Thus, building an encouraging environment that promotes idea sharing, open speech and innovation. Additionally, manager A considered allocating adequate resources and hiring the competent managers as essential factor to deliver open innovation. *'when it comes to the inner part or the inner world of the characteristics, basically is to encourage open speech' Manager A* *'maybe hire the proper management and resources to deliver' Manager A*
7) Ability to develop techniques and	SME A assess each project and each opportunity before deciding on the extent of openness and nature of collaboration. This assessment includes two main aspects: first, the SME identifies what are they looking or seeking from such project; usually a question of 'why are we innovating?' must be addressed prior to any project or product development effort. Second, the enterprise assesses their internal resources and capabilities and decide on the level of openness accordingly. Another aspect that govern the

procedures to governance OI	level of openness in any innovation project in SME A is the type of partnership itself and expectations to be delivered out of such partnership. Thus, SME A adopts procedures to assess and decide on the most appropriate governance model to be adopted. SMEA assesses the level of openness from a strategic aspect which show evidence on the strategic alignment level of open innovation to SME A. Another integral aspect that needs to be determined prior to any open innovation initiative is the nature of the relationships itself; this includes whether this relationship would follow an informal or formal format. However, SME A tend to formalize and document any collaboration that occurs with external parties. This includes signing contracts and non-disclosure agreements to protect what the knowledge shared between the different parties. Additionally, SME A govern open innovation initiatives through identifying roles and responsibilities of each party of a project; this would be clarified and formalised in the contract. Moreover, the SME includes the defined expectations of such project in the contracts. The frequency of communication and mediums used to share information and knowledge is additionally addressed while signing a contract in SME A. *'it depends on the type of partnership itself, some time the partnership is that we, together, agree that this is something that we need to do something that's important for everyone in this case, I do believe it obviously is very high And the normally it comes like a very smooth way. in other type of projects where there is a partnership that is forced on us, for example, we're trying to do, like some people are accepting government institute or ministry, so it forces certain partners to work with us so at this point by you need to do everything documented the do non-disclosure agreements in order to ensure that nothing is being exposed and can be misused. So, the level of sharing and governance of such projects is different according to the partner it-self' Manager C.* *''if there is a pop-up question or a big opportunity that grabs our attention, then we have two ways of approaching each opportunity, either traditional way or we jump and try to do something that's beyond that. And we think about it and see the scalability element and the cost element going down and making sense of numbers and building a business case. Once this comes to our attention we come together, and we go implement a core inquiry mode, it's like a group in a choir and we have many forums for that sometimes we call for it. So, we call for brainstorming sessions around the topic and this is very common in our organization and this happens by the support of withl of our departments. It is a planed process; have defined all of these issues related to these projects. Manager B* *'I think we have a controller here, to we always will share but we are making sure that it's not affecting with any strategic decision from the management, so we have the willingness, but we make sure to there is like a certain agreement or availability, so the approval to share this knowledge or not so we are open and inclusive but we need make share what we are sharing is not harming the company.'* Manager A.

	‘*So the no- disclosure agreement or NDAs are usually assign to protect your name, whatever shared whatever knowledge or information is shared within our meetings or briefings to be enclosed without and not be shared with any third party or any other parties, but the R&D roles and responsibilities, maybe it is part of the contract itself where when we can finalize a debrief report and we are about to create contracts, in the contract we will list all of our roles and responsibilities; who is responsible over delivering what at one time, what milestones’***.** Manager A. ‘*Challenges would be first, of course, is to control the scope; for example in one project we are dealing with several providers so governing the overload with the overall Any governing the what's delivered from every provider and, at the end delivering the government to deliver the big final to the to the out to our customer it's very big challenge to coordinate between the different providers in the same in same in one project.’ Manager A*
8) Ability to build and manage adequate IT infrastructure to support innovation	The IT strategy of SME A works in parallel with all other business unites. The IT department does not only provide the SME with the needed tools and software solutions, but they also work cooperatively with the enterprise’s business functions to support achieving its goals and objectives. The IT department is presented in all other teams and is mainly supporting the functions of the product and project teams. This is an evidence how all SME’s A functions are defined, organised and aligned to achieve a coherence in the line of direction. *‘Our core value that we have in the technical team is that we are always have that mindset that we are helping other functions, for example, our product team, media team, content creation team and marketing, all these types of functions always come to us to provide them with support.’ Manager C.*
	SME A chooses and adopts IT solutions which enable supporting knowledge sharing within and outside the enterprise. It adopts a range of IT such as Trello, Google Analytics, Cloud, Smart Log, Pixel Solution. Such IT analytical solutions are used to record the behaviour of users and allow to lock the power of data gained through analysis. Most of the IT solutions adopted by SME A allow for data availability in a real-life mode. *‘We use Google Analytics, this is one of the main platforms, we also use Login Manager. We use other platforms like Pixel Solution and Smart Log which is a very intelligent application that we use to record the users’ behaviour on website’ Manager C*
	Manager C justified the reason behind that the most IT solution and software provide data availability as being a business requirement for many other functions. This includes measuring customer response instantly, analysing any failure, and analysing security attacks.

	'This is a business requirements to measure different aspects including the Measure of customer responses to certain offerings and promotions, the analyses of failure and anomalies to respond with corrective actions and to analyse security attacks to isolate any vulnerabilities add extra protective layers' manager C
	The role played by IT has been obvious is supporting other competencies. The IT team in SME A has a set of activities to determine and provide other SME functions with the adequate technologies to support their work. The senior technology director of SME A, manager C, clarified the process undertaken to select tools. First, the selection of tools and software are done through the inclusion and input of all stakeholders who would be involved at any certain point with the system. Such involvement and inclusion aim to identify needs and objectives of the required tool. *'We can summarize tools selection process as follows; we define our needs from different involved stakeholders' Manager C*
	After the identification of what are being looked for, the budget must be thought out and identified for the new technology. Then the process of searching for the new technology would start. Matching the comprehensive list of requirements that has been put together, the team would shortlist three options for the new software after a proof of concept conducted. According to manager C, this proof of concept would help examine potential choice of its technologies. Then, potential options would be sent back with the IT team recommendations to stakeholders and management to make the most appropriate choice of the new system. *'Then, we allocate budge, research the best tools in the marketing, perform initial proof of concept on these tools to test the output, shortlist the best 3 options and send our recommendations to stakeholders and management' manager C*
9) Ability to establish cross-boundary collaborations outside the business	SME A is keen on building strong ties with external sources of knowledge. Thus, they follow two main approaches on identifying potential partners; they either follow a formal format that would help in identifying and selecting partners. The SME puts out a Request-For-Proposal where they seek different proposal after announcing briefly on the project itself. However, SME A mostly relies on their networks to connect with. *'Sometimes we go format we put out an RFP and we seek proposals from people and we convert between them, but sometimes we go through our network, believe me with almost 100 employees in the company at this moment this is not small' Manager B*
	Thus, this highlights the role of personal leadership characteristics on building collaborative ties with external sources of knowledge. According to manager B, leaders' ability to sense and sense competitive market data and collaboration opportunities are essential. *'leaders have to keep an open eye on market to different market trends Different opportunity or partnership opportunities have an open mind, maybe to collaborate with any of our competition to deliver more value to any of our consumers' Manager B*

	Whether formally or informally, SME A follows some activities to assure identify those innovation partners and maintain such collaboration. SME A would aim to envision the compatibility and complementarity innovation partners. This envisioning phase assesses and builds knowledge and understanding on the matching between potential partners in term of interactional aspects such as culture and value and other functional aspects such as resources compatibility and ability to deliver and execution. Thus, SME A emphasises on building relationships that is built on mutual compatibility. *'But sometimes, actually You need an innovative partner to understand what you're trying to do and for most of that I would say we divide What we're trying to do into two phases. The first one would be the envisioning face' Manager B*
	this envisioning phase would help to build such knowledge about potential partners which will acts as a base for the next phase, the execution phase. Throughout the two phases, or routines, the SME make sure to conduct enough and periodic communication to build a knowledge store about their innovation partners. Thus, SME A tends to keep constant communication with open innovation ecosystem actors. Therefore, SME A provides multiple ways to keep the conversation happening. This is not limited to its relationship with partners, the SME emphasises on maintaining this conversation internally and externally with all stakeholders. *'The most important thing here is communication. I believe that in change in general and in innovation in specific needs a conversation. So, it's not like a formal thing even, I cannot imagine that I would throw an email or even a requirements document to a partner or company and just wait at my office, waiting for something to come out of it.'* Manager B. *'We have a support system. It is not only our website, but we also have multiple channels. So, we have all the social media channels. They can reach our Facebook page or Instagram or even leave a comment on an ad that we put socially on the internet or our website or send us an email or whatever'* Manager A.
	Manager B carries on clarifying that conversation can take any form, style or medium of communication, however, it must be an effective communication that is based on constant interaction and allows for feedback, otherwise, innovation would not occur. Manager B considered the effective and constant communication with stakeholders as one of the main reasons to sustain the innovation. While the SME emphasis on keeping the conversation around, they take activities to reinforce it. This ongoing and positively reinforced conversation roots knowledge sharing to be a part of SME's A culture. '*Whatever way of conversation. It can be a face-to-face thing, it can be zoom or phone. It is not about the style, but it needs to involve conversation because conversation means that we are building ideas about each other. It is not a one-way thing. It is not*

	about instructing you to let me to do something. Because if I knew very well what I need it would not be innovation, it just a fusion of whatever is needed, but when is it is an innovation, this means that things will emerge, and things will evolve and for that you need the conversation to be in place.' Manager B.
	SME A is keen on building a win-win strategy for both the SME itself and its ecosystem partners. Thus, the SME works on finding a win-win situation for every party involved in this relationship, including customers. as such, this requires a proper understanding of their needs to provide value for all parties Therefore, SME A assesses any relationship prior to partnering in-term of the value such relationship brings to the SME and everyone. This assessment includes what benefits/value this partner can bring, how SME A can contribute to this relationship, how they jointly can bring value to everyone in this relationship and an assessment of a long-term value perspective of such relationship. *'We collaborate where we see that together can succeed and deliver something that has value for everyone for the small company for us, for the bigger companies and at the end to the end user'* Manager C
	SME A seeks to build a partnership that is built on long-term orientation. This means that the SME when engaged with any partnership, they tend sometimes to wave some short-term benefits and provide some extra services to maintain long-term relationship. For example, SME A engaged in a project with one of the biggest banks in Egypt. This project required SME A to provide more services such as providing educational content and unlimited access to the company library in a customised way. While this project invoked SME's A security and was consider challenging to SME A in term of the bureaucracy they have faced dealing with this partner, however, SME A managed to provide satisfactory results to this partner in an aim of providing long-term benefits for SME A. *'We were working on a project for one of the biggest banks in Egypt. We proposed solution for them to have educational content, even most of our library to be accessed, it was very customized for them and we faced a lot of bureaucracy also some legal and security limitations. but at the end we were able to deliver what they were looking for. we tried to find a working solution that was able to pass on the measures that they have , but for us it was one project that will open more room for future and this is what we were able to get from an agreement with the stakeholders from the banking sector'* Manager C.
	Waving some short-run benefits opened new opportunities to SME A. In some knowledge sharing project, SME A would invest in any relationship that would lead to future benefits. *' At a certain point, we even can provide them for consultation that not necessary related to this project or similar services which can be done on goodwill thing in order to have a future potential partnership or having any prospects in the future.'* Manager A.

