University of Strathclyde
Department of Design, Manufacture, and Engineering Management
Glasgow, UK

The Orchestration Role of Innovation Intermediary: A Case of Corporate Accelerator Programme

By

Siska Noviaristanti

A thesis submitted in fulfilment of the requirements for
the degree of Doctor of Philosophy

September, 2018

DECLARATION OF AUTHENTICITY AND AUTHOR'S RIGHTS

This thesis is the result of the author's original research. It has been composed by the author and has not been previously submitted for examination which has led to the award of a degree.

Some parts of this thesis have been presented in academic event and conferences:

- Noviaristanti, S. (2015) A Bibliometric Analysis of Crowdsourcing for Open Inovation, 8th Doctoral Workshop on Product Development Management, Copenhagen, Denmark
- Noviaristanti, S. (2015) Mapping the Rise of Innovation Intermediary: Future Challenges, 25th European Doctoral Summer School in 'Innovation and Technology Management Research and Publishing', Enschede, Netherlands
- Noviaristanti, S., Acur, N., Mendibil, K. (2015) Exploring Crowdsourcing in Open Innovation, British Academy of Management 2015 Conference
- Noviaristanti, S., Acur, N., Mendibil, K. (2015) Mapping the rise of Innovation Intermediary: A Bibliometric Approach, Institute for Small Business and Entrepreneurship 2015 Conference, Glasgow, UK
- Noviaristanti, S (2016) The Role of Intermediary Institution in Developing Partners' Social Capital in Innovation Network, 9th Doctoral Workshop of Product Development Management, Glasgow, UK
- Noviaristanti, S., Acur, N., Mendibil, K. (2016) The Widening Role of Innovation Intermediary, 23rd Innovation and Product Development Management Conference, Glasgow, UK
- Noviaristanti, S., Acur, N., Mendibil, K. (2017) The Role of the Corporate Accelerator as an Innovation Intermediary for Corporation and Start-ups, 24th Innovation and Product Development Management Conference, Reykjavik, Iceland
- Noviaristanti, S., Acur, N., Mendibil, K. (2017) The Orchestration Role of Innovation Intermediary in Open Strategy: A Corporate Accelerator Programme, European Group of Organisational Studies, Copenhagen, Denmark

ACKNOWLEDGMENT

First of all, I am deeply grateful to Allah for the strengths and His blessing in completing this thesis. I would like to expres my gratitude to Directorate General of Resources for Science, Technology and Higeher Education, Misnistry of Research, Technology and Higher Education of Indonesia who funded my study.

Special appreciation to my supervisors, Dr. Nuran Acur Bakir and Dr. Kepa Mendibil for their supervision and constant support. Their invaluable support and great advising were not only for my research but also introducing me to the innovation academics and my academic career development process. I am truly honoured to work under your supervison. And to Dr Athanasios Rentizelas for his continous support at the end of my PhD journey.

I would also like to express my gratitude to Rector of Telkom Univeristy, Prof. Dr. Mochamad Anshari, and Dean of Economic and Business School, Dr. Dodie Tricahyono, for their support and help towards my PhD study. My acknowledgment also goes to all staff Telkom University for their co-operations.

Sincere thanks to all my Indonesian friends in Glasgow and the UK, especially for Tiffany and Arie for their precious friendship and kindness; friends in Indonesia and also my DMEM friends Robert, Khalid, Olga, Ali, for the supports and memories.

Last but not least, my deepest gratitude to my beloved parents, all my family especially Kak Ti, Kak Inta, Kak Ai, and Ian for their endless love, prayers and encouragement. Also special thank you to my husband, Herru for always by my side and taking care of me, and to my dear sons, Umar and Azzam, for their love n hugs. Without their supports, I wouldn't have been able to complete this PhD journey. Thank you.

Siska Noviaristanti, September 2018.

ABSTRACT

The pace of innovation intermediary research has accelerated in recent years, spurred on by new socio-economic models, digital technologies, the local and global challenges of population growth and environmental pressure. Research on innovation intermediaries is predicated on the idea that intermediaries act as a catalyst for innovation to address these changes and challenges. The development of innovation management practices toward openness and emerging socio-economic models have changed the roles and supporting activities of innovation intermediaries. Open innovation literature suggests that corporate accelerators are one way for corporations to access external sources of innovation as part of the ecosystem

The corporate accelerator is one of the available innovation intermediary types and provides a unique position that could support innovation for both worlds: corporations and start-up firms. But despite its importance, corporate accelerator program and its value creation to the corporate and start-ups remains poorly governed and understood. This research aims to examine the central role of the value model that a corporate accelerator as an innovation intermediary develops to manage and grow an innovation ecosystem and how value capture-related arrangements emerge in the design of corporate accelerator programmes. The emergent model defines the value creation potential for the start-ups and corporate, in this way shows how it is crucial in driving succesful open colloborative innovation inititatives as well as the orchestration role of innovation intermediaries.

The mix-method research was applied to answer three interrelated research questions: 1) *How does a corporate accelerator perform the orchestration roles of an innovation intermediary? 2) What is the value created for corporations through a corporate accelerator programme? 3) What is the value created for start-ups from participating in corporate accelerator programmes?* A case study was the main method used to understand the functions, roles, process, and value creation of corporate accelerator program for corporations. The case study was conducted in an Indonesian corporate accelerator named Indigo Creative Nation (ICN). The program was developed by Telkom Indonesia; an Indonesian state-ownedenterprise specialises in the telecommunications industry. Additionally, a survey was conducted to complement the result with information regarding value creation for start-ups.

As a result: 1) a model of orchestration role that comprises: the functions, the roles, and the stage of corporate accelerator programme, and 2) a model of value creation of corporate accelerator that includes sources of value for the corporation and start-ups, were developed. This study contributes to the knowledge of innovation intermediary through the advancement of conceptual understanding of the orchestration role of innovation intermediary through corporate accelerator programme. This study also provided empirical insights into innovation intermediary practice that complements the considerable theorising reported in the literature.

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

The first chapter of this thesis explores the reasons for conducting the present study, beginning by providing information related to the current global condition that has given rise to the research questions, and continuing by explaining the contribution and scope of this study. Finally, the structure of the following chapters of the thesis will be outlined.

1.1 Background and motivation of the research

Over the last decade, innovation has been the subject of a considerable amount of research, considering the fact that it is a process that no longer relies on internal sources and efforts (Lin et al., 2016). With the development of information and communication technology and the open innovation concept introduced by Chesbrough (2003), the innovation process now occurs both inside and outside the company. Companies acknowledge the need to form and engage in innovation networks and collaborate with partners that they can work with long-term in order to survive in fast-changing business situation (Billington and Davidson, 2013). This has been associated with increasing levels of collaboration and outsourcing, which has led to a need for greater understanding of the roles played by various actors in the process (Howells, 2006).

The use of an 'innovation intermediary' has been identified in innovation management research as a way to engage with external parties to support the innovation process (Howells, 2006). Empirical evidence has suggested that the existence of an innovation intermediary improves innovation outcomes (Pittaway et al., 2004, Zeng et al., 2010, Nambisan and Baron, 2009). However, understanding of how the innovation intermediary successfully supports innovation, and what best practices look like in terms of the intermediary's role in coordinating innovation networks, is currently limited (Glennie and Kirsten, 2016).

Previous research investigating the role of the innovation intermediary has identified a shifted in the role following a locus change in innovation management

research. Initially, a firm engaged with external sources to identify other firms that could perform the parts of the innovation process that the original firm was not able to do (Ellis, 2003). Recognising this, companies have emerged that search for external supports, third party institutions, or actors, acting as a broker to build connections between firms, for instance, a business or technology consultant that develops their function not only to act as a broker but also to support in knowledge or technology transfer (Bessant and Rush, 1995, Hargadon and Sutton, 1997). With this type of intermediation, the relationship between firms that supported each other's innovation was no longer exclusively one to one; it could be one to many, or many to many. More recently, companies have realised that to ensure innovation sustainability, they should develop innovation ecosystems within which the corporation, as a hub firm, has mutual relationships with other firms, as members of the wider ecosystem.

Recent research has identified that the innovation intermediary institution does not always have to be a third party that connects two other parties. Big corporations can also act as an innovation intermediary to help themselves by designing, building, and developing an innovation network that orchestrates smaller companies around the corporation in an ecosystem to collaborate for innovation purposes. Corporate accelerator programmes are another type of innovation intermediary (Glennie and Kirsten, 2016) that occupy a unique position, which can support innovation for the corporations and the start-up firms that engage with them (Mocker et al., 2015).

The reason a corporation might collaborate with a start-up is due to the realisation that disruptive innovations often emerge from start-ups (Mocker et al., 2015). For example, young tech companies such as 'Uber' and 'AirBnB', in less than ten years, have valuations reaching billions of dollars, and have replaced the incumbent and main corporations. Instead of viewing start-ups as competitors, many corporations have begun to collaborate with them to create value for the corporation and provide what the corporation is lacking, in order to survive in the globally competitive business environment. Corporations have resources, scale, and power but less agility to move quickly, while, conversely, start-ups have valuable ideas but little resources. In other words, each has what the other lacks (Weiblen and Chesbrough, 2015).

Despite their unique position and the value they create for corporations and start-ups, corporate accelerator programmes are poorly governed and understood.

Most accelerator programmes have no formal process for fostering value creation for corporations and start-ups; it is typically left to occur in an ad-hoc fashion. There is limited empirical academic research that demonstrates the importance of an accelerator programme (i.e. (Pauwels et al., 2016, Miller and Bound, 2011). Rather, research on start-ups has focused on other forms of engagement with corporations, such as incubation and corporate venturing venues for start-ups (Birley, 1985).

The present study aimed to investigate the ways in which the orchestration role of an innovation intermediary is reflected in the activities, functions, roles, and stages of a corporate accelerator programme to support a corporation's innovation process and create value for both the corporation and start-ups. The investigation was conducted to gain a better understanding of the orchestration role and the value created by an innovation intermediary through a case study of a corporate accelerator programme, with the aim of developing a model of the orchestration role of and value creation of the innovation intermediary. The study is considered novel because existing literature on innovation intermediaries primarily focuses on their bridging and transferring role. By contrast, this study investigates the orchestration role of and value creation by the innovation intermediary in a large corporation that utilises a corporate accelerator programme. In this study, the corporate accelerator programme, as the innovation intermediary, occupies a unique position: the programme only supports the innovation process by orchestrating the innovation network of the corporation as an innovation seeker; and the programme also supports start-ups as an innovation provider.

1.2 Aim, contribution, and scope of the research

Understanding the orchestration role of the innovation intermediary remains a challenge since most existing research focuses on third-party innovation intermediaries, yet there is evidence that the innovation intermediary role has expanded over time (Howells, 2006). The orchestration role of the innovation intermediary is considered a new role, and recent research has identified the importance of an innovation ecosystem and platform within a business (Gawer and Cusumano, 2014). This leads to associate big corporation as innovation intermediary plays the orchestration role, which expands on the traditional roles, such as bridging

and transferring. However, the understanding of the orchestration element of the innovation intermediary's role remains underdeveloped.

Meanwhile, previous literature that focuses on corporate and start-up engagement has only discussed corporate accelerators as one general engagement, such as corporate venture capital, acquisitions, hackathons, internal incubators, and co-development partnerships (Weiblen and Chesbrough, 2015, Mocker et al., 2015) without mentioning the specific roles of a corporate accelerator in innovation and value creation through the orchestration process. Understanding value creation in a corporate accelerator programme requires progress in entrepreneurship and innovation literature in regard to aiding new start-ups (Nambisan and Baron, 2012; Pauwels at el., 2016). The information needed is not only related to the activities and processes involved, but also the foundation of value creation in accelerator programmes. As such, it is necessary to focus on how both sides, the corporations and start-ups, capture value. For this reason, this study aims to answer the following research questions:

- *RQ1: How does a corporate accelerator perform the orchestration role of an innovation intermediary?*
- *RQ2: What is the value created for corporations through a corporate accelerator programme?*
- *RQ3: What is the value created for start-ups from participating in corporate accelerator programmes?*

The model of corporate accelerator programmes and value creation via corporate accelerators developed in this study achieves two integrations of the existing innovation literature: first, it connects the literature on open innovation, innovation intermediaries, and the orchestration role; second, it connects the literature on value creation through innovation that consists of design elements and design themes with the literature on social capital. This enables scholars to understand value as both an outcome of and a process that occurs via accelerator programme design. Through combining these two theoretical lenses, this study advances the conceptual understanding of corporate accelerators as examples of the outside-in mode of open innovation, and one type of innovation intermediary. This study also provides empirical insights into innovation intermediary practice that complements the considerable theory presented in the literature. Finally, this study explains the role of

corporate accelerators as innovation intermediaries in regard to both corporations and start-ups and their contribution to value creation, a topic that has been neglected in the literature.

This study adopts a mixed method research design, with in-depth case study as the main research method, complemented with survey-based research. A case study was conducted in an Indonesian corporate accelerator named Indigo Creative Nation (ICN). The programme was developed by Telkom Indonesia, an Indonesian state-owned enterprise that specialises in the telecommunications industry. Telkom Indonesia orchestrates digital innovation ecosystems in the creative digital industry, and aims at improving national economic welfare through corporate accelerator programmes for start-ups. The programme has been running since 2009, and so is able to provide rich data to answer the research questions. To complement the case study, a survey questionnaire was distributed to start-ups involved in Indigo to determine the value of corporate accelerator programmes from the perspective of start-ups.

1.3 Thesis structure

The structure of this thesis follows the process of the study, and thus begins by establishing the research background, goes on to reflect on the research results, and then concluding the research.

Chapter 2: Literature review and theoretical background

This chapter will discuss the current understanding of the definition of innovation intermediary, and identify the gaps in the existing literature using the bibliometric coupling approach. The identified gap will then be explored. Additionally, the theoretical background and related issues regarding the identified literature gap will also be discussed in this chapter.

Chapter 3: Conceptual framework

To organise the ideas discussed in this research, Chapter 3 will present the conceptual framework and hypotheses that guide the research investigation. This chapter will also provide an explanation of corporate accelerator programmes. How the research questions and hypotheses regarding the orchestration role of corporate accelerators were formulated will be explained. The chapter will finish by discussing social capital,

knowledge transfer, and innovation outcome, topics that are related to the research questions.

Chapter 4: Research methods

This chapter will outline the ontology and epistemology of the study, and present the selected research methodology (i.e. mixed methods research) in more detail. The qualitative research method section will explain the data collection procedure and present the case study protocol questions that the corporation and start-ups were asked. In the quantitative research method section, the data collection survey procedure and the analysis of the results using PLS-SEM statistical tools will be outlined. This chapter will conclude by explaining how the study findings were validated.

Chapter 5: The case study: the corporate accelerator programme Indigo Creative Nation

This chapter will present the case study of Indigo Creative Nation. The analysis to answer the process in corporate accelerator programme that reflects the orchestration role of an innovation intermediary ,will be discussed in this chapter. The discussion will draw on and present the research findings. This chapter will primarily respond to the first research question.

Chapter 6: Value creation by corporate accelerator programmes

This chapter will present the analysis regarding value creation by the corporate accelerator programme, for both the corporation and the start-ups. For the start-ups, the hypothesis developed to identify the relationship between social capital, knowledge transfer, and innovation outcome leading to value creation will be discussed. This chapter will conclude by presenting the integrated model of corporate accelerator value creation.

Chapter 7: Discussion and conclusion

The final chapter of the thesis will present a summary of the overall research, its contribution, and suggestions for future studies. This chapter will also explain how the study findings were validated by comparing and contrasting the results with the existing literature. Finally, the strengths, weaknesses, and lessons learned from the research findings, research methods, and the overall research design will be identified.

CHAPTER 2
LITERATURE REVIEW

In order to identify the research gaps in the innovation intermediary area, and, thus, formulate the research questions, a literature review was conducted. This chapter will present the results of the literature review. In the existing literature, the term 'innovation intermediary' is used to represent a variety of types of institution, including banks, governments, consultancy companies (Tran et al., 2011), web-based intermediary services (Lauritzen, 2017, Colombo et al., 2015), transfer offices (Yusuf, 2008, Theodorakopoulos et al., 2012), industry associations (Watkins et al., 2015), or any other type of institution that acts as a third party to support innovation. With different types of institutions involved, many roles of the innovation intermediary have been identified, including: to facilitate transactions or resource flows (Gould and Fernandez, 1989, Wolpert, 2002, Tether and Tajar, 2008); to improve the quality of interconnections, especially in technology and knowledge transfer (Bessant and Rush, 1995, Shohet and Prevezer, 1996, Howells, 2006); and to support innovation performance and productivity. Different terms are also used to describe an innovation intermediary, such as 'broker' (Mele and Russo-Spena, 2015), just 'intermediary' (Billington and Davidson, 2013, Lee et al., 2010, Kodama, 2008, Lauritzen, 2017), and 'innovation agency' (Glennie and Kirsten, 2016, Tai and Davids, 2016).

Despite the various different understandings of innovation intermediaries, and the importance of a clear definition, there is a substantial lack of research that contributes to the knowledge base regarding the different roles of intermediaries. Currently, the literature lacks cohesion regarding the emergent roles of intermediaries and the current areas of concern. It is thus necessary to understand and conceptualise emergent themes of intermediaries, in order to guide innovation scholars and practitioners (Howards, 2006). This study has applied the bibliometric coupling method for the literature review. In addition to identifying research gaps, this chapter also aims to understand the meaning of the term 'innovation intermediary' and identify the related theory. The results of the literature review are used as the basis on which to outline the research questions addressed in this thesis.

This chapter will be organised as follows. First, Section 2.1. will present and discuss the development of innovation intermediary research over the years, and the theoretical background. Then, in Section 2.2, the use of the bibliometric coupling method to collect, identify, and analyse the relevant roles of intermediaries in the innovation management literature will be explained. The section will continue with an explanation of the use of bibliometric coupling method to summarise the current understanding of intermediaries' role and the interpretation of that role in the context of innovation. In this section, the gaps in innovation intermediary research will also be identified. Section 2.3 will explore the identified research gaps and present three research questions, as well as the underlying theory related to each research question. The chapter will conclude with a summary of work, presented in Section 2.4.

2.1 Introduction to innovation intermediary research

This section aims to understand the concept of an innovation intermediary based on previous literature. It will begin by outlining the various definitions of innovation intermediary and identify those that fit with the purposes of this study. It will then go on to explore the different types of innovation intermediary institutions.

2.1.1 Definitions of innovation intermediary

Earlier studies on intermediaries in the innovation context viewed the intermediary as an agent that accomplished certain activities that internal company resources could not adequately cover. In these situations, the company utilised the structure of an exchange relationship with the appropriate mix of incentives and penalties to ensure the intermediaries would be motivated to perform the delegated task in accordance with the company's expectations (Eisenhardt, 1989a). The relationship between the company and agent in this situation is termed the agent-principal connection and characterised by dyadic ties (Granovet.Ms, 1973). The role of intermediaries as described in earlier publications tends to be task-focused, e.g. helping companies to transfer technology and operating based on a spoke-hub model. As the 'hub', intermediaries were expected to help companies develop innovation and/or technology management responsibilities (Shohet and Prevezer, 1996), including capabilities development, technology know-how, knowledge development, intellectual property, customer management, regulatory compliance, and partnership

agreements. To complement this, the ‘spoke’ was conceptualised as an implementation agent responsible for developing business and innovation strategies and locate key sources of new knowledge. Examples of entities that have utilised the spoke-hub model include specialised government agencies, university technology transfer offices (Alexander and Martin, 2013), regional technology centres, and cross-national networks.

The literature review revealed that subsequent studies on innovation intermediaries primarily focused on the intermediary institution as a ‘bridging institution’ that could gather information for a potential partner. This kind of innovation intermediary supports a company in selecting the exchange modes that would minimise the cost of transaction. The underlying rationale for bridging is that, rather than performing tasks in-house, it was more efficient to use an intermediary to access the benefits of partners. The bridging institution is also known as the brokerage (Gould and Fernandez, 1989). The brokerage occupies a central position in the transaction network, facilitating transaction or resource flows. Like a consultant, it provides the brokerage activities that are important in a technology transfer process, and can improve the quality of interconnections (Bessant and Rush, 1995). This brokerage role, also known as “Tertiusgaudens”, necessitates a third party that profits from the disunion of others (Burt, 1992).

Howells (2006) summarised the innovation intermediary literature and concluded that an intermediary could be viewed as a fulfilling institution that bridged the functions of the demand and the supply side of a knowledge structure. Howells (2006) thus defines an innovation intermediary as an “organisation or body that acts as an agent or broker in any aspect of the innovation process between two or more parties”. The activities the intermediary is involved in include providing information on potential collaborators, brokering a transaction between two or more parties, acting as a mediator, body, or organisation that is already collaborating with the company and sourcing advice, funding, and supporting the innovation outcomes of collaborations.

More recently, studies on innovation intermediaries have begun to focus on new forms of collaboration, i.e. established companies (or an established company) reinforce long-term relationships between participants in an innovation ecosystem,

bringing companies together around a common area of interest. The established company is also known as a/the platform leader (Gawer and Cusumano, 2014). This type of intermediary is private companies, which elicit and encourage innovation by others and carry out an orchestration process in network-centric innovation (Dhanaraj and Parkhe, 2006, Nambisan and Sawhney, 2011). Unlike the brokerage form of intermediary, as a third party, platform leaders position themselves as brokers in order to build an ecosystem. The platform leader supports innovation for themselves as well as for other companies in the network. This kind of intermediary, the concept of a platform leader, brings about what is known as open innovation coordination (Katzy et al., 2013).

The definitions of innovation intermediary and the relevant references are summarised in Table 1 below.

Table 1. Definition of innovation intermediary

Definition of innovation intermediary	**References**
The dyadic relationship of principal and agents, where agents perform the delegated intermediary tasks in accordance with the expectations of principal.	Shohet and Prevezer (1996); Ellis (2003); Alexander and Martin (2013).
The 'middleman' actors support companies to connect partners in the innovation process with the aim of minimising transaction costs.	Gould and Fernandez (1989); Bessant and Rush (1995); Wolpert (2002).
The actors with a central position in the pre-equilibrium market who recognise that 'holes' that represents the needs of one party may be filled by the skills or resources of another.	Fleming and Waguespack (2007); Kirkels and Duysters (2010), (Burt, 1992)
Established company that reinforces long-term relationships between participants in the innovation ecosystem, bringing companies together around a common area of interest.	Gawer and Cusumano (2008); Weiblen and Chesbrough (2015); Kohler (2016)

Based on the perspectives presented above, for the purposes of this study the concept of an innovation intermediary can be summarised and defined as an institution that builds, develops, and coordinates network relationships to support the innovation process of all members of the network.

2.1.2 Types of innovation intermediary

Nambisan and Sawhney (2007) identified a variety of innovation intermediary institutions that support the improvement of a company's reach and filter process, and also identify external sources of innovation throughout the various stages of the innovation process. Their study developed an external source continuum, which classifies innovation intermediaries based on the type of innovation output they help to provide. The external source continuum compares the risk and reach, and speed and cost of the different types of innovation outcome, as shown below.

Table 2. Types of innovation intermediary (Nambisan and Sawhney, 2007)

Types of innovation outcome	Type of innovation intermediary institutions	Risk and reach	Speed and cost
Raw ideas	Licensing agents Patent broker Electronic R&D marketplace Idea scout Invention capitalist	High	Low
Market-ready ideas	Innovation capitalist	Middle	Middle
Market-ready products	Internal business incubator External business incubator Venture capitalist	Low	High

Tether (2008) and Yusuf (2008) both conducted similar studies classifying the different types of innovation intermediary. However, they focused on intermediaries in industry and university networks, particularly for manufacturing and services companies. The innovation intermediaries discussed were consultants, private research organisations, and public science-based institutions that support the knowledge-sharing and commercialisation process for companies. The purpose of these types of innovation intermediary is to complement a company's internal innovation activities and provide additional external sources of knowledge.

Specifically focusing on intermediaries that support innovation search for new ventures, the following innovation intermediaries were identified by (Zhang and Li, 2010a): 1) technology service companies; 2) accounting and financial service companies; 3) law companies; and 4) talent search companies. According to Zhang and Li (2010a), for new ventures, their aims in using intermediaries are related to broadening the scope of searches for external sources of innovation, and reducing the search costs.

2.2 Literature review on innovation intermediaries

As explained in Section 2.1, the literature review was conducted in order to gain a better understanding of the role of the innovation intermediary and identify the research gaps. To analyse the structure of innovation intermediary research and identify future research opportunities, in this study a quantitative approach was used for meta-analysis, as well as science-mapping or the bibliometric research method. Specifically, this study used the bibliometric coupling method for two main reasons. First, this method represents the best way to map current research (Vogel and Guettel, 2013), making it appropriate for use in this study, which identifies gaps in the innovation intermediary research area. The method involves capturing and analysing recent publications in a specific area of research; the units of analysis are the identified articles. Second, the results of bibliometric coupling are considered more accurate if compared with the results of co-citation and direct citation analysis method (Boyack and Klavans, 2010).

Bibliometric coupling is a type of bibliometric research that has been widely utilised by researchers to identify connections and determine the relationship between two texts (Zupic and Carter, 2014). A more significant number of connections between the bibliographies of texts indicates a greater association between the references. A connection is identified and counted if the same article is cited in both documents. If two documents cite the same articles, then *bibliometric coupling* is evident. The number of articles cited in the two documents reflects the connection level, where the more frequently the same articles are cited, the stronger the connection. References to several articles can be analysed and clustered based on their citations, and the output of bibliometric coupling analysis is a grouped map of connected articles based on similarity in references.

This study used Bibexcel software to measure coupling and to identify document relationships. Bibexcel is a versatile bibliometric toolbox developed by Olle Persson, a Swedish information scientist, which helps to carry out most types of bibliometric analysis (Persson et al., 2009). Generally, in organisational and management studies, the software is utilised to compute bibliometric analysis (Zupic and Carter, 2014). Bibliometric data is provided at the beginning of the measurement process and can be downloaded from a database source. Bibexcel helps to restructure

the data, perform bibliometric calculations, and carry out analytical functions to measure the relationship matrices between items (e.g., authors, words). The output of the Bibexcel tool is a file that can be used to visualise cluster mapping of articles as a result of bibliometric coupling. After bibliometric coupling had been carried out, a graphical representation of the bibliometric coupling cluster was created using VOSviewer software. VOSviewer develops the article's chart, researchers based on citations, co-citations, or bibliometric coupling networks (Eck and Waltman, 2010).

VOSviewer produced a distance-based map, which shows the distance between two dots, where dots represent articles. The distance between two dots indicates the strength of the relationship between articles, with a smaller distance reflecting a stronger relationship. The dots are often unequally allocated, and it helps to show clusters of related items (Eck and Waltman, 2010).

In the literature search for this study, only peer-reviewed journal articles were included; books and non-refereed publications were excluded. Peer-reviewed journals can be considered validated knowledge; selecting only peer-reviewed journals thus strengthens the robustness of the review. This study also used a multi-step process to identify and select relevant articles for inclusion in the analysis. The steps taken were as follows.

The first step involved selecting highly ranked journals in innovation management research. In this study, the selection process was based on the suggestions given by West and Bogers (2014), to look for articles published in the top 19 journals (Table 2.3). The articles included in this study were all published between January 2003 and March 2017. The year 2003 was set as the initial data parameter as open innovation proliferation had begun to develop at that time. The next step was then to search the titles and abstracts of journals using combinations of the following keywords: 'knowledge' AND 'broker' or 'technology' AND 'broker' or 'intermedia*' AND 'innovation'. This study intentionally used only those keywords in order to specify and distinguish the articles where the research domain was specifically related to innovation intermediaries.

The output from this step was then further restricted to management-related disciplines only, which resulted in an initial database of 232 journal articles. The titles and abstracts of each of the 232 articles were read to ensure their relevance to

innovation intermediary research, and articles that were not related to innovation intermediaries were excluded. Finally, 164 articles were selected for further evaluation. The number of included articles is summarised in Table 3 below, alongside their sources (i.e. journal title).

Table 3. Sources and number of articles reviewed in this paper

No.	Journal	Number of articles	Percentage
1	Research Policy	26	16%
2	Technology Analysis and Strategic Management	24	15%
3	Technovation	19	12%
4	International Journal of Technology Management	17	10%
5	Technological Forecasting and Social Change	16	10%
6	Organisation Science	11	7%
7	R & D Management	7	4%
8	Journal of Business Research	6	4%
9	Innovation Management Policy & Practice	5	3%
10	Journal of Product Innovation Management	5	3%
11	Management Decision	5	3%
12	Strategic Management Journal	4	2%
13	Research Technology Management	4	2%
14	Management Science	4	2%
15	Administrative Science Quarterly	3	2%
16	Academy of Management Journal	3	2%
17	Harvard Business Review	2	1%
18	Journal of Engineering and Technology Management	2	1%
19	MIT Sloan Management Review	1	1%
	Total	164	100%

2.2.1 Results of bibliometric coupling

Having identified 164 publications on innovation intermediaries, as explained above, bibliometric coupling analysis was conducted to identify patterns in the existing literature. In Table 4, the most widely cited articles identified in the innovation intermediary literature are outlined. From the table, it can be seen that Howells's (2006) article is the most cited article in the existing body of innovation intermediary research. This article provides a brief definition and explanation of the typology of innovation intermediaries. Two articles by Chesbrough (2003; 2006) about open innovation are also included in the list, ranking fifth and ninth. The inclusion of Chesbrough's articles in the list can be seen as an indication that open innovation is used by most researchers as a perspective from which to investigate the concept of innovation intermediaries. In addition, the absorptive capacity article by Cohen and

Levinthal (1990), a book by Burt (1992) about the social structure of competition, and a network learning article by Powell et al. (1996), also feature on the list.

Table 4. The top 10 most cited references

Article	No. of Items
Howells (2006)	55
Cohen and Levinthal (1990)	42
Hargadon and Sutton (1997)	32
Bessant J (1995)	29
Chesbrough (2003)	27
Eisenhardt (1989b)	21
Burt (1992)	20
Powell et al. (1996)	17
Chesbrough (2006)	17
Hargadon (1998)	15

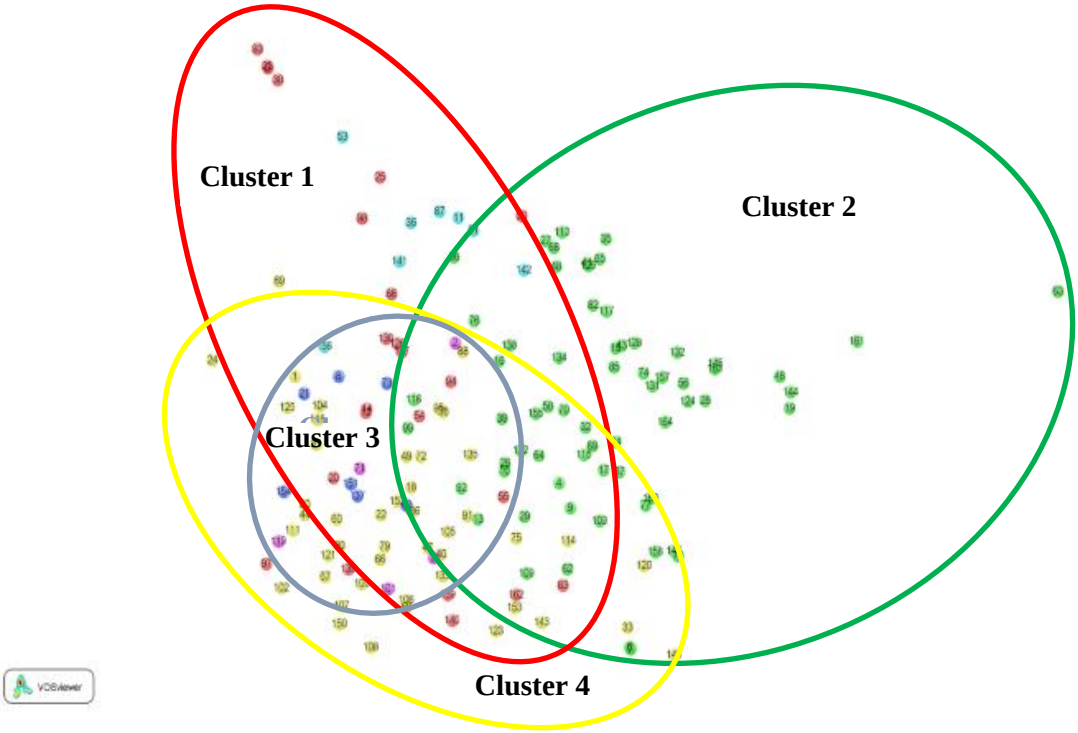
The clusters developed through the process of bibliometric coupling are presented in Figure 1. Having extracted the common references from the innovation intermediary literature, the visualisation is of a dense network document, clustered according to similarity. In order to label the clusters, a detailed review of the title and abstract of all references in each cluster was first conducted to distinguish the key ideas and themes that have taken priority within this field of study. Second, the themes and key ideas were interpreted, and samples of the texts were read. The results revealed four main areas of research on the role of an innovation intermediary: 1) facilitating knowledge or technology transfer; 2) a knowledge broker linking institutions in innovation networks and alliances; 3) orchestrating an innovation network; and 4) an open innovation intermediary role. The role of an innovation intermediary as a knowledge broker was identified as the most studied area of research (Cluster 2). To identify the contents of each cluster, each article (including the title and keywords) was reviewed. The results for each cluster are presented below.

Cluster 1: Facilitating knowledge or technology transfer

This cluster contained 29 articles labelled as ‘facilitating knowledge or technology transfer’. Articles in this cluster primarily discussed the innovation intermediary as an organisation that took on the role of transition management in facilitating the transfer of technology and knowledge. There are various organisations identified in this cluster that act as innovation intermediaries: 1) KTTO – knowledge and technology transfer offices (Landry et al., 2013, Alexander and Martin, 2013); 2)

incubator/service intermediaries (Dutt et al., 2016, Zhang and Li, 2010b); and 3) collective research centres (Knockaert et al., 2014, Spithoven et al., 2010, Spithoven and Knockaert, 2012). This type of innovation intermediary plays the role of a bridging organisation (Villani et al., 2017).

Figure 1. Clusters resulting from bibliometric coupling



In terms of their role in knowledge transfer, innovation intermediaries in this cluster have a variety of types and functions. A transfer office is one type of intermediary that transfers knowledge or technology from a university to industry, in the form of a showcase of new technologies developed by the university that are ready to be amplified and commercialised by industry (Alexander and Martin, 2013, Landry et al., 2013, Yusuf, 2008, Villani et al., 2017). Another type of innovation intermediary is a collective research centre, which is usually initiated by the government and plays a role in conducting R&D collaboration; it also forms a network with downstream sectors (Lee and Park, 2006, Spithoven and Knockaert, 2012). Most of the articles discussed the transfer of technology or knowledge from a university to industry (Villani et al., 2017, Taheri and van Geenhuizen, 2016, Wurmseher, 2017, Yusuf,

2008), with a focus on product commercialisation or solving new social challenges such as environmental issues and urban planning.

Innovation intermediaries can also be participants in the triple helix innovation system model to systematically apply foresight to the renewal of products (Frykfors and Jonsson, 2010, Mendonca and Heitor, 2016, Raven et al., 2010). Some of the articles identified the conditions that support technological transitions or knowledge transfers between connected companies via innovation intermediaries using the triple helix (Frykfors and Jonsson, 2010) in cities where the companies and innovation intermediaries are located (Mas-Verdu et al., 2016, Hodson and Marvin, 2009). Other articles focused on strategic niche management as a tool to develop instruments for governing technological transitions in socially desirable directions (Raven et al., 2010, Schreuer et al., 2010).

A small group of articles in this cluster focused on the impact of innovation intermediaries within the organisations, such as: 1) increasing their absorptive capacity and level of innovation performance (Knockaert et al., 2014, Spithoven et al., 2010); and 2) reducing cognitive, organisational, geographical, and social distance between organisation s(Villani et al., 2017). To some extent, articles in this group are similar to those the role of innovation intermediaries in knowledge or technology transfer.

Cluster 2: Knowledge broker linking institutions in innovation networks and alliances

This cluster is the largest, consisting of 64 articles that mostly discuss actors or individuals as innovation intermediaries (Aalbers and Dolfsma, 2015, Arora et al., 2014, Bidwell and Fernandez-Mateo, 2010, Boari and Riboldazzi, 2014, Kirkels and Duysters, 2010, Lee, 2010, Lin, 2012, Obstfeld, 2005, Quintane and Carnabuci, 2016, Ryall and Sorenson, 2007). As actors, the role of intermediaries is in linking unconnected network members and combining members' knowledge and capabilities in new ways (Hakanson et al., 2011, Kim et al., 2010). Individual actors in this role may include: lead users (Arora et al., 2014); salespeople (Groza et al., 2016, van den Berg et al., 2014); academic inventors (Lissoni, 2010); skilled return migrants (Wang, 2015); and principal investigators in a transfer office (Kidwell, 2013).

Quintane and Carnabuci (2016) discussed two main views on the individual as an innovation broker: 1) an innovation broker in a structural position – an actor's

network of long-term relationships; and 2) an innovation broker as an information exchange process. Moreover, they also explored two different ways in which brokers can negotiate the exchange of information to fill a structural hole: 1) the Tertius gaudens strategy, in which the exchange of information is intermediated between the brokered parties by the broker acting as the only passage through which information flows across the hole; and 2) the Tertius iungens strategy, in which the broker facilitates the flow of information across the structural hole by enabling a direct exchange between the brokered parties.

Cluster 3: Orchestrating the innovation network

Twelve articles were identified in this cluster. The cluster is labelled 'orchestrating the innovation network' since the majority of the articles discussed the role of an innovation intermediary in connecting elements of an innovation network at different levels of activities. The bridging role of innovation intermediaries identified in earlier publications primarily connected companies with customers, research institutions, suppliers, or other partners. In this cluster, the articles expanded the bridging role from connecting one-to-one to connecting one-to-many. Recent articles have focused on innovation intermediaries orchestrating outcomes by developing networks and leading the members to achieve particular purposes. The challenge in orchestrating is to embed members with different aims and backgrounds. Some articles conclude that the way to do this is by understanding the nature and value of activities (Klerkx and Leeuwis, 2009), building trust among members (Lee et al., 2010), balancing multiple interests (Klerkx and Leeuwis, 2008), and/or building innovation intermediaries' dynamic capabilities (Tai and Davids, 2016).