	SME A pays attention on building a trustworthy relationship with their innovation partners. As the SME A prefers to collaborate with partners within its network to guarantee trust. Additionally, usually checks the potential partners records of achievement to assess the pace and frequency of delivery. *'Sometimes we go through our network, believe me with almost 100 employees in the company as a moment this is not small, it usually solve the problem, One important aspect here is that we want to engage with someone we trust. So, it is not enough to have some papers around MBAs and stuff. It is not about legal aspect; we need to make sure that they are trustworthy.' Manager B*
	SME A prefers to partner with a well-known big organisation if innovate project is core to the business as usually the company would get more insights of the other potential organisation record of achievement; this indicates the weight the SME puts to engage with a trustworthy partner. Alternatively, according to manager A, partnering with small and unwell-known company would occur in case of less critical and incremental project that has a less effect on the SME itself. Moreover, past experiences are one determinant for the SME to re-engage again with a specific partner. *So, if there is a choice to be made between two entities, one that we know its people personally and another one that we didn't deal with before, and they are comparable in a sense, we go with the ones we know because this is the heart of what you do, and you don't want your work actually to be stolen somehow'* Manager B *'partners achievements are important, we track record of achievement, if a partner delivers on a fix pace and continuously delivering what we are looking for we would maintain this partnership.'* Manager A *'if its core in our system, we will go for a big partner that is has a strong record of achievements in the market. But if we're experimenting something new with our consumers, where the impact after the pilot field, the impact might be in thousands of users, not in millions of users, we might go with a small organization to partner with, if there are technologies very innovative and would give us an edge in the market .' Manager A*
	After each collaborative project, the SME run an assessment of the project itself. This assessment includes the relational aspect of this partner and is used as reference for future and upcoming project. Therefore, SME A consider experience results in identing future potential partners. *'if you are delivering a product or project, we run project closure at the end of each project or initiative to understand what went right what went wrong or assess whether those partners were reliable so we could rely on them on maybe any upcoming projects or not, so we decided on project closure face.*' Manager A

	The feasibility of this win-win strategy increases the commitment and motivation for all parties and is consider viable for company A business model sustainability. Thus, win-win strategy to SME A might range and vary in nature of the relationship from profit, new market edge, knowledge gain or even future and long-term opportunities. Therefore, crafting an agreement with partners in SME A is aligned strategically with business goals and values. *'there are multiple measures, let's say, which differ also between projects that we consider to choose partners, one of the things is customers satisfaction, so we were receiving like feedback from the project owners or for their customers, so this is one thing, the other thing is how financially a project is profitable for us and for everyone, because you could be even doing a good job of delivering a good project, but at a certain point, you can find out that you it's not profitable for you, so a profit is needed to sustain a business and capable to move on.'* Manager C. *'So, whenever it's like a little pressure, misalignment, miscommunication or anything that happens between different teams in the same organization or with external partner the only thing that gets us back and let us start again is our goals and values to deliver something that will be helpful for us and the people at the end.'* Manager C '*We seek knowledge that we don't have, for example human- centred designs, or if we if our product so we would acquire this knowledge or skill set so we would basically partner with a third party to help us through the project and learn from the third party how to do it maybe in the future.*' Manager A

Appendix L : SME B within case analysis (further evidence)

	SME B **Within-Case analysis**
Theme	**Analysis and evidence**
1) Ability to strategically align and match open innovation with the overall strategy of the SME	SME A aims to build scalable, accurate, flexible and cost-efficient AI processing solutions in a vision of becoming the most preferred artificial intelligence and computer vision provider throughout the fourth industrial area and beyond. In order to achieve its strategic objectives and future vision, SME B emphasises on continuous improvements and innovation. *'we're on a continuous development mode… we have to continue innovating, keep going either in new models to add new use cases or to enhance the accuracy that you are using… so we also need to keep enhancing the other angles in performance' Manager B* *'Innovation could be in the features that we're supporting, the linking between features to get a new use cases, the way we do actually developing thing, the way we work and take decisions. It should be in all aspects which helps us to move on fast forward. Otherwise, the competition would be product price-based competition, which is like race to the bottom.'* Manager B
	The SME's business strategy mainly focuses on considering three main features: accuracy, efficiency, and performance. Innovation is continuously shaping these features. Thus, innovation is considered the backbone for achieving the strategic objectives of the SME rather than being a subordinate element. '*We have also to optimize our performance to make sure that we do an accurate thing with as minimum as hardware we need so that we can draw drive the cost down for the end user. That means you are in a continuous development mode either in new use cases or enhancing the accuracy and performance of the cases that we have already in place'* Manager B
	Since SME B views innovation as a way of sustaining and growing its business, any investment of innovation must consider market readiness, time to market and product market fit. According to manger B, if the innovation strategy does not assess these factors, this might lead to building a technology that is not commercial and would end up in the lab. Thus, such evaluation is done prior to any innovation effort. *'but if market readiness or time to market is not there or the time the product market fit is not there, then you will end up just building something that is nice to be placed in a lab, but for us, we take this into consideration from the beginning, we do not want to build a technology that finally reside in the lab. So, we wanted to build a company that is selling business based on innovation solutions.'* Manager B

	the SME considers innovation strategically in term of financial returns and market penetration. According to manager B, SME A deems innovations as one of its core pillars that would lead to grow, increase sales, merge and acquisition and to exit at a certain point. *'Building a company that is selling business based on innovation solution will lead us to two things: existing in the market, penetration in different market areas and will give us opportunities on a financial reward.' This could be like the company becomes big, the sales are good and healthy, it could be merger and acquisition, in different aspects, so that the company can exit at a certain point of time. So that is why we have to this in your mind from the beginning. That is why we feel that innovation is one of the very important pillars in the company to help one in selling and reaching penetrating markets. Overcoming competition and give us good financial returns'* Manager B
	manager C asserted on the fundamental understanding of what been referred to as 'relevant innovation'. According to manager C, one of the main challenges of implementing innovation is to associate it strategically, and this requires an alignment of all teams and employees in the SME to achieve the SME mission and objectives. *'First of all, you have to Let's say strategically align yourself and understand what is strategic what is not a strategic'* Manager A
	Manager C claimed that engineers keen in building an innovative technology for the sake of innovation, however, the SME is consistently working on linking any innovation effort strategically. Accordingly, it is a requirement to understand the purpose of innovating and link it achieving values to the SME and the customer. Thus, the implementation and evaluation of innovation is measured in parallel of attaining the SME's strategic goals and objectives and should not be appear as random acts of innovation. *'when we develop a beautiful technology, we need to ask how we can convert this technology into a product that brings value to our customers and how to communicate that this kind of value in an understandable way'* Manager C
	SME B widely relies on open innovation model to continuously sense the need and expectations of its customer and to improve innovation performance as the company emphasis on the role of external sources of knowledge in improving and achieving their strategic objectives through innovation. According to manager C, open innovation is the philosophy of SME B, and is in the heart of all its processes. *'open innovation is a philosophy that does not change from one project to the other but what changed from one project to the other is the ingredients and the elements of how you are going to deploy the open innovation in fulfilling the customer's needs.'* Manager C

	the SMEs mission is delivered relying on adopting open innovation practices. According to manager B, all technologies developed is based on open application programming interface. *'our mission is to build a tool set to process customer video data intelligently in a timely fashion. Everything that we develop is based on open API's. So, we are open to the world. So, we can integrate with anybody'* Manager B
	Manager C clarified that company B continuously researching the expectations and needs of their customer throughout the process of developing any new product to assure it would add value. '*Research is our main tool to test and sense the needs and expectations of our customers.'* Manager C
	The strategic alignment of innovation additionally requires building strong relationships internally and externally. Manager B pointed out that such strategic alignment requires the support of all other business functions. This requires the continuous interaction between employees and management to support this competency as such interaction will help unify directions toward achieving the SME's strategic objectives. '*then you need to build your teams according to those bits and pieces that you're building… I believe that this interaction between the higher-level management and the product development team or the developers or the whoever the company is important to make sure that everyone is moving in the same direction toward our strategic objectives'* Manager B
	, the SME is keen on keeping everyone involved and informed of its innovation and build a feedback loop to ensure such alignment. This is done with the support of IT systems build in to facilitate communication across the SME. *'We have different systems that we're using to make sure that everyone knows what we do. So as a team, we do as a software company we work on agile software development, so, we do sprints like it's two weeks, we have a sprint. We have a release dates and we have two different systems. So, we have a system that is putting everyone is like a virtual environment. So, everyone sees the others. I can talk to other team members right away so I can see their online or offline. So, this is one thing for the communication.'* Manager A
	in order to enforce open innovation, SME A rewards ideas and sharing knowledge and associate it with its KPIs *'I'm sure that probably I have shared with you the fact that innovation, because it's part of our key values, it has a significant weight when it comes to the praises.'* Manager C *'we do provide awards for people who come up with outstanding above and beyond delivery or innovations; could be cash award, something like that cash award or Monster work.'* Manager A

2) The ability to develop open innovation supporting culture.	While the strategic alignment is observed to be critical to the success of open innovation in SME B, manager C asserted on role played by the organisational culture and values installed to support its implementation. Accordingly, the SME strategy should define and emphasise the importance of innovation and collaboration for the SME per se to support the implementation of open innovation. *'No matter how brilliant your strategy is, if you don't have a supportive culture and values that your strategy highlights and support you won't be able to go anywhere.'* Manager C
	As SME B consider innovation as one of its main pillars, they believe that open innovation is the only way to achieve their gaols. Manager C referred to open innovation as the philosophy of the organisation. As such, the culture of the SME b is oriented toward continuous innovation and emphasises the free flow of information. *'Open innovation is a philosophy that does not change from one project to the other but what changed from one project to the other is the ingredients and the elements of how you are going to deploy the open innovation in fulfilling the customer's needs.'* Manager C
	SME B considers customer satisfaction as a critical factor for their business. The SME constantly focuses on listening to customer needs and expectations. While the company consider innovation as one of its pillars, innovation is usually associated with value creation and customer satisfaction. According to manager B, SME B directs employees, especially the technical team, to link innovation with customer needs and expectations. *'we are in a company that needed to innovate and develop products to that will hit the market, we should work with it. So, it must be matching our customer expectations'* Manager B
	To reinforce customer satisfaction-oriented culture, the management team tries to engage most of the team to interact with end users. While this might not be possible all the time, the SME seeks to engage the product technical development team to sense and understand the market requirements. Such engagement and interaction would allow the product development team to better understand customer needs and gain more insight of their behaviours, and accordingly, building products and technologies that better matches their needs and expectations. '*We engage most of our team, even in if only for a certain period. I mean in this sense, they have to get interaction with the end users, with the customers to see what kind of heat you will get so that the while they are innovating they would be focus on customer needs and ours as well'* Manager B
	Additionally, SME's B culture emphasise the value of employee development and learning. Manager A claim that the SME B used to dedicate weekly hours for employees to innovate by their own. Moreover, the SME's culture encourages employees to

	share ideas and knowledge. According to manager A, regular discussion sessions are provided to employees to discuss topics they are interested in. this was observed through the support SME B provides to improve employees learning and development through facilitating training and workshops. The purpose of such emphasis on employee's development and learning aims to encourage innovation and knowledge sharing. SME B consider open innovation as a 'way of doing things' and manager A justify this due to the type of employees the company have. *'We allocate the time for employees to innovate on their own for a few hours per week, but unfortunately right now, we're overwhelmed due to COVID. One another thing we used to do is we would encourage the employees to come up with a topic every week. They would have a seminar and discussion seminars about a technology or a new method or a use case or even something that is not related to our work…. things like that. So that we can encourage innovation.'* Manager A *'Our values are the discipline, the quality, the orientation customer interaction, the teamwork and the positive energy'* Manager B
	While knowledge sharing is considered the way to support the innovation direction in SME B, the SME once faced a level of resistance in term of Make Vs Buy. Manager A explained that the SME once wanted to outsource the company's user interference design. This initiative was faced with a level of rigidity from the front and development team. Such rigidity was justified by the team's ability to develop the user interference design internally. Manager A explained that people were resisting due to reasons related to job security. This level of resistance was overcome as the team realised that their skills and knowledge are still considered valuable to the organisation. Thus, keeping consistence communication with employees is necessary to transform toward open innovation '*once we decided to outsource UI, some people who are developing UI were not happy with that. But eventually they realized that this is an important step and they realized that their work is valuable still, and there is plenty of stuff that they could do they evolve themselves into something that is even more valuable, they can orchestrate this whole process and you can perhaps maybe evolve yourself into something that's more impactful especially that all the back end is still in our domain.'* Manager A
	Manager A clarified that such resistance toward open innovation has not been critical and would be considered minimal. This is a due to the organisational culture that consider innovation and collaboration one of the SMEs main pillars and the only things to do things in the SME (see manager A quotation). Manager C clarified that while formulating SME' B values, is on stressing these values through the actions and activities undertaken by the executive leadership. As such, what is done internally should reflect the SME core values. Here, the smaller size and younger age of the SME plays a facilitating role in shaping and maintaining these values.

	'We do not see resistance on this particular thing because this is the only way we can do things, so that people realize that they cannot work on their desks only and do something that is remarkable. They have to collaborate with other people, and the team is young and the new generation we have believed in this type of development or direction, so, we haven't seen any rigidity of it from that perspective' Manager A *'one of the critical things that I thought of before formulating the core values, because it's not only the title it's actually the meaning of that, so, maybe you say, innovation and then you find that maybe the meaning of innovation is different from one to the other so it's very important to make sure that you are stressing on those values in what you do, not on the signs that you put, and it's wasn't a very difficult mission for us.'* Manager C
	To promote these values among all aspect of the organisation, SME B shares these values widely and puts them front and centre. As such, SME B is keen on repeatedly communicating and reinforcing its core values with all employees. As such, the role of the SMEs leadership was observed on reinforcing the SMEs core values. This happens when the executive leadership constantly sharing their vision through regular meetings, briefing and videos, highlighting them on the SMEs Website, considering them while onboarding new and existing employees. *'Our values are listed and repeated to employees all the time, and it's on our website, and people have to abide with it and they would have interview every year to make sure that they have demonstrated and give examples of how they were able to demonstrate the value of everything'* Manager B
	Another executive leadership practice that reinforce the SMEs core values such as innovation, SME B builds its culture around motivation, rewards and recognition. *'We do provide awards for people who come up with outstanding above and beyond delivery or innovations; could be cash award, something like that cash award or Monster work.'* Manager A Moreover, such values account for in employee's performance appraisal. According to manager A, employees' appraisal does consider their competency in term of skills and their demonstration of the SME core value. Per se, employees should demonstrate how they hold SME B values. *'the evaluation of the employees is placed on the installation of their core competency and all skills they have learnt, but it's not only that, the second aspect would be the demonstration of [SME B] values… people have to abide with it and they would have review every year. they have to make sure that they have demonstrated examples of how they were able to demonstrate our values'* Manager A

3) Ability to improve interdepartmental connectedness	SME B fosters cross different teams knowledge sharing and communication through holding regular meetings; this includes constant meetings across all time and periodic meetings of the top management team with all team members to assure teams alignment. Additionally, the SME facilitates data availability and accessibility to all employees and encourages peer learning and training sessions. Manager B asserted on the importance of communication within and a cross different teams. *'The good thing about our company is that we don't have any separate silos. We have continuously kind of peer learning sessions, where whoever is the special in training our conference whatever has a duty to share in our regular meetings this experience And also documented in a way, where it is accessible and available for the rest of team members' manager* C '*The only thing that probably you might need to do is to make sure that everyone knows what other people are doing. We encourage our team members to share knowledge and expertise with other members through business update meetings. So, we have a periodic maybe once a month and sometimes in a week depends on the situation where the management sits with all the teams.'* Manager B
	In addition to management periodic meetings, the COO of SME B facilitates the flow of information coming from the upper levels and acts as a point of interaction between the management team and the development teams. This is not to say that the top management is not involved within the business. According to manager A, the CEO and founder of the company still works with the product development team and participate in some the design of some of the product development features. *'My role here is the Operations Manager for the whole company. I'm working as the point of contact between the higher-level team and the product development team. I have the product owner with me all the time in order to make a unique channel of information going in and out so that we don't face any surprises in the development or any deliverable, and this is somehow ongoing on a daily basis.'* Manager A
	SME B additionally rotate employees and round them between different positions within the business to improve the connectedness between the teams. This is part of the SME's hiring strategy. While this strategy provides the opportunity for employees to expand their skills and get exposed to the work of other functions, it also helps them to construct a big picture and understanding of the SMEs different functions and objectives. According to manager B, this would improve flexibility and agility of employees to do more functions. *'sometimes you might need to do more movement between the teams, like you lead the skill set between the teams. As acquiring more skills would be better as they become more flexible and agile to do more functions. This is actually part of our hiring strategy'* Manager B

	SME B sustain this cross-departmental connectedness by deploying proper technological tools to support formal and informal communication between different members across the business. These communication tools helped the SME to assure this alignment between different departments through the Covid-19 period with the working from home policy. *'we use a collaboration tool which provides meeting rooms for each and for all our teams, and you'll find all the people in these rooms and then you can collaborate with them instantly. So yeah, even though everybody's working at home because of Covide-19 pandemic, they can still interact with each other all the time.'* Manager A
	the SME adopts an open-door policy which gives the opportunity for all employees to discuss and share feedback without the need to go through their chain of command. *'We have an open-door policy, anyone can share and discuss whatever they want'* Manager A
4) Ability to perceive customer needs and expectations and understand market opportunities.	SME B develops processes to increase the level of innovation. According to manager B, the SME first try to understand the needs and expectation of their customers. Thus, the SME collect information through constant interaction with their customers. '*as we are a small company with only around 30 employees and do not have the enough resources and time to do focus groups and surveys, we rely on our clients to give us the directions of what we need to do, so interacting and changing information with end users and the market is the main source of telling you what you need to do in terms of features functions performance.'* Manager B
	SME A as the main strategy of the business revolve around customer satisfaction. According to manager C, one of the main objectives of open innovation is to satisfy and meet customer needs and expectations. Additionally, the culture of the SME encourages listening to customer needs and voice and involving them in many phases of the product development *'open innovation is a philosophy that does not change from one project to the other but what changed from one project to the other is the ingredients and the elements of how you are going to deploy the open innovation in fulfilling the customer's needs.'* Manager C
	SME A search customer needs and expectation and collect data about market trends and opportunities. Thus, building good relationships with customer is observed to be important. Manager B argued that continuous interaction and changing users is the main source for their innovation. *'we are in a company that needed to innovate and develop products to that will hit the market, we should work with it. So, it must be matching our customer expectations'* Manager B

	'interacting and changing information with end users and the market is the main source of telling you what you need to do in terms of features functions performance and so on so forth' Manager B
	SME B gather information about its customer and relies on the use of business analytics models to understand and gain insight about the customer behaviour and market trends. *'we gather sufficient customer information and use business analytics to understand customer and the market'* Manager A
	In order to gain more competitive market data, SME B try get their employees to engage with and interact more often with their customer more. Manager B claimed that even if the job itself does not require interaction with customers, it is important for their employees, specially the technical and product development teams, to gain more understanding of their customer and the market requirements. '*We engage most of our team, even in if only for a certain period. I mean in this sense, they have to get interaction with the end users, with the customers to see what kind of heat you will get so that the while they are innovating they would be focus on customer needs and ours as well.'* Manager B
5) Ability to develop products that meets customer needs and expectations and reflect external environment	The output offered by customer and market analytical process in SME B is used to offer and create value proposition to the customer that meets their needs and expectations. This includes the development of new technologies, solutions and features to customers. Therefore, SME B gives a priority to the R&D team in term allocating adequate budge and resources to support their work as the SME view this team as base to support develop products and services that meets customer requirements. *'We were investing everything that we make into the company, it is invested in our R&D, in new products, it's invested in new innovations and inventions and of course, in new joint collaborations, and we spend a lot of our proceeds on developing proof of concepts.'* Manager A
	SME B does not solely rely on internal ideas and knowledge but goes beyond its internal boundaries to search, harness and integrate outside knowledge to improve its innovation capacity. It has been observed that the top management perceived such role of the R&D functions to be critical as it has been referred to as 'the future of the company'. Additionally, the evidence perceived of the importance of the role of R&D activities was observed through the connectedness of this team and top management team. The team direct to the engineering director who report to the managing director, however, the higher-level management is in constant contacts with the R&D department. *'The R&D team does the deep learning; they report to the engineering director who reports to managing director who reports to me. But I interact with them all the time.'* Manager A