Articles in this cluster also highlighted how the innovation network members could work together in an innovation process. The innovation intermediary in this cluster plays the role of a coordinator, for instance of product development partnerships (Chataway et al., 2010, Rong et al., 2013), and commercialisation (Vivas, 2016). Some of the articles in this cluster do not specifically explore orchestrating, but focus instead on topics related to innovation networks, including an emphasis on the importance of networking for SMEs (Zeng et al., 2010, Vrgovic et al., 2012, Lee et al., 2010) and technology road mapping (Battistella et al., 2015).

Cluster 4: The innovation intermediary's role in the open innovation context

The last cluster was labelled 'the innovation intermediary's role in the open innovation context' as 'open innovation' stands out as the predominant term used in the majority of the publications identified within this cluster (Bakici et al., 2013, Chesbrough and Brunswicker, 2014, Clausen and Rasmussen, 2011, Nambisan et al., 2012, Sieg et al., 2010, Wang et al., 2012). Although some articles do not explicitly mention open innovation, they do discuss closely related topics, including crowdsourcing and using social media to collect ideas (Colombo et al., 2015, Dong and Pourmohamadi, 2014, Franzoni and Sauermann, 2014, Harland and Nienaber, 2014, Holzmann et al., 2014, Pihl and Sandstrom, 2013). In the context of open innovation, intermediaries break down traditional corporate boundaries and allow the free flow of intellectual property, ideas, and people into and out of an organisation (Chesbrough and Garman, 2009). In open collaboration, innovators allow their innovation information to be freely accessed, used, and diffused by others (Baldwin and von Hippel, 2011). The practice of open collaboration is particularly evident in open source software, which programmers use at various levels, collectively contributing to creating and improving software programs (Hutter et al., 2011). Wikis are an example of open collaboration in the context of knowledge creation, where participants voluntarily create and update information on a particular topic. Innovation intermediaries with online platforms, such as InnoCentive, facilitate community forums for contributors who are willing to collaborate with others and cooperate in a group focused on innovative problem-solving. This evidence suggests that open collaboration mostly functions at the user level of network analysis, and at the ideation and development phases of the innovation process.

The articles in this cluster reveal two different perspectives on open innovation facilitation by intermediaries: inside-out, and outside-in innovation. Intermediaries help organisations through *inside-out open innovation* processes in which a business places some of its assets or projects outside its own walls; through saving a company time and money; nurturing new supplier and partner relationships; promoting innovative ecosystems; and, generating high-margin licensing income via IP management (Benassi and Di Minin, 2009, Gredel et al., 2012, Adams et al., 2013, Harland and Nienaber, 2014). The inside-out roles of intermediaries that have been

identified thus far are as follows: 1) patent broker, bridging the demand for and offer of patents through licensing or reassignment (Benassi and Di Minin, 2009, Harland and Nienaber, 2014, Collinson et al., 2005, Caviggioli and Ughetto, 2013, Steensma et al., 2016); and 2) facilitating the commercialisation of technologies at an international scale (Gredel et al., 2012).

Intermediaries also help organisations via *outside-in open innovation* processes, in which outsiders' contributions enable companies to create offerings on a larger scale than could be otherwise achieved through internal capabilities. The role of intermediaries in these processes may include facilitating external knowledge acquisition, but primarily focuses on solidifying the company's position in a desirable innovation or idea generation network. This confers a strategic advantage upon the company in regard to meeting upcoming knowledge or technology transaction needs, as innovation knowledge trading frequently occurs (Ritter and Walter (2003) Tran et al. (2011) Sandmeier (2009) Dong and Pourmohamadi (2014). Furthermore, few articles discuss the outside-in innovation process that involves the crowd as a potential element in the open innovation process, as an idea generator (Franzoni and Sauermann, 2014), or a provider of data analysis (Martinez and Walton, 2014).

The identified publications in this cluster reveal the multi-level nature of innovation intermediaries. This was mentioned in one of the previous clusters, but this cluster specifically examines the multi-level position roles in the open innovation context. Roles supporting product development as an internet-based innovation intermediay, services connection innovation providers, and innovation seekers are included at the company level (Chesbrough and Brunswicker, 2014, Colombo et al., 2015, Dong and Pourmohamadi, 2014, Martinez and Walton, 2014); the role of facilitating inter-company connections as a coordinator in collaborative projects occurs at the industry level (Franzoni and Sauermann, 2014, Harland and Nienaber, 2014); and the role of policymakers in national innovation systems or cross-industry brokerage takes place at the national level (Wang et al., 2012).

As open innovation mostly occurs in large companies, as found by Chesbrough and Brunswicker (2014), the role of an innovation intermediary is typically in facilitating technology-sharing between corporations or business groups (Skold and Karlsson, 2012, Lin et al., 2016).

2.2.2 Discussion

Section 2.2.1 has clustered and reviewed the publications related to innovation intermediaries identified in the literature review. This section further explores the roles identified and the functions that are embedded within the various identified roles. The arrangement of roles was generated based on the cluster titles, which reflect development in innovation management research trends. This study has identified the roles of innovation intermediaries as follows: 1) knowledge/technology broker; 2) knowledge/technology transfer enabler; 3) orchestrator; and 4) open innovation facilitator.

In addition to identifying the roles of innovation intermediaries, this study presents the functions of each role and extends the exploration of function to identify three levels at which the innovation intermediary is employed. Informed by the research by Kivimaa (2014) and multi-level perspectives in open innovation research West et al. (2014), this study has identified three levels of engagement in the role of innovation management: system, sector/industry, and company. These levels of innovation intermediary services utilisation comprise systematic intermediaries, as mentioned in regard to the establishment of different level actors' arrangements to support innovation transitions.

At the system level, innovation intermediaries connect all elements of nation-specific contexts. Research at this level focuses on national system innovation (Wang et al., 2012, Shapiro et al., 2010, Watkins et al., 2015) and the triple helix model (Johnson, 2008), mostly exploring government and related agencies' support of innovation through regulation, standard setting, public-private partnerships, and the funding of basic research (Dong and Pourmohamadi, 2014). Research at the industry level is more focused on the role of the innovation intermediary within industry-specific contexts, such as biotechnology (Chen et al., 2015, Fontes, 2007), manufacture (Adams et al., 2013, Skold and Karlsson, 2012), renewable energy (Loya and Rawani, 2016, Schreuer et al., 2010), and agriculture (Klerkx and Leeuwis, 2009). Lastly, research at the company level examines companies that generate commercial innovations through experimentation, R&D, and product improvement (Colombo et al., 2015, Dong and Pourmohamadi, 2014, Harland and Nienaber, 2014, Holzmann et al., 2014).

The role of a knowledge/technology broker for an innovation intermediary is the third party that facilitates companies seeking out potential partners, resources, and capabilities in order to engage in collaboration. At the company level, the functions of the innovation intermediary are to enable and facilitate joint development projects. The innovation intermediary links organisations and may coordinate and control the exchange of information and resources within networks. This engagement enables collaboration between members. Mostly occurring in the biotechnology sector, the role of innovation intermediaries at the industry level is to form alliances and assist in vertical integration.

Table 5. The innovation intermediary's roles and functions at different levels of unit analysis

		Roles of an innovation intermediary			
		Knowledge/ technology broker	**Knowledge/ technology transfer enabler**	**Network orchestrator**	**Open innovation facilitator**
Innovation implementation level	**System**	Produce policy to facilitate innovation	Facilitate social and technology transitions	Create communities	Develop collaboration models
	Industry	Facilitate vertical integration	Predict and understand the social and technological regimes that govern different institutions	Build and develop ecosystems Manage triple helix	Develop networks
	Company	Enable and facilitate joint development projects Manage IP licensing and reassignment	Facilitate inter-company knowledge/ technology transfer	Build social capital	Develop a web-based innovation market

Vertical integration involves relatively distinct sets of activities, such as a biotechnology company conducting R&D and then transferring the output to a pharmaceutical company for further development or marketing of the product (Stuart et al., 2007). In some cases, the innovation intermediary also engages in university and industry linkages through science and technology parks (Diez-Vial and Montoro-Sanchez, 2016) or industry associations (Watkins et al., 2015). Similar to an innovation

capitalist, an innovation intermediary may also facilitate the resolution of IP-related issues, including licensing and reassignment. Moving up to the network level, the innovation intermediary also has a network development function. At the national level, the innovation intermediary's role in alliance and transaction formation is to facilitate innovation diffusion enabled by policymakers or governments. In this case, the innovation outcome should have an economic and social impact; the government can incentivise innovation intermediaries that construct alliances and facilitate these outcomes via the production of supportive policies.

The second role of the innovation intermediary is as a proponent of knowledge and technology transfer. This role involves activities combining knowledge and technologies. At the company level, the innovation intermediary's function in this role is to facilitate inter-company knowledge/technology transfers. For example, a knowledge transfer office fulfils this role by transferring a university's research results/products to industry for further development or commercialisation. Technological innovation thus induces social innovation, and vice versa (Raven et al., 2010). At the industry level, the innovation intermediary has a strategic function in understanding and predicting the social and technological regimes that govern institutions. This function serves to anticipate the social changes that will occur when a new technology is released on the market. The result is related to the innovation intermediary's function at the national level in planning sustainability transition through new socio-technological (the intersection of society and technology) visions.

The third role identified is the innovation orchestrator, involving the management of the different elements of innovation networks. Nambisan and Sawhney (2011) explain that the innovation intermediary's role as an orchestrator is included in network-centric innovation. In the researcher's view, this orchestrator role comprises all of the previously explained roles: matchmaking, alliance formation, and knowledge integration. This also aligns with Klerkx and Aarts (2013) definition of orchestrator activities as demand articulation, network composition (matchmaking and alliances), and innovation process management (integration and management).

At the company level, the function of the innovation intermediary is to build social capital. Social capital at the company level is related to the accumulation of resources connected to external parties. Some authors have used term 'relational asset'

as another way to describe these valuable external relationships (Kim et al., 2010, Caiazza and Volpe, 2017). At the industry level, the role of the innovation intermediary is to create institutional arrangements or policies to facilitate network formation and establish platforms to achieve strong collaboration, mutual relationships, and a market for network actors. This study prefers to label these activities 'ecosystem building'. At the national level, the role of the innovation intermediary is as an orchestrator, functioning to build a collaboration model that arranges various combinations of actors, their roles, and the ties between them. The most important innovation intermediary at the national level is the government, creating policies to develop and facilitate a culture of collaboration.

Finally, the role of the innovation intermediary is related to open innovation practices. From an open innovation perspective, the innovation process is distributed internally and externally. This highlights the importance of finding the right partner to share in collaborative work. Innovation intermediaries with an internet platform, such as InnoCentive's, have a network of innovators. This type of intermediary does not undertake any technical work; rather, they connect innovation seekers with innovation providers (Dong and Pourmohamadi, 2014).

The innovation intermediary at the company level in an open innovation context supports external knowledge seeking and matching. The creation of a supply-demand network in a particular industry to facilitate the transfer of knowledge, technology, and resources could assist in the development of an innovation market and support innovation processes for its members. To support matchmaking at the national level, the innovation intermediary is involved in building the national IT infrastructure with IT-based connections, current knowledge can be stored and used for future innovation.

2.2.3 Directions for future research

The roles played by innovation intermediaries have changed in response to global challenges and the proliferation of new technology. Based on the current roles of innovation intermediaries, which were explored in the previous section, this study has identified four research gaps relating to each innovation intermediary role, and potential for further research development. Based on each research gap, this study

proposes related research questions for future research and the corresponding theoretical background, presented in Table 6, below.

Table 6: Research gaps and potential future research questions

Roles	Level	Gaps	Research Questions	Concepts/Theories
Knowledge Broker	System	Develop a more comprehensive understanding of the link between different levels of innovation and their implementation	How can policymakers facilitate the flow of information across unlinked brokers in order to increase the collaborative ties of the nation?	Structural holes (Burt, 2004)
	Industry		How does an innovation intermediary function as a knowledge broker to create and grow organisations in a certain industry?	Technology brokering (Hargadon and Sutton, 1997)
	Company		How do innovation intermediaries facilitate organisations' innovation in knowledge or collaboration networks?	Knowledge networks; collaborative innovation networks (Lee et al., 2010, Kirkels and Duysters, 2010)
Knowledge Transfer	System	Increase focus on the role of the innovation intermediary in transition management as part of knowledge/ technology transfer	What are the roles of innovation intermediaries at the system level in transferring new technology?	Strategic niche management (Raven et al., 2010)
	Industry		How does a company become the centre of a collaboration network in its industry and leverage this as a competitive advantage to fill structural holes?	Social network analysis; social capital (Quintane and Carnabuci, 2016)
	Company		How can a company manage innovation from external sources and develop a business model to transfer it internally as an innovation outcome?	Business model innovation (Zott and Amit, 2010, Howells, 2006)
Orchestrator	System	Leverage understanding of the orchestration role of an innovation intermediary	How does an innovation intermediary coordinate, direct, influence, and manage the other network members at the system level?	National innovation system (Kirkels and Duysters, 2010, Kivimaa, 2014); innovation ecosystem (Klerkx and Aarts, 2013,

				Klerkx and Leeuwis, 2009)
	Industry		How might an established company, as an innovation intermediary, play an orchestration role in a given industry?	Platforms framework (Gawer and Cusumano, 2014, Gawer, 2014)
	Company		What innovation outcomes might be gained by innovation network members from an innovation intermediary orchestration role?	Social capital; Social network analyses (Vasudeva et al., 2013)
Open innovation facilitator	System	Direct increased attention to the role of the innovation intermediary in facilitating openness	What role does an innovation intermediary play in open collaboration?	ICT capabilities (Tsekouras et al., 2013); open innovation intermediary (Howells, 2006)
	Industry		How does a public open innovation intermediary (i.e. government) build communities of innovation ecosystems?	Business ecosystem (Ceccagnoli et al., 2012)
	Company		How does the innovation intermediary support an organisation's open innovation process to create value?	Strategic innovation and value capture (Afuah and Tucci, 2012)

Develop a more comprehensive understanding of the link between different levels of innovation implementation

The source of organisational innovation has shifted from internal initiatives to dyadic external collaboration, and now relies on network-centric innovation (Nambisan and Sawhney, 2011, Billington and Davidson, 2013). The role of the innovation intermediary as a knowledge broker emphasises the linking functions, detecting unexplored structural holes and attempting to build new bridges (Quintane and Carnabuci, 2016). As innovation management has evolved toward openness, the innovation intermediary has recently begun to function more via networks than via one-to-one relationships. However, very few studies have focused on the role of the innovation intermediary in linking different levels of networks.

Innovation intermediaries play a critical role in helping organisations, particularly SMEs, to overcome difficulties in creating innovation in the face of resource and competency constraints. Transitioning from a closed business model to an open business model makes it all the more imperative for SMEs to address their potential for innovation within the context of the overall innovation ecosystem, which consists of micro-innovation systems, ecologies of innovation, and social technologies. The roles of the innovation intermediary within this ecosystem are to link organisations and serve as integrators and brokers (Chataway et al., 2010). At the national level, the role of the innovation intermediary is related to facilitating institutional arrangements that increase the public wealth.

The trend in innovation management research toward openness and the proliferation of internet technology create research opportunities to understand the relationships amongst players, including policymakers, SMEs, corporations, financial institutions, incubators, and accelerators. It is also important to investigate both the physical and the non-physical infrastructure of a country to develop a national institutional arrangement that allows innovation activity from various types of innovation intermediaries.

Increase focus on the roles of innovation intermediaries in transition management as part of knowledge/technology transfer

With the proliferation of internet technology, a company can connect with various entities and link into networks around the world. As a part of these networks, companies exchange experiences, information, and knowledge with other network members and initiate collaboration for innovation purposes. However, to find and get access to the right partner within a network, companies need an intermediary that acts as a bridge, knowledge/technology broker, or consultant to achieve the effective performance of innovation collaboration.

Although scholars have begun to identify future research areas related to how intermediaries can facilitate and build fruitful collaborative networks through joint innovation processes (Huggins, 2010), the literature is still in its infancy in terms of exploring how this happens. How can collaborative networks and knowledge flows be developed and managed by innovation intermediaries? As such, future studies on

innovation intermediaries at the network level should be more focused on how knowledge flows and new collaborations emerge over time. Such research might explore initial ideas about how knowledge is shared and how it evolves within collaborative networks in response to innovation challenges; how these challenges generate new directions for organisations; and, how organisations in networks collaborate and react to idea generation. One specific line of enquiry for future research is the role of the innovation intermediary as a social network builder or collaborative network developer, including an exploration of how the transfer of knowledge occurs within and across companies.

Related to the knowledge transfer role, recent research on the transition management role of innovation intermediaries has been growing. Innovation intermediaries' role in transition management is primarily related to strategic niche management, a strategy to develop instruments for governing transitions in socially desirable directions (Raven et al., 2010, Schreuer et al., 2010). Strategic niche management refers to the creation and nurturing of protected spaces for promising technology to facilitate the ongoing interactive learning of participating actors (Schreuer et al., 2010). It is still unclear what the innovation intermediary's role is during this transition process; more empirical research will contribute to a greater understanding of the process, and the development of a toolkit to support it. Moreover, ensuring a multi-level view of this research topic will facilitate a more comprehensive understanding of transition management.

In addition to transition management, it is necessary to consider the importance of the business model intermediary and the role of knowledge brokerage in the context of business model heterogeneity (Nair et al., 2012, Frykfors and Jonsson, 2010). This kind of research is best undertaken at the national level. The parties involved in transition management have different goals, yet need a strategy for collaboration and a good implementation plan for all involved to gain maximal value. Future research may address business models geared toward increasing the value created for all parties, increasing the social impact of new technology implementation, and increasing the wealth of a nation.

Leverage the understanding of the orchestration role of an innovation intermediary

Research on inter-company relations and alliances based on social network analysis has acknowledged the role of hub-companies at the centre of many networks in the formation, growth, and success of the network. Based on the orchestration cluster analysis, it is indicated that, while interest in the orchestration role of intermediaries appears to have increased, few scholars are working to connect innovation research with the various elements of the orchestration role of innovation intermediaries, indicating that this role is not fully considered an innovation intermediary role. Orchestration encompasses "knowledge mobility, innovation appropriability, and network stability" (Dhanaraj and Parke, 2006: 659). Informed by Dhanaraj and Parke (2006), this study views the orchestration role as involving a group of deliberate, purposeful actions taken by the innovation intermediary in seeking to create and receive value from the network, both expanding, and extracting more of, the available 'pie'.

Playing the role of an orchestrator, the hub company could be either an integrator or a platform leader with different functions (Nambisan and Sawhney, 2011). In this way, a hub company is a corporation that seeks to build an ecosystem to coordinate, influence, and/or direct other companies in the innovation network. As an innovation integrator, the established company owns the core technology, and invites the members of the network to develop and innovate different components for technology product development. The theories underpinning this role are related to product architecture, engineering design, and manufacturing (Gawer, 2014). On the other hand, as a platform leader, an established company offers the basic technology architecture, which then becomes a platform for other network members to build and develop products of their own innovation. The theoretical foundation of this concept is economic (Gawer, 2014) and social network theory (Nambisan and Sawhney, 2011). The corporation that plays the role of a hub company is an innovation intermediary for the other network members, and for the company itself. However, it is still unclear how the established company performs this role.

Some research has focused on how the orchestrator provides benefits to the network members (Laten, 2013; Klerkx, 2013). However, the outcome of the orchestration role in innovation networks for all members is still unclear. For guidance,

the creation concept can be used to understand how the innovation intermediary creates value by orchestrating an innovation network for its members.

At this time, research utilising social network analysis to determine how the structural position of a company in a network is related to its impact on innovation outcomes is increasing. Networking is believed to leverage a company's ties, whether they are strong or weak. Studies focusing on a company's presence in an innovation network and the impact of this on their innovation performance have had mixed results; outcomes appear to depend on network partners. More research is thus needed to understand the orchestration role of the innovation intermediary in innovation appropriability and network stability at the industry and organisational levels.

Another area for future research is exploring the orchestration role of intermediaries as part of innovation systems. Innovation intermediaries can be private, or public, where the government supports their existence (Bakici et al., 2013). Public innovation intermediaries have additional roles compared to private companies. The differences are primarily related to a focus on orchestration to support the development of start-up companies or actors in rural areas (Dutrenit et al., 2012), where one task is facilitating the funding of solutions for their clients (Inkinen and Suorsa, 2010). By contrast, the private innovation intermediary's main task is finding solutions for clients. Public innovation intermediaries contribute to building and activating ecosystems, in addition to providing structure to and governance of the ecosystem (Bakici et al., 2013). Additionally, the public innovation intermediary's role is to know 'what works' regarding instruments for designing interventions. Therefore, the orchestration role of such intermediaries is to know about future technology initiatives to enable innovation to flourish in particular systems. It is still unclear what capabilities a public innovation intermediary must have in terms of its orchestration role to face all of the challenges that arise within innovation systems.

Direct increased attention to the role of innovation intermediaries in facilitating openness

The review of earlier work suggests that new types of innovation intermediaries will continually emerge in the context of open innovation. When a company involves the user in its innovation process, the innovation intermediary

supports the communication process to understand the user requirements for a product (Hauge and Power, 2013). On the other hand, the innovation intermediary also facilitates the management of projects and communicates with users or clients in a variety of ways (Chen and Tseng, 2010, Chen, 2011, Myoken, 2010). A study by Boon et al. (2011) identified three challenges for intermediaries. The first challenge is positioning; the innovation intermediary should decide the position it wants to take, considering that it will involve many actors and must balance the interests of the organisation. It may take a neutral, impartial, coordinating, or activist role. Second, there is the issue of representation; the innovation intermediary must have the capability to speak on behalf of the network members and present their demands in representative ways. Third, with regard to the level of proactivity, the innovation intermediary's role depends on its familiarity with different situations and contexts; it should proactively clarify clients' expectations and assumptions in relation to the innovation intermediary's various roles. To address these challenges, researchers have analysed, from a theoretical perspective, the benefits of intermediaries that can derive from involvement with various kinds of users. The open innovation and intermediary literature has integrated these ideas, resulting in increased interest from innovation scholars and users as well as policymakers. However, it is not clear how these three challenges affect the role of the innovation intermediary.

Furthermore, the analysis of the literature reveals that discussions regarding the role of innovation intermediaries in open innovation is largely limited to company level implementations that focus on searching for innovation ideas; most of the research is related to crowdsourcing (Colombo et al., 2015, Dong and Pourmohamadi, 2014, Harland and Nienaber, 2014, Holzmann et al., 2014, Katzy et al., 2013, Lin et al., 2016, Martinez and Walton, 2014, Matsuno et al., 2014, Montelisciani et al., 2014), with only a few studies focusing on wider concerns about how implementation of externally sourced innovations align with a company's internal processes (Colombo, 2014). Research on aligning open innovation results to a company's business model, as suggested by Chesbrough (2010), has only recently begun to be explored. To address this gap, further research is needed to develop an understanding of the role of an innovation intermediary in supporting alignment of business models with open innovation implementation.

Some research has extended the scope of open innovation implementation to a higher level, such as industry, sector, and national systems. At these levels, the government plays an important role in producing policies that facilitate innovation at every level of implementation (Wang et al., 2012). The proliferation of information technology can facilitate government efforts to reach a larger network size (Tsekouras et al., 2013, Bakici et al., 2013). However, only limited research has focused on this topic. Therefore, research that explores how the government contributes to encouraging companies to work together in multi-partner innovation collaborations using information technology could be further developed in the future.

Research regarding collaboration has identified communities as an important element of innovation. According to Bakici (2013), it is a challenge to connect and engage communities in an innovation ecosystem. Public open innovation intermediaries can play a role in this, but little research has focused on how the structure and governance of ecosystems in communities may affect the innovation process.

The more that users/online participants succeed in developing innovative ideas, the more challenging it is for companies to keep track of authorship. In this situation, the role of innovation intermediaries in facilitating open innovation processes and ensuring proper management of intellectual property (IP) issues becomes crucial. For example, who owns the authorship of submitted ideas that were developed over time through co-creation processes with online solvers and the focal company? When and how it is appropriate to share or protect users' ideas is a timely and important research question in this regard. In summary, the impact of the open innovation model on the innovation-related roles of innovation intermediaries is in ensuring the transparency of IP-related issues, the success of innovation and governance structures, as well as assisting cooperative behaviour; this is far from being clear, and thus requires further research.

2.3 The selected literature gap: the orchestration role of innovation intermediaries

The previous section has highlighted possible areas for future research on the innovation intermediary based on the identified research gaps; these areas are as follows: 1) develop a comprehensive understanding of the link between different levels of innovation implementation; 2) increase focus on the roles of innovation intermediaries in transition management as part of knowledge/technology transfer; 3) leverage the understanding of the orchestration role of an innovation intermediary; and 4) direct increased attention to the role of innovation intermediaries in facilitating openness. Of these areas, this study focuses on the third: leverage the understanding of the orchestration role of an innovation intermediary. The reason behind the selection of this area will be further explained in the following paragraph.

The innovation intermediary literature has primarily discussed the role of the innovation intermediary as a knowledge/technology broker that bridges and supports a connection between two or more parties in a network. Howells (2006) suggests that the innovation intermediary function is widening along the innovation value chain into new roles and functions. The orchestration role is different to other roles; its focus is on how a company builds and develops an ecosystem to support its innovation and that of other companies around it. The company acts as a coordinator with a central position in the network structure. The central position is associated with power and influence stemming from control over critical resources. The company plays the role of key actor, triggering entity, strategic centre, flagship company, and network orchestrator (Dhanaraj and Parkhe, 2006, Nambisan and Sawhney, 2011). Therefore in its orchestration role, the innovation intermediary does not act as a third party that bridges or supports the transfer of knowledge/technology between two or more parties, but as a company that looks for support for its innovation process in the innovation ecosystem while also assisting the other companies in the ecosystem.

Recently, there has been a shift in innovation research locus to network-centric innovation, where the network and ecosystem is the source of innovation; thus, the role of the innovation intermediary has also shifted (Sieg et al., 2010). In the innovation management literature, the innovation ecosystem has been discussed specifically in terms of technological and market disruption, which deals with the internal and external systems of a company, and is related to industry platforms (Gawer

and Cusumano, 2013). A focal company attempts to sustain its innovation by building an innovation ecosystem and inviting other companies to participate. A focal company, as the leader of the innovation ecosystem, orchestrates other members to have mutual relationships within the ecosystem, particularly within one industry. However, the way in which interaction between collective, orchestrator, and member goals shapes orchestration action is still not understood (Paquin and Howard-Grenville, 2013). According to Snow et al. (2011), organisational evolution occurs in response to the emergence of new technologies and market opportunities. Focal companies experiment with new ways of using the knowledge flowing into their industries, and respond to market opportunities. Their attempts to embed themselves and their network in a valuable new organisational form have led to a situation where the orchestration trend is increasing. This motivated this study's exploration of the topic.

Prior literature has used the term 'network governance' as another way to describe orchestration. In brokered network governance, there are two different networks: participant-governed networks, and lead organisation-governed networks (Provan and Kenis, 2008). A lead organisation-governed network occurs when one organisation has sufficient resources and legitimacy to play a lead role. In a lead organisation-governed network, one organisation coordinates a network to enhance learning, make more efficient use of resources, increase capacity to plan for and address complex problems, ensure greater competitiveness, and provide better services to clients or customers (Provan and Kenis, 2008). In this sense, it can be concluded that a lead organisation has similar character to a hub firm in an innovation network, i.e. it plays an orchestration role.

From the literature review, six functions of the orchestration process performed by a hub firm can be identified: knowledge mobility, innovation appropriability, network stability (Dhanaraj and Parkhe, 2006), innovation leverage, innovation coherence (Nambisan and Sawhney, 2011), and sustainability strategy (Iansiti and Levien, 2004). These functions have their own specific orchestration activities, as will be explained in the following paragraphs.

In ***knowledge mobility,*** the hub firms provide resources that can be accessed across organisational boundaries by other network members, and knowledge can be combined and deployed in a variety of ways to enhance innovation (Dhanaraj and

Parkhe, 2006). Three specific processes through which the hub firm can enhance knowledge mobility are knowledge absorption, network identification, and inter-organisational socialisation. Absorptive capacity relates to the organisation's learning capability, i.e. its ability to identify, assimilate, and exploit knowledge from the environment (Zara, 2004). Network identification is important in knowledge mobility to motivate members to participate and openly share valuable knowledge. Identity provides the bond that determines whether knowledge flows in a limited or generous way (Brown and Duguid, 2001). Socialisation between organisations in a network is designed to increase social and relational capital, where the serendipitous nature of innovation is expected to manifest in exchange forums, formal and informal communication channels.

Innovation appropriability is an essential process undertaken by hub firms to ensure that the value created from knowledge mobility is distributed equitably and perceived by all network members. This can be ensured by building trust, providing procedural justice, and through joint asset ownership (Dhanaraj and Parkhe, 2006). It is important for the hub firm to act as network champion in building trust and communicating clear, pre-established sanctions for trust violation. For procedural justice, hub firms can communicate early on the principle of bilateral communications, ability to refute decisions, a full account of final decisions, and consistency in the decision-making process. Joint asset ownership can enhance appropriability as it strengthens the commitment of actors toward shared goals and provides incentives for sharing rewards.

For hub firms, it is crucial to maintain ***network stability*** to avoid member isolation, migration, cliques, and attrition, which can decrease the network's value creation capabilities. The hub firm can increase network stability through a process of enhancing reputation, lengthening the shadow of the future, and building multiplexity (Dhanaraj and Parkhe, 2006). Reputation provides two-fold support for network stability. First, it prevents network members from severing ties with the hub firm, and second, it encourages the formation of new ties. Reputation also has a signalling effect, indicating trustworthiness, and is significant in helping to attract alliances and acquisitions. The 'shadow of the future' refers to a bond that is developed through iterated conditions where the incidence of cooperation increases substantially, between

the future anticipated benefits and present actions. Network multiplexity refers to two or more types of relationship occurring simultaneously. It increases network stability, as firms interact more broadly and deeply with each other, building a better understanding of each other's capabilities and idiosyncrasies, leading to greater network stability.

Innovation leverage relates to the sharing or reusing of technologies, processes, intellectual property, and other innovation assets by a member of the network (Nambisan and Sawhney, 2011). The hub firm must create such opportunities for the members and facilitate the process. The opportunities can be created by identifying assets that may be owned by network partners, and facilitating the leverage of these within the network.

Innovation coherence relates to the hub firm's ability to synergise the network to increase innovation output. This can be viewed from two perspectives (Nambisan and Sawhney, 2011). First, external innovation coherence is the coherence between a network's innovation goals, architecture, external technology, and market context. Hub firms must correctly interpret the waves of external technology/market changes and rally other members around those changes; this ensures the continued relevance and market value of the network's innovation output. Second, internal innovation coherence is the alignment between the innovation tasks, components, and interactions of the network members. The hub firm's ability to coordinate and align the various processes and outcomes in the network determines the overall innovation efficiency and effectiveness of the network.

Sustainability strategy can be defined as a situation where, despite competing on individual product lines, each network member can benefit from collective accomplishments (Iansiti and Levien, 2004). The hub firm must recognise, beyond the traditional notion of competition, a more progressive understanding of inter-firm dynamics and emphasise that the hub firm will live and die by the health of the innovation network that is built. The hub firm should take this into consideration when making business decisions, and it should guide its future thinking regarding policy and regulation.

2.4 Themes related to innovation intermediaries and the orchestration role

The previous section identified the gap in the literature that is investigated further in this thesis: the orchestration role of the innovation intermediary. The literature review process, discussed in Section 2.2, also identified issues related to orchestration as a topic. These issues provide insight to develop an understanding of the orchestration role of the innovation intermediary. These issues are: new organisation forms and network dynamics; the platform leader; and ambidextrous organisations. These issues will be explored in more depth in the following subsections.

2.4.1 New organisation forms and network dynamics

In the current conditions, where internet technology and 'big data' issues are rapidly developing, with corresponding shifts in patterns of international trade and competition, companies have been driven to develop strategies to face the increasing competitive pressure. Some of the competitive challenges are: 1) shorter product life cycles, 2) integrating a variety of technologies in a new product design; 3) co-creating products and services with customers and partners; and 4) the development of scientific and technical knowledge in many sectors (Fjeldstad et al., 2012). The effect of these has pushed companies to search for and create a new organisational form that forces the development of new concepts and terms, which can provide new insight into existing strategies and structures. The new organisational form relies on a mix of strategy, structure, and management processes, and is referred to as a 'dynamic network'.

The dynamic network refers to major organisational components that can be assembled and reassembled in order to meet complex and changing competitive conditions, and is structured in various ways, including: 1) vertical disaggregation, where business functions are performed by independent organisations within a network; 2) brokers, who assemble or locate separate business units; 3) market mechanisms, limited plans, and controls of major functions; and 4) full-disclosure information systems, as substitutes for lengthy trust-building processes based on experience (Miles and Snow, 1986).

The new organisational form, along with the dynamic network, is related to a company's adaptive cycle, i.e. how the company faces the continuous challenges that

occur in a changing environment. These challenges can be categorised into three broad problems: entrepreneurial, engineering, and administrative (Snow et al., 2011). Entrepreneurial problems are related to the domains in which the company operates, such as products, services, target markets, and customers. Engineering problems are relates to the technologies and systems used to deliver the company's product or services, while administrative problems relate to the organisational and management processes in the company. Strategic management research has shown that all problems can be addressed by adopting new procedures, structure, relations, and capability solutions.

Companies that attempt to adapt through use of a dynamic network can be grouped into three types, based on their strategy, structure, and performance: prospectors, defenders, and analysers (Snow et al., 2011). Prospectors are companies that lead the market; their products, services, technologies, and markets continue to develop through research and development. Defenders are companies that focus on process innovation through efficiency; their products and services are more stable. Analysers are companies that attempt to find proven technologies for new and cheaper products. These three types of company exist within an industry as a whole, and innovation often occurs because of this.

Among these three types, analysers have a unique characteristic, in that they follow prospectors but stay within the markets they already have, with products that can be enhanced. Analysers have the ability to envision the market potential for a new product or technology (Snow et al., 2011). In the network, analysers act in a similar way to a broker that reconfigures its network of other companies to commercialise a new product and exploit the market. Hence, a company as an analyser can be defined as one that plays a role as an innovation intermediary that seeks innovation for itself and also companies around it. This type of company also plays a role as an orchestrator, whereby it attempts to develop and organise the network, meaning all members can gain value from being in the network. This kind of company can be more innovative by setting up special units focused on innovation and playing the role of broker, bringing resources together and later transferring the results to a larger operating system (Snow et al., 1992).

In 2004, IBM developed a developer community called BladeCenter with the purpose of expanding the number of solutions that could be made available from one of its products, blade architecture. Later, in 2006, IBM announced the formation of an independent organisation: Blade.org. Blade.org acted as an innovation intermediary that housed a community of complementor and user companies to develop products specifically for BladeCenter. In this role, IBM represented an analyser company playing an orchestration role. This company builds networks, facilitates and links communities in pursuit of common objectives, enhancing their capabilities through collective learning and providing the necessary infrastructure (Snow, 2011).

2.4.2 The platform leader

The term 'platform leader' has become an increasingly interesting topic in the innovation strategy research area, especially for high-tech industries (Gawer and Cusumano, 2014). In 2004, Iansiti and Levian used the term 'keystone company' to refer to the focal company that drives industry-wide innovation for an evolving system of separately developed components. In addition to the platform leader term, a cohort of related concepts, such as hub company, network coordinator, and orchestrator were developed in the same vein (Adner, 2017, Gawer, 2014).

According to Gawer and Cusumano (2008), a platform leader is a company that produces a core component with complementary components produced by many other companies, together forming an 'ecosystem' of innovation that increases the value of their innovations. With changes in technological and market disruptions over time, the definition of platform leader has been divided into two types: internal or company specific platforms; and external or industry-wide platforms (Gawer and Cusumano, 2014). Internal platforms are related to new product development and an incremental innovation context, where a company can build a family of related products or sets of new features. External platforms are similar to internal platform in terms of being a company that develops products, services, or technologies as a foundation upon which a large number of companies can build further complementary innovations and generate network effects; however, with external platforms the foundation technology is 'open' to other companies.

Literature on platform leaders has widened the meaning of the term so that it is not only limited to technology. An external platform leader that has influence at the industry level, especially in the digital sector, plays a central orchestrating role within a network of companies (Gawer, 2014). The platform leader company orchestrates a network and has the task of ensuring the creation and extraction of value (Dhanaraj and Parkhe, 2006). According to Adner (2017) the network of companies that are structurally aligned must interact in order for a focal value preposition, called an ecosystem, to emerge. From an innovation management point of view, in a competitive ecosystem there is a focal company that aligns the partners structurally and plays an orchestration role. Adner (2017) identifies several elements of structure, which consist of activities, actors, positions, and links.

The arrangement of activities, actors, company positions, and links is orchestrated by a focal company as a platform leader. It provides complementary assets for a group of companies, which simultaneously creates and captures value by combining their resources (Valkokari, 2015). Prior studies on innovation networks and ecosystems have suggested a concept of orchestration wherein the focal company assumes the responsibility for coordinating value creation and appropriation (Nambisan et al., 2017). Therefore, this study views the orchestration role played by a focal company as a platform leader aligning the activities, actors, positions, and links of the related companies for value proposition or creation.

2.4.3 Ambidextrous organisation

The term ‘ambidextrous organisation’ has emerged in an attempt to understand the patterns of organisational evolution that relate to periodic discontinuity of the innovation process (Tushman and Oreilly, 1996). For companies aiming for long-term success, it is necessary for them to periodically reorient themselves by adopting new strategies and structures to adapt to a changing environment. The discontinuous change simultaneously leads to a shift in organisation strategy, structure, skills, and culture. However, the company should also be able to maintain the products and processes from the past and balance the changes (Birkinshaw and Gibson, 2004).

O'Reilly and Tushman (2004) describe the balancing capability of a company by citing the metaphor of the Roman god, Janus, who has two set of eyes – one pair

focusing on what lies behind, and the other on what lies ahead. This reflects the capability of a corporate executive, which should be able to continually look backward, at existing products and processes, while also looking forward, at future innovation. Ambidexterity refers to a company's ability to simultaneously execute current strategy while developing new strategy for the future (Birkinshaw and Gibson, 2004, O'Reilly and Tushman, 2004). Related to balancing capability, research on innovation has focused on two tensions in the ambidextrous organisation: contextual and structural tensions, which can relate to an organisation's employees and activities (Birkinshaw and Gibson, 2004, Agostini et al., 2016, Choi et al., 2016, Lee et al., 2013), sustainability and profitability (Du et al., 2013), evolutionary and revolutionary change in terms of new product development (Tushman and Oreilly, 1996), and exploration and exploitation of sources of knowledge for innovation (Andriopoulos and Lewis, 2009, Asif, 2017, He and Wong, 2004, Jansen et al., 2006b, O'Reilly and Tushman, 2011). This study will focus on exploitation and exploration, since the topic under study is the intermediary role of a network orchestrator in innovation.

The exploitation and exploration topic in relation to ambidextrous organisations is prolific in innovation research following the seminal study by March (1991), which concluded that superior innovation performance can be achieved through continuously balancing exploitative and explorative learning (Wei et al., 2014, Chen and Kannan-Narasimhan, 2015). Exploitative learning relates to the development of a company's current product-market knowledge based on the extension of existing competences, technologies, and paradigms, while explorative learning refers to learning beyond the current product-market knowledge base, to search for and experiment with new alternatives (Luzon and Pasola, 2011, Wei et al., 2014). However, the need to balance exploitative and explorative learning creates a dilemma in organisations, considering resource scarcity and dynamic learning (Wei et al., 2014, O'Reilly and Tushman, 2011).

According to Mele and Russo-Spena (2015), an innovation intermediary occupying a central position in a network has the ability to improve the flow of actions and processes of resource integration for exploration and exploitation. The orchestration role of the innovation intermediary in exploration and exploitation in the open innovation process involves building network relationships, mobilising

knowledge through training and guidance, and supporting network members to maintain commitment to innovation and meeting the network project requirements. Therefore, this study identifies the ambidextrous organisation as a concept related to the orchestration role of the innovation intermediary.

2.5 Conclusion

Based on the literature review, four different roles of innovation intermediary were identified: knowledge or technology broker, knowledge or technology transfer enabler, network orchestrator, and open innovation facilitator. Corresponding to these roles, four directions for future research were highlighted: 1) develop more comprehensive understanding of the link between different levels of innovation implementation; 2) enhance focus on the role of the innovation intermediary in transition management as part of knowledge/technology transfer; 3) leverage the understanding of the orchestration role of the innovation intermediary; and 4) direct increased attention to the role of the innovation intermediary in facilitating openness.

The shift in innovation management from closed to openness, and to a focus on the ecosystem, has led to the widening of the role of the innovation intermediary. The innovation intermediary's roles now extend beyond bridging, brokering, and transferring or as a third party. The corporation begins to build and develop an innovation ecosystem and acts as an innovation intermediary for itself, and for new ventures around the corporation. The role whereby the corporation builds, develops, and manages and innovation ecosystem is referred to as orchestration. Currently, corporations implement a corporate accelerator programme to orchestrate their innovation networks and become the innovation intermediary for the corporation itself and for start-ups. Having acknowledged from the literature review that research on the orchestration role of the innovation intermediary is underdeveloped, this study focuses on addressing the third direction of future research: leverage the understanding of the orchestration role of the innovation intermediary, using a corporate accelerator programme as the type of innovation intermediary.

CHAPTER 3
CONCEPTUAL FRAMEWORK

The previous chapter identified and explained the orchestration role of the innovation intermediary, as the focus of this study. As explained in the previous section, the innovation intermediary has various types. This study will focus on one type of innovation intermediary that plays an orchestration role: the corporate accelerator programme. To organise the ideas in this research, a conceptual framework is developed, and hypotheses are also stated in order to guide the research investigation. This chapter will begin by providing an explanation of corporate accelerator programmes, and then continue by explaining the conceptual framework. This will form the foundation for the development of the research questions and hypotheses regarding the orchestration role of corporate accelerator programmes. Finally, the research questions will be outlined.

3.1 The accelerator programme

As explained in Section 2.1.2, the different types of innovation intermediary can be grouped based on the innovation outcome: raw ideas, market-ready ideas, and market-ready products. For market-ready products, one of the innovation intermediary types is an incubator. This type of intermediary supports a start-up, as a new venture, to survive and grow to become a company that can have an economic impact.

Incubators exist to support new firm creation. The new firms are key drivers of economic development, industrial evolution, and innovation. They are founded to convert innovative ideas into commercial products, as stated by Schumpeter (1934) (Battistella et al., 2017). These new firms play an important role in the development of local, regional, and national economies through the creation of jobs and the generation of profit (Scillitoe and Chakrabarti, 2010). However, many new firms are unsuccessful in developing further, and few grow to medium size. In their attempts to grow they must face many challenges, such as lack of resources (Dahlander and Gann, 2010), less legitimacy or brand presence, incomplete or even non-existent business processes (Freeman and Engel, 2007), extreme uncertainty and high-competition

pressure (Battistella et al., 2017), and start-ups' lack of experience in the founder team (Clarysse, 2015).

Previous literature has recognised the existence of an incubation mechanism introduced by policymakers, private investors, corporations, universities, and research institutes to support the creation of successful new firms (Pauwels et al., 2016, Bruneel et al., 2012). Incubators started to be recognised as providers of office space, bringing new firms together under one roof in the 1980s. Incubators are primarily non-profit organisations; besides providing office space, their services have been developed to build connections with investors, and legal, technology transfer, and accounting consultants (Cohen, 2013). The services they provide have evolved and continue to evolve into a new generation of incubation model: the accelerator programme.

In the literature, the existence of accelerators has been explained from different points of view: 1) as new incubation model, 2) as an institutional intermediary, and as 3) open innovation support. Table 7 summarises the different definitions of an accelerator programme.

Table 7. Accelerator programme definitions

NO	ACCELERATORAS	DEFINITION	AUTHORS
1	Incubation model evolution	Refinement of the incubator model with the specific aim of assisting new digital ventures early in their lifecycle using a lean start-up approach.	Clarysse (2015)
		The new wave of incubator particularly to support start-ups, driven almost exclusively by private investors and focused on not only digital technology but also such diverse sectors as fintech, internet of things, and entertainment.	Miller (2011), Mocker (2015)
		An organisation that aims to accelerate successful venture creation by providing specific incubation services, focused on education and mentoring	Pauwels (2016)

		during an intensive programme of limited duration.	
2	Institutional intermediary	Institutions helping entrepreneurs to avoid institutional voids by bridging the gap to substantial public resources in emerging economies.	Armanios (2016)
		Social networking event that has an impact on entrepreneurs, helping them to establish new ventures.	Audretsch (2011)
		Publicly-funded organisations that give a different mix of support to very early stage companies.	Glennie (2016)
3	Open innovation support	An open environment provider that facilitates many beneficial open innovation practices for founders of early-stage ventures to gain the knowledge and resources they need to better fulfil their business potential.	Battistella (2017)
		A way for big companies to use external and internal ideas and paths to market by building structured programmes to harness entrepreneurial power.	Kohler (2016)
		Outside-in innovation programmes that are time-limited, to which start-ups can apply if their product fits with the company.	Weiblen (2015)

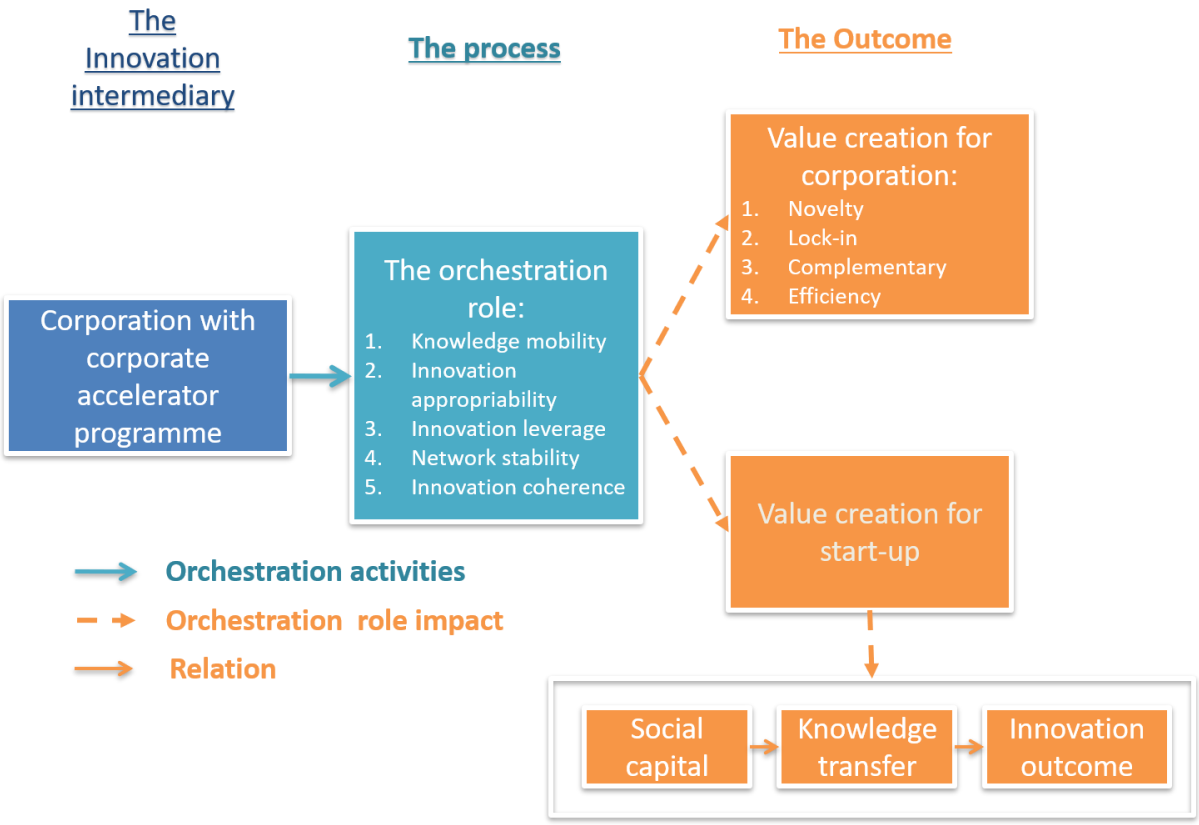
Taking into account the above views, this study defines an accelerator programme as an innovation intermediary institution that offers more than incubator services and aims to support an open innovation process. In summary, the literature has characterised accelerator programmes as: 1) having a focus on early-stage tech firms or start-ups; 2) offering time limited support (usually 3-6 months); 3) offering pre-seed investment, usually in exchange for equity; 3) building connections with investors; 4) aiming to develop start-ups into investment-ready businesses through mentoring session programmes and networking opportunities, alongside a supportive

peer-to-peer environment and entrepreneurial culture; 5) focusing on intense interaction, monitoring, and education to enable rapid progress; 6) having an application process that is 'in principle' open to all, yet is highly competitive; 7) having cohorts or classes of start-ups rather than individual companies; 8) mostly focusing on small teams, not individual founders; 8) hosting periodic graduation with a demo day/investor day (Miller and Bound, 2011; Cohen, 2013; Battistella, 2017; Pauwels, 2016)

3.2 Conceptual Framework

The object of this study is a corporate accelerator programme that plays an orchestration role. This study aims to understand the orchestration role of the innovation intermediary as a corporate accelerator, one of the innovation intermediary types. The study also attempts to identify the value created by the orchestration role for corporations and start-ups. The activities related to this role are: knowledge mobility, innovation appropriability, innovation leverage, network stability, and innovation coherence. Those activities will create value for the corporation and start-ups that are involved in the corporate accelerator programme. For the corporation, the value will derive from the programme's novelty, lock-in, complementarity, and efficiency, while for start-ups, the value is related to the development of social capital for innovation. All the key constructs of this study and the relations between them mare visualised in the conceptual framework presented in Figure 2 below. The following sections will explain in more detail all of the key constructs.

Figure 2: The Conceptual Framework



3.3 The orchestration role of the corporate accelerator programme as an innovation intermediary

Prior studies have highlighted the importance of an innovation ecosystem that is led by an established firm (Iansiti and Levien, 2004, Nambisan and Baron, 2013). Particularly in the technology sector, the type of innovation ecosystem where a single firm establishes and leads the ecosystem or conducts orchestration is referred to as a hub-based ecosystem. The hub-based ecosystem is also known as the platform-based network, the orchestra model ,or the Keystone model (Nambisan and Baron, 2013). The firm occupying the central position in the hub-based ecosystem is called the hub firm, and drives industry-wide innovation (Iansiti and Levien, 2004), helps other private firms to elicit and encourage innovation (Gawer and Cusumano, 2014), and orchestrates network activities to ensure the creation and extraction of value (Dhanaraj and Parkhe, 2006). There are three basic modalities of network orchestration: 1) participants governed by a central network broker; 2) brokered by a firm in the network

that acts as a lead organisation or hub firm that initiates and channels most interactions; 3) separate, independent, and more impartial network administrative organisation (Provan and Kenis, 2008). The hub firm that acts as an innovation intermediary, the model discussed in this study, is included in the second network orchestration modality mentioned above.

Implementation of the hub firm's activity in building an ecosystem and conducting orchestration occurs through a corporate accelerator (Pauwels et al., 2016). The corporate accelerator is one type of accelerator, which differ based on their objectives (see Table 2.7). There are three types of accelerator: ecosystem builder, deal-flow maker, and welfare simulator (Pauwels et al., 2016, Clarysse et al., 2015). The **deal-flow maker** is the most common type of accelerator, using the original concepts of Y-combinator, the first and leading accelerator. This type of accelerator is also known as the investor-led accelerator. Its objective is to bridge the equity gap between early-stage projects and investors. The accelerator receives funding from business angels, venture capital funds, or corporate venture capital. The **welfare simulator** accelerator stimulates start-up activities and fosters economic growth. This type of accelerator has the most in-depth developed curriculum among the different accelerator types (Pauwels et al., 2006). They organise training sessions, workshops and practical learning-oriented events to help start-ups develop their ideas (Clarysse et al., 2015). The relationship between the accelerator and start-up is more focused on transferring knowledge or technical skill. The **ecosystem builder** accelerator's purpose is to build a corporate ecosystem in a specific technological domain. This kind of accelerator is usually owned by big companies that wish to develop an ecosystem of customers and stakeholders around their company. They actively involve corporate stakeholders in the accelerator's operations. The ecosystem builder has a similar model to a hub-based innovation ecosystem, where a single firm plays the orchestration role which establishes, leads and is responsible for coordinating value creation and value appropriation in the ecosystem (Nambisan et al., 2017).

Each type of accelerator aforementioned has different innovation intermediary roles. As discussed in Section 2.2.1, the innovation intermediary has four general roles: bridging, transferring, orchestrating, or facilitating open innovation. This study maps

the accelerator objectives against its intermediary roles based on the type of accelerators. These are summarised in Table 8.

Table 8. Types of accelerator and innovation intermediary roles

Accelerator type	**The accelerator's objectives**	**The innovation intermediary roles**	**Examples**
Deal-flow maker	Bridge the equity gap between the early-stage projects and investors	Bridging	Techstar London
Welfare simulator	Stimulate start-up activity and foster economic growth.	Transfer knowledge/skill	Le Camping
Ecosystem builder	Build corporate ecosystem in specific technological domain	Orchestration	Microsoft ventures accelerator

A corporate accelerator is an ecosystem-builder type of accelerator, with the corporation as its source of funding (Pauwels et al., 2016). In terms of the programme, it offers the same package as a general accelerator: mentoring services, curriculum, counselling services, demo days, location services, and investment opportunities. The aim of the corporate accelerator is to develop an ecosystem of customers and stakeholders around the company (Pauwels et al., 2016). A corporate accelerator is also a way for corporations to find an external source of innovation, so in this way it acts as an innovation intermediary (Nambisan and Sawhney, 2007).

Corporations realise that an accelerator is a way to adopt open innovation; large companies need to speed up their progress, or they will be left behind in the changing business landscape. Innovative products that lead and change existing technologies and industries typically emerge from start-ups (Weiblen and Chesbrough, 2016). Instead of treating start-ups as a threat to their sustainability, corporations can engage with them and build an ecosystem of start-ups around the corporation. This is achieved through a corporate accelerator programme. A corporate accelerator can create a bridge between the corporation and start-ups to generate new ideas, disruptive innovations, and enable survival in the competitive modern business landscape (Weiblen and Chesbrough, 2015).

Another purpose of the accelerator programme is to elude institutional void (Dutt et al., 2016), helping the success of start-ups or new venture creation. In this sense, the corporate accelerator programme is an innovation intermediary for both the corporation and the start-ups. The corporate accelerator has a unique dual position in helping innovation: it helps the corporation that looks for innovation, and the start-up that provides market-ready products. The accelerator is thus used as a matchmaking device to engage with promising start-ups and nurture the development of an ecosystem around the corporation. Therefore, this study views the corporate accelerator programme as an innovation intermediary that plays an orchestration role.

A report by Nesta mentioned that corporate accelerators have an unclear business model (Clarysse et al., 2015). Moreover, according to Gawer (2014), future research is needed to investigate how a hub firm, as the platform leader, can establish itself as a broker or innovation intermediary. Thus, to further investigate corporate accelerator programmes as innovation intermediaries, this study proposes the first research question as follows:

RQ1: How does a corporate accelerator perform the orchestration roles of an innovation intermediary?

3.4 Value creation by corporate accelerator programmes as a type of innovation intermediary playing an orchestration role

Research that focuses on collaboration between corporations and start-ups has identified several different benefits of this relationship. For a technical-based corporation, it can minimise the risks associated with product development (Duarte and Sarkar, 2011), as the engine of corporate innovation, and help to keep pace with a dynamic, turbulent, and potentially disruptive environment (Weiblen and Chesbrough, 2015). It can also help to develop an ecosystem of customers and stakeholders around the company to increase its foothold in the market (Pauwels et al., 2016, Nambisan and Baron, 2013). As the locus of innovation has shifted from closed to network, the collaboration between a corporation and start-ups will be sustained if the relationship provides a compelling experience with a value creation effect for the network (Lee et al., 2012).

In the current conditions, i.e. a highly competitive global marketplace and shorter product life cycle, value creation is the main function of innovation. Value creation is identified as a source of competitive advantage for a company, embedded within a larger stream of activities (Nucciarelli et al., 2017) and transactions (Amit and Zott, 2001). Five areas of innovation for value creation have been identified: 1) introduction of new products, services, or ventures; 2) value chain innovation to make processes more efficient, which in turn will cut costs, improve quality, and/or increase the speed of the processes; 3) reinventing the concept of customer value to expand from price, quality, speed, and customisation to experience, emotional fulfilment, and public good; 4) expanding the customer base; and 5) new business models (Lee et al., 2012).

Recent literature on innovation networks and ecosystems has highlighted the importance of orchestrators, i.e. where one or more firms assume the responsibility for coordinating value co-creation and value appropriation (Nambisan et al., 2017). The orchestrator adds value in enabling innovation exchanges between organisations and creates value for the entire network and its activities (Paquin and Howard-Grenville, 2013). Value creation is needed in an innovation network; it refers to the collaborative process and activities involved in creating value for stakeholders (Ritala et al., 2013). If the corporation, as the orchestrator, is interested only in pursuing its own goals without any regard to the value shared with the start-ups around it, it will not survive. Occupying the central position in a network, the hub firm has a brokerage role that facilitates transactions in the network. It is, therefore, important to understand the activities and transactions that create value in the ecosystem; by doing so, the way in which the market is created and how various actors may realise their common and own business objectives can be identified (Ritala et al., 2013). As such, it can be concluded that it is necessary to identify the impact of a corporate accelerator programme, which can be studied from the perspectives of both the corporation and start-ups.

3.4.1 Value creation for the corporation

The results of interaction and transaction between members in a network can create different types of value. In the multi-actor system, stakeholders interact and integrate their resources through processes of coordination, consultation, and

compromise, leading to three value outcomes: innovation, knowledge (technological, market, and managerial), and relations (Reypens et al., 2016). In an innovation service-ecosystem, collaboration conceptualised technological and market innovation as the value creation (Vargo et al., 2015). In an innovation ecosystem, the maintenance of value creation involves keeping the network up and running, as well as ensuring the longer-term competitiveness of the network (Ritala et al., 2013). At the firm level, in any organisation, five areas where organisations can create value have been identified: 1) introducing new products, services or new ventures; 2) value chain innovation to make processes more efficient, which in turn will cut costs, improve quality, and/or increase the speed of the process; 3) reinventing the concept of customer value to expand it from referring to price, quality, speed, and customisation to include experience, emotional fulfilment, and the public good; 4) expanding the customer base; 5) adopting new business models (Lee et al., 2012).

With various types of value being the output of activities and transactions, Zott and Amit (2010) have developed a framework to identify value creation. This framework starts with identifying the design element, and continues by recognising the design themes. In the design element identification phase, the analysis attempts to capture the key parameters that describe the activities of the system architecture, which includes the content, structure, governance, and interdependence between these elements. Content refers to the selection of activities; structure describes how the activities are linked, and captures their importance for the business model; and governance concerns who performs the activities.

In the design theme recognition phase, the configuration of the design elements that are orchestrated and connected is then evaluated, leading to the identification of the design themes. Usually, the design themes that structure the design elements are driven by novelty, lock-in, complementarities, and efficiency (Zott and Amit, 2010). Novelty drives value creation through the adoption of new activities (content), and/or new ways of linking the activities (structure), and/or new ways of governing the activities (governance). The lock-in theme focuses on power to continue to attract third parties as business model participants. Complementarities present whenever bundling activities within a system provide more value than running activities separately. The

theme of efficiency arises when firms use their activity design elements to aim at achieving greater efficiency through reducing cost.

This study adopted the value creation framework explained above, as it can be used to examine the configuration of activities defined in an ecosystem (Adner, 2017). The framework was also used to understand the accelerator programme, in terms of its distinctive characteristics and profiles geared toward reinforcing start-ups (Pauwels et al., 2016).

Related to the role of a corporate accelerator programme as part of a corporation's innovation network strategy, West and Bogers (2014) identified a research opportunity to evaluate the value created by an innovation network in which both an ecosystem and platform are included. According to West and Bogers (2017), network collaborations that include alliances, communities, consortia, ecosystems, and platforms require firms to orchestrate and capture value across the network. However, they argued that few open innovation studies have examined such network collaborations. The study presented in this thesis aims to address this opportunity by answering the following research question (RQ2):

RQ2: What is the value created for corporations through a corporate accelerator programme?

3.4.2 Value creation for the start-up

As mentioned in Section 3.3, in addition to identifying the activities and processes the innovation intermediary is engaged with in its orchestration role, this study also aims to understand the value created from the role. Understanding the value created for start-ups via accelerator programmes is viewed as essential in order to recognise the innovation intermediary objectives roles. Moreover, by identifying the value created, the sources of value can also be identified (Zott and Amit, 2011). This can help to provide information that can be used as the basis to design activities and processes that will support value creation.

Particular to the orchestration role, an innovation intermediary is a hub-firm that occupies the central position in an innovation network. A hub firm facilitates connections between members and the wider network, and the establishment of new relationships. To understand these relationships, existing literature has used social

capital theory, which explains the social relations that are important for an organisation (Nahapiet and Ghoshal, 1998, Zheng, 2010). Therefore, this study applied social capital theory to understand the impact of the orchestration role of the innovation intermediary on its innovation network members. Moreover, the social capital theory has been identified as adding value to the social network process (Inkpen and Tsang, 2016). Particularly in new business ventures research, social capital is also widely recognised as a key variable in explaining the social ties that are important for start-ups' survival and success in business (Audretsch et al., 2011).

Social capital is defined as the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit (Nahapiet and Ghoshal, 1998). At the organisational level, social capital is defined as resources that can be derived from a personal network or a set of ties to achieve specific goals (Alguezaui and Filieri, 2010).

Within the innovation intermediary research, the social capital concept is used to explore the brokerage role that involves connecting different parties, such as university and industry engagement through government support (Al-Tabbaa and Ankrah, 2016, Eun et al., 2006, Kodama, 2008), brokerage in industries (Boari and Riboldazzi, 2014, Gassmann et al., 2011, Knockaert et al., 2014), open innovation communities (Fleming and Waguespack, 2007), inter-country and inter-city relations (Guan et al., 2015), and partnerships of multinational companies (Hahn and Gold, 2014). In Section 2.3, it was explained that knowledge mobility is one activity associated with the orchestration role (Dhanaraj and Parkhe, 2006). In knowledge mobility, socialisation between different organisations in a network is designed to increase social and relational capital; this is what gives rise to the serendipitous nature of innovation.

Innovation management studies began to use the concept of social capital when management innovation shifted from firm-centric or closed innovation to network-centric or open innovation, as discussed in Section 2.1.1. Innovations can be viewed as the product of cooperation and continuous interaction between a firm and other external actors (Alguezaui and Filieri, 2010). Firms realised that external factors were important to creating, developing, and exploiting new opportunities, and deriving profitable value from these (West and Bogers, 2014). Social capital provides firms

with the mechanisms to access external factors, such as resources and networks, so that they can improve their innovation capability.

Previous research has identified that social capital can be a source of value (Al-Tabbaa and Ankrah, 2016), but this has not yet been empirically proven. While other literature has also highlighted social capital as an important contributor to SMEs' growth and new venture creation (Lee et al., 2010, Molina-Morales and Martinez-Fernandez, 2009, Scillitoe and Chakrabarti, 2010), in general, these researchers have emphasised that ties or relationships support start-ups or new ventures that are lacking in resource by providing access to a wider network.

Having acknowledged that: 1) social capital has been used to investigate relationships in innovation intermediary research; 2) social capital creates value in the form of new venture creation; and 3) it is deemed important to identify the value created for start-ups by participating in corporate accelerator programmes, as discussed above, this study uses social capital theory as a perspective from which to investigate the value of the corporate accelerator for start-ups. Based on these points, the third research question (RQ3) was formulated:

RQ3: From a social capital perspective, what is the value created for start-ups by participating in corporate accelerator programmes?

Based on existing literature, this study measured knowledge transfer and innovation outcome as concepts related to social capital development and the value created via the corporate accelerator programme. To answer the third research question, several hypotheses were developed. The following section will explore all the concepts related to value creation, and how the hypotheses were developed to be tested further.

Social capital

The literature provides several different definitions of social capital (see Table 9). These definitions all have a similar emphasis on social relations.

Table 9. Social capital definitions from different authors

Author	Social capital definition
Adler and Kwon (2002)	Goodwill is available in individuals or groups. Its sources lie in the structured content of the actor's social relations. Its effects flow from the information, influence, and solidarity it makes available to the actor.
Kirkels and Duysters (2010)	The value that arises from the way a person is connected to others.
Burt (2000)	A concept of location effects in differentiated markets. The social capital concept consists of closure and structural holes.
Nahapiet and Ghoshal (1998)	The sum of the actual and potential resources embedded within, available through, and derived from the network of relations.

According to the Web of Science database, the most cited article on and definition of the concept of social capital is that by Nahapiet and Ghoshal (1998). Their definition integrates various facets of social capital into a framework consisting of three dimensions: the structural dimension, the relational dimension, and the cognitive dimension. The structural dimension is the most important dimension of social capital, and refers to the configurations and patterns of connections between people, addressing such properties as network density, connectivity, and hierarchy (Zheng, 2010). Ties provide access to the network. Such access is considered essential, as it can provide information channels, through which the amount of time and investment required for collection of necessary information can be reduced (Totterman and Sten, 2005).

The relational dimension refers to the beliefs and norms that bond people together in a social network; for example: respect, friendship, trust, trustworthiness, expectations, norms, and obligations (Zheng, 2010). In a business environment, Totterman and Sten (2005) view trust as a factor that is fundamental to the existence and growth of social capital. When relationships have a high level of trust, people are more willing to engage in a social exchange, particularly in a cooperative interaction.

The cognitive dimension refers to shared representation, interpretation, and systems of meaning amongst people in the same social network, such as shared

narratives, shared language, and shared codes. This dimension highlights the importance of understanding other network members' expectations and the need to act accordingly (Totterman and Sten, 2005). Conversations that consist of gossip, stories, the mutual discovery of meaning, negotiation of norms and aims, and expressions of sympathy, disapproval, bewilderment, and understanding also build social capital, and are a part of this dimension (Cohen and Prusak, 2001).

The concept of social capital concept, and its three dimensions, has received a considerable amount of research attention, being regarded as an important factor to explain the relations and connections between members in a network (Alguezaui and Filieri, 2010, Al-Tabbaa and Ankrah, 2016, Bstieler et al., 2015, Yu, 2013). However, understanding of how the different dimensions of this type of capital create value is considered limited (Al-Tabbaa and Ankrah, 2016).

Tsai and Ghoshal (1998) conclude that the three dimensions of social capital have significant effects on resource exchange and combination, and later to product innovation association. The identified existing literature on social capital potential reveals that firms with good relational assets, such as belonging to a collaborative network, tend to have an increased likelihood of innovative performance (Powell et al., 1996, Landry et al., 2013). For start-ups, the relationships support their survival as new ventures in the business environment (Battistella et al., 2017).

The use of social capital theory as a fundamental concept to explain how an organisation's social relations facilitate transfer of knowledge (Adler and Kwon, 2002, Inkpen and Tsang, 2005) and eventually generate innovation (Alguezaui and Filieri, 2010, Yu, 2013, Baker et al., 2016) has been identified in previous studies. In a social interaction network, members engage through mentoring, meetings, or gatherings. Knowledge is often generated during these activities. The process of transferring knowledge from one member to others affect the generation of innovation (Shu et al., 2012, Maurer et al., 2011). Ties and relations that arise from social interaction serve as channels for knowledge flow. Since knowledge is known to be a source of innovation (Filieri and Alguezaui, 2014, Hargadon and Sutton, 1997, Levine and Prietula, 2012), such social interaction can affect innovation outcome. In this sense, knowledge transfer can be perceived as a mediating factor between social capital and innovation relation.

A few studies have explored the effect of different dimensions of social capital on innovation outcome (Tsai and Ghoshal, 1998; Obstfeld, 2005; Bstieler et al., 2015; Akhavan and Mahdi Hosseini, 2015; Zheng, 2010). These studies have examined the structural, cognitive, and relational dimensions of the social capital possessed by a firm. The variation in the findings of empirical studies of the relationship between social capital and innovation success is extensive. For example, a study by Tsai and Goshal (1998) reported that the relational dimension of social capital has a strong and positive indirect effect on innovation outcome, whereas the effect of the structural and cognitive dimension of social capital on innovation outcome was found to be significantly negative. These mixed results suggest that perhaps some mediating factor might be active. With very few exceptions (e.g., Tsain and Ghoshal, 1998; Akhavan and Mahdi Hosseini, 2015), critical mediating factors for converting a firm's social capital into improved innovation outcomes have not been addressed.

Knowledge transfer

Knowledge is believed as a source of innovation. Thus, it is considered important in innovation management research to understand how knowledge is transferred within and between organisations and individuals (Inkpen and Tsang, 2016). Knowledge transfer is the process through which one network member is affected by the experience of another (Inkpen and Tsang, 2005). Knowledge transfers (or is transferred) through ties between organisation members as channels for information exchange and knowledge flow (Maurer et al., 2011). Since ties or relations area a dimension of social capital (see Section 5.2), previous literature has identified knowledge transfer as a link between social capital and innovation outcome.

Acknowledging the importance of knowledge transfer, the knowledge transfer process has been discussed by different authors, as identified in the literature review. The processes identified and defined by different authors are summarised in Table 10, below.

Table 10. The knowledge transfer process

Author	Knowledge transfer process
Maurer et al. (2011)	Mobilisation: looking for and identifying useful resources within the social network and contacting network relations through sociali activities or business meetings.
	Assimilation: retrieval and absorption of network resources.
	Resource use: allocation of the network resources to particular tasks, performance of the tasks, and transformation into particular outputs.
Filieri and Alguezaui (2014)	Knowledge search: the activities of the individual/group/focal firm in looking for and identifying useful knowledge that is produced externally.
	Knowledge access: the activity of accessing the externally generated knowledge that is critical to an individual/group/focal firm's operations.
	Knowledge assimilation: the process of analysing, processing, interpreting, and understanding the knowledge obtained from external sources.
	Knowledge integration: the activity of combining new external knowledge with existing internal knowledge.
Gilbert and Cordey-Hayes (1996)	Acquisition: acquiring knowledge from past learning, searching, or scanning.
	Communication: the dissemination of information.
	Application: the application of knowledge that enables the organisation to learn.
	Assimilation: applying the knowledge gained.

The various implementations of knowledge transfer in social interactions are also identified in the literature. These include: the implementation of training programmes, teaching, communities of practice, virtual communities, meetings, best practice files, wikis, dynamic communities, coaching, mentoring, informal networks and encounters, systemic thinking, and cross-functional teams (Spraggon and Bodolica, 2012).

Innovation outcome

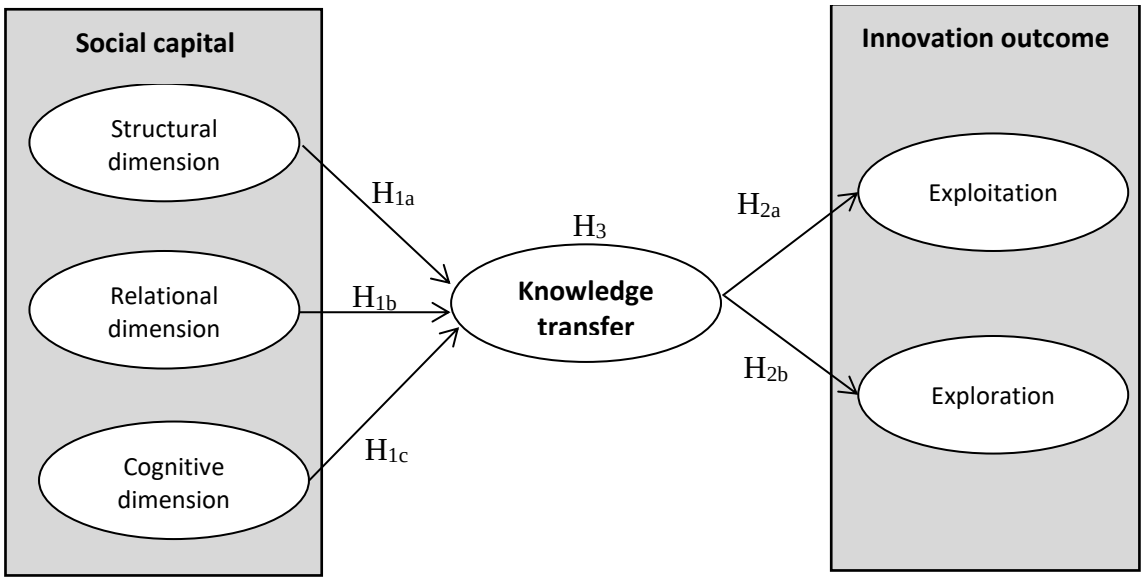
Studies of innovation outcome measurement have produced different results. Innovation outcomes that answer the questions 'what' or 'what kind' can refer to form (product/service/process/business model), magnitude (incremental/radical), referent (firm/market/industry), or type (administrative/technical) (Crossan, 2010). As the result of organisational learning and innovation, exploration and exploitation are used to reflect knowledge existence (McDermott, 2012). Exploration and exploitation are innovation outcomes related to the social network theory (Michelfelder, 2013), and the terms were first defined by March (1991). In knowledge management research, it is believed that social capital results in innovation outcome mediated by knowledge transfer (Filieri, 2014). Prior studies have shown that social relations contribute to innovative outcomes (i.e. exploration and exploitation) (Yu, 2013, Lin et al., 2016). According to Li et al. (2008) and also McDermott and Prajogo (2012), exploration and exploitation are sources of advantages for SMEs. Since this study used social capital based on social relation for start-ups, meanwhile based on the size, start-ups can be categorised as SMEs, this study perceives exploration and exploitation to be innovation outcomes of start-ups.

The terms exploration and exploitation emerge as fundamental themes in organisational learning and strategy**,** innovation, and entrepreneurship research areas (Jansen et al., 2006b). They emerge in relation to the concept of ambidexterity, which emphasises the need for an organisation to have a balanced strategy of sustaining existing business while also searching for new opportunities. Exploration refers to innovation activities aiming to capture and benefit from external sources of knowledge to enhance current technological development (van de Vrande et al., 2009). Exploration often refers to the identification of new possibilities and ideas, which arise from interaction with partners or alliances in different lines of business (Dittrich and Duysters, 2007). Exploitation drives innovation by developing existing knowledge, increasing efficiency, and meeting the needs of existing consumers (Michelfelder and Kratzer, 2013, van de Vrande et al., 2009).

Hypothesis development

This section will explain how the hypotheses of this study were developed based on the existing literature on social capital, knowledge transfer, and innovation outcome. The existing literature on innovation management indicates that social capital is a source of innovation, while knowledge transfer mediates this relationship (see Section 5.2). Social capital consists of three dimensions (see Chapter 2, Section 2.3.2). These three dimensions have been found to relate to knowledge transfer, mediating the relationship that fosters innovation outcome, which consists of exploration and exploitation (Section 5.2.2). Figure 3 depicts this relationship between social capital, knowledge transfer, and innovation outcome. These three constructs and the relations are further explained in the following sections.

Figure 3. Corporate accelerator programme's value creation for start-ups



The impact of social capital on knowledge transfer

The relationship between social capital and knowledge transfer is recognised in the literature. However, the effect of each dimension on knowledge transfer results in different outcomes. For example, several studies have revealed that the three dimensions of social capital simultaneously affect knowledge transfer as intellectual capital (Nahapiet and Ghoshal, 1998, Akhavan and Mahdi Hosseini, 2016). Others

have identified the structural dimension as an antecedent of the relational dimension, with the cognitive dimension moderating the relationship that influences knowledge transfer (Bstieler et al., 2015). From a different perspective, the structural dimension and cognitive dimension are viewed as the antecedents of relational capital, which affects knowledge transfer (Tsai and Ghoshal, 1998). Al-Tabbaa and Ankrah (2016) conclude that the different outcomes might be related to the context of the relation, which gives rise to different barriers and challenges. The mixed findings regarding the relationship between social capital dimensions and knowledge transfer, this study investigates the relationships between the two concepts in the context of the innovation intermediary.