	'R&D is the future of our company' Manager C
	As the SME considers open innovation as its philosophy and the way they operate, Manager C considered R&D functions as essential tools to achieve open innovation hence it helps in generating, selecting and incorporate internal and external ideas to develop new products and services. Thus, SME B considers R&D functions as breathing to achieve open innovation not an alternative to it. *'open innovation is a philosophy that That does not change from one project to the other. But what changed from one project to the other is the ingredients and the elements of how you are going to deploy the open innovation in fulfilling the customer's need'. Manager C* *'R&D are tools. it's like breathing to our end but it's not an alternative to open innovation.' Manager C*
	Manager C clarified that relying on external sources of knowledge requires investigating these types of external knowledge and incorporate it with internal ones to develop value to customers. Therefore, R&D can act as a base for open innovation hence the SME relies on external sources to validate what has been researched internally and adjust the mix of them and turn it into actions. This validates manager C argument of SME B philosophical view of open innovation and how R&D functions of adjusting the mix of internally developed and externally developed knowledge to develop products that meets customer expectations. *'Even though we rely on open innovation, we still need R&D because actually we need to assist us. As open innovation is kind of generic in certain aspects where you might to provide several options. So, we need to assess the possible options and usually get to dig deeper in several aspects to reach what you need. So, I don't think at any point of time, open innovation will not inherent the R&D team.*' Manager B '*as we are a small company with only around 30 employees and do not have the enough resources and time to do focus groups and surveys, we rely on our clients to give us the directions of what we need to do, so interacting and changing information with end users and the market is the main source of telling you what you need to do in terms of features, functions performance.'* Manager B

6) The ability to get top management support.	SME B founding team members were all previously had the experience to work at Intel Corp. thus, the founding team believed in open innovation and were aware of the rewards it would bring to the organisation. Therefore, open innovation was deemed as the philosophy of the SME since the beginning. '*The founding team members are ex tech giant Intel Corp. who shared a great passion for video technologies.'* The company's website. '*I used to work for Intel for about 19 years before. I worked with the CTO of Intel and was the director of Intel labs in Europe. I was reporting to him as I was responsible for internal Middle East labs, he was a big fan of open innovation.*' Manager A
	Manager C asserted on the role played by top management to support open innovation implementation in SME B *'I stresses on the important role of leadership in the company in relation to open innovation and so on, I believe that this is not disputable by any means So yes, of course, leadership is very important'* Manager C *'I really believe that the leadership of the organization definitely is the trendsetter when it comes to innovation'* Manager B
	Since it started, SME B high-level management has shown support to open innovation initiatives. This has been observed through the adopted practices the leadership team demonstrated to support open innovation. For example, employees were given every week free hours dedicated for ideas storming, discussions, knowledge and expertise sharing to support and improve the learning and innovation of both the employees themselves and the SME. This helped in increasing employees' commitment toward open innovation. *'We allocate the time for employees to innovate on their own for a few hours per week, but unfortunately right now, we're overwhelmed due to COVID. One another thing we used to do is we would encourage the employees to come up with a topic every week. They would have a seminar and discuss seminars about a technology or a new method or a use case or even something that is not related to our work…. things like that. So that we can encourage innovation.'* Manager A

	The strong sponsorship of the top management to open innovation was observed through the culture created and emphasised shared values which promotes collaboration, innovation, customer integration and free flow of information, which affected how the SME operates. For instance, SME A encourages building good relationships internally and externally. Manager C considered networking as the SME vitamin. As such, the leadership team invites external recognised people, doners, and external consultant to both talk about their businesses and their vision. According to manager C, this expands their network and improves the SME and employees learning. Additionally, it brings many opportunities for the SME. *'because we have strong network, the business vitamin, we bring people to talk to us and to share and we share our vision with them and we get the feedback collectively as a company itself... these activities that we do as organization community collectively.'* Manager C
7) Ability to develop techniques and procedures to governance open innovation	SME B aligns performance measures that undertake the perspective of open innovation. While these measures vary depending on the nature of the open innovation project itself, the company emphasises on considering explicit performance measure to evaluate each project depending on the project itself. However, in most open innovation projects, the company consider the external actors benefits and expectations as one criteria of evaluation. *'the criteria we do use for evaluating projects would be based on the situation that we're in. whether it's a strategic or primarily projects.'* Manager A The company participated in a study conducted by Cambridge evaluation for companies. The input of this study, along with other companies all around the world, produced a report on how to evaluate projects. *'we were part of EBRD start-ups venture program. So, through the service of this program, we got this opportunity to get Cambridge to evaluate our company as the first like software company that they did, they got information about the company, they understood what's going on and they created a nice report on how to go about evaluating projects'* Manager A Open innovation is a philosophy that does not change from one project to the other.But what changed from one project to the other is the ingredients and the elements of how you are going to deploy the open innovation in fulfilling the customers needs.' Manager C *'Open innovation is a philosophy that does not change from one project to another. But what changed from one project to the other is the ingredients and the elements of how we are going to deploy the open innovation in fulfilling the customers' needs; and this is planned and organised.'* Manager C

	'We want to make sure that they're competent as competency is very important. We need to make sure they're not going to waste our time; they're going to integrate or they're going to deliver what they're supposed to do in the scheduled that is prescribed.' Manager A
8) Ability to build and manage adequate IT infrastructure to support innovation	While SME B does not have a sperate IT department, they consider IT to be inherent in the work of each employee in the company as all employees are coming from IT background. The function of the IT director is aligned to the business development manager who had been an IT director in another company. According to manager C, this will improve the strategic alignment level of the SME hence the director of the IT team is the same one who is overseeing the strategic direction for SME B *'this way of operating is making it more strategically aligned to the business because the ones responsible for the IT is the same person who is responsible for overseeing the strategic direction of the organization'* Manager C
	Manager C pointed out that investing in an IT system should be evaluated strategically in term how such system would support in the achievement of strategic objectives and how it would provide value proposition. Therefore, aligning the role of IT director to a would help in achieving this end. *'we first assess why would we need to invest in this technology and how it's going to affect my bottom-line results how it's going to affect in supporting us strategically.' Manager B*
	SME B is adopting many IT systems that assist in improving the knowledge exchange within and outside the SME. Communication systems deployed by the SME aim to get all SME members to get involved and informed of what is happing. According to manager A, these communication systems provide virtual environment that allows everyone in the SME to interact and share information seamlessly. *'We have different systems to make sure that everyone knows what we do… we have a system that is putting everyone is like in a virtual environment. So, everyone sees the others I can talk to other team members right away so I can see their online or offline. So, this is one thing for the communication.' Manager A*
	Manager B gave an example of one of the IT tools deployed to support open innovation, JIRA. This software allows for collaboration and transparency in product development. Manager B considered this software as the SME's knowledge acquisition system. *'The other thing we have another system which is JIRA system that is we are using it as a repository of our software and two for the tasks for everyone… we are talking about like a knowledge system acquisition or system containing.' Manager B*

	The SME uses many other software and tools that promotes openness. According to manager B, all SME's B technologies are developed based on APIs. *Everything that we develop is based on open API's. So, we are open to the world. So, we can integrate with anybody' manager B'*
	Manager B pointed out to the importance of having IT systems that allow data to be easily and seamlessly accessible, internally and externally, and is flexible enough to permit collaboration with different partners. Therefore, the IT system in SME B support collaborative relationship by providing seamless accessibility and allow for connection and integration to any partner. *'We have different systems, but all are easily accessible and can be accessed from anywhere and no problem' Manager B* *'the system that we're using is accessible by our employees they are public system so that we actually can add other users, for example, when we do integration with a certain party we actually add them to the system. It has like our partner side and our company side they work together. so, we add users to it from other companies and work collaboratively.' Manager B* Moreover, it has been observed that systems adopted permits data availability as it allows data to be exchanged in real-time mode. *'all collaborative tool should be in real-time.'* Manager D
9) Ability to establish cross-boundary collaborations outside the business	Building healthy and strong relationships with different stakeholders has been observed to be important to SME B. According to manager C, building cross boundary relationships is not an alternative. From the manager perspective, extending the SME network is necessary. *'it's not an option not to have a healthy relationship with your other value chain Members, like the system integrators and the hardware providers and so on.'* Manager C
	Manager C pointed out that while it is important to build strong relationship with end customer to help in understanding their demands, building ties with other stakeholders in the market is not a less of importance and might require exerting bigger effort to maintain such ties. *'how are you going to build a strong relationship, not only with the end customer, but also with the other value chain members is critical. .Here are the challenge that you face; it is not only for creating demand and maintaining or building a strong relationship with your end customer, but actually you have to exert equal effort, if it's not more, to build a very healthy relationship with all stakeholders in the marketplace'* Manager C

	It has been observed that the personal treat of the leadership has a critical role in building such relationships. According to manager D, the SME relies heavily on the network and personal contacts of its senior level management and employees. However, SME B additionally considers some activities to assure building effective relationships with external stakeholders and open innovation partners that is built on trust. This include an evaluation of how competent this potential partner would be in term of resources, culture and deliveries. As according to manager, A, choosing an incompetent partner would be a waste of resources. Thus, SME B conduct few meetings before signing with potential partners to decide whether such partner is competent or not. *'this sometimes requires contact with the high level people in the particular sectors like CEOs of the companies or people in industry sector or even the government sector and I would go and talk to them and could invite like companies to a workshop and you explain to them what the product is and also give them information about this sector'* Manager D *'we want to make sure that they're competent as competency is very important. We need to make sure they're not going to waste our time; they're going to integrate or they're going to deliver what they're supposed to do in the scheduled that is prescribed.*' Manager A
	Additionally, manager C asserted a trustworthy relationship could be maintain through continuous interaction. Such interaction would help in facilitating gaols sharing. *'it should be based on interaction with our client and partner'* Manager B
	In order to strengthen relationships with its partners, SME C tries to improve trust through providing a proof of concept. This investment from the SME perspective proofs it intention to deliver. Additionally, according to manager C, providing product free trial for a period would help in building trust between the SME and their partners. Additionally, the SME lives up to deliver the value their partner is looking for. *'So, developing new proof of concept, whether it's with the customer or with the partners so that this is this is part of our investment that we have to do'* Manager B *'we would install this software for them on trial basis for three weeks so that they can feel it, can use it, and so on, so what else would build better trust!'* Manager C

Appendix M: SME C-Within-Case analysis (further Evidence)

	SME C Within-case Analysis
Competency	Description
1) Ability to align and match open innovation with the overall strategy.	SME C consider innovation as a mean to reach its goal of teaching Arabic language in interesting ways. The SME relies on researching customer needs and wants to develop its new and exciting products. According to manager A, innovation is in everything the company does. *'Innovation for us is how to teach and improve the Arabic language learning combined with what the students now wants and needs for there are very different needs and wants from students today than students many years ago, the traditional teaching methodology is not appealing for them.'* Manager A *'We don't talk about it every day. But we're a tech company and this is what we do; So much everything in the company is about innovation.'* Manager A
	SME C undertakes an innovation strategy which includes few activities to support the strategic path of the SME, including constant scouting of the market, looking for competitors, sensing the market needs, and understanding market dynamics. *'we value constant updates, we are always scouting the market, looking at competitors, looking for what the market needs, understanding our different markets so Saudi is very different than the UAE ,how can we innovate our products and meeting our the goals'* Manager A
	According to manager B, bringing new ideas, either from internal or external sources of knowledge, would be always linked to reaching the SME's mission of creating advanced digital solutions for students. These innovation actions would be always associated with SME's resources and strategic objectives. Therefore, open innovation has not only been viewed as a mean to achieve the company's strategic objects; manager B argued that pooling in new ideas is changing the SME mission itself. According to manager B, as a start-up, the SME has alerted its mission of creating educational Arabic content for pre-schoolers based on videos and apps to create advance digital solutions for all-aged students. This alteration in the mission statement was a result of open innovation.