In social capital theory, the network position that reflects the relationship pattern of entities is included in the structural dimension (Inkpen and Tsang, 2005). According to Inkpen and Tsang (2005), the relationship pattern refers to ties, configuration, and stability. Ties between network members serve as channels for information exchange or knowledge flow, and, therefore, ties facilitate knowledge mobility in a network (Dhanaraj and Parkhe, 2006). Additionally, through social ties, network members can inform their colleagues about the existence and location of relevant knowledge. This supports the assimilation of knowledge by allowing members to exchange and combine other members' knowledge.

The structural dimension can also be defined as amount of social interactions (Totterman and Sten, 2005). Previous research has revealed the positive relationship between the structural dimension and knowledge transfer (Tsai and Ghoshal, 1998, Hansen, 2002, Reagans and McEvily, 2003, Maurer et al., 2011). This means that the more members interact in a network, the stronger the ties between them. Consequently, there are more opportunities to share knowledge and creations. Start-ups involved in an corporate accelerator programme would likely develop social ties because the corporate accelerator provides access to the corporation's networks. In this sense, it can be concluded that when the structural dimension (interaction) increases, knowledge transfer also increases. In other words, in start-ups, the structural dimension has a positive relationship with knowledge transfer. Based on this deduction, the following hypothesis (Hypothesis 1a) was constructed:

Hypothesis 1_a: In a corporate accelerator programme, the structural dimension of social capital in start-ups is positively related to knowledge transfer.

Relational social capital may be defined as the quality of relationships among network members, which could overcome diversity and leverage its positive influence on the network (Vlaisavljenic et al., 2016). The existing literature views the relational dimension as the outcome of interaction, reflecting on trust, norms, and group identification (Inkpen and Tsang, 2005). Trust is a type of expectation that alleviates the fear that one's exchange partner will act opportunistically (Tsai and Ghoshal, 1998). When a relationship is characterised by a high degree of trust, the parties to the relationship will be willing to exchange knowledge and to engage in cooperative interaction. In the absence of trust and shared norms and behaviour, sharing knowledge, combining skills, or collaborating on projects are likely to be difficult (Vlaisavljevic et al., 2016a).

The corporation with a corporate accelerator programme is a hub firm that has power, dominant in the industry and occupies a central position in the network (see Chapter 2, Section 2.3). The hub firm has a reputation as a market leader among new and emerging firms seeking experience in the field. As part of the big corporation's strategy, start-ups would likely trust the corporate accelerator programme and support it with knowledge search, acquisition, and implementation or knowledge transfer. As such, the start-ups would likely to share their knowledge with the corporation. Hence, it can be concluded that trust (the relational dimension) can positively affect knowledge transfer. Based on this deduction, the following hypothesis (Hypothesis 1b) was formulated:

Hypothesis 1_b: In a corporate accelerator programme, the relational dimension of social capital in start-ups is positively related to knowledge transfer.

Cognitive social capital refers to resources that represent shared understanding and common goals (Totterman and Sten, 2005). Cognitive social capital presents in the member's commitment to relationships, and their understanding of other network members' expectations and the need to act accordingly (see Chapter 2, Section 2.3.2). Thus, when shared understanding presents in the network, members have similar

perceptions regarding how they should interact with one another. This can promote the exchange of ideas and resources for a network integration of knowledge (Inkpen and Tsang, 2005). The process of knowledge creation is rooted in rational analysis and strong arguments, which are represented in the form of stories that facilitate the exchange of practice and tacit experience (Tsai and Goshal, 1998). The emergence of a shared success story and the experiences of others thus enables the creation, transfer, and combination of different forms of knowledge (Nahapiet and Goshal, 1998).

In the corporate accelerator context, a shared understanding embodies the collective goals of the corporate accelerator programme and start-ups. When the corporate accelerator programme and the start-ups have the same perception of how to interact, between each other and also between the start-ups, they can avoid potential misunderstandings in their communication. They can also have more opportunities to exchange ideas and knowledge freely. In this sense, having a common understanding of a goal among start-ups and the corporate accelerator (cognitive dimension) would likely lead to knowledge transfer between them.

Therefore this study proposes:

Hypothesis 1_c: In a corporate accelerator programme, the cognitive dimension of social capital in start-ups is positively related to knowledge transfer.

Impact of knowledge transfer on innovation outcome

Knowledge is often generated through social interactions. The process of transferring knowledge from one organisation to another, or from one person to another, is considered to be vital for the generation of innovation (Filieri and Alguezaui, 2014). The innovation process can be considered as one of the most knowledge-intense business processes. Innovation requires that the firm continuously renew its knowledge and combine its existing knowledge assets to create new knowledge (Jimenez-Jimenez et al., 2014). For entrepreneurs, it is important to have diverse external knowledge-sourcing relationships to identify more market opportunities. As such, a new venture needs must be open to external sources of knowledge (Eftekhari and Bogers, 2015).

The previous research has indicated that knowledge transfer influences organisational processes and outcomes. For example, knowledge transfer spreads best

practices, and aids organisational learning, performance, and innovation (Levine and Prietula, 2012). In this study, knowledge transfer is defined as the process of searching, accessing, assimilating, and integrating information and skills in a corporate accelerator ecosystem (see Section 5.2.1). The process of transferring knowledge needs to be systematically organised, ensuring that the information and skills sent by the sources through various channels are accepted by the recipients and have an impact on their productivity (Liao and Hu, 2007, Filieri and Alguezaui, 2014).

The existing literature emphasises that knowledge transfer is an important factor in generating innovation outcome (Bessant and Rush, 1995, Cassiman and Veugelers, 2006, Chen and Huang, 2009, Chiang and Hung, 2010, Frenz and Ietto-Gillies, 2009, Gallego et al., 2013). The innovation outcome within an organisational context can be understood as exploration and exploitation (March, 1991, Jansen et al., 2006b, Michelfelder and Kratzer, 2013), and knowledge creation can be used as an indicator of innovativeness (Li et al., 2008).

As innovation intermediaries, accelerators would likely transfer knowledge from large firms to society, and possibly enable innovation for start-ups (Clausen and Rasmussen, 2011). Because knowledge is a source of innovation, more knowledge is transferred, innovation in the form of exploitation and exploration would likely also be generated. Therefore, in this study, the following hypothesis is proposed:
Hypothesis 2: Knowledge transfer is positively related to start-ups' innovation outcome: a) exploitation, and b) exploration.

The mediating effect of knowledge transfer on the relationship between social capital and innovation outcome

Prior studies have identified the benefits of social capital, which are access to new sources of knowledge (Inkpen, 2005; Lee, 2015; Ramasamy, 2006; Tortoriello, 2012) and knowledge generation (Filieri, 2014). The knowledge that is transferred through intensive social interaction is considered important for the generation of innovation (Leiponen, 2006; Powell, 1996). However, with the exception of a few studies (Tsain and Ghoshal, 1998; Akhavan and Mahdi Hosseini, 2015), the way in which knowledge transfer mediates the relationship between social capital dimensions

(e.g. structural, relational, and cognitive) and innovation outcome has not been empirically proven (Filleri, 2014).

Previous studies have acknowledged the existence of a process that mediates social capital and, consequently, influences innovation outcome. For example, Camps (2014) identified innovation enablers that relate to social capital and innovation outcome. In the field of social networks and innovation, Leenders (2016) identified that knowledge brokers maintain effective arrangement of external and internal ties, integrating knowledge from both sources and then creating innovative solutions.

A study by Maurer (2011) provided empirical evidence that knowledge transfer mediates intra-organisational social capital and innovation performance. However, the study focuses on the structural dimension of social capital only. Shu et al. (2011) showed that individual social capital, in the form of managerial ties, has an indirect relationship with firm innovation, and knowledge exchange. They also showed that knowledge combinations contribute to firm innovation.

Related to the knowledge transfer, social capital, and innovation outcome concepts explained above, it can be concluded that, in a corporate accelerator programme, the more start-ups harness the advantages provided by the programme, the more possibilities for knowledge transfer there, which would likely generate innovation. Therefore, this study argues that in a corporate accelerator programme, the advantage that facilitates social capital development for start-ups would likely result in innovation outcome for those start-ups, with knowledge transfer mediating the relationship. Therefore:

Hypothesis 3: Knowledge transfer mediates the relationships between start-ups' social capital dimensions and innovation outcome.

3.5 Conclusion

Having acknowledged, based on the literature review, that understanding of the orchestration role of the innovation intermediary is underdeveloped, this study focuses on addressing the third identified direction of future research: leverage the understanding of the orchestration role of the innovation intermediary with a corporate accelerator programme as the type of innovation intermediary.

To achieve the above aim, three research questions were developed. The research questions are related to understanding the activities, roles, and processes of a corporate accelerator programme as an innovation intermediary, and also the value that the programme creates for the corporation and the start-ups involved. The research questions are as follows:

RQ1: How does a corporate accelerator perform the orchestration role of an innovation intermediary?

RQ2: What is the value created for corporations through a corporate accelerator programme?

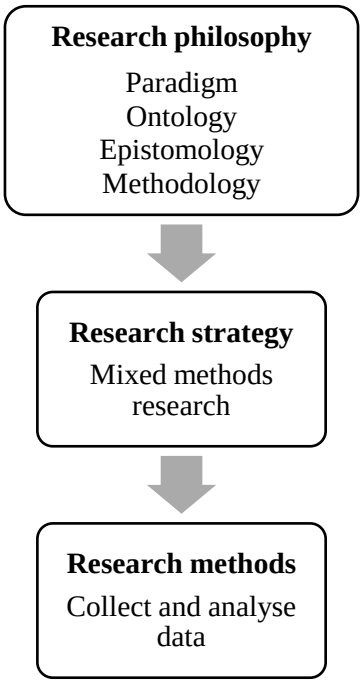
RQ3: From a social capital perspective, what is the value created for start-ups from their participation in corporate accelerator programmes?

Key constructs and their contribution to answering the research questions have been identified from the literature review. These key constructs are: the corporate accelerator programme, as the object of this study, playing the orchestration role; the orchestration role or processes; and the value created through the role, for the corporation and start-ups. To organise the key constructs and the relationships between them, a conceptual framework has been developed.

CHAPTER 4
RESEARCH PHILOSOPHY AND METHODOLOGY

This chapter will explain the selection of the research philosophy and procedures used to answer the research questions. When undertaking a research study, the process begins with the identification of the research philosophy (Easterby-Smith et al., 2012, Collis and Hussey, 2013). A research philosophy is based on certain philosophical assumptions that relate to paradigms or sets of beliefs that underlie the research activities (Creswell, 2009). The paradigm will guide the research methods and the overall research strategy. The next step is to break down the research strategy into different steps of data collection and data analysis, regarded as the research methods. Figure 4 summarises the selection process followed in the present study; the terms in each box will be explained in the following sections.

Figure 4. The process of deciding the research methods of this study



4.1 Research Philosophy

Before conducting research, it is considered important to establish what philosophical assumptions are being made about the world and the nature of knowledge, known as the research philosophy. This indicates how the researcher understands the research questions, and guides the data collection, analysis, and interpretation (Saunders et al., 2012). In the literature, authors have used a variety of terms to represent philosophical assumptions, such as philosophical worldview (Creswell, 2009) and paradigm (Collis and Hussey, 2013, Karami, 2010). However, for consistency purposes, the term "paradigm" is used throughout this thesis.

The research paradigm can be defined as a philosophical framework that sets out how scientific research should be conducted (Collis and Hussey, 2013, Karami, 2010). It determines the type of knowledge the researcher seeks to acquire, and how the evidence they collect is interpreted (Clark and Creswell, 2008). In management research, four main paradigms are used (Saunders et al., 2012): pragmatism, positivism, realism, and interpretivism. In the literature, these four paradigms have been referred to using different terms; for example, realism is also known as participatory (Creswell and Clark, 2011) or critical research (Hallebone and Priest, 2008), while interpretivism can also be described as social constructionism (Easterby-Smith et al., 2012) or constructivism (Creswell, 2009).

As a philosophical framework, a paradigm has three elements (Easterby-Smith et al., 2012): ontology, epistemology, and methodology. The ontology is the researcher's view on the nature of reality or being (Saunders et al., 2012, Easterby-Smith et al., 2012), which will sit somewhere on a spectrum between realism, which values objectivity, and relativism, which is aligned with subjectivity (Stokes, 2011). Epistemology relates to what constitutes acceptable knowledge in a field of study (Collis and Hussey, 2013, Saunders et al., 2012). In some literature, epistemology refers to the paradigm itself, with two possible contrasting views: positivism and interpretivism (Saunders et al., 2012, Easterby-Smith et al., 2012). Methodology refers to the combination of techniques used to make inquiries into a specific situation (Easterby-Smith et al., 2012). It is concerned with the process of research (Collis and Hussey, 2013, Creswell and Clark, 2011), and encompasses a body of methods (Collis

and Hussey, 2013). Table 11 explains the differences between each paradigm in regard to these three elements.

Table 11. Summary of the different research paradigms and their constituent elements

	Pragmatism	**Positivism**	**Realism**	**Interpretivism**
Ontology	Multiple, external views chosen to enable the best response to the research question.	One objective, external reality, independent of social conditions.	Objective reality exists independently of human thoughts, beliefs or knowledge of their existence but is interpreted through the social condition.	Subjective, socially constructed, multiple reality.
Epistemology	Either or both observable phenomena and subjective meanings can provide adequate knowledge to answer the research question. Focus on practical applied research, integrating different perspectives to help interpret the data.	Only observable phenomena can provide credible data and facts. Focus on causality and law-like generalisations, reducing phenomena to their simplest elements.	Observable phenomena provide credible data and facts. Phenomena create sensations, which are open to misinterpretation. Focus on explanations within a context or contexts.	Subjective meanings and social phenomena. Focus on the details of the situation, the reality behind these details, subjective meanings motivating actions.
Methodology	Abductive	Deductive approach	Iterative modelling	Inductive approach
	Any meaning structure must come from the lived experience of the individual.	Studies cause and effect, and uses a statistical design where categories are identified in advance.	The idea that causality exists as a potential rather than automatic correlation.	Studies the topic within its context and uses an emerging design where categories are identified during the research process.
	Transferability, knowledge gained can be transferred to other settings.	Generalisation leads to prediction, explanation and understanding.	Time and space-specific. There is a deep understanding of particular or	Patterns and/or theories are developed for understanding.

			categorical phenomena.	
	Inter-subjective, emphasis on the process of communication and shared meaning.	Results are shown to be accurate and reliable through validity and reliability testing.	Findings shared with participants who attribute a truth value to study's descriptions and interpretations.	Findings are shown to be accurate and reliable through verification.
	Mixed or multiple method designs, both quantitative and qualitative.	Generally quantitative but can use qualitative.	Methods chosen must fit the subject matter, but can be quantitative or qualitative.	Qualitative.

Adapted from (Collis and Hussey, 2013, Clark and Creswell, 2008, Hallebone and Priest, 2008, Creswell and Clark, 2011, Easterby-Smith et al., 2012)

Adopted paradigm

From the above explanation regarding the different types of paradigm, *pragmatism* is identified as the main philosophical assumption that underpins this study. The reasons for this will be explained in the following paragraph.

First, the research questions addressed in this study are as follows:

RQ1: How does a corporate accelerator perform the orchestration role of an innovation intermediary?

RQ2: What is the value created for corporations through a corporate accelerator programme?

RQ3: From a social capital perspective, what is the value created for start-ups from participating in corporate accelerator programmes?

This study aims to understand the role of the innovation intermediary as an orchestrator, using a case study of a corporate accelerator programme. The orchestration role of the innovation intermediary is still an underdeveloped topic (Gawer, 2014). It emerged recently when corporations began to build innovation ecosystems, inviting and coordinating start-ups around them. As part of this, a corporation can develop a corporate accelerator programme that acts as an innovation intermediary that supports start-ups and also the corporation. The lack of theory to explain this phenomenon motivates this study.

The first two questions were addressed by observing the activities of a corporate accelerator and interviewing the individuals participating in the programme. These questions aimed to identify, understand, and construct the processes that comprises a corporate accelerator programme, which required an interpretivism paradigm (see Table 9). The third research question was addressed using the constructs of social capital, knowledge transfer, and innovation output, which can be measured using established theory. The relationships between these constructs were measured using hypothesis testing, which is a feature of the positivist epistemology (see Table 9). The shifted paradigm from interpretivism to positivism put this study in pragmatism paradigm.

Second, the corporate accelerator and the orchestration role can be considered as new phenomena (Pauwels et al., 2016, Battistella et al., 2017). A new phenomenon is best studied by collecting both qualitative and quantitative data, which can be complimentary and enable the researcher to better explore and understand the phenomenon under study (Creswell and Clark, 2011). The pragmatic paradigm recognises this.

Third, the study evaluates the corporate accelerator programme as a part of a firm's strategy and aims to understand the roles of the innovation intermediary and the value created during the corporate accelerator programme process. The problems investigated in this study includes the management of the process, and the creation and management of organisational knowledge. Such problems, according to Easterby-Smith et al. (2012), fall under the category of management research, within which pragmatism is a valuable perspective that can serve as a philosophical assumption. Saunders et al. (2012) also emphasised the increasing use of the pragmatist paradigm in management research, which this study is an example of.

4.2 Research Methods

Methods are the techniques used for data collection and analysis (Creswell and Clark, 2011; Easterby-Smith et al., 2012). The researcher decides which methods will be used as the instruments in their research depending on the specific epistemological stance adopted. The chosen method must be a technique that is able to meet the objectives of the research (Saunders et al. (2012). There are three broad types of

research methods that can be identified from the literature, two of which are distinct, qualitative and quantitative research, and one that combines both methods, known as mixed-methods research. The distinction is based on the collection and analysis of data in the form of either words (qualitative) or numbers (quantitative), or the use of closed-ended questions (e.g. quantitative hypotheses) or open-ended questions (e.g. qualitative interview questions). The following sections will outline the differences and relationships between the three methods in more detail.

4.2.1 Qualitative research

Qualitative research is an approach to exploring and understanding the meaning that individuals or groups ascribe to a social or human problem (Cresswell, 2013), primarily working within the constructivist paradigm, and principally interested in narrative data and analyses. Qualitative research is exploratory in nature, generating information about an unknown aspect of a phenomenon. Qualitative research typically employs inductive logic or reasoning, which involves arguing from the particular to the general. Qualitative data analysis is also known as thematic analysis, as it uses categorical and contextualising (holistic) strategies to identify themes (Teddlie and Tashakkori, 2009). İn qualitative research, relatively samples are selected, in what is known as purposive sampling, as they can provide particular and specific information related to the research question being addressed.

Three qualitative research designs can be identified (Teddlie and Tashakkori, 2009, Creswell and Clark, 2011): 1) grounded theory, for theory development where the researcher derives a general, abstract theory of a process, action, or interaction based on the views of participants; 2) ethnography, to obtain an in-depth understanding of a distinct culture, and involves describing and interpreting human cultures using data collection techniques such as participant observation, interviews, and artifact collection. With the proliferation of internet technology, this method has developed to include the ‘netnography’ method, where the participants’ behaviour is observed from their internet and social media activity; 3) case study research, which involves the in-depth analysis of a single case or multiple cases, where data is collected from a variety of sources. The cases are often a programme, event, activity, process, or one or more individuals.

4.2.2 Quantitative research

Quantitative research is an approach to testing scientific theories that involves examining the relationships between different variables. Variables are anything that can be assigned a value (Creswell and Clark, 2011). This research method includes confirmatory research, which employs deductive logic or reasoning, arguing from the general to the particular. The process of theory testing begins with generating propositions or hypotheses based on a specific theory or conceptual framework, measuring variables' hypothesis, and analysing these using statistical procedures (Saunders et al. (2012). Statistical analysis includes: 1) descriptive analysis, where numeric data is analysed to obtain a summary of indicators that can efficiently describe a group and the relationships amongst the variables within that group; and 2) inferential analysis, where samples are inferred from populations, and an estimation of the degree (probability) of error in making those inferences is provided (Saunders et al. (2012).

Probability sampling is typically associated with quantitative research. Such sampling involves selecting a large number of units from the population at random, where the probability of the inclusion of any member of the population can be determined (Collis and Hussey, 2013). Two types of variables are used in quantitative research: independent and dependent variables. An independent variable is presumed to influence or affect a dependent variable, a variable presumed to be affected or influenced by the independent variable (Saunders et al. (2012).

Three types of research design can be used in a quantitative study: 1) correlation research, which identifies the strength of the relationships between variables; 2) survey research, a systematic method of data collection, with the goal of predicting population attributes or behaviours; 3) experimental research, where one or more independent variables are manipulated or controlled to ascertain their effects on one or more dependent variables (Saunders et al. (2012).

4.2.3 Mixed-methods research

Mixed-methods research is a method of inquiry that involves the collection of both quantitative and qualitative data, integrating the two forms of data, and uses distinct designs that may involve philosophical assumptions or theoretical

frameworks. The rationale of this method is that by combining quantitative and qualitative methods, a complete understanding of a research problem can be provided. In mixed-methods research, the data can be both narrative and numeric, addressing a range of both confirmatory and exploratory questions, and use both deductive and inductive logic (Creswell and Clark, 2011).

When using mixed methods, research sampling can employ both probability and purposive procedures, as well as other techniques, such as triangulation and data conversion. Triangulation refers to the combination and comparison of multiple data sources, data collection and analysis procedures, research methods, and inferences that occur in the study. Data conversion refers to converting collected quantitative data into narratives, or qualitative data into numbers (Teddlie and Tashakkori, 2009).

There are two types of research design within mixed-methods research: parallel mixed designs, and sequential mixed designs. Parallel mixed designs, also known as the concurrent or simultaneous design, are a type of research design where the quantitative and qualitative strands of the study occur in a parallel manner, either simultaneously (starting and ending at approximately the same time) or with the same time lapse (Clark and Creswell, 2008). İn such a design, the qualitative and quantitative phases are planned and implemented to answer related aspects of the same basic research questions. A sequential mixed design is a type of research design where the quantitative and qualitative strands of the study occur in chronological order, i.e. the procedures of one strand emerge from, or are dependent on, the previous strand. The research questions explored in the qualitative and quantitative phases are related to one another and may evolve as the study unfolds. In Table 12 below, the differences between the above research methods are summarised.

Table 12. Summary of differences between research methods
(Teddlie and Tashakkori, 2009, Creswell and Clark, 2011)

Dimension of difference	Qualitative method	Mixed-methods	Quantitative method
Paradigm	Interpretivist	Pragmatism	Positivism
Form of data	Typically narrative	Narrative plus numerical	Typically numerical
Purpose of research	Exploratory	Exploratory plus confirmatory or vice versa	Confirmatory
Role of theory; logic	Grounded theory; inductive logic	Both inductive and deductive logic	Rooted in conceptual framework or theory; deductive logic (hypothesis testing)
Sampling	Purposive	Mixed probability and purposive	Probability
Data analysis	Thematic strategies: categorical and contextualising	İntegration of thematic and statistical	Statistical analysis: descriptive and inferential
Research design	Grounded theory, ethnography, case study	Parallel, sequential	Correlation, survey, experiment

4.3 Research Strategy: Mixed-Methods Research

As explained in Section 4.1, pragmatism is the primary paradigm underpinning this study. Pragmatism typically implies the use of a mixed-methods research strategy, combining the qualitative and quantitative approaches in a single or multi-phase study (Clark and Creswell, 2008, Easterby-Smith et al., 2012). Pragmatism, from an epistemological point of view, involves integrating different perspectives to help interpret the data. Both observable phenomena and subjective meanings are considered to provide adequate knowledge. This fits with the way in which mixed-methods research analyses both narrative and numerical data to enrich the research findings.

The reason the mixed-methods design was used in this study was to try to understand the role of the corporate accelerator as an orchestrator, which requires multi-level perspectives, i.e. the perspective of the corporation that is running the programme, and of the start-ups participating in the programme. As explained in the earlier section discussing the adopted paradigm, in this study qualitative data was used to obtain information about every element of the corporate accelerator programme, the

corporation, and the start-ups, while quantitative data was used to obtain information from start-ups. The process of mixed-methods research applied in this study is explained in Section 3.4.

The use of mixed methods is this research also serves a complementary purpose, where the results from each methods elaborates on and enhances the overall results (Creswell and Clark, 2011, Clark and Creswell, 2008). This study prioritised qualitative data (Creswell and Clark, 2011), with a greater emphasis placed on an in-depth study of the corporate accelerator programme. The result is used in the next step to understand the value created by the corporate accelerator role and its impact on start-ups' social capital. In this study, the qualitative results relating to the first and second research questions, and the quantitative results relating to the third, complement each other to enrich the overall understanding of the corporation's orchestration role and value creation as an innovation intermediary. The results achieved using both approaches were analysed together to obtain a holistic result.

4.4 Research Design

The research design selected in this study is a parallel mixed-methods design, with priority given to qualitative research. As such, this study comprises three research designs, with different objectives that correspond to the three research questions (Section 4.1). To answer the first research question, a case study approach was applied, as it was considered the most appropriate design to investigate human interaction in an organisational context (Easterby-Smith et al., 2012). A case study that collects qualitative data that emphasises individuals' lived experiences is appropriate for understanding the processes and structures of an organisation, and also for connecting these meanings to the social events around them (Miles et al., 2013). Moreover based on the bibliometric coupling results presented in Chapter 2, Section 2.2.1, table 4 the10-most cited articles, Eisenhardt (1989b) is one of the articles. The article describes the process of inducting theory using case studies. It shows that case study research methodology was the most method used in this area. Therefore following the lead of existing articles in this research area, a case study was selected for this study.

Research questions two and three are considered interrelated as both primarily seek to understand the value creation of the corporate accelerator programme based on

analysis of different subjects: the corporation for research question two, and the start-ups for research question three. To answer research question two, a qualitative method, i.e. interview, was selected. To answer research question three a quantitative method, i.e. survey, was used.

As this was a parallel study, it was therefore implemented using a concurrent nested research design (Clark & Creswell, 2008). The parallel mixed-methods concurrent nested research design is depicted in Figure 6 below, and will explained in more detail in the subsequent sections, beginning with an explanation of the case selection.

Figure 5 Visual diagram of concurrent parallel mixed-methods design of this research (adapted from (Clark and Creswell, 2008))

4.4.1 Research design one for RQ1

The goal of the qualitative research phase was to build a detailed picture of the activities, function, roles, and processes of the corporate accelerator programme, which reflect the orchestration role of the innovation intermediary. It aimed to answer research question one, as follows: *How does a corporate accelerator programme perform the orchestration role of an innovation intermediary?* This research attempts to answer a 'how' question; according to Yin (2009), the use of this word implies that the research aims to describe situations, either real or theoretical.

A case study method was applied as the primary research method. This is an empirical enquiry, or evaluation, in which the researcher develops an in-depth analysis of a case, often a programme, event, activity, or process (Creswell, 2013) that is considered to be aligned with the study's aims (i.e. RQ1) (see Section 3.1). According to Yin (2003), a case study is an appropriate choice when the phenomenon being studied is contemporary and occurs in a real-life context, and the boundaries between the phenomenon and the context are not clear. The increasing number of corporate accelerator programmes, and the lack of knowledge related to them, can be considered a contemporary problem, and there is increasing recognition of the need for a design of a corporate accelerator programme that results in successful start-ups (Pauwells, 2016). Another reason for conducting a case study for this research was that a case study utilises quantitative data collection methods, as deemed appropriate for mixed-methods research (Yin, 2009).

Selecting cases

In this research, the case study is applied for theory elaboration (Ketokivi and Choi, 2014), where an in-depth investigation is conducted to identify the relationships between concepts. This type of case study can be described as reconciliation of the general with the particular. Therefore, the case selection in this study relied upon theoretical sampling (Eisenhardt, 1989b, Eisenhardt and Graebner, 2007), which focuses on theoretically useful cases where the cases are chosen based on their ability to extend emergent theory or provide examples of polar types. The purpose of this study is to understand the orchestration role of the innovation intermediary; hence, the

selected case has to be transparently observable to see how concepts regarding orchestration have been implemented.

Based on the literature review, the orchestration role is performed by a company as a network orchestrator that meets the following criteria: 1) has prominence and power in a particular industry; and 2) plays a leadership role in pulling together the dispersed resources and capabilities in the industry (Dhanaraj and Parkhe, 2006). As explained in Chapter 3, Section 3.2, this study chose a company with a corporate accelerator programme that plays an orchestration role as the research object. The programme is called Indigo Creative Nation, and is owned by Telkom Indonesia, an Indonesian state-owned enterprise and a leader in the Indonesian telecommunication industry. As stated in Telkom's corporate strategy, the corporate accelerator programme is a way to find new markets by developing a creative digital industry. In this case, the corporate accelerator programme plays an orchestration role and gathers together start-ups as the main players in the creative digital industry developed by the programme.

The programme began in 2009, and provided a rich research context for an in-depth case analysis, which drove the selection of Indigo Creative Nation as a case study through which to explore the orchestration role of the innovation intermediary phenomenon. Based on the corporate accelerator database website, at the end of 2016 there were 79 corporate accelerators around the world (https://www.corporate-accelerators.net/database/index.html, accessed May 2018). With a limited number of corporate accelerator programmes that could be investigated, it was decided to conduct a single-case study, with the case selected based on convenience sampling (Barratt et al., 2011), where the company provided access to all data related to the corporate accelerator programme. The case details will be outlined in the following section.

The case: Indigo Creative Nation, a corporate accelerator programme

In understand Indigo Creative Nation, a corporate accelerator programme, this study used a book authored by Vice President of Telkom Corporate in Innovation Strategy at that time, Dr. Indra Utoyo, entitled *The Silicon Valley Mindset: Building Indonesian Digital Start-up Ecosystem* (Utoyo, 2016). The book explores Telkom's

innovation strategy to move from the telecommunication industry to the creative digital industry. The Indigo Creative Nation corporate accelerator programme is a way for Telkom to implement a shift in strategy by building a relationship with the start-up community, the main player in the creative digital industry. Using this book as the main reference point, complemented by with interview and observation data, a case narrative was built, presented in the following paragraph.

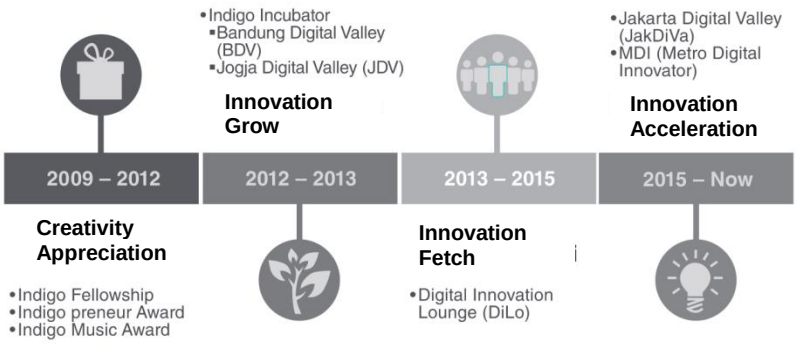
To fulfil the aforementioned aim of this chapter, a case study investigation was conducted of Indigo Creative Nation (hereafter 'Indigo'), an IMES (Information, Media, Edutainment, and Services) corporate accelerator. Indigo is powered by Telkom Indonesia, an Indonesian state-owned enterprise in the telecommunication industry. Telkom provides multiple services, ranging from fixed wireline to wireless connection, mobile connections, networking and interconnection services, the internet, and data communication services. Telkom serves customers comprising of individuals and companies across Indonesia. Telkom and its subsidiaries in the Telkom Group also offer services in the field of information, media, education and entertainment, cloud-based and server-based management services, e-payment services and IT-enabled, e-commerce and portal services. Indigo (indigo.go.id) was selected as the case study for this research as the company possesses characteristics typical of a corporate accelerator programme, and the programme has been running since 2012. As such, a case study of this company will provide rich data related to the research questions.

The Indigo journey began in 2009 when Telkom Indonesia decided to build a digital ecosystem for the Indonesian creative digital industry to enhance national economic welfare. The main player in the creative digital industry is a start-up, a new venture with an IT-based product. To this end, the company created a championship programme for start-ups, or award programme, entitled the Indigo Fellowship. Initially, the programme offered a monetary prize to winners without providing any mentoring or support facilities for the start-ups. However, from 2012, the programme also provided seed funding and support services to accelerate start-ups' capabilities. This programme was named Indigo Creative Nation. To support and nurture creativity, from 2013 to 2015, Telkom operated a creative space called Digital Innovation Lounge, or DiLo. DiLo was attached to Telkom branch offices all over Indonesia. In these spaces, Telkom held training and workshops for individuals interested in start-

ups and the creative digital industry. To support the corporate accelerator programme, in 2015, Telkom developed Metro Digital Innovation, offering corporate venture capital. Metro Digital Innovation acts as an investor to provide funding for potential start-ups that have graduated from the Indigo programme. In Figure 7, the Indigo journey and development is visualised.

Indigo focuses on faster start-up development, with an emphasis on market scaling and competencies enhancement for the next level of digital business and investment. Indigo supports start-ups' development by providing a distribution channel, professional and experienced assistance, networking, skills, and best-practice to enhance competencies and business, and funding for thriving start-ups. The provision of this kind of support can be seen as a point of differentiation compared to other start-up programmes, as it provides access to Telkom channels, big data capabilities, cloud infrastructure, and a well-managed customer base.

Figure 6. Indigo's journey as an orchestrator (Utoyo, 2016)



From 2009 to 2016, a total of 74 start-ups were involved in Indigo, and 56 of those joined the accelerator programme. These start-ups fell into different product categories, i.e. government solutions, business solutions, home solutions, commerce, personal apps, social media, and community. Start-ups joined seven-month acceleration programmes, assisted by professionals and certified mentors with a broad range of experience from global IMES (Information, Media, Edutainment and Services) businesses. Over the course of their participation, start-ups were periodically monitored to evaluate their progress and readiness to continue to the next level. The

accelerator programme was divided into three stages: 1) one month of consumer validation; 2) three months of product validation; and 3) three months of business model validation. At each period, the accelerator programme provided seed funding amounting to USD 750, USD 9,000, and USD 9,000, respectively.

This study examines Telkom from the perspective of its coordination position, from which it orchestrates an innovation network through the corporate accelerator programme. The central argument for this view is that Telkom is a leader in the Indonesian telecommunication industry in Indonesia. As it attempts to shift its market to the digital creative industry, Telkom continues to develop an innovation network that consists of the main players in the digital creative industry, i.e. start-ups. This attempt is aimed at developing an innovation network in the creative digital industry by providing a corporate accelerator programme with integrated services to support start-ups' creation and development. For this reason, the corporate accelerator programme can be viewed as a way for Telkom to orchestrate its innovation network. Network orchestration can be defined as a set of deliberate, purposeful actions undertaken by the hub firm to create and extract value from the network (Dhanaraj and Parkhe, 2006). In general, an accelerator programme aims to help start-ups or new ventures in order to avoid institutional void (Dutt et al., 2016). An accelerator is also a way for corporations to find an external source of innovation that acts as innovation intermediary (Nambisan and Sawhney, 2007). As such, the corporate accelerator can help innovation in two ways: by helping the corporation that looks for innovation, and the start-up that provides market-ready products.

Data collection

Since this study aims to examine the orchestration roles of the innovation intermediary, interviews with key actors in Telkom Indonesian, the corporate accelerator Indigo Creative Nation, and start-ups were deemed appropriate to provide the primary data. The interview data was triangulated against two other major sources, corporate and start-ups documentation, and direct observations. All the data and sources used in this study are presented in Table 13. Multiple sources of evidenc eare used in this study to meet the construct validity test of case study research (Yin, 2009).

As mentioned previously (Section 4.1), this study is focused on the orchestration role of the innovation intermediary, which can be considered lacking in

the innovation management research area. This study explored the phenomena where, recently, corporations have developed a corporate accelerator programme to coordinate and manage a corporate innovation ecosystem and, thus is exploratory in nature. The author collected data on-site where the corporation and the corporate accelerator programme were located, and the start-ups experienced the corporate accelerator programme. The data collection process was conducted from June to September 2016, followed by Skype meetings and email conversations from October 2016 to March 2017, due to location differences (the researcher was located in Glasgow and the participants in Indonesia).

Table 13. Summary of all the data sources used in this study

Sources of evidence	**Type of information**	**Form of sources**
Documentation	Internal corporate accelerator documents	- the corporate accelerator programme and report presentations - the application form - the evaluation form - demo day booklet - data and report of start-ups participants - start-ups' progress reports - start-ups' matrix achievement reports - Telkom digital matrix report - Telkom incubation programme performance assessment reports
	External public documents	- the corporate accelerator websites - start-ups' websites - book publications
Interviews	Start-up owners	6 start-ups, each 1-1.5 hours
	The corporate accelerator management	2 participants, each lasting 40 – 60 minutes
	Telkom top management	3 participants, each lasting 40 – 60 minutes
Direct observations	The corporate accelerator shared office	3 sites for three months
	Start-up evaluations	2 events
	Start-up classes	2
	Start-up mentoring process	8 events

Interviewees were selected to ensure that a representative sample was obtained. The interviewees consisted of the manager of Telkom's corporate accelertor programme, advisor, and start-up staff. The sampling method followed the snowballing approach (Yin, 2013), and aimed at collecting data from semi-structured interviews using a predefined definition of a start-up that is successful in operating a corporate accelerator programme. The sample selection was based on interviews with two corporate accelerator staff members, who suggested six start-ups for data collection. Semi-structured interviews were conducted with six founders/co-founders of the chosen start-ups. Descriptions of these start-ups are provided in Table 14 below. All interviews lasted between 45 minutes to two hours. All interviews were audio-recorded and transcribed verbatim.

Table 14. Start-up interviewees

Title	Position	Founding year	Type of product
Goers start-up	CEO	2014	Social media and community
Jarvis start-up	CEO	2013	Business solution
Kakatu start-up	CTO	2014	Personal apps
Kartoo start-up	CEO	2016	Commerce
Privy_ID start-up	CEO	2014	Business solution
Zelos start-up	CEO	2015	Personal apps

Table 15. Corporate and corporate accelerator interview list

Name	Position	Since
Arief Mustain (AM)	Head of Digital Service Division	2015
Ery Punta (EP)	Executive General Manager of the Digital Services Division	2015
Dinoor Susatijo (DS)	SM of Open Innovation Management	2015
Johannes Adi (JA)	Manager of Incubation Management	2009
Agnesia Candra Sulyani (ACS)	Incubation Assessment Management	2009

The interviews were conducted in Indonesian language, transcribed in Indonesian and then translated into English. During the data collection phase, copies of the start-ups' evaluation reports, minutes of key meetings, annual reports, policy manuals, design workshop records, and competition documentation were collected.

Additional internal documents that were considered important by key informants during interviews, such as internal corporate accelerator documents (start-ups' evaluation and progress reports), external corporate accelerator documents (demo day booklet, websites) were also collected. Additionally, secondary data, such as the corporate accelerator programme annual reports, documents relating to the companies and the project, YouTube videos, website articles, and a book containing an explanation of the Indigo Creative Nation programme written by the Telkom innovation strategy leader were collected to complement the primary data.

Designing interview questions

Prior to conducting the interviews, and to reach the quality design requirements in terms of reliability (Yin, 2009), interview questions were designed. Based on the concepts depicted in Figure 6, the interview questions were designed to serve as guidance during the face-to-face interviews, ensuring the research remained directed toward the overall research objectives. One-to-one interaction in an interview is considered powerful for data collection since it provides an opportunity for the interviewer to ask for an explanation of vague answers or to provide clarification if a question is not clear (Teddlie and Tashakkori, 2009).

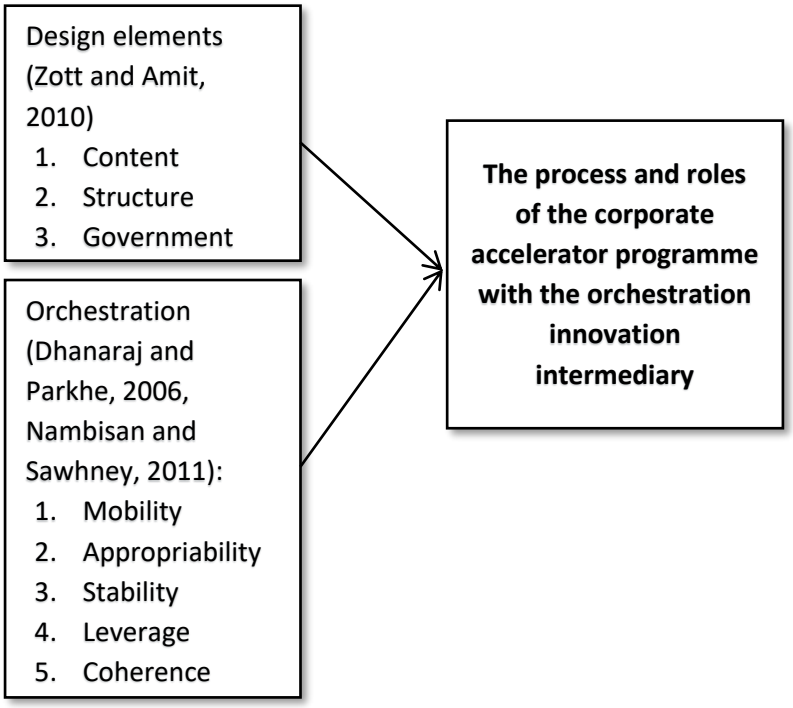
In this study, the interview design followed the general interview guide approach, i.e. semi-structured and with a topic guide (Easterby-Smith et al., 2012), where topics are specified and outlined in advance; the interviewer decides upon the sequence and wording of questions asked, in an attempt to cover all of the issues addressed in the research. In the interviews, open-ended questions were used in order to generate a considerable volume of information, expected to lead to the conceptualisation of activities, function, roles and process of the corporate accelerator programme.

Data analysis

The relationship between the underlying concepts applied and the expected results of this study are depicted in Figure 6. Figure 6 was developed to explain the underlying theories used and the expected output from data analysis. This relation between theory and the expected result helps to determine what information should be

collected. First, the design elements were identified to understand the activities, functions, roles, and processes of a corporate accelerator programme. Second, the orchestration processes of managing innovation leverage, innovation coherence, knowledge flows, network membership, and network stability (Dhanaraj and Parkhe, 2006, Nambisan and Sawhney, 2011) are compared and contrasted with the results of the first step to identify the orchestration role of the corporate accelerator programme.

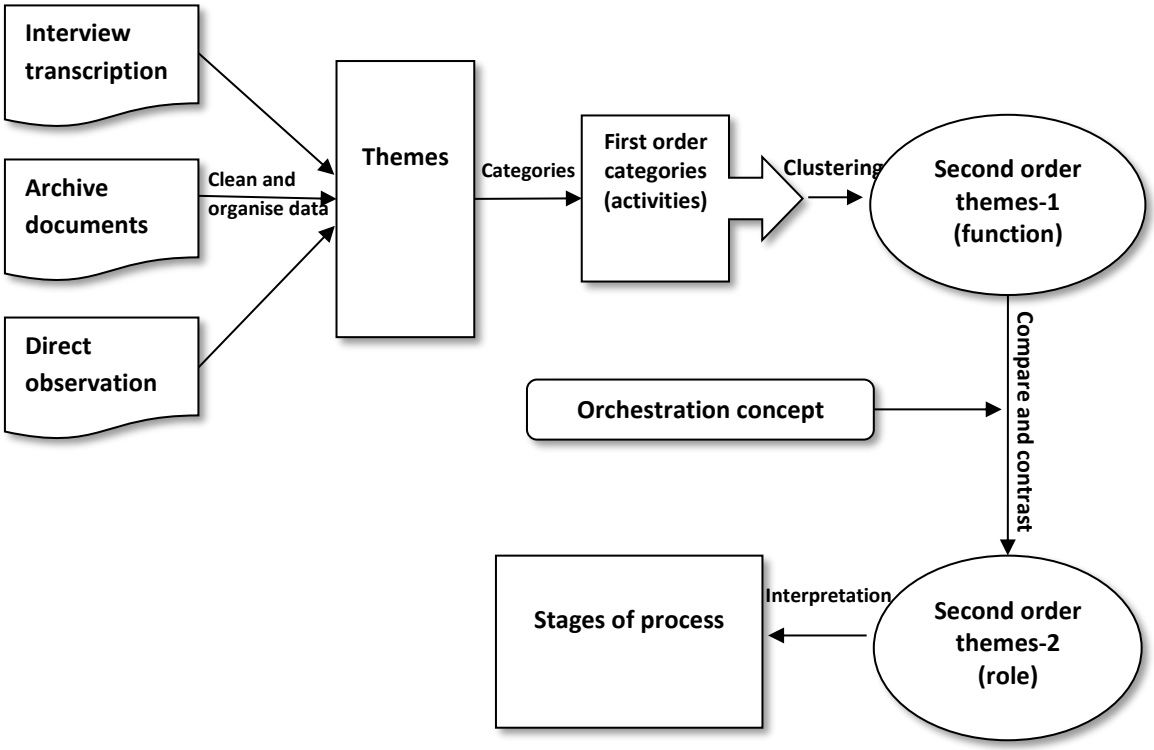
Figure 7 Relationship between the underlying concepts and the resulting outcome



Initially, design elements were identified to understand the activities that occur within the corporate accelerator programme. This identification was achieved by analysing the primary interview data inductively. Figure 9 depicts the data analysis process. First, each interview was coded separately using “in vivo” words, phrases, terms, or labels offered by the interviewee; this process resulted in interviewee keywords that reflected the activities experienced by the corporation and start-ups during the course of the corporate accelerator programme. In this process, conceptual patterns were detected from constant comparisons of various interviewees. Conceptual patterns refer to the activities of grouping words that were similar in essence, called first-order categories.

While grouping the first-order categories, the functions and roles of the corporate accelerator were identified into second-order themes. Second-order themes are researcher-induced concepts (Nag and Gioia, 2012), identified at a more abstract label using informant labels if they represent an emerging concept. In this study, these were related to the functions and the orchestration roles of the corporate accelerator programme. The analysis continued with the ordering of second-order themes as the sequences of processes within the intermediation process.

Figure 8. The analysis process followed to identify the activities, function, roles and stages of the corporate accelerator programme



The information obtained from the interviews was presented in a content-analytic summary table (Miles et al., 2013) to identify the main themes in the qualitative data, supported by graphs visualising the final model of the research findings. The use of a content-analytic summary table in this study was to display information obtained from the interviews that unified pertinent information from different interviewees into a single matrix form for exploratory analysis.

4.4.2 Research design two for RQ2

The goal of the qualitative research undertaken in this part of the study was to understand the value creation of the corporate accelerator programme performing the orchestration role of an innovation intermediary. It aimed to answer Research Question 2: *What is the value created for corporations through a corporate accelerator programme?* This question starts with the term "what", which, according to Yin (2009), may be considered descriptive in nature. Such questions aim to describe situations, either real or theoretical.

Data collection

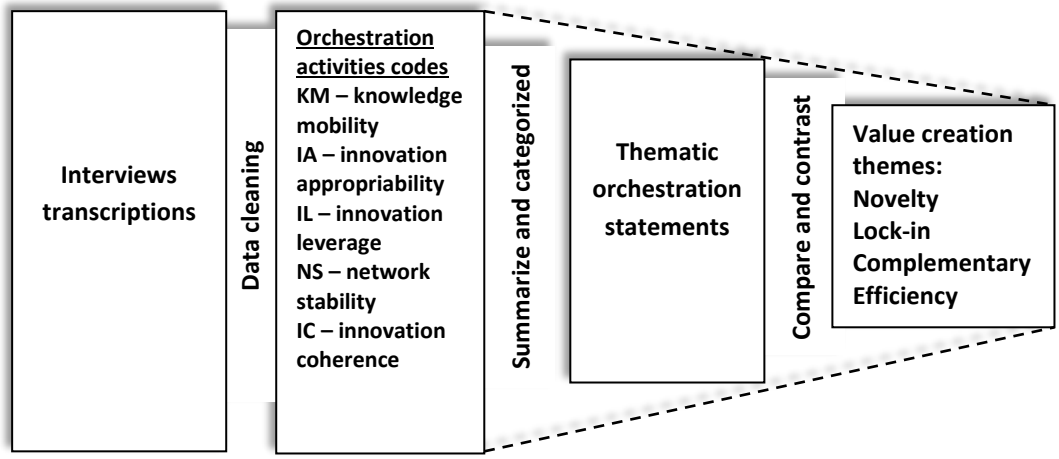
Research Question 2 required the same source of data as Research Question 1, as both research questions are interrelated regarding information based on experience and opinion in regard to the performance of the corporate accelerator programme. Interviews with Telkom employees who responded in Indigo, and also Indigo's managers, as the key actors, were the primary data source in this part. This was also supported by other sources: corporate and start-ups' documentation and direct observations. Therefore, the data collection process and design of the interview questions in this part were similar to research design 1.

Data analysis

Using content analysis, this part of study analysed the corporation staff interview data. Figure 8 depicts the analysis process in this stage. The analysis began by building coding for orchestration activities based on the theory and concepts that were identified from the literature review (see Figure 8, orchestration activity codes). The interview transcriptions were then reviewed, to identify and assign the parts of transcriptions that matched with the codes. This phase resulted in a number of thematic statements.

The analysis process continued by summarising and categorising the thematic orchestration statements and then interpreting the result to identify the orchestration practices in the corporate accelerator programme. The identified orchestration practices were then compared and contrasted with the value creation design themes to identify the values created for the corporation during the corporate accelerator programme.

Figure 9. The analysis process for identification of value creation



4.4.3 Research design three for RQ3

The quantitative research part of this study was conducted to understand the value created for start-ups after they became involved in a corporate accelerator programme. This method was used to answer the third research question (RQ3): *From a social capital perspective, what is the value created for start-ups from participating in corporate accelerator programmes?*

The value creation identified for start-ups was focused on social capital capability development as a critical variable, and the research investigated how it affects value creation in terms of innovation outcome with intermediation of knowledge transfer. During the corporate accelerator programme, one of the capabilities start-ups attempted to develop was social capital. The programme provides social event activities, and facilities to support knowledge transfer during this interaction. From the existing literature (Fillauri, 2014), it was determined that knowledge transfer could be considered a source of innovation. Therefore, social capital was hypothesised as affecting innovation outcome, with knowledge transfer as the relationship mediator.

Survey design

Survey research was conducted to identify the value creation for start-ups that had been involved in the corporate accelerator programme. A survey was deemed to be an appropriate way of collecting data about opinions and behaviours, and the inferential survey type was considered relevant in establishing a relationship between

dependent, predictor variables, and the hypothesis (Easterby-Smith et al., 2004). A conceptual framework was also developed to test the relationship between social capital, knowledge transfer, and innovation outcome.

The survey data was collected at just one point in time. This kind of survey can be regarded as a cross-sectional survey (Collis and Hussey, 2013). Due to time and cost limitations, a web-based survey was selected, as the participants were located in Indonesia. Web-based surveys are considered an effective means of data collection and have become commonplace, used in various different types of studies (Easterby-Smith et al., 2012). However, several disadvantages of using a web-based survey can be identified, such as the high possibility of invalid content and low response rates (Collis and Hussey, 2013). These disadvantages were addressed by continuously contacting the start-up CEOs via e-mail, LinkedIn, phone, Skype, and a direct visit to the site where participants were located. The web-based survey was designed and administered using Qualtrics, an online survey tool. Qualtrics is commonly used in academic research. It helps to manage online questionnaires systematically from designing the questionnaire, to distribution, collection and support in the analysis process. It is considered a user-friendly tool (reference) that allows the researcher to monitor the survey and results.

Research instrument

The research instrument used in this study, i.e. the questionnaire, was designed based on the conceptual model that was developed from the results of the literature review. The questions in the questionnaire can be categorised as closed-ended questions with categorical and Likert scales. The Likert scale was used in the questions that aimed to test a hypothesis, while a categorical scale was used for the questions that aimed to identify demographic information relating to the start-up staff. These types of scales are widely used in management and academic research (Clark and Creswell, 2008). A 5-point Likert scale was used, with 1 indicating strong disagreement, and 5 indicating strong agreement.

Based on the literature review, the measurement instrument used in the questionnaire is shown in Table 16.

Table 16. Measurement instrument and scales

QUESTIONNAIRES SOURCES AND MEASUREMENT SCALES		
Q1	**Start-up general information**	**Scales**
QID1	Start-up name	Open-ended question
QID2	City	Open-ended question
QID3	Year established	Open-ended question
QID4	Number of employees	a. Less than 3 people b. 3-5 people c. More than 5 people
QID5	Product category	a. Government solution b. Business solution c. Home solution d. Commerce e. Personal apps f. Social media and community
QID6	Year involved in accelerator	a. 2012 b. 2013 c. 2014 d. 2015 e. 2016
QID7	Job position in start-up	Open question
QID8	Gender	a. Male b. Female
QID9	Educational background	a. High school b. Bachelor's degree c. Master's degree d. Doctorate
SOCIAL CAPITAL		
Q2	**Structural dimension**	**Scales**
Configurations and patterns of connections between people; that is, the presence or absence of social interaction ties, as information channels that could reduce the amount of time and investment required for collection of necessary information (Totterman and Sten, 2005, Zheng, 2010, Nahapiet and Ghoshal, 1998).		
SD1	Provide assistance to find appropriate resources for tenants.	1 (strongly disagree) to 5 (strongly agree)
SD2	Incubator's capability to provide scarce resources.	
SD3	Tenants' can benefit from other tenants in the incubator.	
SD4	Incubator facilitates interaction with other tenants.	
SD5	Tenants' have possibilities to benefit from other tenants.	

SD6	Tenants' have developed a network from incubator's network relations.	
Q3	**Relational dimension**	**Scales**
The beliefs and norms that bond people together in a social network (Totterman and Sten, 2005, Zheng, 2010, Nahapiet and Ghoshal, 1998, Vlaisavljevic et al., 2016b).		
RD7	Belief that the future of tenant is related to the assistance of incubator.	1 (strongly disagree) to 5 (strongly agree)
RD8	Climate of cooperation and mutual trust in the incubator network.	
RD9	Maintains the commitments made in the incubator network.	
RD10	Agreement that specifies the obligations of each party.	
Q4	**Cognitive dimension**	**Scales**
Shared representation, interpretation and systems of meaning among people in the same social network, such as shared narratives, shared language, and shared codes (Totterman and Sten, 2005, Zheng, 2010, Nahapiet and Ghoshal, 1998, Vlaisavljevic et al., 2016b).		
CD11	Understand the aims of the corporate accelerator programme.	1 (strongly disagree) to 5 (strongly agree)
CD12	Start-up has and shares the same aims with the corporate accelerator programme.	
CD13	Solidarity among other start-ups in the corporate accelerator programme.	
Q5	**KNOWLEDGE TRANSFER**	**Scales**
A process through which a piece of knowledge is acquired in one situation and applied to another (Filieri and Alguezaui, 2014, Lin et al., 2005, Maurer et al., 2011).		
KT14	During the programme, start-ups received the knowledge they expected.	1 (strongly disagree) to 5 (strongly agree)
KT15	The programme provides start-up business management training.	
KT16	The programme provides training to develop start-ups' technical skills.	
KT17	The programme provides start-up strategic plan training.	
KT18	All the mentors have the appropriate capability in their speciality.	
KT19	The knowledge that start-ups gained during the programme was useful for the company.	
KT20	Start-ups implemented the knowledge they gained from the programme.	
KT21	Start-ups combined the knowledge that they gained with their existing knowledge.	
KT22	Indigo helped start-ups to implement and combine knowledge gained during the programme.	
INNOVATION OUTCOME		

Q6	Exploitation	Scales
Search for knowledge within the organisational boundaries that is local to their existing knowledge base (Li et al., 2008, Jansen et al., 2006a, March, 1991).		
EPT23	Refined and improved existing products/process/methods.	1 (strongly disagree) to 5 (strongly agree)
EPT24	Produced patents or licences with high potential value for the organisation.	
EPT25	Produced scientific publications with high scientific value.	
EPT26	Produced relevant knowledge for the targeted technology (new product, new process, new methods).	
EPT27	Generated follow-on projects for its organisation that target using and refining existing products/processes/methods.	
Q7	**Innovation outcome – exploration**	**Scales**
Searching distant knowledge that is unfamiliar (Li et al., 2008, Jansen et al., 2006a, March, 1991).		
EPR28	Developed creative ideas for completely new and very innovative products/process/methods that could become very valuable in the future.	1 (strongly disagree) to 5 (strongly agree)
EPR29	Discovered opportunities for future patents, licenses, or publications that could be very valuable in the future.	
EPR30	Discovered ideas to transfer products/processes/methods to other markets or new product application.	
EPR31	Potential was created for new innovative revenue streams.	
EPR32	New contacts were made that could lead, in the future, to new cooperation projects.	

The questionnaire was developed using the back-translation process, i.e. it was developed in English, conducted in the Indonesian language, and then responses were translated into English. The questionnaire was pilot-tested through interviews with the CEOs of seven start-ups during their regular gathering meeting, and two corporate accelerator staff members. The pilot test aimed to determine the face validity, clarity, and relevance of the measures in the Indonesia start-up context. The interviews lasted an average of three hours. The results of the pilot test resulted in some rewording of questions to make them understandable and suitable for the study context.

The population and sample

The population of this study is start-ups that have been involved in a corporate accelerator programme. Indigo Creative Nation, the case examined in this study, was founded in 2012 as an incubator programme and recruits two batches of participants every year. Up to now, 74 start-ups have been involved in Indigo's incubator programme. Telkom, as the owner of Indigo, developed and changed the incubator programme into a corporate accelerator programme in 2013, and only 56 start-ups were involved in the programme. Hence, instead of 74, only 56 start-ups were included in this study (i.e. the population of this study). These start-ups varied in terms of their product categories, which included government solutions, business solutions, home solutions, commerce, personal apps, social media, and community. In total, for this study, data was obtained from 36 start-ups, representing a participation rate of 69.2%.

Table 17. Start-ups population

Year	Startups
2012	18
2013	15
2014	17
2015	24
Total	74

This study followed the 10 times rules (Hair et al., 2017) to determine the minimum sample size to test a model using structural equation modelling (SEM). These rules are: 1) 10 times the largest number of formative indicators used to measure one construct; or 2) 10 times the largest number of structural paths directed at a particular construct in the structural model (Hair et al., 2017). The second option was chosen for application in this study. The first rule was considered inapplicable in this study considering the limited population size. For the second rule, as can be seen from Figure 8, KNOW_TR is the construct with the largest number of structural paths directed to it, which is three (STRUCTURAL, DIMENSIONAL, COGNITIVE). Applying the second 10 times rule, the minimum sample size required for this study is 30. The number of samples obtained for this study was 36. Therefore, it is appropriate to test the model using structural equation modelling.

Data cleaning

Data cleaning was conducted to identify the error component of the data and remove it before analysing the data. The error component of the data must be removed to ensure that the questionnaire responses are valid and reliable (Hair et al., 2017). The primary issues in data cleaning that need to be examined include missing data, suspicious response patterns, outliers, and data distribution.

Missing data occurs when a respondent either purposively or inadvertently fails to answer one or more questions. As mentioned previously, the Qualtrics application was used in this study as a tool for administering and managing web-based surveys. Qualtrics has a feature that enables missing values to be avoided by preventing the respondent from answering the next question before a full answer is given for previous questions. As such, missing data was not an issue in this study.

Suspicious response patterns refers to a response pattern that can be described as straight lining, diagonal lining, or alternating extreme pole response. Due to the limited volume of data used in this study, this issue was examined by looking at the data patterns in tables using Excel software; this revealed no particular pattern in the data table.

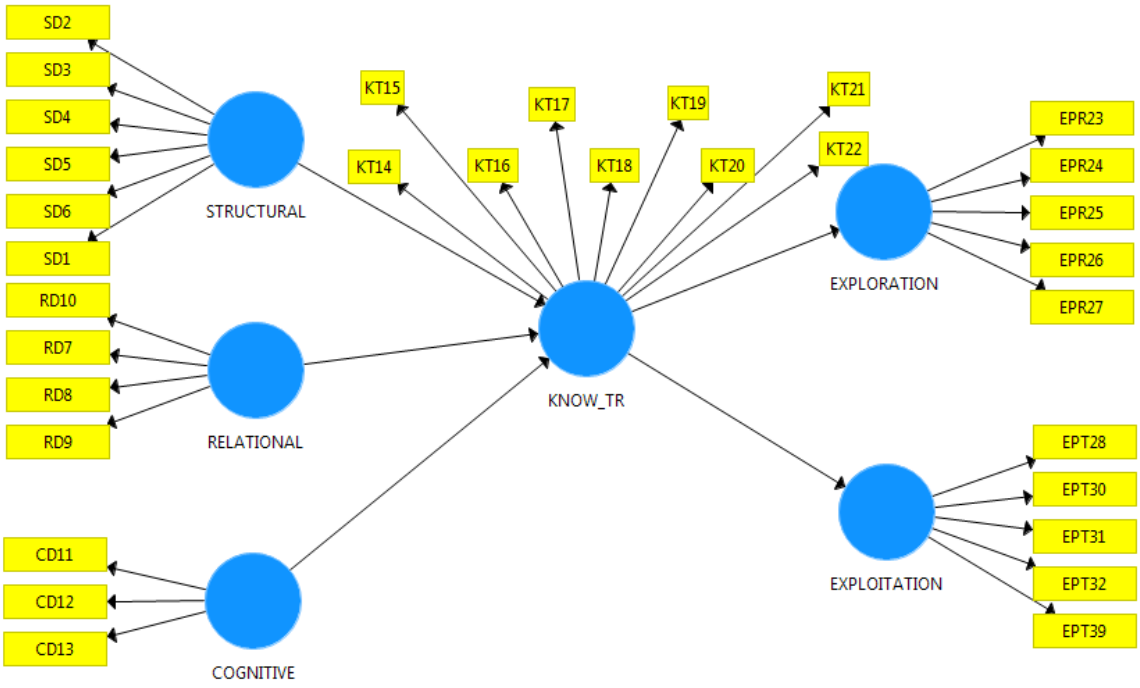
An outlier refers to an extreme response to a particular question, or extreme responses to all questions. Data distribution enables the researcher to verify that the data are not too far from normal data using two measures of distribution: skewness and kurtosis. Skewness assesses the extent to which a variable's distribution is symmetrical, and kurtosis is a measure of whether the distribution is overly peaked. This study ran outlier diagnostics using SPSS software. The results indicated no outliers in the data. The kurtosis and skewness values of the indicators are within the -1 and +1 range, meaning that the data can be considered normal.

Data analysis and interpretation

The statistical analysis technique was used to test the framework that will be discussed in Chapter 5. The conceptual model presented SEM between the dimensions of social capital, knowledge transfer, and innovation outcome of exploration and exploitation. Figure 10 presents a visualisation of the SEM of the quantitative research in this study, which is explained in detail in Chapter 5. SEM is one of the statistical

analyses included within multivariate analysis. This study selected SEM as it simultaneously analyses multiple variables and the latent constructs. The variables represent measurements, which in this study were social capital (STRUCTURAL, RELATIONAL, COGNITIVE), knowledge transfer (KNOW_TR), and innovation outcome (EXPLORATION, EXPLOITATION). To test the relationship between the variables, the hypotheses were developed, and the framework was tested using SmartPLS software.

Figure 10. The structural model of social capital, knowledge transfer, and innovation outcome



There are two main approaches to estimating the relationships in SEM: covariance-based SEM (CB-SEM) and partial least square SEM (PLS-SEM). Each is appropriate for a different research context. Table 18 presents the rules of thumb for selecting between PLS-SEM and CBS-SEM.

Table 18. Rules of thumb for selecting between PLS-SEM and CBS-SEM

Use PLS-SEM when	Use CBS-SEM when
• The goal is to predict fundamental target constructs or identify key 'driver' constructs. • Formatively measured constructs are part of the structural model. • The sample size is small and/or the data is non-normally distributed. • The plan is to use latent variable scores in subsequent analyses.	• The goal is theory testing, theory confirmation, or the comparison of alternatives theories. • Error terms require additional specification, such as the covariant. • The structural model has circular relationships. • The research requires a global goodness-of-fit criterion.

In this study, survey data was analysed using PLS-SEM, a statistical modelling technique commonly implemented in social research. It was decided to use PLS-SEM as the statistical methodology for two main reasons. First, empirical research testing the relationship between social capital and innovation outcome with the mediation of knowledge transfer is lacking (Filleri, 2014). Research discussing the relation between constructs has begun to emerge recently. According to Hair et al. (2017), PLS-SEM is best used to predict key "driver" constructs, because it estimates the coefficient of path model relationships that maximise the R^2 values of the endogenous constructs. This feature achieves the prediction objective of PLS-SEM. Moreover, PLS makes no *a priori* assumptions about the normality of data (Tiwana and Bush, 2005). Therefore, this study used PLS-SEM as it fits with the study conditions.

Second, this study relies upon a relatively small sample size (i.e. 56). PLS-SEM allows the estimation of relationships between latent variables for small sample sizes (Grote et al., 2012, Persaud, 2005), and it makes no *a priori* assumptions about the normality of data (Tiwana and Bush, 2005). Thus, PLS-SEM was deemed appropriate for this study.

PLS-SEM results are examined via a systematic process which consists of a measurement models and a structural model (Hair et al., 2017). The measurement model evaluates the reliability and validity of the construct measures, and the structural model evaluates the model's ability to predict the variance in the dependent variables. The structural model is examined after the measurement model is established. In Table 19, the two-step process of the PLS-SEM systematic evaluation, as discussed above, is outlined

Table 19. PLS-SEM process of systematic evaluation

Stage		Definition	Value
Measurement Model (evaluates the reliability and validity of the construct measures)	Internal consistency	An estimate of the reliability based on the intercorrelations of the observed indicator variables.	Cronbach's alpha> 0.7
			Composite reliability> 0.7
	Convergent validity	The extent to which a measure correlates positively with alternative measures of the same construct.	Indicator reliability> 0.7
			Average variance extracted> 0.5
	Discriminant validity	The extent to which a construct is genuinely distinct from other constructs by empirical standards.	HTMT
Structural Model	Collinearity issues	The evaluation of the formative measurement model.	VIF values
	Size and significance of path coefficients	Assesses the significance level of the structural model relationship or tests hypothesised relationships between the constructs.	*p* value
	Coefficients of determination	A measure of the model's predictive power	R^2
	f^2 effect sizes	A measure to evaluate whether a change in R^2 has a substantive impact on the endogenous construct.	f^2
	Predictive relevance	Evaluates the magnitude of R^2 values as a criterion of predictive accuracy.	Q^2
	q^2 effect sizes	To compare the relative impact of predictive relevance.	q^2

Descriptive analysis of demographic data was performed before conducting the hypothesis test analysis. The demographic data relating to the start-ups is presented in Table 20. The 'residence city' category consists of three cities in which the corporate accelerator takes place: Jakarta, Bandung, and Yogyakarta. Table 20 indicates that the respondents represent all start-ups at every city in which the corporate accelerator programme operates, with the largest number of start-ups being located in Bandung. All start-ups that participated in this study were established between 2013-2015. Since the accelerator programme began in 2013, it can be concluded that all respondents were new start-ups. Start-ups established in 2014 represent the largest proportion of participants in this study. Start-ups can be considered as new ventures with a relatively small number of employees (i.e. fewer than five). However, the start-ups that participated in this study mostly had more than five employees. Regarding the product category, most of the participants' products were business solution applications, followed by personal apps. The social media and community product category accounted for the least number of start-ups.

The list of participants shows that they were involved with the corporate accelerator programme around 2013 to 2015. These years were years when the programme had open requirements. This means that the start-ups that participated in this study represent the overall years of open requirements. Most of the participants were involved in the programme in 2015. The data revealed that the people assigned as the respondents for the study were those who occupied an important position within the start-up, i.e. the CEO and/or the founder. In other words, the questionnaires were completed by individuals who well-understood the organisation condition and were directly involved in the corporate accelerator programme. In general, the CEOs had all obtained a Bachelor's degree so, they were well educated, and thus, had the capability to answer all questions. This information is summarised in Table 20.

Table 20. Start-ups' descriptive information

Residence city	Bandung	39%
	Jakarta	36%
	Yogyakarta	14%
Established since	2013	14%
	2014	40%
	2015	37%
Number of employees	Less than 3	14%
	Between 3 – 5	28%
	More than 5	58%
Product category	Business solution	44%
	Personal apps	19%
	Social media and community	17%
Year involved in ICN	2013	19%
	2014	22%
	2015	39%
Job position	CEO/Founder/Co-founder	78%
	CTO	11%
Gender	Male	92%
	Female	8%
Educational background	Graduate	72%
	Postgraduate	28%

4.5 Conclusion

This chapter has explained the research philosophy and the research methodology applied in this study, from Section 3.1 to Section 3.2. Section 3.1 also provided a general overview of different philosophical assumptions, leading to the identification and justification of pragmatism as the paradigm underpinning the present study. Section 3.2 presented the research design applied in this study, including the data collection procedure, data analysis, and research tools. Table 21 summarises this chapter.

Table 21. Summary of this chapter

Category	Option		
Research questions	*RQ1: How does a corporate accelerator perform the orchestration roles of an innovation intermediary?* *RQ2: What is the value created for corporations through a corporate accelerator programme?* *RQ3: From a social capital perspective, what is the value created for start-ups from participating in corporate accelerator programmes?*		
Research philosophy	Pragmatism		
Research strategy	Mixed-methods research		
Research design	Case study as primary method and complement with survey research		
	RQ1	RQ2	RQ3
	Qualitative method	Qualitative method	Quantitative method
Method of data collection	Interview Site observation Documents	Interview Site observation Documents	Survey
Data analysis	Thematic analysis	Thematic analysis	Inferential statistic/SEM
Purpose of study	To understand the process and roles of the corporate accelerator programme	To understand the value creations for the corporation	To understand value creations of the corporate accelerator programme for start-ups
Time dimension	June 2016 – March 2017		September 2016 – January 2017
Environment	The corporate accelerator programme, the corporation, and the start-ups		

CHAPTER 5
CASE STUDY: INDIGO CREATIVE NATIONS
THE CORPORATE ACCELERATOR PROGRAMME

This chapter aims to answer the first research question of this study: *How does a corporate accelerator perform the orchestration role of an innovation intermediary?* The literature review chapter has shown that the existing studies in innovation intermediary tend to focus on the bridging role (Section 2.2.1). This study is different, as it explores the orchestration role, wherein corporations own and operate a corporate accelerator programme as a way to build, develop, and manage (i.e. 'orchestrate' (Nambisan, 2017)) an innovation ecosystem. This ecosystem consists of a number of start-ups, and aims to help these start-ups become established new ventures through the corporate accelerator programme. It is also aimed at creating opportunities for collaboration and integration with the corporation's innovation process. In this sense, the corporate accelerator can act as an innovation intermediary berween the corporation and the start-ups.

The goal of this chapter related to answering Research Question 1 is to build a detailed picture of the activities and processes within the corporate accelerator programme as an innovation intermediary that reflects its orchestration role. This chapter will begin by briefly explaining the case study of Indigo Creative Nation, the corporate accelerator programme of Telkom. It will then continue by presenting the data analysis using the design element framework (Zott et al., 2011) to identify the activities, functions, roles, and processes ofthe programme. At the end of this chapter, all of the identified elements will be unified in a model of the corporate accelerator programme as an innovation intermediary.

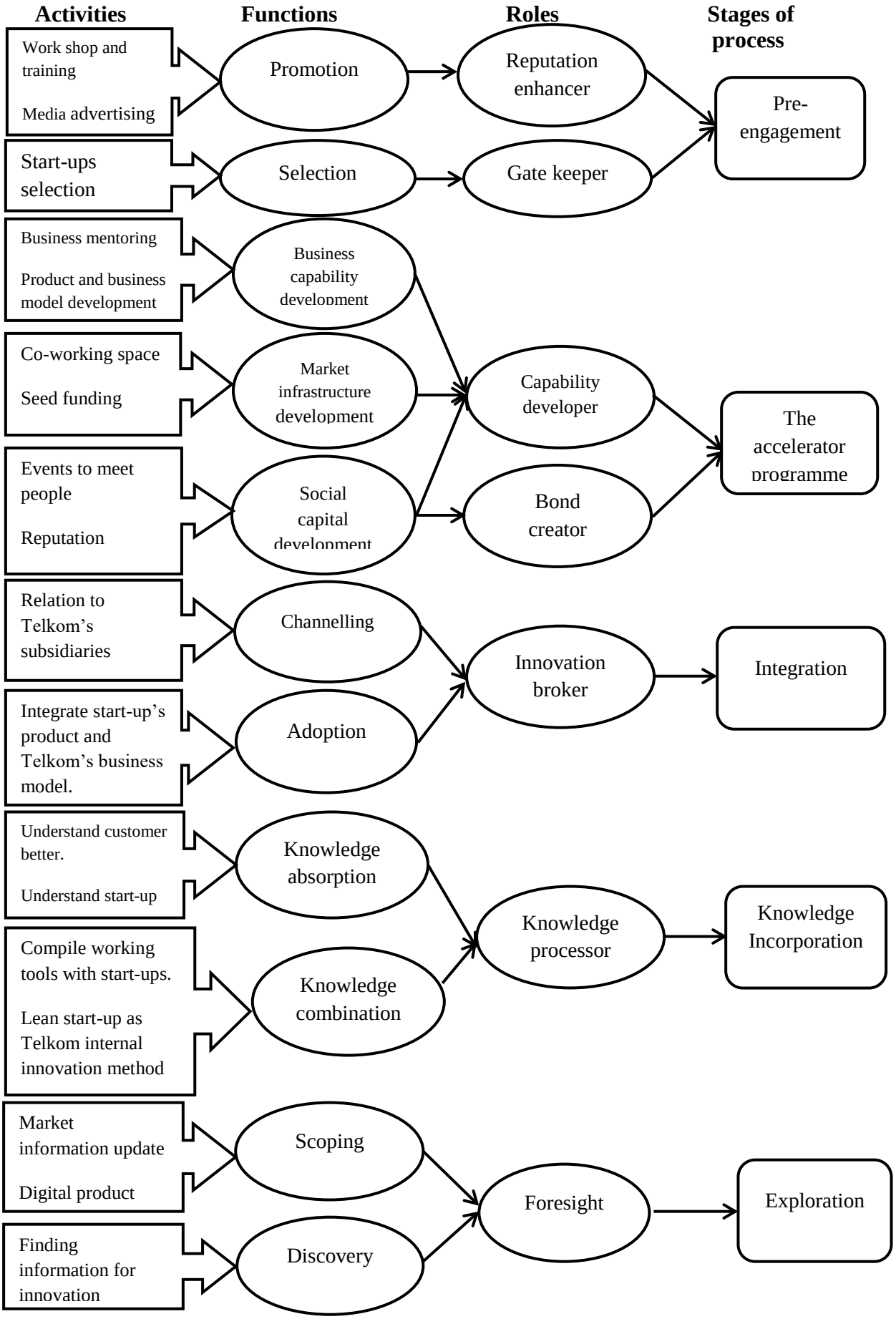
5.1 Processes in the corporate accelerator programme

The first stage of data analysis was to understand the processes in the corporate accelerator programme using the design element concept (Zott and Amit, 2010), which captures the activity system's architecture. Design element identification consists of content (i.e. related to activities), structure (i.e. how the activities are linked), and

governance (i.e. within what context the activities are performed) that characterise an activity system. This study used a thematic analysis approach, and the following sections will explore the design elements that were identified during the analysis. The identification of these elements was deemed necessary to identify the value of the corporate accelerator programme. As discussed in Chapter 2 Section 2.3.2 regarding value creation, the value is embedded in activities, and thus, identifying activities can guide the identification of values.

Prior to the analysis, it was considered necessary to distinguish the content to be identified. The content consists of the activities, functions, and the orchestration role of the programme. This study investigated the relationships between these, and the part of the corporate accelerator programme in which the content emerges (i.e. the different stages). As the definitions of the terms “activity”, “function”, “role” and “stages” were found to be inter-related, for data coding purposes, these terms were distinguished. To align the definitions with the aim of this study, the content was defined within the context of a corporate accelerator programme. As a result, “activities” were defined as any particular actions, “functions” as the intended purpose of activities, “roles” as functions that are specific to the orchestration role of the innovation intermediary, and “stages” as parts of a process. Figure 11 visualises the structure of data relating to activities, functions, roles, and stages. These will be further explored in the following section.