	'innovation affects our mission, so being a start-up, we would always try to look for new ideas. We are always trying to bring something new to the table. We have a mission that could change from time to time. If someone brings out a new idea, no matter who that person is, if it is valid, it will get its right resources, maybe it will even get how we operate across the year itself. I think it directly affects the mission.' Manager B
	However, SME C assesses and analyses innovation opportunities to see if it is commercially viable. This assessment is made to see if such these new features or ideas to develop the product would propose value to the SME and the customer themselves. Manager A explained that ideas are evaluated in-term of feasibility, functionality and sales. '*Sometimes what the teachers want or what the students want is not necessarily something that helps with the sales process. So, we need to think what are the commercially viable features that I want to push versus the features that teachers will care about, but at the same time will help me sell the software, so sales versus feasibility versus functionality of the software.*' Manager A
	As such, any innovation effort would be assessed strategically to achieve long-term value. *'to launch a new product, there has to be, first of all, it has to cover its costs minimum, and then it has to have a long term lifetime value and a long term profitability and proposition.'* Manager A
	In order to support the alignment of open innovation, SME C associated knowledge sharing knowledge as key performance indicator. The content director of the SME explained that once roadmap has been set to achieve the SME objectives, they translate this roadmap in term of KPIs. One of their KPIs is to conduct periodic focus groups and surveys with their customers and end users to identify external ideas. '*this is part of our KPIs and is written down. Drawing on the company objectives, we do a roadmap and then we translate it into KPIs for our content team. So, one of the KPIs is you have to create or conduct focus groups once every quarter as content team. So, one of the senior hands of our content team has to conduct focus groups, every quarter with the end users'* Manager C.
	, Manager A pointed out to the importance of aligning people throughout the process of achieving any innovation project. The manager asserted on the importance communicating this strategy with all employees to assure their alignment. Moreover, the SME is keen on providing the support to employees through training programmes as a part of employee alignment to transform open innovation strategy. *'we are changing, we started with something and we're pivoting. and when you do that, I would not say that everyone is aligned, but the change takes a little bit of time. So, when that happens, people need to be trained, they need to be on the same page and aligned with the objectives, they need to calibrate this is internally.'* Manager B

2) Ability to create open innovation supporting culture.	While SME C works on strategically aligning open innovation, they are working parallelly on changing the organisational culture to be more supportive to OI. Manager A pointed out to the resistance they were facing from their technical team toward open innovation. The technical team was resisting because they believed they can do it all by themselves. However, the buy-in of other teams, like the product development team and the sales teams has pushed the technical teams to accept it. According to manager A, the sales and product development team support open innovation because they believe that it would provide a win-win reward. '*the tech team they don't love it because they think they can do it better all the time. But they have been forced to basically go with the other team members who will tell them stop it this year, you're not going to develop this we're taking it in out of our own hands' Manager A*
	Manager A explained that the technical team is now accepting open innovation as they realised that with their current resources compared to the timeframe, they have they need outsource and collaborate with external sources of knowledge. *'because of the overwhelming demands on the technical team, they are now accepting more to get games from outside, software from outside, collaborating with other software providers' Manager A*
	Manager B argued that the resistance they initially faced was not only by the technical team. Many employees in the SME were initially refusing to share their knowledge with the product development team when they were asked for their input on features to be changed in product. Manager B claimed that this resistance caused was because employees did not used to participate and being asked about their feedback and ideas to share with other department which caused a lot of confusion to them and lead to asking many questions as they thought this was not their role it is the role of the product development team. '*there was some sort of resistance at the beginning. I will give you a real example. We wanted to change something in the product itself and we were asking for ideas from other employees not in the product development team, and we were very surprised that people did not want to shared their knowledge, not even to give their opinion as it was for another departments' Manager B*
	Manager B considered this resistance as one of the main challenges they faced at the beginning. Therefore, SME A worked to keep the communication between the top management, the product development team and other SME C members around to support open innovation adoption. This took SME C six month to be addressed and overcome. The SME was able to overcome this challenge by emphasising cooperation and sharing among employees. *'this was a real challenge at the beginning… it took over six months for that to change gradually. But luckily now I would say that we're doing the roadmap together all of us.'* Manager B.

	SME C not only emphasising on promoting cooperation between different teams, but it also promotes values of team building, harmony and cooperation spirit. This has been observed as the SME culture promotes confidence and trust among teams, including them to feel as one team who are directed to achieve common things. *'making sure that there's communication across the company. So, everybody communicates with each other, making everybody feel that they are part of this team, so nobody is doing it alone. We are all part of a team. We are all heard we all have equal pay, and we respect each other's opinions and thoughts and ideas.* Manager C *'I would say that the culture of how I can help you, rather than what have you done is dominant. we treat each other as helpers and advisors to each other. We give everybody confidence and that we are one team trying to achieve one thing rather than many small teams fighting for the resources on the on the company.'* Manager A
	Moreover, SME Culture emphasis employees learning. The SME dedicate a budget for training courses chosen by employees themselves. Additionally, they encourage employees to enrol in open source training. Manager B explained that employees are encouraged to periodically engage on training courses that is of the employee's choice. *'We actually fund training and online courses, like I said, we have them go online, because they're open source, and these trainings are all over the internet, provided whether for free or for fees. We actually have budget allocated to support this.'* Manager A
	the culture of SME C promotes free flow of information, collaboration, inclusivity and social cohesion values. This was observed as the SME encourages employees share their ideas and include them in decision making and product development activities. The SME follows an open office policy. Much interaction is going between the management team and the rest of employees. SME is oriented toward results. *'Everybody has a say. We do weekly management meetings. Everybody knows everybody. We have a very open office policy. The managements are sitting amongst all employees, anybody can say whatever they want, and we have very flexible working hours. Everything is based on deliverables. We stick very much to deadlines.'* Manager A

	Innovation appears as core value that SME C emphasises. Manager A claimed that employees adopt an innovation mindset, referring to innovation as the nature of high-tech companies. The lean structure of the SME encourages flexibility, experiment and adaptation. The SME promotes a culture that's not only emphasising innovation, but also promotes a collaborative culture that values the free flow of information internally and with external customers. *'our employees definitely adapt an innovation mindset because we're a tech company and that's what we do. It is like that is in our DNA… Our culture is quite fast. So, like you have to quickly adapt, test and then iterate and adopt according to surroundings. So, we're quite a lean organisation.'* Manager A
3) Ability to build interdepartmental connectedness.	While SME C has initially faced some challenges in-term of building a culture that supported OI implementation, one of the main pillars that help in such transformation is through cooperation and communication between different teams within the SME. According to manger B, the top management leadership has been working on improving the communication between different departments and team members to support knowledge sharing. '*Internally, we do heads of departments meeting regularly to evaluate ideas and work progress. We have now even weekly meetings. We didn't even use to have that as we had meetings, but not on this level where you share everything, and we have input from everyone.'* Manager B *'we are making sure that there's communication across the company. So, everybody communicates with each other, and making everybody feel that they are part of this team, so nobody is doing it alone, we are all part of a team'* Manager A
	The SME has a high level of dependency between departments. According to manager A, the product team and the technical team have a dependent relationship. Moreover, formal and informal communication is constantly happening between these departments. *'we have high dependencies. For example, the content department is very dependent on the tech department. they have a very close relationship in terms of dependencies. And again, communication is very open between them and they communicate formally and informally together all the time.'* Manager A
	SME C holds regular meetings with their all employees. When the product development team decide on developing or changing on of their product features, they include all employees through big meetings where the product team would explain to everyone what would need to be changed. This is communicated to all employees and all of them can give their feedback on the it.

	'*Whatever feature we want to add, we just don't, we don't go only for the for the specific resource that going to work on it as a developer know We have a big meeting where we explain the document the change itself from A to Z. Everybody hears it, everybody can comment on that.'* Manager B
	Additionally, the SME has created a voting system for some cases to allow employees to provide their feedback and vote on any suggested ideas. This system allows for employees to visualise, browse, suggest and provide feedback on all ideas provided to develops technologies. According to manager B, this improved the connectivity and interaction between employees at different levels. *'we do have voting system where everybody has a say in; how the product will look like. This resulted in a great interactivity between employees. Now, everybody is involved.'* Manager A
	SME C has a flat and lean structure that support communication between different teams within the SME. Moreover, SME C has an open communication policy that support the interaction between all employees themselves and the higher management. Manager C high-tech companies needs to keep continuous communication to succeed. *'We're very flat organization. Again, with tech companies, we cannot not be but like this to succeed. Everybody has a say in the company, we do have weekly management meetings. Everybody knows everybody. We have a very open office of the CEO. The managements are sitting amongst all employees, anybody can say whatever they want'* Manager C
	Lately, with the destruction of covide-19, the SME has created one-hour mandatory coffee break for its employees to encourage socialising, the top management hope that such activity would help in improve team's harmony. *'As Part of our organization's team building activities, we have setup a mandatory coffee breaks every Tuesday between 6-7 colleagues to get to know each other and their roles in SME'* Manager C
4) Ability to get top management support	The transformation toward open innovation strategy has started in SME since 2015 as a result of a change in the management team. Open innovation was an initiative proposed by the new management partner and gained alignment from the remaining management team. Therefore, the new leadership team played significant role in pivoting open innovation in the SME. According to manager A, the top management knowledge of the benefits of innovation collaborative projects is necessary. Manager A pointed out the top management worked on building communication and relationship with those outside the organisation. *'if you are a leader, you need to be very aware of the trends that are happening in the markets, to be very well read on how this company added a lot of value through collaboration, how this company went to market much faster because of collaboration'* Manager A

	The top management of SME C has shown practices that demonstrated their sponsorship to the implementation of open innovation. According to manager B, the CEO accept and encourage ideas, and has improved collaboration between teams. According to manager B, without their support, change would have not happened. *'Our CEOs are accepting of people and ideas. And I think if a different kind of managerial style were there, it would have been more difficult to accomplish what we're trying to accomplish.'* Manager B
	Moreover, the top management has worked on building strong relationship with outside stakeholder to support knowledge sharing. The top management believes on the importance of external sources of knowledge, specially the teachers as the SME considers them as one of their most important stakeholders, therefore, they showed commitment to build relationship with them and include them in the process of product development. '*I work to maintain very good relationship with our teacher as throughout the year. We realized that the teachers are the most important decision maker in the sales process and the most important contributor to the collaboration. So, if I want any to understand how I can change the product or how can I improve the product, I need to be able to reach and call the teachers and ask for their feedback and ideas.'* Manager A
	This commitment toward the importance of open innovation pushed the SME to build a teacher reward program to enable the teacher to be more engaged and build a good relationship with them that would support knowledge sharing. Moreover, the top management invite them to social events and dinners to maintain their involvement. '*We've developed a whole program for teachers, teachers reward program, to keep them very much engaged and excited. the bucket for thinking lines so the more that teachers use the program, we do a lot of social media coverage for our schools, we invite them to Ramadan dinner, we invite them to a Christmas lunches, we just to keep them very involved with the brand'* Manager A
	Additionally, top management support to open innovation was observed through the allocation of adequate resources and budget to product development collaborative projects. *'we have budgets allocated at the beginning of the year for our outsourced services with collaborators that are that are going to cut us time to market and would help in building new products.'* Manager A.
5) Ability to develop techniques and procedures to	SME C started to plan and structure the type of open innovation project the SME wanted to establish. SME C tend to formalise any open innovation project through good documentation. This includes a clear identification of expectations, communication mechanisms and goals of collaborations.

governance open innovation	*"Another thing is just required is to have good documentation and plan, you should have good documentation that is shared with everyone to guide you to manage it."* Manager B
	, the SME has been working on building new artificial intelligence features to its product. According to manager A, the SME would have several management meetings to constantly review, adjust and add features to the product roadmap. This process is discussed, done and shared with all employees within the company. '*in our yesterday's management meetings, which is typical management meeting, we were discussing the features that were added to our product roadmap, what are the most important, ranked them we discussed them as a team and we keep adding and removing features that we don't need, getting new software and plugging it like I was telling you that language recognition AI BR are all these new things that That are now cutting edge technology, We tried to bring them into the product and that's the job of everybody in the company. So, it's very much in our DNA'* Manager A

	Manager B clarified that to support a free flow of information internally regarding this matter, they use a voting system, and they share everything using drive. After the internal assessment and prioritisation of the product development team of the suggested added features, the company would externally test the product with ends users. The company would collect feedback from their customers regarding the product feature through surveys, phone calls, focus groups. The input perceived from the customer would again be assessed in-term of feasibility and meeting customer needs and then be added to the product roadmap. *'product team will assess the priorities, we don't just assess them amongst ourselves, we have to go and test that with the market. We go and we do surveys, or we do actual phone calls with at least 20-30 features to make sure that this is actually what they want and see if it is feasible. Then we added to the product roadmap. So yes, it's a very collaborative process with the stakeholders.'* Manager A

6) ability to perceive the needs and expectations of customer.	SME C maintain good relationship with their customer to be able to perceive their needs and expectations. The SME has launched many initiatives to support this relationship including building a teacher reward system, what's app groups, regular heath checks, focus groups, and seasonal dinner initiatives. *'customer service has a way to communicate with the teachers. So, we do questionnaires, we do newsletters, we do random health checks, we call them and, So the customer service team and then let's say the business development team is in constant contact with the end user.'* Manager A *One of our priorities is to understand our customers' needs and live up to their expectations; definitely, this is what our strategy stands on."* Manager C *'In terms of product development itself where we we use mostly two things. One is just to monitor is like, I like to say it is like Silent surveying, So we're just observing how users are our students, maybe using the platform. What kind of challenges that they have through the data that we have without asking them directly.This is one form and the other form is we do conduct some focus groups with the schools with the students just to make sure that the application is going well we we do ask their opinion. Of course, we have surveys for teachers and for students in the application. That appears for them to answer the questions which can help us create or enhance our products in general.'* Manager B *"We have constant health checks; we keep contacts with end-users. And then through customer service we communicate through our own internal channels as a company. We have different channels to work through on how they supply us with all this feedback, and then the rating is on our own back and which we have developed, So we get the ratings. It gives us that the data generate data and reports on the ratings.'* Manager C *Yes, I would say even that This for using the data and I, in my opinion, when you when you target when you have an application that targets the say Last quarter million users It's not feasible to go and do any conduct just surveys or focus groups that and in statistical standpoint test to represent All of the students or all the users in the application. So when you just use the data and see how they're interacting with the platform, What type of things they use and what Even features they don't use and try just to understand their behavior. We do a lot of cohort analysis as well as for end users behavior in general that helps a lot. And Really improving our product and coming up with new features.* Manager B
	Additionally, the SME adopted CRM system to support this end. According to manager A, this system is bringing them to build closer relationship with their customer and help in pooling in customer needs and expectations and collaborate with them

	automatically. *'We use CRM systems now for customer relationship management system. It allows us to send automatic notifications to teachers' automatic notifications and many other features. These tools allow us to collaborate seamlessly with the customer automatically without having to put any time and effort into manuals'* Manager A
	generating data from customer regarding their needs and behaviour is important to offer products and services that they value. The SME holds its strategy around listening to its customer voices
7) Ability to develop products that meet these expectations.	While SME C does not allocate a specific unite for R&D activities, much of the R&D functions are carried in place through the collaborative work of different teams who works on capturing, identifying and selecting new ideas to develop and redefine new products. '*we do not have a specific R&D because all of us are R&D. Because in high-tech companies the product tech team is more or less is the R&D arm'* Manager A
	SME C follows a systematic process to build and develop their products according to the needs and expectations perceived. As the SME widely relies on exchange knowledge with their customers and end-users to provide relevant products and services that matches what they need and want. According to manager A, the SME view their customer as their partner in the process of in innovation and product development. *''We exchange knowledge to be very relevant, to give them what they want, to always make them feel like we're listening to them, to make them feel that we're partners. We're not a third party just throwing something with them to get their engagement to get to keep our brand as top of mind. Because we listen to them. So, so have them as collaborators, rather than customers only, and we develop our products and services accordingly '* Manager A *'Where we are re-inventing the product again by collaborating with a lot of parents being a lot of focus groups, understanding the need, and now we are launching a B2C product for the first time. Again, to give the customer what they need*.' Manager A
	The output gained through CRM system and data gather through what's app groups, regular heath checks, focus groups and the output of customer involvement in product ideation stage are analysed and used along with internal ideas in developing products and services that provide value to the customer.

	Yes, I would say even that This for using the data and I, in my opinion, when you when you target when you have an application that targets the say Last quarter million users It's not feasible to go and do any conduct just surveys or focus groups that and in statistical standpoint test to represent All of the students or all the users in the application. So when you just use the data and see how they're interacting with the platform, What type of things they use and what Even features they don't use and try just to understand their behavior. We do a lot of cohort analysis as well as for end users behavior in general that helps a lot. And Really improving our product and coming up with new features. Manager B Thus, the SME based its new product strategy on both meeting customer needs and market opportunities.
8) Ability to build open innovation supporting culture.	As SME D is transforming toward open innovation, they are facing a degree of resistance. According to manager B, this resistance is associated with the restructuring of new process and roles added related to open innovation. This cultural challenge has been has been rationalised by employees' fear and uncertainty of doing new things. The source of resistance is coming from employees who has been long in the SME and are threaten of change. The fear of losing their positions or having new roles they are not used to perform before is what shaping this resistance. *'the main issue with people who have been at the company for too long and senior positions. They believed that there is no need for us to change our mentality of our way of doing business because this might threaten so many things. It might threaten my position. It might threaten my importance and my role at the company.'* Manager C
	However, the awareness of the importance of innovation initiative is started to reduce such resistance. Thus, educating employees with the importance of open innovation and communicating its objective is necessary to shift toward a culture that promotes open innovation practices. *'We faced some resistance at the beginning of changing things, but now, people are becoming more receptive for the new idea, and I think we are making impressive progress in a very short period of time.*' Manager B
	SME D is adopting few activities to support this cultural change. This includes conducting training and education workshops to familiarise employees of what is innovation and its importance to the SME and to the employees themselves in term of salary and new roles and positions it requires. *'we do trainings, and we try to explain what we are doing and what is the value of what we are doing and how would that affect their life and the company as a result, it will affect their salaries certainly their positions in the company.'* Manager A

	Thus, SME D culture was not prepared to support collaboration and innovation. SME E started to rethink its process with a consistent view of innovation and collaboration. Manager B explained that this restructuring has been faced with resistance from those who were involved in the change and this was a challenge that hampered the effort to successfully implementing innovation. As the SMEs in the middle of this tension between the innovation strategy and existing forms of system, people are gradually becoming more receptive to this change. '*we are in the middle of a restructuring. to be honest it's not easy as I thought but we are getting there while considering restructuring the things, adding new processes not as easy as I thought, we faced some resistance at the beginning of changing things, but now, people are becoming more receptive for f the new ideas, and I think we are making impressive progress in a very short period of time.'* Manager B

Appendix N: SME D-Within Analysis **(further evidence)**

SME D **Within-case analsysis**	
Theme	**Analysis and Evidence**
1) Ability to align open innovation to the overall strategy.	While SME D vision is to be the leading customer service in the middle east region, SME D has not consider adopting innovation a way to achieve its strategic goals but recently. *'Our company has a vision to lead the customer service in the region and to lately to integrate innovation and technology into their system, processes and everything they do.'* Manager B
	According to manager B, the customer service outsourcing industry in the MENA region, and in Jordan specifically, has been the same for more than three decades and only witnessed slight changes and has slightly subjected to innovation and disruptive changes. Thus, the SME did not perceive the need to innovate by then. However, SME D has lately reconsidered innovation as mean to gain an edge in the market after its realisation that the traditional way they adopted before did not lead to a competitive advantage. *'Call Centres outsourcing industry been the same for the past 30-40 years nothing changed, they are using the same system using the same providers and infrastructure. The company realised that the old rigid systems of the outsourcing centres will not give us the edge we want, so we needed to have that omni channel, we need to innovate, we need to create a new channels for the customer service so they can engage with the brand. This is what we are doing now'* Manager A
	Manager B explained that this new orientation toward innovation is due to the top management realisation of the importance of innovation to their business survival. *'innovation is not a choice anymore for Crystel, the top management came to this conclusion that it's not it's not only nice or an extra thing to offer innovative products to offer, it's either doing it or we'll will be left behind.'* Manager B
	The high level of competition SME D is currently facing with those international giant companies such as Microsoft and IBM are the main driver for the SME to invest in innovation now. SME D limited resources associated with its size is pushing toward OI as an innovation model.