Figure 11. Data structure for activities, functions, roles and stages



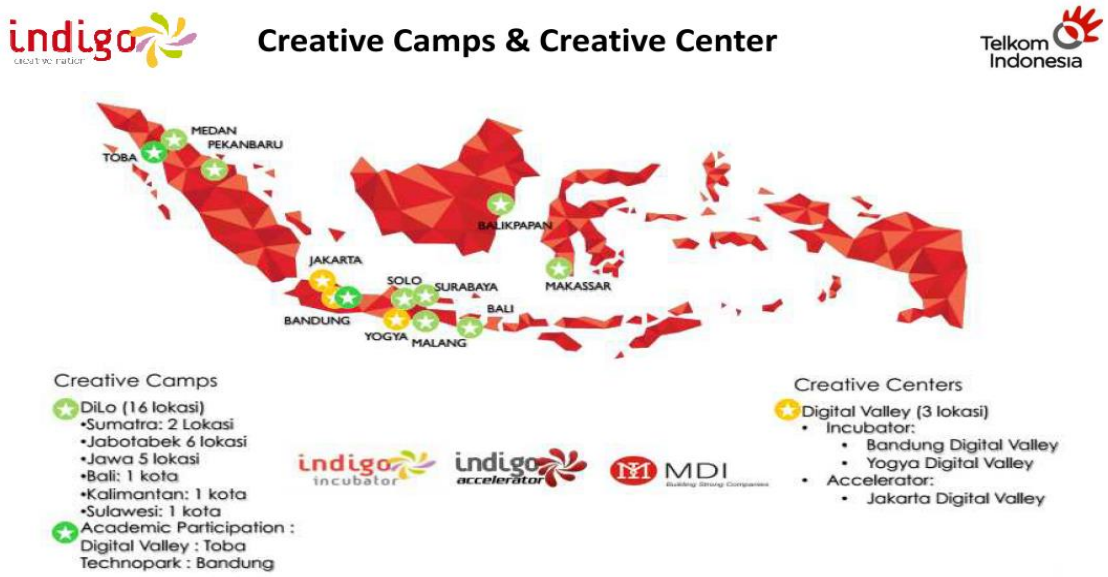
5.1.1 First stage: Pre-engagement

Pre-engagement is the stage during which the corporation searches for, identifies, and selects potential start-ups to accelerate. As the number of accelerator programmes grows, it becomes more challenging to attract the best start-ups willing to engage with the corporation. At this stage, the corporation attempts to build awareness and interest amongst potential start-ups, so that they are ready to respond to a call to join the programme. Pre-engagement has two functions: promotion, and selection. This study labelled this stage 'pre-engagement' because the functions consist of the activities that take place before the start-ups and the corporation are officially engaged in the corporate accelerator programme. However, the activities are managed by the corporate accelerator programme.

Function in first stage: Promotion

This study labelled the first function of pre-engagement 'promotion', based on the antecedent group of publicity-type activities identified during the analysis. Here, promotion has the same meaning as the publicity, or encouragement (Crozier et al., 2013), and activities that relate to these terms were identified. The antecedent activities are related to spreading information about and introducing the corporation accelerator programme. To support these activities, Telkom provides specific sites known as creative camps, in this case named a Digital Lounge (DiLo), where people can meet up and have opportunities to form a start-up team. There are 19 DiLo locations across Indonesia, which are usually embedded within Telkom branches. Figure 12 shows DiLo's locations in Indonesia. In these locations, boot camp activities, such as training and workshops, are held. DiLo also provides basic business and technical training to nurture creativity

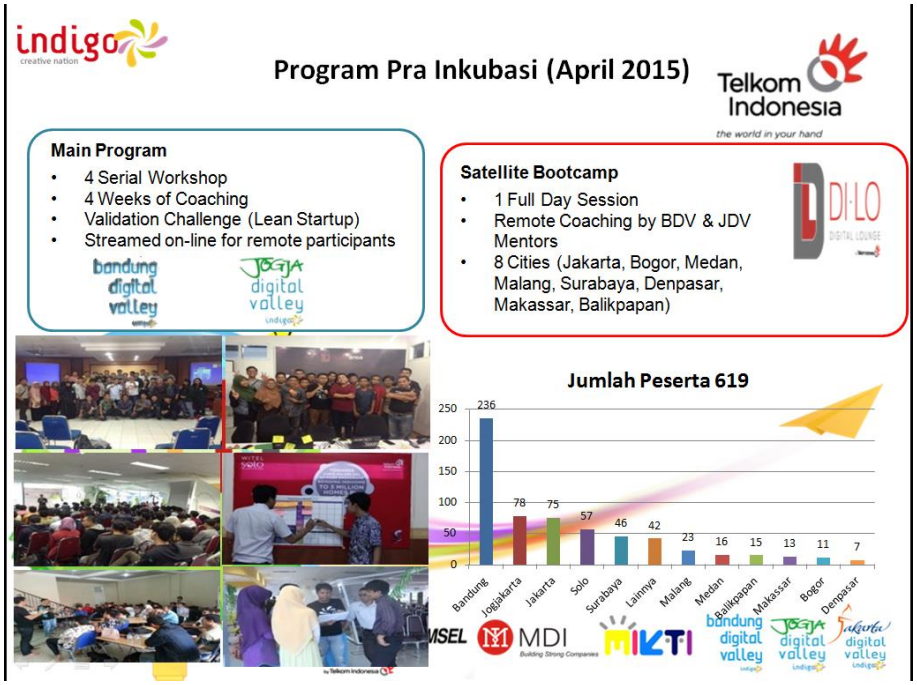
Figure 12. Digital Lounges (DiLo) across Indonesia for promotion activities



Another event is pre-incubation. This is a four-week serial workshop and coaching programme where the participant start-ups are expected to generate creative ideas. If the start-ups are selected, their ideas can be developed further during the corporate accelerator programme. A representative of Jarvis, one of Indigo's start-up tenants in 2013, said "*I knew about Indigo because it held workshops in several cities. From those events, I knew what Indigo was, the benefits and why we should join, and then I decided to join Indigo*". Figure 13 shows that nine out of 16 start-up tenants in the 2015 corporate accelerator programme were pre-incubation participants in DiLo. Additionally, Figure 14 also shows the pre-incubation programme report, which consists of an overview of activities, the number of participants, the location, and a brief explanation of the pre-incubation programme.

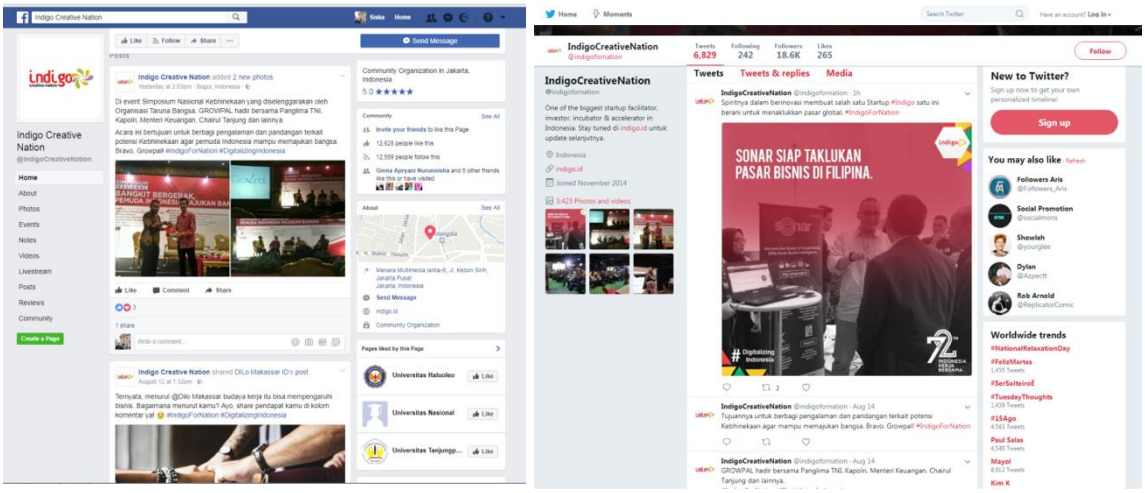
Figure 13. Start-up tenants in corporate accelerator programme resulting from DiLo participation (source: the corporate accelerator progress presentation 2015)

Figure 14. Workshop and pre-incubation activity report (source: the corporate accelerator progress presentation 2015)



In addition to training and workshops, Indigo also uses social media to promote their activities and provide information on the selection process. Figure 15 shows Indigo's social media activities on their Facebook and Twitter pages. Start-ups were able to recognise Indigo via this activity. As a representative of the Kakatu start-up mentioned, "*We discovered Indigo for the first time from the fan page on Facebook*". The promotional activities are more frequent in the two months before the selection process begins.

Figure 15. Indigo's Facebook and Twitter pages



Being personally approached by Indigo staff is another way in which the Indigo programme is promoted and potential start-ups are recruited. This can be done through, for example, meetings or informal conversations at community events. Privy-ID and Goers are examples of start-ups that joined Indigo after being personally approached. Privy-ID's CEO stated, "*I had chatted and made friends with Nico from Indigo, and he recommended that I join Indigo*". The representative of Goers made a similar statement: "*I met Indigo staff and they suggested we join Indigo because, according to them, Goers had a potential product that would be of interest to many people*". It should be noted that, even when personally approached, start-ups still have to pass the selection process to be accepted into the corporate accelerator programme.

Function in first stage: Selection

The second function in pre-engagement is labelled 'selection' based on several facts that emerged, and the emergence of 'selection' as keyword during the interviews. The selection process starts with the submission of a proposal and registration on the corporate accelerator website. The selection function aims to appoint the start-ups with the best potential ideas, or products that suit the corporation's innovation strategy. The selection function begins with an open call for proposal submissions. Figure 16 shows the interface on the Indigo website inviting start-ups to submit a proposal and announcing the selection process schedule. A team of referees consisting of successful start-up owners, corporation employees in charge of the accelerator programme, subsidiaries' managers, and mentors, are involved during this process. Figure 17 presents the selection process showing the team of referees. The involvement of Telkom employees at the selection stage is intended to help recognise the start-ups that could potentially be developed further to become a part of the corporation's innovation. The selected start-ups with the best proposals are then interviewed. If a start-up passes all of the selection stages, they are invited to join the accelerator programme.

The selection process was explained by a Kakatu start-up employee:

"*First there were several selection processes, which started with administration selection and an interview. During the administration selection, we submitted the required documents (e.g. application form) and three ideas in the form of proposals. This is regarded as the first stage of selection. In the second stage, after the interview process, only two out of three ideas were passed. Our team were initially nine people. However, Indigo had the initiative to divide our team into two based on the product ideas.*"

And also by a Goers start-up employee:

"*For eight months, we had informal meetings with MDI [venture capital], were interviewed by MDI, followed all the* ***selection*** *processes, until finally we passed and joined the Indigo programme."*

Figure 16. Open call on the Indigo website (www.indigo.id)

Figure 17. Scoring, and the judging team consisting of internal Telkom's employees and external expert (source: the corporate accelerator progress presentation 2015)

During the selection process, the start-ups' products are mapped according to metrics of product coherency and potential social impact. This is done to identify the start-ups that align with Telkom businesses. The selected start-ups are those with high coherent and social impact scores. Another criteria selection is the commitment of the founder and the quality of the start-up's business idea. This includes a unique selling proposition and monetisation strategy. Figure 18 shows the product mapping process conducted by Indigo.

In addition, start-ups are clustered based on the corporation's products and services; this is another way to ensure that the potential start-up is well accelerated and aligned with the corporate mission. Start-ups that intend to apply must choose to include their product in one of Telkom's product categories, i.e. home solution, personal apps, business solution, city and government solution, social media and community, and commerce.

Figure 18. Mapping start-ups' potential following the selection process (source: the corporate accelerator progress presentation 2015)

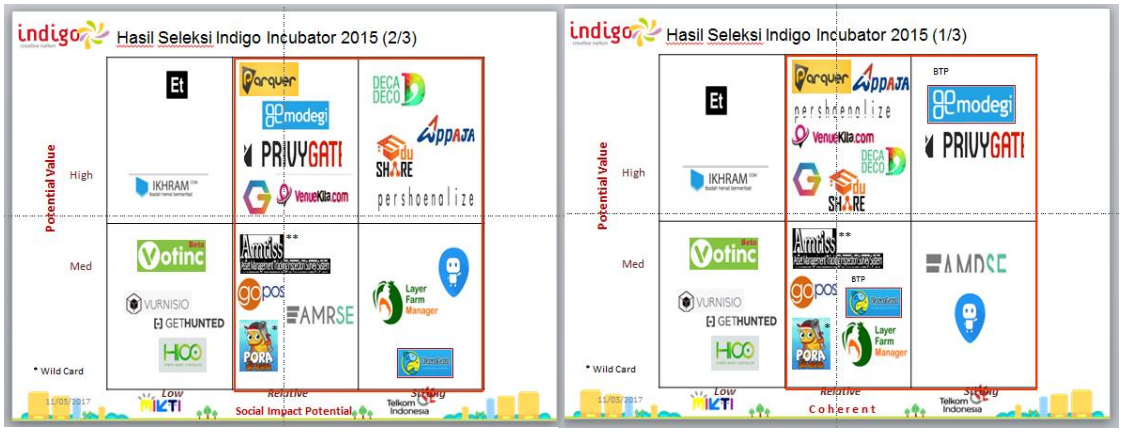


Table 22 below presents the data structure for pre-engagement, based on the promotion and selection activities discussed in the previous section.

Table 22. Pre-engagement activities, functions, and representative quotes

Function and activities	Representative quotes
Promotion	
Join offered	*I met Indigo staff, and they suggested that we join Indigo because, according to them, Goers had a potential product that would be of interest to many people* (Goers start-up). *I had chatted and made friends with Nico from Indigo, and he recommended that we join Indigo* (Privy-ID start-up).
Media advertising	*We discovered Indigo for the first time from its fan page on Facebook* (Kakatu start-up).
Roadshow and workshop	*I discovered Indigo when it held workshop in several cities. From those events, I knew what Indigo was, the benefits, and why we should join, and then I decided to join Indigo* (Jarvis start-up).
Selection	
Start-up selection	*First, there were some selection processes, which started with the administration and an interview. We supplied the documents, submitted three ideas, and all of them passed the first stage. In the second stage, after the interview process, only two of the three passed. We were nine people, but Indigo had the initiative to split us according to the two products, so our team was split* (Kakatu). *For 8 months, we had informal meetings with MDI, and were interviewed by MDI, and followed all the selection processes until finally we passed and joined the Indigo programme* (Goers).

Roles: Reputation enhancer and gatekeeper

As was evident in the selection and promotion section above, all of the promotion activities are ways for Telkom to enhance the reputation of the corporate accelerator programme. These are also ways for Telkom to encourage the formation of new ties with new start-ups to participate in the programme. Formation of new ties can affect network stability, as it will help maintain the number of members in the network. Network stability is an important task in orchestration for hub firms (Dhanaraj and Parkhe, 2006). In this sense, the corporation acts as a reputation enhancer. Telkom, as a hub firm, must enhance its reputation among start-ups, which are seeking legitimacy in the marketplace. Allowing the start-ups to experience the accelerator process during the pre-incubation even can reassure the start-ups that the

accelerator programme will support their capability development as a new venture. As such, start-ups will be more likely to answer the call to submit a proposal to be considered as a new accelerator start-up tenant. This helps to establish the formation of new ties that work to stabilise the network.

In this stage, the study found that the corporate accelerator has a role as a gatekeeper in deciding which start-ups can enter the programme (see Table 23). The gatekeeper role relates to the selection activities, where the corporate accelerator selects start-ups for inclusion in the programme. A gatekeeper is a brokerage role, and has a position in the social network structure (Boari and Riboldazzi, 2014). Telkom, as a hub firm, through start-up recruitment can control its network position, and maintain its centrality and status. The corporate accelerator will grant the selected start-ups access to various facilities, e.g. access to customers for validation of their idea. The start-ups will also have access to Telkom network subsidiaries and partners. Table 23 summarises the findings of the selection and promotion section. The summary can be seen as evidence supporting the argument of this thesis regarding the promotion and selection functions.

Table 23. Representative data points underlying the analysis of the corporate accelerator's roles

Stages	Roles	Evidence of occurrence
Pre-engagement	Reputation enhancer	• Pre-incubation, inviting start-ups to experience the accelerator process and training them to be ready to submit proposals when the registration process opens • DiLo: as a gathering place for communities • Co-working space • Periodic free workshop and training for start-ups
	Gatekeeper	Periodically selecting potential start-ups through a registration and interview process.

Once selected, the start-ups continue to the subsequent stage and start their journey as a tenant of the accelerator programme. This stage comprises of the 'obtaining' innovation stage, which is the first stage of a four-stage process model for leveraging external sources of innovation; the other three stages consist of: searching,

filtering, and acquiring (West and Bogers, 2014). All the activities, functions, and roles that were identified are part of the pre-engagement process. This process is how Indigo obtains potential start-ups, as external sources of innovation for Telkom.

5.1.2 Second stage: The accelerator programme

The second stage is labelled 'the accelerator programme', as this stage comprises a chain of activities that occur during the course of the corporate accelerator programme. At the end of the programme, the start-ups are expected to become a new venture. In Indigo, the activities begin with a kick-off event where the selected start-ups are given the opportunity to meet Telkom's subsidiary managers or head of divisions in Telkom's structural organisation to discuss collaboration possibilities with Telkom. Additionally, they are introduced to Telkom's digital performance metrics to ensure alignment between the start-ups and Telkom's expectations. Concerning capabilities enhancement, the start-ups are given access to Telkom's assets as complementary resources, such as payment platform systems or customer databases. Figure 19 depicts the advantages provided during the accelerator programme; these include: shared working space; seed funding; mentoring; Telkom's application programme interface, which consists of the companies' technology for product development; company resources, such as their account manager; Telkom's access to the market, customer databases, and global venture capital. By providing these advantages, the accelerator programme aims to develop start-ups' business, market, and social capabilities.

Figure 19. Facilities available to start-ups during the corporate accelerator programme (source: the corporate accelerator progress presentation 2015)

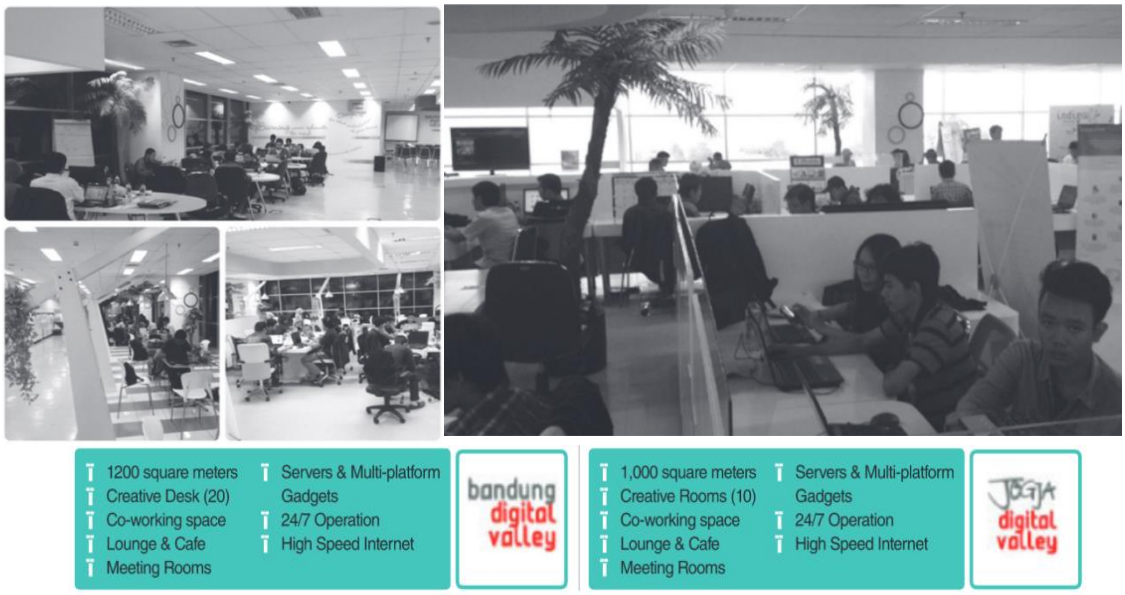
The accelerator programme consists of three functions: market infrastructure development, business capability development, and social capital development. The functions relate to activities that develop the capabilities needed for start-ups to become a new venture.

Function in second stage: Market infrastructure development (MID)

Market infrastructure development (MID) is related to the corporate accelerator function providing services that support start-ups' operational activities, such as funding and office space (Dutt et al., 2016). Activities classified as MID may remove and reduce constraints on transactions, which is the basis for labelling this function 'market infrastructure development'. Moreover, these services are expected to build start-ups' capabilities to become company-ready. In the future, the start-ups are expected to become successful spawns of other new ventures that could build a stable labour market.

Regarding the services provided during the accelerator programme, a representative of the Zelos start-up stated, "*From the office space provided we got the chance to meet important people*," and a representative of Kartoo explained "*By joining Indigo we got access to office space*". Goers, as a new venture, used the shared office facility until they were able to establish their own office. The shared office is beneficial for a start-up in reducing operational costs (Utoyo, 2016). Like common accelerator programme packages (Pauwels et al., 2016), Indigo also provided seed funding for its start-up tenants. Start-ups receive funding at the start of every stage of the accelerator programme: customer validation, product validation, and business model validation. A representative of Jarvis, a start-up, stated, "*We got investment of 1 billion IDR from Indigo*," and a representative of Kartoo explained, "*We got funding for three months*". The funding aims to support the start-ups in growing and exhibiting their achievement at the evaluation point at the end of each stage.

Figure 20. The shared office space and other supportive facilities in Indigo



Function in second stage: Business capability development (BCD)

Business capability development (BCD) can be defined as a type of function that focuses on improving start-ups' functional and managerial skills, such as marketing, finance, production, and general leadership, project management, and human resource management skills (Dutt et al., 2016). Tenants in corporate accelerators are new ventures that lack knowledge and experience; hence, the accelerator curriculum is designed as a comprehensive programme that features an educational element (Kohler, 2016). The curriculum is delivered through classes, mentorship, and workshops provided throughout the programme. Over the seven-month Indigo programme, start-ups are required to attend mentoring, classes and others accelerator events to develop their business knowledge and technical skills. Mentoring, workshop, and classes for start-ups can be perceived as opportunities to meet people from successful start-ups, investors, and/or mentors and obtain feedback on the start-ups' product and recommendations on how to develop the company further. As the representative from Jarvis stated, "*We learned pricing strategy from a mentor on how to make our product price affordable for SMEs. Our price was paid annually; our mentor suggested that we change it to monthly, so that the barrier to entry was low. We tried it, and the results were was good*," and, "*We received mentoring from business experts, for example how to make a press release, marketing*

campaign, develop a business strategy and business model, and then these were validated."

Two types of mentor are provided by Indigo: 1) resident, and 2) visiting mentors. Resident mentors are typically successful local start-up founders and/or accelerator alumni. They are assigned to a particular start-up tenant to support and provide advice when required. Visiting mentors are guests, such as founders of a top Silicon Valley company. They are invited to conduct private, one-to-one sessions aiming to inspire and train start-up tenants, as well as giving talks in classes. These sessions are opportunities for a start-up to enhance their business knowledge and technical skills. As the representative of Goers start-up mentioned, "*Besides technical skill, we also impart understanding related to user behaviour*".

The representative of Kakatu affirmed that,

"*In Indigo, we not only gained knowledge related to product development but also on how to build our business. We were always told to build, measure, and learn as a lean start-up method. Moreover, we were taught how to conduct financial planning, problem-solving, management and leadership."*

Based on the interview results, this study concluded that start-ups benefitted from business capability development during the accelerator programme.

Figure 21. Mentoring activities during the accelerator programme (source: the corporate accelerator progress presentation 2015)

Function in second stage: Social capital development (SCD)

Social capital development is related to function in network building, for example connecting with various institutions or individuals that, in the future, can provide benefit. The opportunities to meet corporate subsidiaries and gain market access come from attending corporate events during the accelerator programme. This will increase start-ups' connections. These connections, formal or informal, in the form of information exchange are beneficial to increase start-ups' network size. They can also lead to new projects, markets, or revenues sources.

From the interview with a number of start-ups, it was found that attending events facilitated by the accelerator programme, such as demo days, can be opportunities for the start-ups to build and widen their networks. Jarvis, for example, commented, "*Indigo held a demo day. Investors were invited, and we presented there. We met investors and built up many relationships*." Along similar lines, Goers explained that, "From Indigo events the doors were opened and we met with an investor who invested in our start-up."

Figure 22. Demo day for attracting investors and networking
(source: the corporate accelerator progress presentation 2015)

Another finding from the interviews was that participating in Indigo can help start-ups to build up a good reputation, which in turn helps the start-ups to gain access to and the trust of new investors. As the representative from Goers stated, "*Reputation, due to being part of Indigo, built trust in the investor to invest in us*." Along similar

lines, a representative from the start-up Zelos explained, "*If we wanted to participate in investor networking it was easier if the investors knew that the start-ups were from Indigo*." This interview finding revealed that being a part of Indigo creates a widespread belief that the start-up tenant has good potential, which in this study is referred to as 'reputation'.

A sense of togetherness with other start-up tenants creates unity amongst them, fostering the feeling that other start-ups are facing the same challenges and problems during the accelerator programme. This connection and the bond that emerges from this togetherness can become an antecedent for future collaboration. For example, a representative from Privy-ID mentioned, "*We chatted and collaborated with start-ups under Indigo, maybe because of our compatibility in solutions*." A similar statement was made by the representative from Jarvis, who explained, "*We also collaborate with other start-ups in Indigo, for example by bundling products. Another start-up provided solution A and we provided solution B, so we bundled these solutions*." Table 24 summarises the activities of the accelerator programme, the functions developed from the activities, and excerpts from the interview transcripts, from which the activities and functions were identified.

Table 24. The accelerator programme activities, functions, and the related data

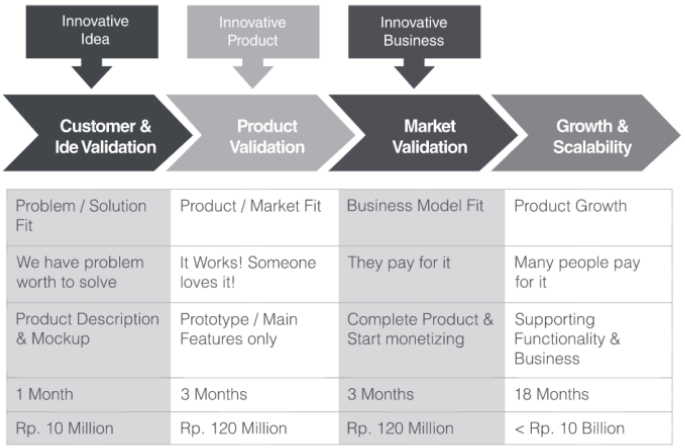
Function and activities	Representative quotes
Business capability development	
Business mentoring	*We received mentoring from business experts, like how to create a press release, marketing campaign, develop a business strategy and business model, and then these were validated* (Jarvis). *Besides technical skill, we also acquired understanding related to user behaviour* (Goers).
Product and business model development	*In the validation stage, we felt our business model was not valid, so we tried some other business models* (Kakatu). *We learned about pricing strategy from a mentor, about how to make our product price affordable for SMEs. Our price was paid annually; our mentor suggested we change it to monthly, so that the barrier to entry was small. We tried it, and the results were good* (Jarvis).

Market infrastructure development	
Co-working space	*From the office space provided, we got the chance to meet important people* (Zelos). *By joining Indigo, we got office space* (Kartoo)
Seed funding	*We received investment of 1 billion IDR from Indigo* (Jarvis). *We got funding for three months' runaways* (Kartoo).
Social capital development	
Events to meet people	*When Indigo held events, we participated, and we met people* (Kartoo) *From Indigo events the doors were opened for us to meet with an investor who invested in our start-up* (Goers). *Indigo held a demo day. Investors were invited, and we presented there. We met investors and build many relations* (Jarvis). *We met with an investor/angel at an investor day*.
Reputation	*Reputation as part of Indigo bring trust to investor to invest in us* (Goers) *If we want to join investor networking, it became easier if there is a reference that start-ups were from Indigo* (Zelos).
Solidarity	*We have more start-up friends, we needed a friend and talked about our problem*s (Zelos). *We built a relationship with a start-up that has product similarity, so that we could talk about this* (Kakatu). *We chatted and collaborated with start-ups under Indigo, maybe because of our compatibility in solutions* (Privy-ID). *We also collaborated with other start-ups in Indigo, for example by bundling products. A start-up provided solution A and we provided solution B, so we bundled these solutions* (Jarvis).

Roles: capability developer and bond creator

Once start-ups have been selected for and entered the accelerator programme, they are required to pass three evaluation stages and demonstrate that their venture capabilities are well developed. The stages follow the lean start-up model (Blank, 2013), which consists of: customer validation, product validation, and business model validation. At the end of each stage, the start-ups present their progress and are evaluated based on their achievements during each stage. Figure 23 shows the stages of the Indigo accelerator programme and also the facilities provided at each stage.

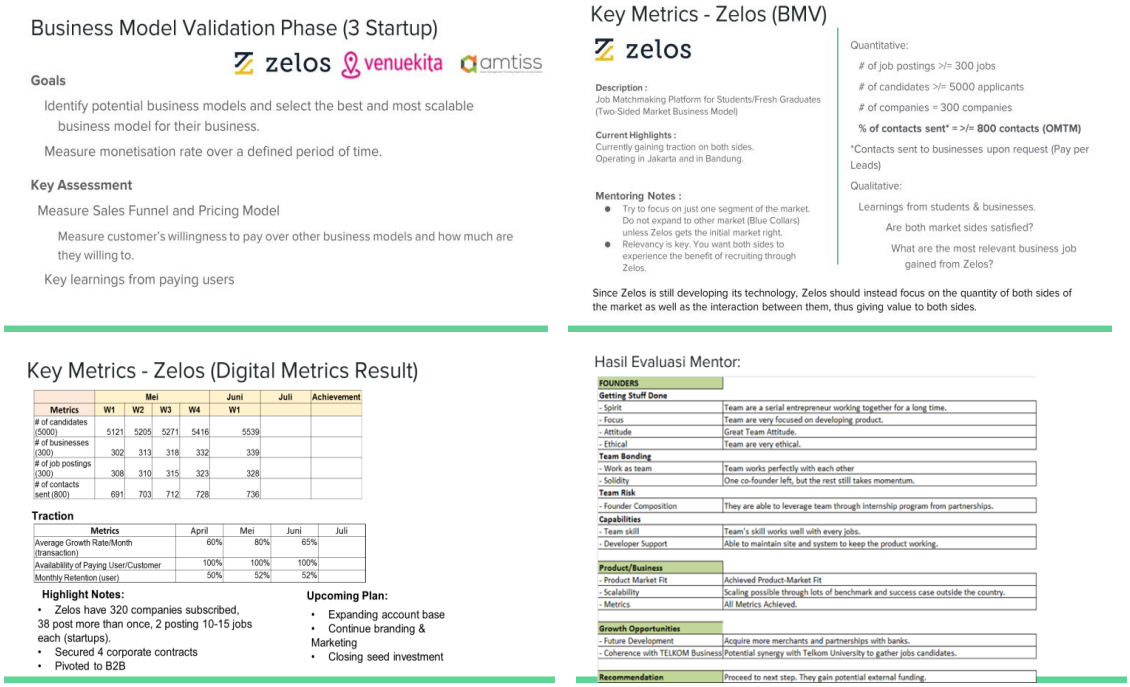
Figure 23. Indigo accelerator programme stages and facilities provided at each stage



Customer validation is a one-month programme where start-ups must validate their idea by demonstrating the number of people experiencing the issue that they are aiming to solve through their product. To support this process, each start-up is provided with USD 750 seed capital. If the start-up meets the requirements to pass this stage, they can continue to the next stage, product validation. Product validation is the stage during which the start-ups' idea must be developed into a product. This stage lasts for three months, and the selected start-ups are given USD 9,000 in financial support. After passing the requirements at the end of the product validation period, the start-ups continue to the next stage, business model validation. The business model validation stage is a three-month programme with USD 9,000 financial support. The start-ups must demonstrate how they will sell the product and operate their business by completing a business model canvas.

Within their seven-month involvement in the corporate accelerator programme, the start-ups receive a total of USD 18,750 in financial funding. In addition to this financial support, they are supported by facilities such as free office space and mentoring. Figure 24 shows the evaluation report used in business model validation. It consists of goals and critical assessments to be evaluated at a particular stage, the start-ups' achievements, and mentor comments and suggestions regarding those achievements.

Figure 24. The evaluation report of one start-up tenant in the business model validation phase (source: start-up progress report documentation)



Business Model Validation Phase (3 Startup)

zelos venuekita amtiss

Goals

Identify potential business models and select the best and most scalable business model for their business.

Measure monetisation rate over a defined period of time.

Key Assessment

Measure Sales Funnel and Pricing Model

Measure customer's willingness to pay over other business models and how much are they willing to.

Key learnings from paying users

Key Metrics - Zelos (BMV)

zelos

Description :
Job Matchmaking Platform for Students/Fresh Graduates (Two-Sided Market Business Model)

Current Highlights :
Currently gaining traction on both sides.
Operating in Jakarta and in Bandung.

Mentoring Notes :

- Try to focus on just one segment of the market. Do not expand to other market (Blue Collars) unless Zelos gets the initial market right.
- Relevancy is key. You want both sides to experience the benefit of recruiting through Zelos.

Quantitative:

# of job postings >/= 300 jobs

# of candidates >/= 5000 applicants

# of companies = 300 companies

% of contacts sent* = >/= 800 contacts (OMTM)

*Contacts sent to businesses upon request (Pay per Leads)

Qualitative:

Learnings from students & businesses.

Are both market sides satisfied?

What are the most relevant business job gained from Zelos?

Since Zelos is still developing its technology, Zelos should instead focus on the quantity of both sides of the market as well as the interaction between them, thus giving value to both sides.

Key Metrics - Zelos (Digital Metrics Result)

	Mei				Juni	Juli	Achievement
Metrics	W1	W2	W3	W4	W1		
# of candidates (5000)	5121	5205	5271	5416	5539		
# of businesses (300)	302	313	318	332	339		
# of job postings (300)	308	310	315	323	328		
# of contacts sent (800)	691	703	712	728	736		

Traction

Metrics	April	Mei	Juni	Juli
Average Growth Rate/Month (transaction)	60%	80%	65%	
Availability of Paying User/Customer	100%	100%	100%	
Monthly Retention (user)	50%	52%	52%	

Highlight Notes:

- Zelos have 320 companies subscribed, 38 post more than once, 2 posting 10-15 jobs each (startups).
- Secured 4 corporate contracts
- Pivoted to B2B

Upcoming Plan:

- Expanding account base
- Continue branding & Marketing
- Closing seed investment

Hasil Evaluasi Mentor:

FOUNDERS	
Getting Stuff Done	
- Spirit	Team are a serial entrepreneur working together for a long time.
- Focus	Team are very focused on developing product.
- Attitude	Great Team Attitude.
- Ethical	Team are very ethical.
Team Bonding	
- Work as team	Team works perfectly with each other
- Solidity	One co-founder left, but the rest still takes momentum.
Team Risk	
- Founder Composition	They are able to leverage team through internship program from partnerships.
Capabilities	
- Team skill	Team's skill works well with every jobs.
- Developer Support	Able to maintain site and system to keep the product working.
Product/Business	
- Product Market Fit	Achieved Product-Market Fit
- Scalability	Scaling possible through lots of benchmark and success case outside the country.
- Metrics	All Metrics Achieved.
Growth Opportunities	
- Future Development	Acquire more merchants and partnerships with banks.
- Coherence with TELKOM Business	Potential synergy with Telkom University to gather jobs candidates.
Recommendation	Proceed to next step. They gain potential external funding.

As evident above, this study has identified that the corporate accelerator has a capability developer role, which consists of business, market infrastructure, and social capital development functions. During the formal and informal meetings in classes, mentoring process, and/or daily interactions between start-ups, knowledge is transferred, which aids the development of business knowledge and technical skills. Knowledge transfer has been defined as the process through which a piece of knowledge is acquired in one situation and applied to another, consisting of knowledge search, access, assimilation, and integration (Filieri and Alguezaui, 2014). The function of transferring knowledge is the corporate accelerator's way to link start-ups to mentors, successful start-up owners, and the other start-ups. This function aims to provide access to potential sources of knowledge. Additional facilities, such as seed funding, shared office space, market access, and the Telkom technology platform improves start-ups' business capacities to enable them to become new established ventures that support the creative digital market. As explained in Table 24 above, it is evident that start-ups' business, market infrastructure, and social capital capacities develop.

This study also identified that the corporation plays a role as a bond creator, related to its orchestration role, to ensure that the value created during the corporate accelerator programme is distributed equitably (Dhanaraj and Parkhe, 2006). Signing a contract before commencing the accelerator programme is required and serves as the foundation that ties Telkom and the start-ups together. Figure 25 shows a part of the corporate accelerator report from 2015 describing the kick-off event programme. At the event, the start-ups receive an explanation of the contract, symbolic grant giving, and an explanation of the facilities provided and the programme curriculum. The activities were the implementation of a contract containing items that Telkom is responsible for providing as part of the accelerator services, and for the start-up to perform as the accelerator expected from the programme (customer development, lean analytics, agile development make up the accelerator programme's curriculum and tools to evaluate start-up achievement). The contract is used to ensure that each party has their rights protected and fulfils their responsibilities. Additionally, the contract is written to avoid future issues such as free-riding and opportunism. Besides the contract, ties also appear among start-ups in solidarity, as discussed in the previous section (Section 5.1.2). These ties are horizontal and at the same level as the strengthening of homogenous network member, these types of ties in social capital are defined as 'bonding' (Mitchell et al., 2014). Hence, the accelerator programme has a role as a bond creator.

Figure 25. Corporate accelerator presentation report showing the activity where the contract was explained at the beginning of the programme

Table 25. Representative data points underlying the analysis of the corporate accelerator's roles

Stages	Roles	Evidence of occurrence
The accelerator programme	Capability developer	• Through socialisation activities among tenant start-ups through formal meetings such as mentoring and classes, and informal conversations during evaluation events, and everyday interaction at the shared office. • Formal classes and mentoring to develop start-ups' business capabilities, market infrastructure, and social capital. • Telkom provides its application programme interface (APIs), such as billing system, big data, and cloud services for start-ups to use in product development. • Other facilities such as market access, Telkom's account manager, and shared office space are also provided during the accelerator.

	Bond creator	• Contract with start-up at the beginning of the accelerator programme. • Solidarity.

5.1.3 Third stage: Integration

In this study this stage is labelled 'integration' as the activities identified here assimilate the innovation obtained from external sources (West and Bogers, 2014). The integration stage consists of two functions: channelling and adoption. In both functions, the corporate accelerator programme plays a critical role in linking start-ups and the corporation. As the result of participating in the accelerator programme, start-ups will improve their products and develop their commercialisation strategy. To fulfil the aim of the accelerator programme (i.e. as part of the corporation's innovation strategy), the start-ups' product portfolio must complement and integrate with the corporation's current products. The product could also be a new product or service that can be offered by the corporation. The corporate accelerator programme facilitates the alignment of the products of start-ups with the corporation's business.

Function in third stage: Channelling

During the accelerator programme, there are activities aimed at linking a start-up's product with Telkom's business. Every start-up has the opportunity to meet Telkom's employees working in product development to pursue future collaborations.

The function whereby the corporate accelerator attempts to find future development opportunities for start-ups so that they can reach next level of venture readiness is labelled 'channelling' in this study. The dictionary definition of 'channel' is to guide, transmit, conduct, or convey (Crozier et al., 2013). Figure 24 shows the channelling activities within Indigo.

A representative of the start-up Kakatu mentioned that the attempt to connect start-ups with Telkom subsidiaries was useful. In addition, a representative of Zelos stated, "*By synergising with the Telkom group, Indigo introduced us to their customer-facing unit (CFU) or subsidiaries*." This activity is also part of Telkom's open innovation strategy (Figure 25), as expressed by the Telkom open innovation senior manager (DS): "*Digital Service Division (DSD) connects innovation results (pipeline)*

from the accelerator programme to customer-facing unit (CFU)," and "*The integration process introduces start-ups to another unit in the Telkom group.*"

Another event that supports the channelling function takes place in the evaluation stage. At this stage, the accelerator programme decides whether a start-up will continue to the next step or not. In the evaluation, the judges also consider several opportunities for a start-up to align with Telkom businesses. An evaluation report, in which the judges offer opportunities to align with Telkom businesses, can be seen in Figure 26, in the red box.

Figure 24 Channelling activity
(source: the corporate accelerator progress presentation 2015

Figure 26. Channel start-ups with Telkom's subsidiaries (Utoyo, 2016)

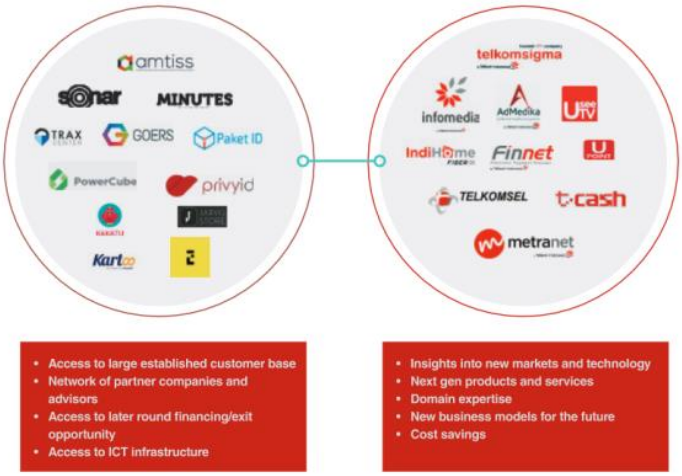


Figure 26. The judges' evaluation report at the evaluation stage

Hasil Evaluasi Mentor:

FOUNDERS	
Getting Stuff Done	
- Spirit	High spirit.
- Focus	Very focused.
- Attitude	Great attitude.
- Ethical	Very ethical.
Team Bonding	
- Work as team	Team works perfectly with each other
- Solidity	Team work solidly on execution
Team Risk	
- Founder Composition	Team works without issue.
Capabilities	
- Team skill	Founders works well, with same background and have known for each other for a long time
- Developer Support	Able to create both Android app and all the API. iOS in the works, but not in a rush.
Product/Business	
- Product Market Fit	Achieved Product-Market Fit
- Scalability	Scaling is possible after product development is finished (points system, loyalty service)
- Metrics	OMTM achieved. Problem with Monthly Retention.
Growth Opportunities	
- Future Development	Acquire more merchants and partnerships with banks
- Coherence with TELKOM Business	Potential synergy with T-Cash and T-Money.
Recommendation	Proceed to next step. They gain Follow on Funding deal through LOI.

Function in third stage: Adoption

The interview with a Telkom employee involved in the accelerator programme revealed a stage where the corporation continues to support the start-up until the product aligns with a Telkom business. They stated, "*The integration process assesses start-up readiness, product evaluation, grab the needs, and customisation*." They also mentioned that customisation is a stage in which they help the start-up make their product compatible. The adoption function includes activities where the corporation and start-ups work together for product improvement, capacity development, and market commercialisation. During these activities, the corporate accelerator participates as a bridge between the corporation and start-ups. If the corporation and start-up agree to collaborate and continue to the next step of working on a project together, the corporate accelerator is removed from the process.

Telkom's Digital Services Division contains open innovation unit; in the interviews, an employee in that division emphasised their role in open innovation strategy and stated "*The OI unit's role is in integrating external innovation resources and ultimately producing a product to deliver to CFU*." The open innovation unit in

the Telkom organisational structure falls under the Digital Services Division, which is responsible for the corporate accelerator programme.

This function is labelled 'adoption', which in this context means to take ownership of something (Crozier et al., 2013). For example, Telkom treats the product of a start-up as a Telkom product. Table 26 summarises the data relating to this integration stage.

Table 26. Integration activities, functions, and the relevant data

Function and activities	Representative quotes
Channelling Relation to Telkom's subsidiaries	*The most useful relation is with Telkom subsidiaries* (Kakatu). *By synergising with the Telkom group, Indigo introduced us to their customer-facing unit (CFU) or subsidiaries* (Zelos). *Indigo gave us contact persons in Telkom subsidiaries* (Jarvis). *DDS connects innovation results (pipeline) to CFU* (DR) *The integration process introduces start-ups to other units in the Telkom group* (Telkom 2).
Adoption Alignment	*Integration process: start-up readiness, product evaluation forum, grab the needs, customisation* (Telkom 1). *The OI unit's role is in integrating external innovation resources and producing a product to deliver to CFU* (Telkom 2).

Role: innovation broker

The analysis revealed that, in the integration stage, the corporation acts as an innovation broker, undertaking matchmaking, scale-up, and commercialisation; facilitating Telkom's subsidiaries and start-ups in seeking collaboration opportunities, coordination, and alignment of different processes and capacity are some of the tasks involved in this role (see Table 27). This role is also the innovation intermediary role most commonly found in the prior literature (Howells, 2006, Hargadon and Sutton, 1997, Kirkels and Duysters, 2010).

Kakatu is one of the tenant start-ups that has been developed through the accelerator programme. At the end of the programme, they produced an application to prevent children from accessing inappropriate internet content. Telkomsel, one of Telkom's subsidiaries in mobile telecommunication services, embedded Kakatu apps

into one of their services. In this case, the corporate accelerator helped Kakatu by channelling and establishing contact with Telkomsel. Up to now, the application has been used by 280,000 users.

Another start-up, Jarvis, collaborated with Telkom to create an event called 'Kampung Digital UKM', a 'digital valley' for SMEs; this was an event where Telkom introduced the advantages of the internet for businesses, to Telkom's customers (i.e. small and medium-size companies). By participating in this event, Jarvis gained access to the market, and had the opportunity to introduce and also sell its product (Utoyo, 2016).

Table 27. Representative data points underlying the analysis of the corporate accelerator's role

Stages	Role	Evidence of occurrence
Integration	Innovation broker a. Matchmaking b. Scale-up c. Commercialisation	• Conducting events together. • Channelling start-ups to subsidiaries that are willing to use a start-up's product. Align and link start-ups' product with subsidiaries or Telkom customer interface unit. • Working together for product improvement, capacity development, and market commercialisation. • Support start-up alignment with Telkom business.

5.1.4 Fourth stage: Knowledge incorporation

Knowledge incorporation is the stage in which the corporate accelerator supports the corporation to accept and adapt knowledge from a start-up as a raw material of innovation. This study labelled this stage 'incorporation', referring to a merger, fusion, or absorption, or inclusion as part of a larger unit (Crozier et al., 2013). The corporation accepts tacit knowledge, which that refers to 'know-how' or non-codified, and non-verbalised knowledge (Filieri and Alguezaui, 2014). Such knowledge is gained during interaction with start-ups, mentors, and participation in events such as demo days within the accelerator programme.

In the knowledge transfer process, knowledge incorporation refers to the process whereby knowledge is considered for implementation, or is implemented.

Knowledge incorporation consists of two functions: knowledge absorption, and knowledge combination. These functions were identified based on the activities that were referenced in the interview data.

Function in fourth stage: Knowledge absorption

Knowledge absorption is the process of analysing, processing, interpreting, and understanding the knowledge obtained from external sources (Filieri and Alguezaui, 2014). It is also referred to as assimilation, meaning the retrieval and absorption of network resources (Maurer et al., 2011). This study identified several activities that relate to the knowledge absorption function. Telkom's future vision is to become the dominant player in the digital industry (Utoyo, 2016); thus, they need to close in the new industry that is different from the telecommunication industry. As the main player in the digital industry is currently start-ups, understanding start-ups could affect Telkom's intention to develop these players and grow this industry. Telkom has a Digital Services Division tasked specifically with supporting their strategy in increasing start-up numbers for digital industry development (Utoyo, 2016).

This study identified that one of the roles of the transfer office is performed by the corporate accelerator. The 'transfer office' is a term used in the open innovation literature, in particular in regard to university-industry-government relationships, to describe the intermediary institutions that offer development and management services, and are also instrumental in bridging knowledge providers and knowledge-users (Alexander, 2012). In this study, the knowledge providers are the start-ups, and the knowledge-user is the corporation. The knowledge can take the form of information that relates to a digital market condition, digital user behaviour, or trends in the digital industry. Such information is collected by start-ups during the accelerator programme, and then transferred as knowledge to the corporation. The knowledge is then absorbed and used to develop future innovation strategic planning. As stated by the head of Telkom Digital Services Division, "*One of the corporate accelerator programme's aims is to understand customer needs better in order to enhance the customer experience by using Telkom resources*."

Aside from the knowledge that relates to new ideas for product improvement, Telkom also learns from the start-ups' working culture and organisation. Telkom identifies start-ups' organisation agility from the low level of bureaucracy and the short

decision-making process. Telkom then learns how this culture could be implemented within a larger company. As stated by one of Telkom's employees, "*Being honest, we actually want to copy the way the start-ups works, because they are flexible with less bureaucracy, and simple organisation structure. So, we are developing that culture*."

Similar statements were made during the interview with another Telkom employee: "*We have that kind of plan with HCM (human capital management). There will be a pilot first, so we can say it is an insight start-up. They named it Amuba. The organisation is a little bit different. However, we see there is something good in start-ups that we do not have; we want to learn. Even though they have a small organisation and have nothing but the spirit, the culture appears. Not too bureaucratic, stratified decision-making, which makes it short and less extensive. Because there are only five of them, they just decide today so they can move forward, not like in a big organisation. However, this the trend; some global companies, like GE, adopt this model… However, the awareness has already emerged after a long discussion observing the start-up actions. Then this concept, how can it be implemented in a big corporation? That will require adaptation because it cannot be copied directly."*

Function in fourth stage: Knowledge combination

The knowledge combination function is related to the activities of combining new external knowledge with existing internal knowledge (Filieri and Alguezaui, 2014). In the literature, knowledge combination is also referred to as resource use (Maurer et al., 2011).

Many large companies are taking up and implementing start-ups' strategies (Anthony, 2012). This is also true of Telkom, which has adopted the lean start-up method in its product development innovation process (Utoyo, 2016). Senior managers in Telkom's Digital Services Division have acknowledged this fact, and follow the lean method. To produce an innovative product, Telkom carries out customer validation, product validation, and business model validation as the main stages before the product can be released to the market. Utoyo (2016) explained that, "*Telkom implements an incubation method (lean start-up) in its product innovation process, as in start-up incubation*." This indicates that the lean start-up methodology is not only

suitable for start-ups; large companies that embrace this method can gain the greatest benefits (Blank, 2013).

To ensure it is always aligned with the start-up world, Telkom also changed its working tools, particularly in the Digital Services Division (DSD), which works closely with the start-up (Utoyo, 2016). Like start-ups, DSD implements a flexible approach in developing a new digital product that is expected to reach every consumer segment, from individuals to enterprises.

Table 28. Knowledge incorporation activities, functions, and the relevant data

Function and activities	Representative quotes
Knowledge absorption	
Better understand customer and start-ups' world	Understand customer needs better to enhance customer experience by using Telkom resources. Assign the Digital Service Division to grow start-up numbers, as key players in the digital industry.
Develop start-ups' culture	Being honest, we actually want to copy the way the start-ups work, because they are less bureaucratic and simple organisation structure. So, we are developing that culture. We have that kind of plan with HCM. There will be a pilot first, so we can say it is an insight start-up. They named it Amuba; the organisation is a little bit different. However, we see there is something good in start-ups that we do not have; we want to learn. Even though they have a small organisation and have nothing but the spirit, the culture appears. Not too bureaucratic, stratified decision-making. Because there are five of them, they just decide today so that they can move on, not like in a big organisation. However, this the trend; some global companies, like GE, adopt this model. Not yet, the concept is being prepared. Next Monday and Tuesday, there will be a two-day workshop to discuss it. However, the awareness has already emerged after a long discussion observing the start-ups' actions. Then this concept, how can it be implemented in a big corporation? That will need adaptation, because it cannot just be copied.
Knowledge combination	
Compile working tools with start-up	DSD decided to change its working tools to be suitable for start-ups.
Lean start-up as Telkom innovation method	Telkom implements the incubation method (Lean start-up) in its product innovation process, as in start-up incubation.

	Telkom is in the progress of preparing a special unit that runs like a start-up and has a different process to other units in Telkom. We tried to implement the method and its mechanisms; the name is Lane Start-up. The aspiration was then retrieved, later on, we met Steve Plane as well as an 'early adopter'. Because it is still in the early period, we are still new to this. Moreover, not many entities had implemented the method. To be honest, for Telkom, it is 180 degrees different, the principle is totally different.

Role: knowledge integrator

In this study, the corporation's role in the knowledge incorporation stage is labelled 'knowledge integrator', which refers to knowledge absorption and combination. This role was also identified as one of the functions of the innovation intermediary, which helps to combine the knowledge of two or more partners (Howells, 2006). The importance of this role is acknowledged in prior literature recognising the external knowledge flow and the organisation of the innovation process within corporations (Escribano et al., 2009, Tzabbar et al., 2013).

In this study, Telkom recognised the benefits of organisational agility (start-up culture) and intended to implement that culture within the corporation. Telkom also identified the Lean Start-up model containing steps to produce apps in the start-up world. This model is currently being implemented in Telkom's innovation process. At the time when the interviews were conducted, Telkom was preparing a special unit that had a similar culture to start-ups, with the intention of reducing bureaucratic complexity and implementing the Lean Start-up method. The learning process of identifying and absorbing knowledge takes place within the corporate accelerator programme. As such, the corporate accelerator programme can be perceived as a knowledge integrator.

Table 29. Representative data points underlying the analysis of the corporate accelerator's role

Stages	Role	Evidence of occurrence
Knowledge incorporation	Knowledge integrator	- Process the knowledge gained from start-up engagement to better understand customer needs - Lean Start-up method is implemented as Telkom's internal innovation method - Preparation of special unit

5.1.5 Fifth stage: Exploration

The final stage of the corporate accelerator programme process is exploration. In this stage, the scoping and discovery functions were identified during the analysis process. Organisational learning theory relates exploration to searching, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation (March, 1991). Hence, the term 'exploration' was used to label this stage. The following sections will present and discuss the activities that occur during the exploration stage.

Function in fifth stage: Scoping

The primary challenge for the corporation is to innovate continuously while maintaining sales growth; in addition, innovation is a risky strategy (Baker et al., 2016). To address this challenge, Telkom uses a balanced innovation strategy portfolio. That is, it has the strategy to innovate and, at the same time, to look for new products that are different from its core business (exploration) as well as leveraging its existing business (exploitation). Exploration refers to scoping new market opportunities, while exploitation relates to sustaining and scaling the existing business or processes.

In a Silicon Valley Mindset book (Utoyo, 2016), it was revealed that the corporate accelerator programme with start-up engagement is one corporate strategy for exploration (depicted in Figure 27). The exploration strategy aims to create viable options or scoping to find new markets (Figure 27). During the interviews, one of Telkom staff members working on the corporate accelerator programme explained: "*The programme mission is to help Telkom's Digital Services Division identify the trends in digital product innovation and scope, which are new innovation areas to*

explore". Another member of staff mentioned, "*Open innovation strategy makes Telkom always update in a digital wave, understand product variation and information update*."

Figure 27. Telkom's Balanced Portfolio (Utoyo, 2016)

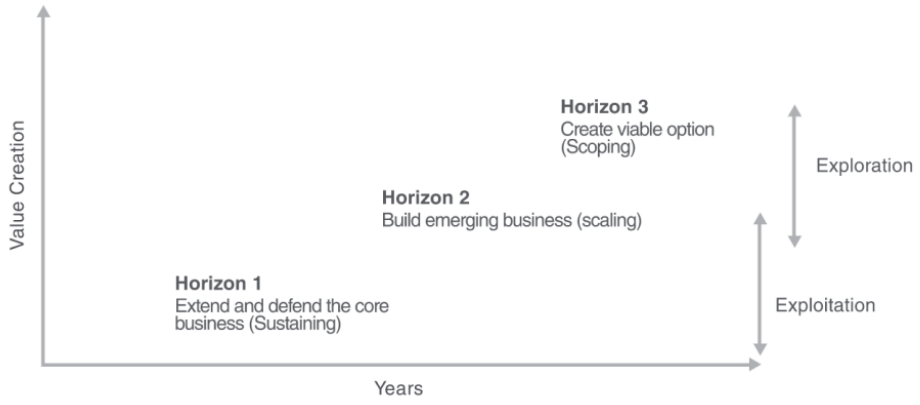
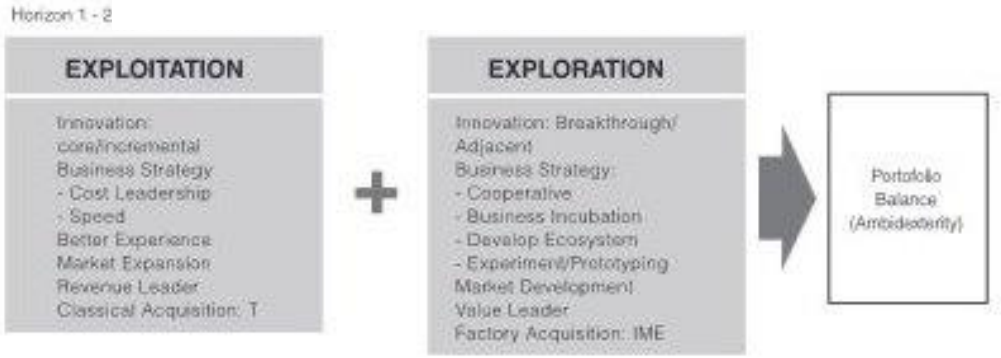


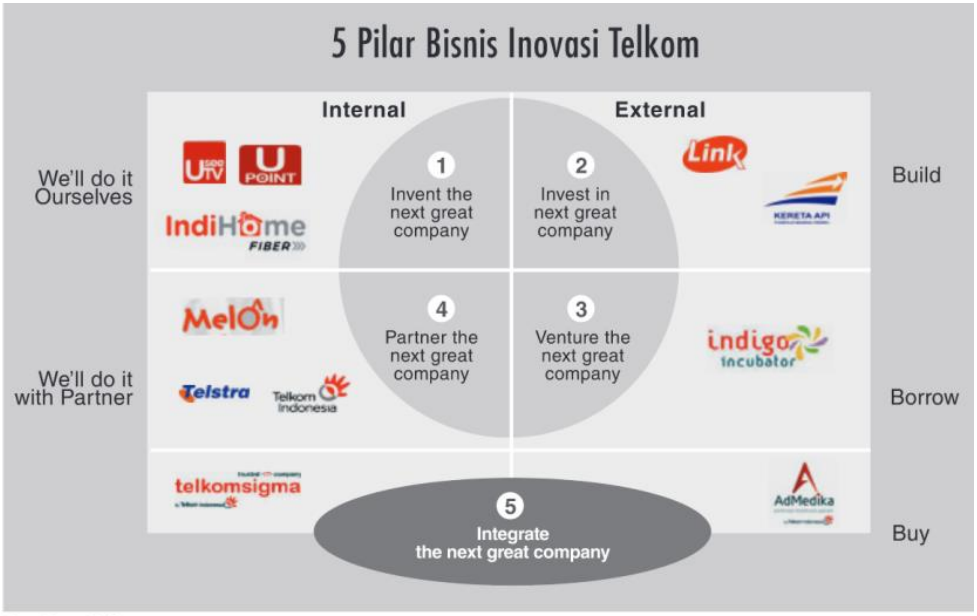
Figure 28. Telkom's innovation strategy (Utoyo, 2016)



Telkom's innovation strategy, with a balanced portfolio, comprises of exploitation, i.e. relates to internal sources, and exploration, i.e. relates to external sources, such as start-ups. Telkom's future vision of entering a new industry, namely the digital industry, will be implemented through the development of a digital ecosystem using the corporate accelerator programme, which involves external sources, specifically start-ups. The aim of engaging with start-ups and building a digital ecosystem is to better understand the customers' needs in regard to a digital product. As such, Telkom technology can be optimally used to support customer

needs. The dictionary definition of the term 'scoping' is an opportunity for using abilities (Collins English Dictionary, 2013). As the activity of engaging with start-ups and building a digital ecosystem can be perceived as an opportunity (i.e. for a digital ecosystem) for using abilities (i.e. engaging with start-ups) this activity is therefore labelled 'scoping'. Figure 29 shows how Indigo, as part of Telkom's innovation strategy, engages with external sources of innovation.

Figure 29. Telkom's five innovation business strategies (Utoyo, 2016)



Sumber: Telkom

Function in fifth stage: Discovery

In the Telkom open innovation strategy, engagement with start-ups through the corporate accelerator is one of the methods of searching for new digital-based business opportunities. As stated by a member of Telkom staff during the interviews, "*DSD is dedicated to creating a new digital product that has never existed before*." DSD is the Telkom division responsible for the corporate accelerator programme, and start-ups are the sources of the new product creation. New insight and knowledge have been identified from the previous stages, regarded as knowledge incorporation. This knowledge is then applied to discover new products or markets. Scoping activities then support corporations in understanding the market and quickly collect information regarding the digital product. This information then assists the corporation in discovering innovation. According to the Collins English Dictionary, the term

'discovery' can be defined as "to find, after study or search," which is in alignment with the activity explained above; thus, this activity is labelled 'discovery activity'.

Table 30. Exploration activities, functions ,and the relevant data

Function and activities	Representative quotes
Scoping	
Product category	Digital product categories for start-ups follow Telkom's markets and consumers. The acceleration programme and digital marketing as market validation.
Information update	This programme mission is to help Telkom's Digital Services Division identify the trends in digital product innovation and scoping innovation area. ICN benefits; product variation and information update (something new continuously). Open innovation strategy to make Telkom always update in digital wave.
Discovery	
Start-up search	Discovery recruits start-ups in batches and incidental recruitment.
Corporation strategy	Telkom innovation discovery programme: open innovation with start-up. DSD dedicated to creating new digital products that have never existed before.

Role: foresight

The analysis above has revealed that the corporation's role in foresight and diagnostics is related to its scoping and discovery function. Foresight is also identified as one of the innovation intermediary types (Howells, 2006) (Mount and Martinez, 2014).

Telkom does not gain the actual innovation source, in terms of a new technology or new product. The corporate accelerator programme facilitates Telkom remaining relevant and gaining information to support Telkom's innovation efforts through engaging with start-ups. As shown in Section 4.2.2, via the corporate accelerator programme, Telkom is exposed to new technologies or methodologies that enable it to better understand its customers' needs, and gains greater insight into the creative digital industry as well as upcoming trends.

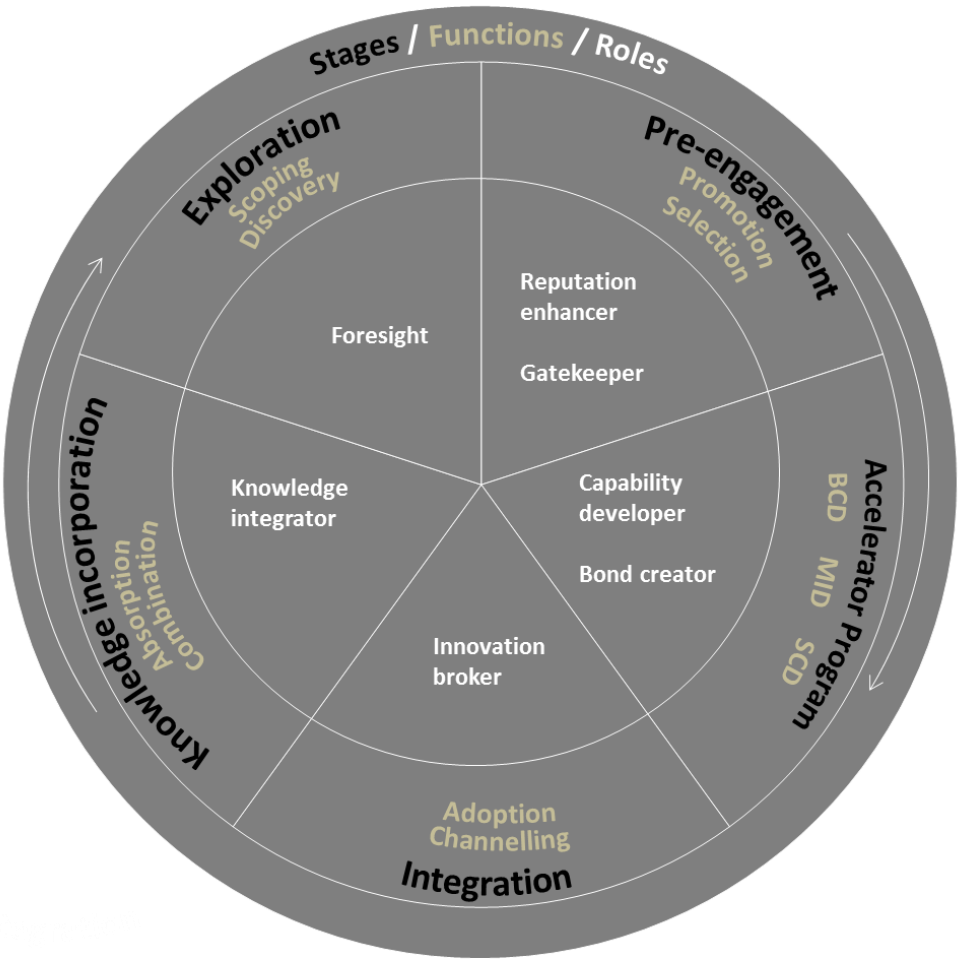
Table 31. Representative data points underlying the analysis of the corporate accelerator's role

Stages	Role	Evidence of occurrence
Exploration	Foresight and diagnostic	- Understanding the market and technological developments in the digital industry. - Telkom's digital strategy: portfolio strategy balance between exploration and exploitation, one platform innovation, innovation mechanism, open innovation, and ecosystem enablement (Utoyo, 2016).

5.2 Model of the corporate accelerator programme as an innovation intermediary with an orchestration role

Synthesising the results fpresented from Section 5.1.1 to Section 5.1.5, this study summarised the findings and represented them in a model of the corporate accelerator programme as an innovation intermediary with an orchestration role (Figure 30). In this model, the circle shape represents the clock-wise direction of the process flow, with stages focusing on start-ups on the right-hand side and the corporation on the left-hand side. The pre-engagement, the accelerator programme, and the integration are the processes that focus on the start-ups. Meanwhile, integration, knowledge incorporation, and exploration are corporation- focused processes.

Figure 30. Orchestration model of the corporate accelerator as an innovation intermediary



The orchestration model represents the design element of the corporate accelerator's value creation (Zott et al., 2011). The model describes the content, structure, and governance of the corporate accelerator system. The stages are pre-engagement, the accelerator programme itself, integration, knowledge incorporation, and exploration, with corresponding functions and roles at each stage. Pre-engagement is the stage in which the corporate accelerator performs its promotion and selection functions, and plays a role as a reputation enhancer and gatekeeper. In the accelerator programme stage, start-ups engage in activities that relate to business capabilities, market infrastructure, and social capital capability development, and the corporate accelerator plays a role as a capability developer and bond creator. The integration process is the stage where the accelerator programme activities involve both the start-ups and the corporation. In this stage, the accelerator programme attempts to intermediate the collaboration process between the start-ups with the potential product

and the corporation's subsidiaries or customer-facing units. The functions of the corporate accelerator at this stage are channelling, and adoption; and its role is as an innovation broker. At the knowledge incorporation stage, absorption and combination are the functions that relate to knowledge transfer activities, with a knowledge integrator role. The final stage is exploration, where the corporate accelerator performs scoping and discovery functions and plays a foresight role. The orchestration model resulting from this study is an extended view of the hub firm as a platform leader in network-centric innovation (Nambisan and Sawhney, 2011).

Telkom can be considered a platform leader (Gawer and Cusumano, 2014). Telkom is the largest company in the Indonesian telecommunication industry, and provides a board range of services including internet provision and a cloud system, to millions of customers. Telkom understands the challenges in the current business situation and that it is essential to pursue organisational evolution. Therefore, Telkom has shifted its strategic focus from telecommunications to the creative digital industry. This shift affects Telkom's organisational structure and has forced Telkom to create a new organisational form, which is the corporate accelerator programme, as an innovation intermediary to connect with start-ups within its network. The start-ups use Telkom services and adopt Telkom technology, thereby creating new markets for Telkom services. The programme processes are visualised in the orchestration model, which presents Telkom's network dynamics wherein the programme plays a brokering role (Miles and Snow, 1986), connecting start-ups and Telkom, as the corporation.

Weiblen and Chesbrough (2015) state that the corporate accelerator is in an outside-in open innovation programme. However, this study has revealed that the corporate accelerator programme in Telkom implements open innovation, where the start-ups are not only a source of outside-in open innovation but also inside-out open innovation. The start-ups also leverage Telkom platforms to develop their products/services.

As stated in the scoping section, the corporate accelerator programme is the implementation of Telkom's exploration strategy. While Telkom also maintains and leverages its existing business via an exploitation strategy. For exploration Telkom uses the corporate accelerator programme as a way to keep close to start-ups, as the main players in the digital industry. The knowledge and experience that is gained

through its relationships with start-ups helps Telkom to find new products, services, and markets. Exploitation strategy is by stay in telecommunication industry and also find another way to leverage the existing business. The balancing of exploration and exploitation capabilities shows that Telkom is implementing an ambidextrous organisational strategy (Tushman and Oreilly, 1996).

The corporate accelerator programme that operates under one particular Telkom division has been designed to face the challenge of understanding and succeeding in the new creative digital industry. The goal is to create new products, services, and even new markets. This reflects Telkom's strategy to address the entrepreneurial problem of adaptive cycle (Snow et al., 2011) and includes start-ups as part of the solution. Through the corporate accelerator programme, Telkom attempts to build and develop an innovation network with start-ups. This strategy means that Telkom can be considered an 'analyser' type firm (Snow et al., 2011). Through the corporate accelerator programme, Telkom configures the network and explores new markets in an attempt to envision the creative digital industry.

This study reinforces the process model for leveraging external sources of innovation developed by West and Bogers (2017). The model conceptualises four phases of leveraging external sources of innovation: obtaining, integrating, commercialising, and interaction. The model developed in this study contributes by elaborating on the interaction phase. The results of this study show that utilising external sources of innovation can be represented by feedback loops with partners and integration within the corporation's internal innovation process. This is different to West and Bogers (2017) model, which represents the external source utilisation in a linear fashion.

5.3 Chapter summary

This chapter has identified the activities, functions, roles, and stages in the corporate accelerator programme, which are inter-related. Table 32 below summarises the identified stages, roles, and function sin the corporate accelerator programme. The relationships between these elements are presented in a model of the corporate accelerator programme as an innovation intermediary with an orchestration role.

Table 32. Summary of stages, roles, and functions in the corporate accelerator programme

Stages	Roles	Functions
Pre-engagement	a. Reputation enhancer b. Gate keeper	a. Promotion b. Selection
The accelerator programme	c. Capability developer d. Bond creator	c. Business capability development d. Market infrastructure development e. Social capital development
Integration	e. Innovation broker	f. Channelling g. Adoption
Knowledge incorporation	f. Knowledge integrator	h. Knowledge absorption i. Knowledge combination
Exploration	g. Foresight	j. Scoping k. Discovery

CHAPTER 6
VALUE CREATION OF THE CORPORATE ACCELERATOR PROGRAMME

In Chapter 5, the activities conducted during the corporate accelerator programme were explored and reported. In this chapter, the values created from these activities for the corporation and the start-ups will be presented and investigated; this is done to answer the second and third research questions:

RQ2: What is the value created for corporations through a corporate accelerator programme?

RQ3: From a social capital perspective, what is the value created for start-ups from participating in corporate accelerator programmes?

Design themes consisting of novelty, efficiency, lock-in, and complementarity (Zott, 2011), and the concept of orchestration (Dhanaraj, 2012; Iansiti, 2009; Nambisan, 2014) were used to define value creation for the corporation. Meanwhile, social capital theory was applied to capture the value creation of a corporate accelerator programme for start-ups. Value creation from both perspectives was then combined, resulting in a value creation model of the corporate accelerator programme as an innovation intermediary playing an orchestration role. The corporation operates the corporate accelerator programme in order to build and orchestrate an innovation ecosystem. Through this programme, the corporation engages with start-ups and involves them in the corporation's innovation strategy. Hence, the corporate accelerator programme can be seen as an innovation intermediary that connects the corporation with start-ups, and simultaneously creates value for both. The relationship between the corporate accelerator programme as an innovation intermediary for start-ups and the corporation, and also the value created from this relationship, is depicted in Figure 31 below.

Figure 31. The relations and value creation of the corporate accelerator programme

The first section of this chapter will discuss the value creation for the corporation, followed by a discussion of the value creation for start-ups. At the end of this chapter, the results of the first and second sections will be combined to present a model of value creation in the corporate accelerator programme.

6.1 Value creation for the corporation

Having identified the activities, functions, roles, and processes that the corporate accelerator programme performs in orchestrating Telkom's innovation network (see Chapter 5), the analysis continued by identifying the value created (for the corporation) from the orchestration roles.

As explained in Section 4.4.1, the analysis process in this study began with coding of the orchestration activities. The coding was based on the theory and concepts identified from the literature review. The interview transcripts were reviewed to identify and label the parts that matched with the codes; this was the coding process, from which some thematic orchestration statements resulted (see Table 33 - Orchestration activities). The analysis process continued by summarising and categorising the thematic orchestration statements, and the results were interpreted to identify the orchestration practice in the corporate accelerator programme (see Table 33 - Corporate accelerator programme orchestration activities). The identified orchestration practice was connected with the value creation design themes in order to identify the value created for the corporation during the corporate accelerator programme. The results are summarised in Table 33, below, and will be discussed in the following subsections.

Table 33. Representative data points underlying the analysis of the corporate accelerator's orchestration activity and value creation

Orchestration Activities (Dhanaraj and Parkhe, 2006, Iansiti and Levien, 2004, Nambisan and Sawhney, 2011)		**Corporate accelerator programme orchestration activities**	**Value creation**
Knowledge mobility	Knowledge absorption	Knowledge internalisation for the corporation.	Novelty, create knowledge mobility to enhance innovation.
	Inter-organisation socialisation	Corporation gains access to start-ups' communities, enlarges its network, and finds additional sources of innovation.	
Innovation appropriability	Joint asset ownership	Seed funding for start-ups and equity for Telkom.	Lock-in, build innovation appropriability to keep members in the network.
Network stability	Reputation enhancement	Promotion activities through the website and articles in the online media.	Lock-in, activities to establish and maintain innovation network stability.
	Network membership	Periodic selection of potential start-ups through a registration process and interviews.	
Innovation coherence	Facilitate transition of innovation	- The division that is responsible for the corporate accelerator programme supports the adoption of start-ups' product in Telkom's subsidiaries. - Collaboration activities between Telkom and start-ups.	Complementarity, all activities enable innovation coherence
	Redefine innovation for new markets	- Scoping - Discovery	
Innovation leverage	Identify opportunities for asset leverage	Telkom application programme interface (API) can be used by start-ups to develop their product.	Efficiency, leveraging resource use

6.1.1 Knowledge mobility

According to Dhanaraj and Parkhe (2006), knowledge mobility can be related to knowledge-creating activities in the network, where knowledge resources are combined and deployed within the network. The combination and deployment of knowledge resources in the network is believed to lead to the serendipitous nature of innovation (Dhanaraj and Parkhe, 2006). Knowledge absorption, network identification, and inter-organisational socialisation are included within knowledge mobility activities. Activities that are include within knowledge absorption are associated with identifying, assimilating, and exploiting knowledge from the environment, while sharing the same identities among network members is related to network identification, and formal and informal linkages between network members is correlated with inter-organisational socialisation (Dhanaraj and Parkhe, 2006).

From the corporate accelerator programme, Telkom identified a method of innovation from the start-up evaluation process known as the 'Lean Start-up' method. The head of the Telkom Digital Services Division explained, "Telkom adapted the method and implemented it in the innovation process. We followed the start-up modelling, started with customer validation, product validation, and then business model validation until market exploration." Moreover, he also explained that: "*we see that there is something good in start-ups that we do not have; we want to learn. Even though they have a small organisation and have nothing but the spirit, the culture appears. Not too bureaucratic, stratified decision-making, so make it not a long and extensive process."*

From these statements, it can be seen that Telkom acknowledges the positive components of start-ups. As the Telkom Senior Manager for Open Innovation explained, "*the awareness has already emerged after a long discussion and observing the start-ups' actions. Then we think about how the concept that had been implemented in start-ups can also apply in a big corporation*." From this statement, it is clear that Telkom has captured the knowledge related to innovation methods through its interactions with start-ups, absorbed that knowledge and will adopt the knowledge within its internal innovation process.