	'as a Jordanian company, we have to compete with Microsoft here in Jordan, we have to compete with all these global technology providers operating here in Jordan, and they are offering what we cannot offer as Jordanian company, so we are in competition with them and we need to find new ways, so we need to attract those talents, and this is the main ' Manager B
	Since SME D is transforming toward investing more in innovation, the top management has defined objectives they were looking for from this strategy. However, this transition to open innovation is not widely shared with all employees and the objective of the innovation strategy were not communicated but with the innovation team. According to manager C, the SME does not share its strategy with all employees, its only limited to those who are involved in strategy making. Thus, innovation appears as a one department effort that is separated from other teams.
2) Ability to build an open innovation supportive culture	As SME D is transforming toward open innovation, they are facing a degree of resistance. According to manager B, this resistance is associated with the restructuring of new process and roles added related to open innovation. This cultural challenge has been discussed earlier in section (6.8.1.2) as it has been rationalised by employees' fear and uncertainty of doing new things. The source of resistance is coming from employees who has been long in the SME and are threaten of change. The fear of losing their positions or having new roles they are not used to perform before is what shaping this resistance. *'the main issue with people who have been at the company for too long and senior positions. They believed that there is no need for us to change our mentality of our way of doing business because this might threaten so many things. It might threaten my position. It might threaten my importance and my role at the company.'* Manager D

	However, the awareness of the importance of innovation initiative is started to reduce such resistance. Thus, educating employees with the importance of open innovation and communicating its objective is necessary to shift toward a culture that promotes open innovation practices. *'We faced some resistance at the beginning of changing things, but now, people are becoming more receptive for the new idea, and I think we are making impressive progress in a very short period of time.*' Manager B SME D is adopting few activities to support this cultural change. This includes conducting training and education workshops to familiarise employees of what is innovation and its importance to the SME and to the employees themselves in term of salary and new roles and positions it requires. *'we do trainings, and we try to explain what we are doing and what is the value of what we are doing and how would that affect their life and the company as a result, it will affect their salaries certainly their positions in the company.'* Manager B
	Thus, SME D culture was not prepared to support collaboration and innovation. SME E started to rethink its process with a consistent view of innovation and collaboration. Manager B explained that this restructuring has been faced with resistance from those who were involved in the change and this was a challenge that hampered the effort to successfully implementing innovation. As the SMEs in the middle of this tension between the innovation strategy and existing forms of system, people are gradually becoming more receptive to this change. '*we are in the middle of a restructuring. to be honest it's not easy as I thought but we are getting there while considering restructuring the things, adding new processes not as easy as I thought, we faced some resistance at the beginning of changing things, but now, people are becoming more receptive for f the new ideas, and I think we are making impressive progress in a very short period of time.'* Manager B
3) Ability to improve interdepartmental connectedness.	While SME D still transforming toward open innovation, the top management has been working toward achieving a higher level of cooperation and inter-organisational integration between the different teams across all SME levels. Manager B claimed that departmental collaboration is a necessity to support open innovation, otherwise, it would not be possible to develop new products or services. Therefore, top management has been putting activities in place to support the collaboration between the different teams to feed information to the product development team that comes under the supervision of innovation director. *'We need collaborative work between the departments, because otherwise we wouldn't be able to develop any more products, unless everybody is being collaborative'* Manager B

	Manager A claimed that these activities to support inter-organisational cooperation includes connecting the product development team with all other team heads to assure continuous engagement with other teams. *'The product development manager has a contact person in each department. Usually, the head of that department. And it's that person's job to make sure that everybody is submitting the information needed and continuously communicating with them about any inquiries that they might have while developing'* Manager A *'we've collaborated with other departments for everybody to start within our process of how to feed information into our product development'* Manager D
	Other top management initiatives to improve cross-team communication is through mandating regular weekly meetings with all departments. According to manager A, this is done to insure continuous commination between the top management and the rest of the SME departments. Additionally, the top management is keen on maintain open communication channels with all employees; this is happening now to support this alignment of the innovation team and other teams. *'We sit together on a weekly basis; with everyone like with each department at own and then departments together to make sure that there is continuous communication happening'* Manager A *'how we always try to keep this open communication and try not to keep any the department, not communicating for a long time.'* Manager A
	While manager C asserted that SME D has proper and open communication channels, the manager referred to the innovation team as sperate team that has its own different tasks than his team and that there is no intersection between their work. Thus, despite the top management initiative to improve the level of internal communication, there is minimal communication between the two teams. Manager C referring to his relationship with the innovation team. *'I didn't say that we don't have proper cross departmental communication on the contrary, we have fully open communication it's just not part of my process weren't part of my tasks, or even my requirements to talk to them if unless there is something related to HR that says.'*
	This has been also confirmed by Manager B who claimed that communication between the other different teams within SME D is good, however, when it comes to the effectiveness of communication between the innovation team and other teams it would be lower than across the other teams themselves. Therefore, it can be observed that the work of the innovation team is not well integrated with the other SMEs remaining teams. However, Manager B claimed that they have been working on increasing this level of cooperation

	between the innovation teams and other teams as they have noticed this obstacle, however, culture issues are challenging their effort. Manager B argued that this enhancement is getting in place hence the top management is supporting open innovation initiative. *'we are trying to build that cooperation between us and the other departments , as I said it's not something impossible it's As the top management is sponsoring this new initiative and it will happen eventually, but, as with any other company I think in the beginning, you see some resistance, people tend to not leave their comfort zones or you want to force them out of the comfort zone'* Manager B
	Manager B justified this departmental misalignment as to the way the SME C department used to operate before open innovation initiative. Manager B claimed that not until the innovation team was created, it was not a responsibility for the heads of the different departments to feed information to the product development team department. This is an evidence that the employees have not perceived the importance of open innovation due to the lack of the strategic alignment of open innovation.
4) Ability to perceive customer needs and expectations.	SME E tries to be proactive and understand the needs and wants of their customers. The SME analyses the pains and gains of their customer, and accordingly analyse the feature of product that address these pains and gains. SME D is becoming more adaptable to customer needs and tries to engage customer in the process of product development. *'this is what we're trying to achieve, to be adaptable to our client's needs and to provide the superior customer care'* Manager A *'we start with customer development, we build a persolise where we understand the pains and gains and then we start to analyse what kind of features we should use for them, We give them the minimum viable product, so they can test it out, If they like it we proceed and build up on that, If they don't like it we get it start something new.'* Manager B *'Those are things that the clients now are starting to feel the need for they need them. They are requesting them. And so, we have one of two options, either we move with them and we try to solve their problem for them by providing them with these services, whether we rent out These licenses from third parties or develop our own through our in house developers But we need to ride the wave, otherwise we will become obsolete'* Manager A

	In addition to perceiving customer needs and expectations, SME E sense the market. They look out for competitors and new technologies in the market. *'And What our competition is doing worldwide. And to try to see what technology or new services we can adopt to improve and to be able to compete even better. So, this is part of business development'* Manager A

5) Ability to develop a product that meets customer expectations.	While SME E is transforming toward open innovation, they emphasis on the need on R&D activities to support open innovation. According to manager B, building proper R&D activities that aims to identify and generate and evaluate all sources of ideas would give a strong base to initiate any open innovation project. *'R&D department is crucial for the success of any business, even if you want to learn to cooperate with other departments or your competitors or whatever, it's always good to start the cooperation on a certain solid account with where you initiate the R&D this will always put you in a better position'* Manager B One of the main processes SME E is now investing in is searching for new ideas internally and externally. This includes high level of involvement of customer to identify their needs and expectations. Then, analysing these needs and building features around these requirements, and then a product model would be built for the customer to test initially. Thus, SME E stives on identing source of values to its customers. *'Business development team part of their job is to continuously search for what is new.'* Manager A *'so we start first with customer development process where we meet with potential users of the product and we gather their requirements and ideas we try to uncover their pains, expect their pain, and then we build the model of the product or the prototype of the product and then we start the development process'* Manager B *'We don't just launch it, and then try to sell it, we actually launch it based on the need'* Manager A

6) Ability to develop techniques and procedures for open innovation implementation.	Open innovation in SME E was initiated by the chief innovation officer. The innovation team is trying to plan the type of innovation they want, including level of openness, and main rules and roles of engagement. Thu, any innovation project would be first assessed in-term of internal resources and capabilities this assessment will help in identifying level of knowledge transfer. Additionally, objectives of each projects should be formulated. *'I always look at first of the capabilities of departments and my capabilities at the same time so the first step for me is to evaluate where we stand, are we on the same, do we have the same capabilities or are they ahead of us? Do we need them to open doors for us? for example, are they going to provide A new skill set that we don't have?'* Manager B *Any idea, knowledge and any innovative it has to go through what we call a value proposition document. Which contains a brief about the idea itself. It contains any document, the template that you have to sell, what it contains? Why would this idea succeed, why it might fail? What kind of potential, It has reach impact, how does it fit with everything else? Once it's Finished by anyone who wants to present any kind of idea, we take it internally as a product and we have a prioritisation system. Where we define each, let's say opportunity by itself. It strengths and weaknesses, Many other of course things and we assess each idea. And then we have a weight and score. We have a scoring system. Okay, well, which idea to go first?. Yeah. And this is well documented and shared with everyone. Yes, the evaluation apart and the value proposition is shared within the team.* Manager C Manager A also clarified that determination of responsibilities and roles played in this project should be explained. *'we intend to understand where do we stand in that partnership, are we the lead in that project? Or will I be the follower in that project'* Manager A The SME additionally tries to structure frequency and medium of communication and performance measurement. '*We decide on how they communicate and what KPI, the rules and regulations that they put on our'* Manager A
7) Ability to identify and manage IT for open innovation.	SME D uses Sandbox tool as channel of communication between the innovation team and external actors. This tool provides real life information and is considered user friendly. *'Where we have a SandBox, it is a channel with Disco In order to were to update each other to discuss what is going on and if anyone is facing any challenge with integrations with. it allows for real time information it's super friendly super easy.'* Manager B

	The SME also is considering adopting Enterprise Resource Planning systems (ERP) to support and monitor the communication and knowledge. Manager A consider this IT system a mechanism to improve communication with this the SME hence it has been observed that there has been miss cooperation between the innovation team and other teams. *'we're trying to work more on the ERP systems that are providing the professional communication tools for more ease of communication and are more monitored and more professional. We need softwares is let's say that would cater to our clients' needs, for us to organize their data for us to manage'* Manager A.
8) Ability to build cross boundary collaborations	One of the main challenges that hinder building strong relationship with external actors is the lack of adopting a win-win strategy. According to manager B, *'I believe in a win-win situation But unfortunately, most of the people here they believe and if I win, then you lose'* Manager B

Appendix O: SME E-Within case analysis (further evidence)

SME E Within-case analysis	
Theme	**Analysis and evidence**
1) Ability to strategically align open innovation to the overall strategy.	While SME E has launched an open innovation team in late 2019, the director of the open innovation project claimed that the SME does not articulate an innovation strategy that align collaborative innovation effort to the overall strategy of the business. According to manager A SME E lacks having an explicit innovation strategy with defined goals. This has been observed as a main challenge for open innovation implementation. *'We need that to have of the directors, managers and CEO to sponsor this. They have to start introducing open innovation as part of their strategies. They have to own it. And this is one of our challenges'* Manager A
	Manager A develop that SME E needs to utilise open innovation and link it with the strategic objectives of the business. Thus, SME E needs to formulate policies to support open innovation implementation and priorities it as a mean for creating value. '*the third challenge is probably having to do with the competing priorities. We have got to meet our sales targets; we have got to make the revenue. So, we need policies to address and prioritise open innovation' Manager A*
	Manager C claimed that without open innovation reinforcing policies, it would be difficult to change. such polices might include allowing employees to have a dedicated time for ideation. Manager C explained that the idea of open innovation is not wieldy practiced in Palestine, the *'We don't have much time dedicated. So, you need policies to address that. You know, we will allow you 30 percent of your time to do whatever you want, like Google. So that has to be formulated as part of a policy. So not until that policy is there, it will become difficult to change that.'* Manager C *'open innovation practices in Palestine is a nascent idea. Still is not something that has been widely practiced.*' Manager C
	Manager A consider that such for a successful alignment of open innovation, such policies need to be communicated widely throughout the SME, so all employees be aware of it. Additionally, open innovation related policies should be associated with incentives to allow employees to perceive the importance open innovation.

	'The attitude of CEOs, the attitude of directors, the attitude of staff members also have to change, and that requires that there should be an incentive scheme somewhere as part of the policy that will drive these employees to wanting to do a bit of innovation' Manager A
	Manager B associated the lack of such strategic alignment of open innovation with the top management sponsorship to open innovation. As the top management is yet not considering open innovation as one of its competing priorities, they are not allocating enough resources toward it. Manager C clarified that in the time of Covid-19, SME E decided to delay allocating resources to open innovation projects. According to manager C this was related to the timing of innovation from the top management perspective. '*the timing of innovation has to also be conducive. What do I mean, if the company structure is busy with covid-19 disruption, it would be very difficult for them to put resources towards innovation? We had to delay some of those activities due to covid-19'* Manager C
	SME E has not considered open innovation as a thrust to deal with this disruption, in contrary, it considered it a subordinate effort that is consuming resource that needs to be allocated to other strategies. *'in Covid-19 era there was destructive in terms of the work that we are doing because the focus has been shifted and all of people are focusing on the main core of the businesses'* Manager B.
2) Ability to build an open innovation culture.	According to manager A, when they started to launch open innovation initiative, the organisational culture was not prepared for this new concept. They faced a high level of resistance at the beginning. This resistance started slightly diminishing by the team effort of building a well conducted case of the reward open innovation projects would bring to the SME. According to manager A, increasing the level of knowledge about the value open innovation could bring to the SME was a mechanism adopted to somehow reduce the high level of resistance they have faced. However, level of resistance is still existed in SME E and is forming a struggle to the open innovation team. '*You should have seen the resistance that we were faced throughout the beginning of making them aware about this. We had to increase the knowledge about open innovation. We have even made financial modelling just to prove applying it and how it will return a better investment if all things work out.'* Manager A *'we are still struggling in this because we are changing the mentality of a whole organization to be open to new ideas and to be open to new innovative ideas that can come from outside the company and you can integrate it inside the company and build a new products accordingly. So yes, we are struggling in this because the mentality that we do have here is a risk averse mentality and all the people they are VERY by the book.'* Manager B

	effort made to increase the knowledge about open innovation helped somehow to gradually change the attitude of the top management. however, manager B considered the cultural change toward supporting open innovation is essential and described SME E culture as risk-averse that holds back ideas from all over the SME E. *'all these little practices were able to change the attitude of management to leverage this. So that's a huge cultural change as part of that, you know, going towards supporting open innovation, but today, today it's more acceptable to do so. So that's a change in culture'* Manager A
	However, manager A developed that while changing the culture to be supportive to open innovation is essential, they need a leader, or a champion, who pushes toward open innovation. The manager explains that for OI to be part of the culture it's a process that needs a champion. ' *'We have to influence change of attitude. The language of open innovation may not resonate with the average director or staff member. Right, it's just completely it's not the rules, not the competing priorities, et cetera. So, attitude working on attitude change is also essential. This is why I think it's a process. But it has to have a champion. It has to have a leader*,' Manager A
	Additionally, this process of building an open innovation supportive culture require having a reward system that reinforces innovation related behaviour. *' the attitudes of CEOs, the attitude of directors, the attitude of staff members also have to change, and that requires that there should be an incentive scheme somewhere as part of the policy that will drive these employees to wanting to do a bit of innovation.'* Manager A
	Manager C considered changing the organisational culture is a critical success factor to open innovation *'you cannot do innovation if you don't have the culture for it. This is how important culture is, and this is what differentiates why open innovation is working at one place, but it is not working at the other'* Manager C *'the first step in making people aware that there is something called open innovation and it can come from internal sources, it can come from external sources. It can be a hybrid between both. So be aware of that model and thus have an open eye and open mind set for it.*'Manager B
	As the SME is still going through this cultural change, manager B pointed out that this cultural change might take a long time. However, the managers asserted that keeping continues evangelism and educating staff about open innovation importance is critical throughout the cultural change.

	‘*The mechanism is to just continue being vocal about it, preaching, always preaching about evangelism. This is all about evangelism and having a bit of a drive. Just continue educating them on the good practices and how open innovation will improve staff morale, will improve company performance, will improve securing additional revenue streams. So continuous evangelism All of this was disrupted when covid-19. it just you know, we were on the momentum and I felt it and the culture is changing’* Manager B
3) Ability to get top management support.	The main challenge with aligning open innovation to the business strategy in case E is the need top management sponsorship. Manager A claimed that one main reason for the lack of the strategic alignment to open innovation to the overall strategy was the lack of top management. SME E top management considered open innovation as a subordinate element to the overall strategy rather than a being a main element to achieving it. Thus, this has been reflected on the resources and budget allocated to support such strategy. Therefore, manager B highlighted the importance of top management sponsoring open innovation. ‘*Having sponsors from inside the company is very important as well’* Manager B.
	Manager A pointed out that the resistance the innovation team has faced toward implementing open innovation made them considered working on the buy-in of the top management through building a well conducted business case that highlights the value and importance of implementing open innovation. *‘we had to go back and start working on the buy in, start working on the policy that putting some incentive schemes, start doing more work, knowledge, what this is all about and why we're doing it. So, we have to go back to the drawing board and take it from those aspects.’* Manager A *‘they are very hesitant to go and do a program, so in the corporate world there has to be a business case for them to dedicate budgets and money and time for’* Manager C *‘we were able to do in terms of openness is influence management towards new practices and their knowledge of open innovation, making them buy into this, making them also being vocal about it themselves, adopting and approving policies. And once that is there, the culture will be top down, will not be bottom up. So it's not a it's not going to be a bottom up culture is going to be a top down introducing new policies to incentivize the bottom to also work at it. That's the formula. How do I do it’* Manager A
	The reason manager A stresses top management buys-in as it will affect other factors and facilitate their implementation, this includes OI strategic alignment and the cultural change toward OI. According to manager A, the sponsorship of the top management is an evolutionary process, where top management buys-in as accumulated to their realisation of the importance of OI. And this realisation can only be gained through building a business case.

	'it is an evolution process, not until the top management rationales it. The top management is so much immersed in meeting KPIs and sales targets. I don't think we have much bandwidth left to put into open innovation and creation activities, *see my point, not unless, they start seeing and realizing more and more that the talent that sits outside their walls, unless they see how it feeds into creating new revenue streams to the business.'* Manager A *'we need to come to the table of negotiations and to develop discussion. So sometimes you have to show them the importance of doing this and to bring the value'* Manager B
	Additionally, Manager C emphasised the importance of have a top down change to the success of open innovation implementation. This top-down approach is important to initiate change in culture and nature of work and roles. *'the very important thing to start with a top down approach because you cannot just change the work, even though if we were able to change the mentality of people , we need to change real work, and we cannot apply this without the top management blessings,'* Manager B
	However, while the open innovation team has not won the top management sponsorship to open innovation, they started to show more interest of such initiative. *'The top management used to be more risk averse. Recently, they started to listen more to us can see the value right now because we implemented already one or two projects with two and I think they understood saw and realized how easy some quick can be done through start-ups and through innovative ideas that come from outside company'* Manager B

4) Ability to build IT infrastructure	While manager A asserted on the important of IT to support the implementation of open innovation, the manager argued that the IT team in SME E is not really concerned about external source of knowledge. According to manager B the IT team do perceive the importance of open innovation strategically. Thus, the relationship between the two teams is not very beneficial as the IT team consider supporting the open innovation as not of the SME's strategic priorities. *'IS is the backbone for our operations success, but unfortunately the IT people are not concerned about open innovation.'* Manager A *'while we are developing a business case to win top management support, IT were not willing to engage in it'* Manager C While the SME recently has adopted a system that integrates all information coming from other systems and sources of knowledge, manager B clarified that such initiative was not done to support open innovation, in contrary, it has been deployed to support SMEs operational efficiency. *'the company has faced a problem with the different systems we have internally, that's why we have a unify system for all data as they notice that issue, but it was not for us nor we were involved in that decision' Manager B*
5) Ability to develop techniques and procedure to manage open innovation implementation.	Manager A pointed to the importance of elaborating best practices to structure an open innovation model for the SME, otherwise open innovation would not be sustained. As the SME F now is delaying open innovation activities, the open innovation team is trying to build a policy or a plan of the kind of open innovation model they wish for to develop a methodology of open innovation competency as they fail to put this so far. *'it has to be based on good practices. If you know them, these good practices, it is great. But if you want to say I want to do open innovation haphazardly, I think that you're not going places with a such'* Manager A
	This plan or policy is mainly required to support the strategic alignment of open innovation to the overall business strategy. This would only happen with the sponsorship of the top management. *We don't have much time dedicated. So, you need policies to address that. You know, we will allow you 30 percent of your time to do whatever you want, like Google. So that has to be formulated as part of a policy. So not until that policy is there, it will become difficult to change that.'* Manager C
	this methodology would address the legal aspect of any open innovation project and all other needed documentation. *'And we look into the legal stuff. So, we have to make sure that all the papers are right, they have rights and liar, they register.'* Manager B

6) Ability to build cross boundary collaborations.	Manager B highlighted the importance of establishing a partnership with all stakeholders. This relationship to be strong it has to consider aligning the interest of those parties involved to assure the success of this partnership. *'to develop this alignment of interests between all stakeholders and all parties. We have to communicate and to reach out to the right person. So, we make sure to get connected to the right person inside and outside the company*.' Manager B
	Manager A asserted on the importance of interest alignment in open innovation. From the manager perspective, developing alignment of interests requires understanding the language of a stakeholder, and acting upon it. And this alignment of interest needs to be developed internally and externally. *'There's something called the alignment of interest. I keep repeating this phrase. Yeah, well, it would only make sense that if alignment of interest is there or if we are able to develop whether internal or external.*' Manager A Manager C explained that this partnership should be established on trust and commitment to be effective. And this is one of the other reasons for the slow adoption of open innovation. '*definitely everything is built on trust. This is why it's still a work in progress, because many of the things we want to do You cannot start doing them, not unless you have a personal relationship that is built on trust with all the stakeholders.'* Manager C
	One of the main factors to build effective relationship is to maintain communication with all stakeholders. *You have to know how to communicate, and you have to Keep a very good relationship with everyone. So, you can have them on your side.'* Manager B However, while SME E has failed to successfully implement open innovation, the SME encourages building collaborations with external stakeholders.