Formal and informal interactions between start-up tenants can occur through mentoring, classes, and informal conversations during corporate accelerator events or daily interactions at the shared office and promote knowledge mobility in the Telkom

innovation network. This socialisation process increases social and relational capital for both start-ups and Telkom. As the Telkom Senior Manager for Open Innovation stated: "*From the corporate accelerator programme we get help, especially for networking with investors and other parties, and we get help from the mentors, too*." Moreover, he explained, "*From that event we can also identify major capital and other incubators. So, that can be a way for us to build or develop the network even further*."

All the activities that were identified and included under knowledge mobility led to something new for Telkom, such as a new relationship or new method. Knowledge mobility enhances start-ups' innovation process, from ideation to commercialisation. This results in a variety of potential products to develop and combine with existing or future Telkom products. This was mentioned by Telkom's Head of Digital Services Division, who is responsible for product innovation: "*It is just the same from the product variation, but start-ups are more. Sometimes we also need to have something new continuously, and it usually comes from the start-ups*." According to Zott and Amit (2010), value creation relates to new activities, and/or a new way of linking the activities, and/or new ways of governing the activities, and those are the essence of novelty. The adoption of innovative content, structure, and governance are also examples of novelty. Based on this, this study included knowledge mobility as an example of value created by the corporate accelerator programme for the corporation.

6.1.2 Build innovation appropriability

Innovation appropriability is a mechanism that ensures every member in the network obtains an appropriate value for their contribution in the network. Previous studies in this area have identified several possible negative behaviours of network members, for example free-riding and opportunistic behaviour, innovation leaks to a competitor, and lack of relation clarity (Nambisan and Sawhney, 2011). These behaviours, according to Nambisan and Sawhney (2011), can reduce the likelihood of potential members participating in the network. Therefore, to ensure equitable distribution of value, corporations often attempt to keep start-up seek out opportunities to contribute to the network. In this context, joint asset ownership between a hub firm and members in the network, which enhances the commitment of actors toward shared

goals and provides incentives for sharing reward, is related to innovation appropriability (Dhanaraj and Parkhe, 2006).

The contract signed by all start-ups at the beginning of the corporate accelerator programme is a form of procedural justice clarifying the start-up-corporate relationship and the obligations of both parties. The contract builds trust and ensures clear communication of all activity achievements during the programme. The accelerator programme is designed to help a start-up accelerate its business and technical development in a limited time by providing financial support, shared office facilities, and wider network relationship opportunities. During the programme, start-ups are required to demonstrate their achievements in customer validation, product validation, and business model validation. At each validation stage, if a start-up satisfies the requirements, they receive the next stage of funding. By contrast, if start-ups do not satisfy the requirements, their participation in the programme will be terminated.

The accelerator programme manager explained the stages that force start-ups to demonstrate their business capability progress over the course of the programme:
"*The corporate accelerator programme is divide into three stages: 1) Customer validation, where the idea is validated by the customer via interviews, ensuring that the product is a solution for a customer problem and that they will use the product. The start-up will receive funding of 10 million rupiah for one month; 2) Product validation (product development, product developed to a minimum level scale and then tested with the customer), over a three-month duration and with funding of 120 million, facilitated with office space, a tutor and events to knowledge update; 3) Business model validation (business model development, how to deliver the product to customers so they want to buy the product), over a three-month duration and with funding of 120 million. The total duration of the programme is seven months, with a total of 250 million IDR funding in return for 12% equity for Telkom*."

The shared value between start-ups and Telkom forces each party to sustain the systems. Start-ups must present their progress at the end of every stage of the corporate accelerator programme. If they fail, their participation in the programme will be terminated. Hence, they must enhance their business ability in order to preserve their position in the programme. Telkom, as the programme owner, is motivated to help the

start-ups be continuously successful and sustain their position in the programme. The shared value in terms of equity ties start-ups to Telkom , as mentioned in the interview with Telkom's Head of Digital Services Division: "*We have already given them money that can be converted into equity. So, we will not get profit from the product. Nevertheless, we can still get value from the start-ups because we are a shareholder*." The situation of retaining business model stakeholders, in Zott and Amit (2010) corresponds to lock-in. Here, 'lock-in' refers to the value-creating potential that motivates parties to maintain and improve their associations (Amit and Zott, 2001). Based on this, this study identifies innovation appropriability as lock-in design themes value creation for corporate accelerator programme.

6.1.3 Establish and maintain innovation network stability

Network stability is a mechanism for maintaining a conducive balance between the number of members and is linked to value creation. Loosely network condition has advantages in terms of adaption and agility, however, loss of members can significantly impair innovation output. Network stability can be maintained in several ways: by enhancing reputation; by lengthening the shadow of future; and by building multiplexity (Dhanaraj and Parkhe, 2006).

A hub firm with a strong reputation will find it easier to formulate new ties, especially with new firms searching for legitimacy in a market place with the market leader. Telkom, as a hub firm, has a strong brand reputation in the telecommunications industry. However, in the digital creative industry, Telkom is still attempting to build a reputation as a leader. As such, Telkom actively promotes its corporate accelerator programme. Activities in the pre-engagement stage, where Telkom hosts promotional events to introduce the corporate accelerator programme, are a way to enhance the company's reputation and to encourage the formation of new ties as well as building trust. Through social media, workshops, and websites, Telkom promotes Indigo. In addition, to attract start-ups to join the innovation network, this promotion also aims to position and portray Telkom as a leader in the creative digital industry. As a Telkom Senior Manager in open innovation explained, "*Our first tool is our website, indigo.id. Indigo.id is the tool to introduce Indigo, to share news about Indigo, and then to*

register start-ups. Through Indigo, we also want people to know that we are moving into digital industry."

The other way of maintaining network stability is through network membership, where the corporation recruits and selects partners (Dhanaraj and Parkhe, 2006). During the corporate accelerator programme, start-ups are periodically evaluated to ensure their achievements meet Telkom's expectations. If they do not reach the progress requirements of the corporate accelerator programme, their participation will be terminated, which decreases the number of members in Telkom's network. By periodically opening the recruitment process, every six months, Telkom attempts to keep the network stable as well as allow new ideas to flow into the network. As a Telkom Senior Manager in open innovation explained: "*The corporate accelerator programme searches for startups in various ways. There are batches and incidentals. The batch is twice a year. In the first or second quarter, and the third quarter. Currently, the second batch of 2016 is running. There are always new ideas coming from the new start-ups providing us with new knowledge."*

Telkom's promotional events attempt to promote and introduce the corporate accelerator programme in a variety of ways to enhance the Telkom brand within the creative digital industry. It is important to maintain a strong perception of Telkom's commitment to the creative digital industry in order to ensure start-ups remain in the Telkom network via the corporate accelerator programme. A senior manager in Telkom open innovation explained, "*With the open innovation, we get to be known too. Obviously, Telkom has concerns regarding those issues, and from some testimonies or experiences of previous start-ups, their products adopted by Telkom. That also helps us to become known outside*." This statement shows that start-ups remain in the programme due to the possibility of their product being adopted by Telkom.

In value creation, the design theme of lock-in can be related to the activities preventing the migration of partners to competitors (Amit & Zott, 2001). As such, this study has identified network stability as a value created by the corporate accelerator programme for the corporation.

6.1.4 Enable innovation coherence

Innovation coherence relates to goal alignment between the hub firm and network members. It comprises of internal and external coherence. Activities related to internal innovation coherence include the coordination and alignment of processes and outputs of the network, while external innovation coherence relates to the alignment of the goals and outputs of the network to the external market environment and technologies (Nambisan and Sawhney, 2011). In an innovation ecosystem, the focal firm that initiates the ecosystem development as an innovation strategy demands an innovation process or innovation outcome improvement. This is accomplished by utilising ecosystem members' products as if they were new products, or combining the ecosystem members' products with existing products or services. It is also accomplished by using the knowledge that is collected via corporate accelerator programme activities to improve corporate business and its strategy.

Telkom has a special division that operates the corporate accelerator programme. Its function is to manage the programme and its output. This is the Digital Service Division (DSD), responsible for Telkom product innovation, supporting the process of integrating start-up and Telkom products in terms of product improvement, capacity development, and market commercialisation. As explained by the Telkom open innovation Senior Manager:

"*To explain it clearly, the first stage is to determine the start-up's readiness. Because when they joined with Telkom, they surely have to scale up their product. The scale ability is, for example, maybe they have 100 clients, what if this suddenly increases to 10,000 clients, is the system capable of this? Can it tolerate? Is the server capable, or the application capable? These must be assured. Then, in parallel, we have a forum in DDS, namely the product forum, every Thursday. In this forum, all kinds of innovation ideas that are guarded by the DDS team are presented. There will be opportunities for problems to not be solved by start- but we have to make another one because that will take more time. Second is to grab the needs. From the events, we hold exhibitions and invite start-ups; we ask them to have a booth. From this activity, the needs usually emerge. There is no standard process, but we always do it like that. On one side, we look for opportunities for the start-ups to be implemented. The implementation does not have to be as it is. The most widely used, for example, we labelled it so the product will be used but under a different name. The engine will be used. Third, it needs to be*

customised because it will be integrated with other products. That process has to be identified and we need to connect the start-ups with others who might need them. If there is a deal between start-ups and our business unit or internal departments, then they enter into the engagement area. After entering the engagement area, then we discharge them. They will be taken over by ecosystem sectors."

The division also facilitates the formation of relationships between start-ups and Telkom subsidiaries or Telkom customer-facing units to pursue collaboration opportunities. As a Telkom accelerator programme manager stated,

"*In the Telkom organisational structure, DSD is under the Innovation and Strategic Portfolio department. It manages Bandung, Yogya, and Jakarta Digital Valleys, where acceleration and incubation are taking place. It also manages DiLO (Digital Lounge) in collaboration with MIKTI (Indonesia Digital and Creative Industry Community). Its purpose is to bring creativity to commerce, exploring how creative and innovation products or services from start-ups could be developed further to be marketed to Telkom CFU, which has 150 million mobile customers, 3 million IndiHome customers, more than 200,000 corporate and small business customers, and also branches in 10 countries."*

Knowledge from the corporate accelerator programme can be used as information for developing an innovation sustainability strategy (Iansiti and Levien, 2004). Related to external coherence, this knowledge is also valuable to understand market and technology development in the digital industry. As explained by Telkom's Head of Digital Services Division:

"*Our development strategy was portfolio balance, so exploration and exploitation had an equal portion. This means we are exploring products which are in a ready condition so that we can scale them. But for scoping, we still need a couple of initiatives. One of the initiatives to understand the market is open innovation through Indigo Creative Nation. We collaborate with digital talents in hopes of creating a marketable product. But we also have another initiative for exploitation; we have been doing internal innovation."*

He further stated, "*Open innovation management functions relate to start-ups and digital environment development involving external participations… Its roles also include planning how to produce a new product that will eventually be delivered to*

the customer-facing unit; this could be a unit in Telkom or one of its subsidiaries that sells and delivers product to the market. The information obtained during the process enables us to define our future innovation strategy."

This statement portrays engagement with a start-up as an attempt to create a product that can be commercialised through corporate subsidiaries. In value creation, the design theme of complementarities can be defined as the bundling of activities to generate more value (Zott & Amit, 2010). This study relates complementarities with innovation coherence, creating value from the aforementioned activities.

6.1.5 Innovation leveraging

Innovation leveraging is related to the reuse or redeployment of corporate technologies, processes, and other corporate assets to facilitate or enable start-ups' capacity development (Nambisan and Sawhney, 2011). According to Iansiti and Levien (2004), these assets may be physical, such as a manufacturing network, intellectual, such as a software platform, and financial, such as portfolio investments.

In addition to financial assets, which are shared through seed funding, Telkom allows start-ups to access and use its technology during the validation process. Telkom's application programme interfaces (APIs), such as its billing system, big data, and cloud service are free for tenant start-ups to access. Telkom also provides free server facilities for start-up product development. The accelerator manager described this in the interview:

"*We have one other sector in DDS, namely Open API. Open API actually makes it possible for the start-ups to be integrated into available service infrastructure in Telkom. For example, we want to use an SMS service. I think if they make an application for it they will need SMS fortification so they could provide the service via us. Then to integrate it into an online payment system that already exists."*

This study views Telkom market as the asset scope that is provided for start-up innovation. As Gawer and Cusumano (2014) stated in management research technological platform research has developed market as platform perspective. Telkom market access is important for start-ups during the customer validation process. Market access is important to ensure that there are customers with a problem that needs to be solved, and that the start-ups' product can solve that problem.

Moreover, access to Telkom customer data based is valuable for start-up product commercialisation. This was reflected in the interviews with the start-ups, where a representative of Jarvis explained, "*Market access is how we can penetrate Telkom customers, offering Jarvis Store to them. Some, such as Kampung UKM Digital, workshops held by Telkom in some cities. This year in 300 cities. Why has that helped? Because user acquisition for a start-up is quite expensive if it is done manually, through a campaign. With the help from Telkom, the market access is valuable.*"

Similarly, a representative from the start-up Kakatu explained, "… *access, because under the auspices of the Telkom group, it is arguably very easy to enter and work with the subsidiaries of Telkom*." The Telkom accelerator programme manager also mentioned the benefit of market access for a start-up: "*Telkom group resources for marketing channels can be used to market start-up products and gain access to all Telkom customers*."

The Privi-ID start-up developed an application for document digitalisation. Their product, called Privi-doc, is used in collaboration with the Telkom Indihome product. Telkom's Indihome is an integrated digital service that comprises internet, television, and telephone services. Using Privi-doc, the customer registration process for Telkom Indihome has been simplified, and thus, the application time is reduced. Privi-doc also enables an online registration service for Telkom's Indihome customers.

This shows how efficiency, in terms of process simplification and process time reduction, results from a collaboration between a start-up's product (i.e. Privi-ID) and the corporation's (Telkom) product. Efficiency was included as one of the sources of value creation when activities are reorganised to reduce transaction costs. For this reason, this study includes 'innovation leverage' as a source of value creation for the corporation in a corporate accelerator programme.

6.2 Value creation for the start-ups

To understand the value created for start-ups, a survey study was conducted to capture all start-ups' attitudes regarding the corporate accelerator programme they had been involved in. The hypotheses were developed in Section 4.4.3, and this section will explore the results of hypothesis testing and also interpret the findings.

6.2.1 Hypothesis testing: results

As explained in Chapter 4 Section 4.4.3, to test the aforementioned hypotheses, this study used PLS-SEM, which consists of two stages: 1) a measurement model; and 2) a structural model (Hair et al., 2017). The measurement model evaluates the reliability and validity of the construct measures, and the structural model evaluates the model's ability to predict the variance in the dependent variables. The following sections will report the results of the hypothesises testing.

Hypothesis 1_a: In a corporate accelerator programme, the structural dimension of social capital in start-ups is positively related to knowledge transfer.

Hypothesis 1_b: In a corporate accelerator programme, the relational dimension of social capital in start-ups is positively related to knowledge transfer.

Hypothesis 1_c: In a corporate accelerator programme, the cognitive dimension of social capital in start-ups is positively related to knowledge transfer.

Hypothesis 2: Knowledge transfer is positively related to start-ups' innovation outcome: a) exploitation, and b) exploration.

Hypothesis 3: Knowledge transfer mediates the relationships between start-ups' social capital dimensions and innovation outcome.

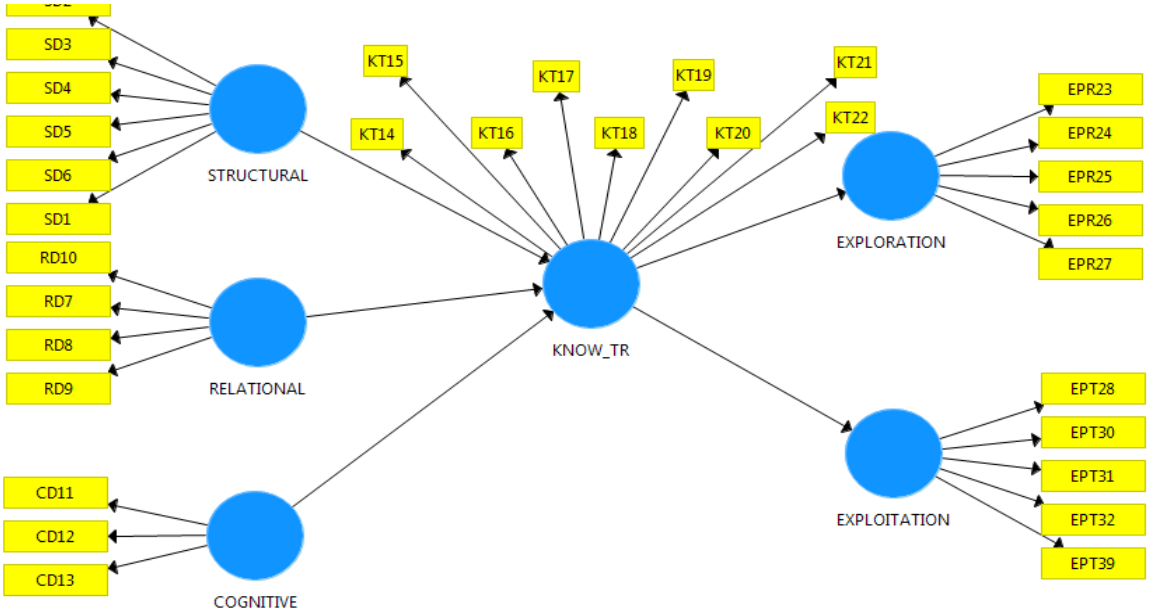
Measurement model

The previous section has explored the value of a corporate accelerator programme for start-ups, which foster innovation with the mediation of knowledge transfer, from the social capital perspective. This section will describe the hypothesis testing using PLS-SEM and outline the results. The two-stage test of the hypotheses using PLS-SEM involved: 1) a measurement model, to evaluate the reliability and validity of the construct measures; and 2) a structural model, to test the relationships between constructs.

A measurement model examines the extent to which measurement scales are actually measuring the supposed constructs. There are three types of measurement model: 1) convergent validity; 2) internal consistency reliability; and 3) discriminant validity. The first refers to which measurement items correlate strongly with its assumed theoretical construct. The second is an estimate of reliability based on the correlations between the observed indicator variables. The last is a measure of the

extent to which a construct is truly distinct from other constructs by empirical standards (Hair et al., 2017). The social capital and innovation outcomes model have four latent variables with reflective measurement models (i.e., STRUCTURAL, RELATIONAL, COGNITIVE, KNOW_TR) as well as a double-item construct (EXPLORATION, EXPLOITATION).

Figure 32 The structural model



The first criterion to be evaluated in the measurement model is internal consistency reliability, for which Cronbach's alpha and composite reliability were used. Cronbach's alpha and composite reliability have the same threshold value, between 0.6 and 0.9, with a higher value indicating a higher level of reliability. All constructs in this study have internal consistency values above 0.7, indicating that the constructs are measuring different phenomena and are valid measures of the construct. Some item measurements were removed at this stage because they showed a value of less than 0.3.

Table 34. Results summary for internal consistency reliability

Latent Variable	Cronbach's alpha	Composite reliability
STRUCTURAL	0.704	0.730
RELATIONAL	0.763	0.781
COGNITIVE	0.674	0.780
KNOW_TR	0.798	0.838
EXPLORATION	0.759	0.791
EXPLOITATION	0.828	0.873

The second test is convergent validity. To test the convergent validity, two metrics were used: measurement item outer loading and average variance extracted (AVE). High outer loading on a construct indicates that the associated indicators have much in common. A common rule of thumb for outer loading is 0.708 or higher. An AVE value of 0.5 or higher indicates that, on average, the construct explains more than half of the variance of its indicators. In this test, the items that were measured included were the remaining items from the prior internal consistency reliability test. The test was an iterative process, whereby under-value item measurements were removed until all variables reached the convergent validity criteria. In this study, all variables reached the convergent validity criteria after three iterations. A summary of the results of this test is presented in Table 35 below.

Table 35. Results summary for convergent validity

Latent Variable	Measures	1st test		2nd test		3rd test	
		Convergent Validity		Convergent Validity		Convergent Validity	
		Loading	AVE	Loading	AVE	Loading	AVE
		>0.7	>0.5	>0.7	>0.5	>0.7	>0.5
STRUCTURAL	SD1	0.591	0.419	0.679	0.550	0.685	0.542
	SD2	0.714		0.779		0.770	
	SD3	0.759		0.712		0.723	
	SD4	0.521					
	SD5	0.415					
	SD6	0.784		0.790		0.783	
RELATIONAL	RD7	0.727	0.585	0.861	0.585	0.863	0.584
	RD8	0.700		0.741		0.736	
	RD9	0.767		0.675		0.683	
	RD10	0.857		0.769		0.764	

COGNITIVE	CD11	0.685	0.556	0.644	0.541	0.640	0.542
	CD12	0.683		0.655		0.661	
	CD13	0.855		0.883		0.882	
KNOW_TR	KT14	0.778	0.416	0.764	0.512	0.798	0.590
	KT15	0.504					
	KT16	0.602		0.604			
	KT17	0.630		0.620			
	KT18	0.090					
	KT19	0.858		0.875		0.854	
	KT20	0.690		0.673		0.651	
	KT21	0.620		0.678		0.750	
	KT22	0.722		0.758		0.771	
EXPLORATION	EPR23	0.724	0.499	0.774	0.574	0.803	0.661
	EPR24	0.844		0.853		0.837	
	EPR25	0.813		0.796		0.799	
	EPR26	0.613		0.579			
	EPR27	0.471					
EXPLOITATION	EPT28	0.852	0.641	0.881	0.623	0.860	0.635
	EPT29	0.857		0.823		0.835	
	EPT30	0.753		0.708		0.738	
	EPT31	0.738		0.763		0.760	
	EPT32	0.796		0.760		0.784	

The third test is discriminant validity, which is used to measure the extent to which a construct is truly distinct from other constructs by empirical standards. Henseler et al. (2015) introduced a new, alternative approach to evaluate discriminant analysis, the heterotrait-monotrait (HTMT) ratio of correlations. HTMT is the ratio of the between-trait correlations to the within-trait correlations. In short, the HTMT approach is an estimate of what the true correlation between two constructs would be if they were perfectly measured. The final results of the discriminant validity assessment for all constructs in this model are presented in Table 36 below. The results show that all constructs have good discriminant validity with an HTMT of less than 0.9.

Table 36. Discriminant validity results

	STRUC-TURAL	RELA-TIONAL	COG-NITIVE	KNOW_ TR	EXPLO-RATION	EXPLOI-TATION
STRUCTURAL						
RELATIONAL	0.515					
COGNITIVE	0.484	0.544				
KNOW_ TR	0.832	0.296	0.241			
EXPLORATION	0.653	0.332	0.403	0.565		
EXPLOI TATION	0.522	0.298	0.457	0.294	0.748	

Structural model

The assessment of the structural model commenced after the construct measures were confirmed as valid and reliable. This assessment involved examining the model's predictive capabilities and the relationships between the constructs. The systematic approach to assessing the structural model consisted of six steps (Hair et al., 2017):

Step 1: Assess structural model for collinearity issues

Step 2: Assess the significance and relevance of the structural model relationships

Step 3: Assess the level of R^2

Step 4: Assess the f^2 effect size

Step 5: Assess the predictive relevance Q^2

Step 6: Assess the q^2 effect size

Step 1: Collinearity assessment. This assessment evaluates the correlation between constructs. High correlations between two constructs indicates that redundant indicators are used as single items to measure two (or more) constructs. The critical level is between 0.2 and 5. Table 37 shows the collinearity assessment results for all constructs.

Table 37. Collinearity assessment results

	KNOW_TR	EXPLORATION	EXPLOITATION
STRUCTURAL	1.236		
RELATIONAL	1.333		
COGNITIVE	1.303		
KNOW_TR		1.000	1.000

The critical level of each set of predictor variables is in tolerance values (0.2<critical level<5), and, therefore, collinearity among the predictor constructs was determined not to be a critical issue in this structural model. Therefore, the assessment could continue to the next step.

Step 2: Structural model path coefficients. The path coefficients represent the hypothesised relationships among the constructs, with standardised values between 0 and 1. Estimated path coefficients close to 1 represent strong positive relationships, which are usually statistically significant. The closer the estimated coefficients are to 0, the weaker the relationships. Whether a coefficient is significant or not ultimately depends on the empirical t-values and p-values for all structural path coefficients. When an empirical t value is greater than the critical value, it can be concluded that the coefficient is statistically significant at a certain error probability. This research used a significance level of 5%. The p-value is the probability of erroneously rejecting a true null hypothesis. When assuming a significance level of 5%, the p-value must be smaller than 0.05 to conclude that the relationship under consideration is significant at the 5% level. Table 38 outlines the measurement values of the structural model path coefficients.

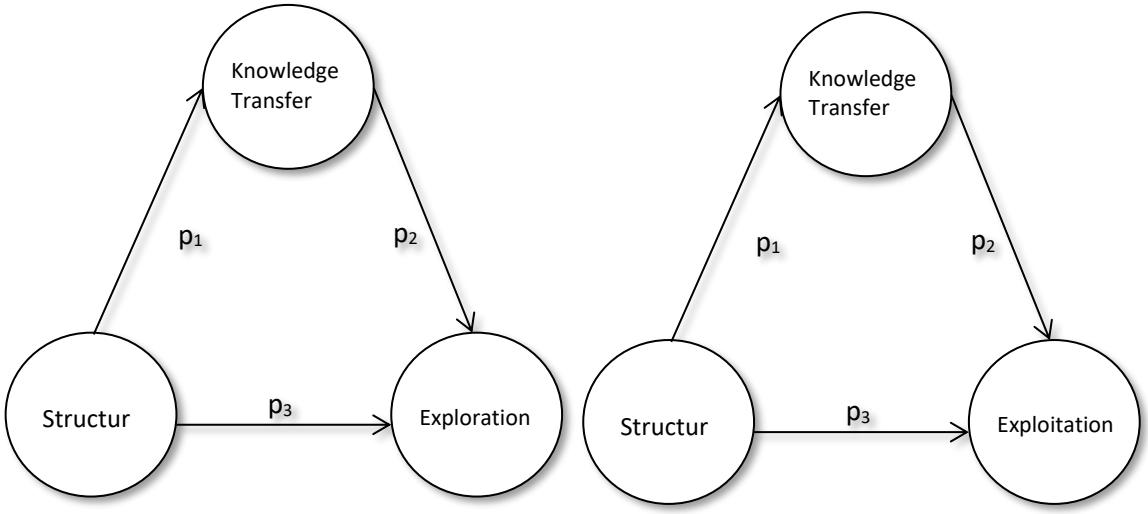
Table 38. The measurement values of structural model path coefficients

Hypothesis	**Relationships**	**Path coefficients**	**t-values**	**p-Values**	**95% confidence interval**	**Significance (p < 0.05)**
1	KNOW_TR → EXPLORATION	0.382	2.655	0.008	[-0.469, 0.563]	Yes
2	KNOW_TR → EXPLOITATION	0.421	2.735	0.006	[-0.738, 0.532]	Yes
3	STRUCTURAL→ KNOW_TR	0.730	4.879	0.000	[0.407, 0.978]	Yes
4	RELATIONAL → KNOW_TR	-0.05	0.245	0.806	[-0.577, 0.232]	No
5	COGNITIVE → KNOW_TR	-0.03	0.194	0.846	[-0.319, 0.285]	No

Assuming a 5% significance level, this study found that the significant relationships in the structural model are: STRUCTURAL – KNOW_TR, KNOW_TR – EXPLORATION, and KNOW_TR – EXPLOITATION.

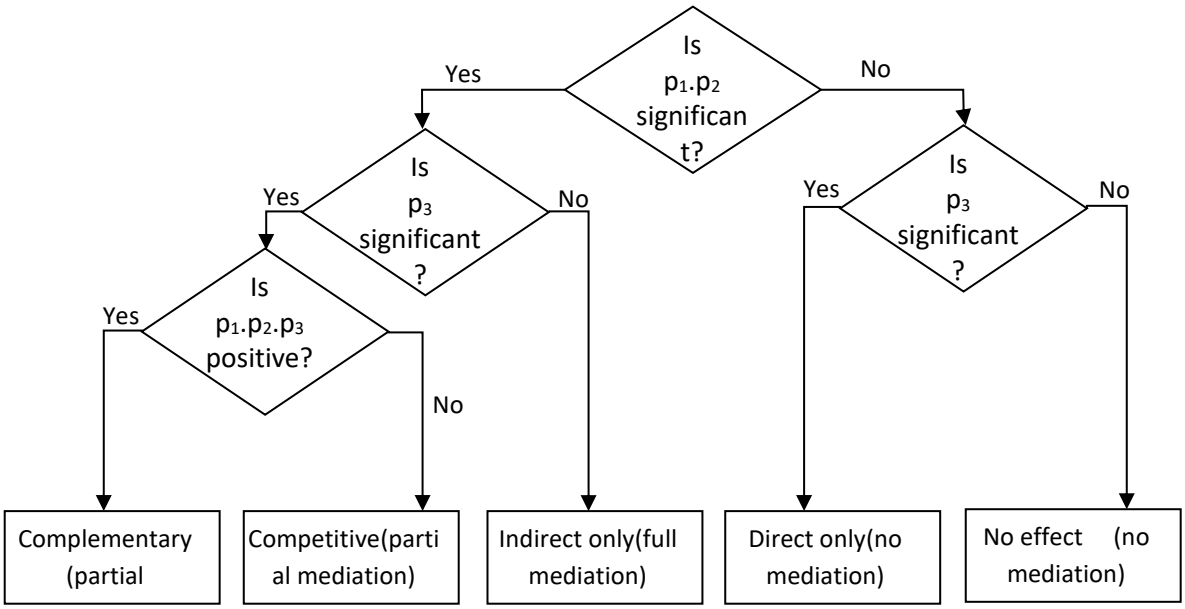
This study further measured the mediating effect of KNOW_TR as a mediator variable that intervenes between STRUCTURAL and EXPLORATION, and also between STRUCTURAL and EXPLOITATION. The mediation model of this study is visualised in Figure 33. The mediating effects are calculated from direct effect value (p_3) and indirect effect value (p_1p_2). Direct effect can be seen from the single arrow that links two constructs, while indirect effects are those relationships that involve a sequence of relationships, with at least one intervening construct involved.

Figure 33. The mediation model of this study



According to Hair et al. (2017), there are three types of mediation: 1) complementary mediation, where the indirect effect and the direct effect are both significant and point in the same direction; 2) competitive mediation, where the indirect effect and the direct effect are both significant and point in opposite directions; and 3) indirect-only mediation, where the indirect effect is significant but not the direct effect. Testing the type of mediation requires running a series of analyses, as presented in Figure 34.

Figure 34. Mediation analysis procedure



In this study, p_1 is the p-value of the relation between STRUCTURAL and KNOW_TR, p_2 is the p-value for KNOW_TR and EXPLORATION or EXPLOITATION, and p_3 is the p-value for the direct effect relation between STRUCTURAL and EXPLORATION or EXPLOITATION. The mediating effect test was performed using SmartPLS, which resulted in the data shown in Table 39 below.

Table 39. Significance analysis of the direct and indirect effects

	Direct effect (p_3)	**95% confidence interval of the direct effect**	**t-value**	**Significance ($p < 0.05$)?**
STRUCTURAL → EXPLORATION	0.163	[-0.245,0.869]	1.394	Yes
STRUCTURAL → EXPLOITATION	0.129	[-0.219,0.837]	1.517	Yes
STRUCTURAL → EXPLORATION	0.000	[-0.278,0.511]	0.460	Yes
STRUCTURAL → EXPLOITATION	0.000	[-0.315,0.476]	0.337	Yes

The mediating effect test results in Table 39 show that relationships between STRUCTURAL-EXPLORATION and STRUCTURAL-EXPLOITATION are significant for direct effect and also for indirect effect. Comparing the results to Figure 5.3 shows that KNOW_TR mediates the relation between STRUCTURAL and EXPLORATION or EXPLOITATION.

Step 3: Coefficient of determination (R^2 value). This coefficient is a measure of the model's predictive power and is calculated as the squared correlation between a specific endogenous construct's actual and predicted values. The coefficient represents the exogenous latent variable's combined effects on the endogenous latent variable. The R^2 value ranges from 0 to 1, with higher levels indicating higher levels of predictive accuracy. Acceptable R^2 values depend on the model complexity and the research discipline. R^2 values of 0.75, 0.5, or 0.25 for an endogenous latent variable can, as a rule of thumb, be described as substantial, moderate, or weak, respectively (Hair et al., 2017). From Table 40 it can therefore be concluded that all the dimensions of social capital together have a moderate relationship with KNOW_TR, and KNOW_TR has a weak relationship with EXPLORATION and EXPLOITATION.

Table 40. Coefficient of determination results

	$\mathbf{R^2}$
KNOW_TR	0.494
EXPLORATION	0.146
EXPLOITATION	0.177

Step 4: Effect size (f^2). In addition to calculating the R^2 values of all endogenous constructs, f^2 measures the change in R^2 value when a specified exogenous construct is omitted from the model. This can be used to evaluate whether the omitted construct has a substantive impact on the endogenous constructs. This step tests whether STRUCTURAL has a substantive impact on KNOW_TR, and KNOW_TR on EXPLORATION and EXPLOITATION. The guidelines for assessing f^2 state that the values of 0.02, 0.15, and 0.35 represent small, medium, and large effects of the exogenous latent variable (Hair et al., 2017). An effect size of less than 0.02 indicates

that there is no effect. The results showed that STRUCTURAL has a substantive impact on KNOW_TR, while KNOW_TR has a medium impact on EXPLORATION and EXPLOITATION.

Table 41. Determination of effect size

	KNOW_TR	EXPLORATION	EXPLOITATION
STRUCTURAL	0.853		
RELATIONAL	0.004		
COGNITIVE	0.001		
KNOW_TR		0.171	0.216

Step 5: Predictive relevance (Q^2). This step evaluates f^2 values as a criterion of the predictive accuracy of R^2. Q^2 is an indicator of the model's out-of-sample predictive power, or predictive relevance. In the structural model, if the Q^2 value is larger than zero for a specific reflective endogenous latent variable, this indicates the path model's predictive relevance for a particular dependent construct. From the results shown in Table 41, it can be seen that the Q^2 values of KNOW_TR, EXPLORATION, and EXPLOITATION are above zero. More specifically, KNOW_TR has the highest Q^2 value, followed by EXPLORATION then EXPLOITATION. These results provide clear support for the model; in other words, KNOW_TR, EXPLORATION, and EXPLOITATION are the most relevant predictive variables in the model.

Table 42. Predictive results

	$\mathbf{Q^2}$
KNOW_TR	0.226
EXPLORATION	0.075
EXPLOITATION	0.057

Step 6: Effect size (q^2). In this step, the effect size measures the relative impact of predictive relevance (Q^2). As a relative measure of predictive relevance, values of 0.02, 0.15, and 0.35 represent small, medium, and large size effects of the exogenous construct, respectively. Following the rule of thumb, Table 43 shows that the relationship between STRUCTURAL and KNOW_TR can be considered medium,

while the other relationships indicate no relative impact. This means that variable STRUCTURAL has predictively relevant relationship to KNOW_TR.

Table 43. Effect size of predictive relevance

	KNOW_TR	EXPLORATION	EXPLOITATION
STRUCTURAL	0.28		
RELATIONAL	-0.003		
COGNITIVE	-0.006		
KNOW_TR		-0.015	-0.099

6.2.2 Conclusion and interpretation of hypothesis testing

This section has presented the conclusion of the hypothesis testing using PLS-SEM and the interpretation of the results. The results are summarised in Table 44 below. From the results, it can be concluded that: 1) the structural dimension has a positive relationship to knowledge transfer; 2) knowledge transfer has a positive relationship to exploration and exploitation; and 3) knowledge transfer mediates the relationship between the structural dimension and exploration or exploitation.

Table 44. PLS-SEM results summary

Hypothesis		**Findings**
H_{1a}	*The advantages of a corporate accelerator programme for start-ups' structural social capital development are positively associated with knowledge transfer.*	Yes
H_{1b}	*The advantages of a corporate accelerator programme for start-ups' relational social capital development are positively associated with knowledge transfer.*	No
H_{1c}	*The advantages of a corporate accelerator programme for start-ups' cognitive social capital development are positively associated with knowledge transfer.*	No
H_{2a}	*Knowledge transfer is positively associated with exploitation.*	Yes
H_{2b}	*Knowledge transfer is positively associated with exploration.*	Yes
H_3	*Knowledge transfer mediates the relationships between start-ups' social capital dimensions and innovation outcome in terms of exploration and exploitation.*	Yes

This study aimed to examine the value created for start-ups involved in a corporate accelerator programme, from a social capital perspective. The data analysis revealed that, of the three social capital dimensions, the structural dimension relates positively to knowledge transfer, while relational and cognitive dimension have no positive relationship to knowledge transfer. Knowledge transfer also has a positive relationship to exploration and exploitation. Finally, knowledge transfer mediates the relationship between the structural dimension and exploration or exploitation.

The structural dimension has a positive and significant relationship to knowledge transfer. The items that were found to be valid and reliable to measure the structural dimension are SD1, SD2, SD3, and SD6. These respectively indicate that: Indigo provides start-ups with assistance in finding appropriate resources: Indigo has the capability to provide scarce resources: tenants can benefit from other tenants in the accelerator programme; and, tenants have developed a network through the incubator's network relationships. In regard to the structural dimension of social capital, this finding illustrates that the corporate accelerator supports the creation of new ties by connecting start-ups to Telkom's network in order to find scarce resource. Resource here refers to all the facilities provided by Telkom in the corporate accelerator programme (e.g. funding, market access, connection to Telkom's subsidiary companies, APIs, and mentors).

The relational and cognitive dimensions were found to have no significant relationship to knowledge transfer. In social capital, the structural dimension relates to the identification of a relationship pattern between actors, while the relational dimension relates to the quality of that relationship. In this study, the primary attributes of the relational dimension were found to be trust and commitment. The findings indicate that the corporate accelerator attempts to build trust with start-ups' through agreement and maintaining start-ups' commitment. However, these attempts were not strong enough or of high enough quality to build start-ups' trust and commitment to transfer knowledge in the network.

Knowledge transfer has a positive relationship to exploration and exploitation. The measures for knowledge transfer are that the start-up receives the knowledge they expected; the knowledge the start-up gained during the programme is useful for them; start-ups implement the knowledge they gained from the programme; start-ups

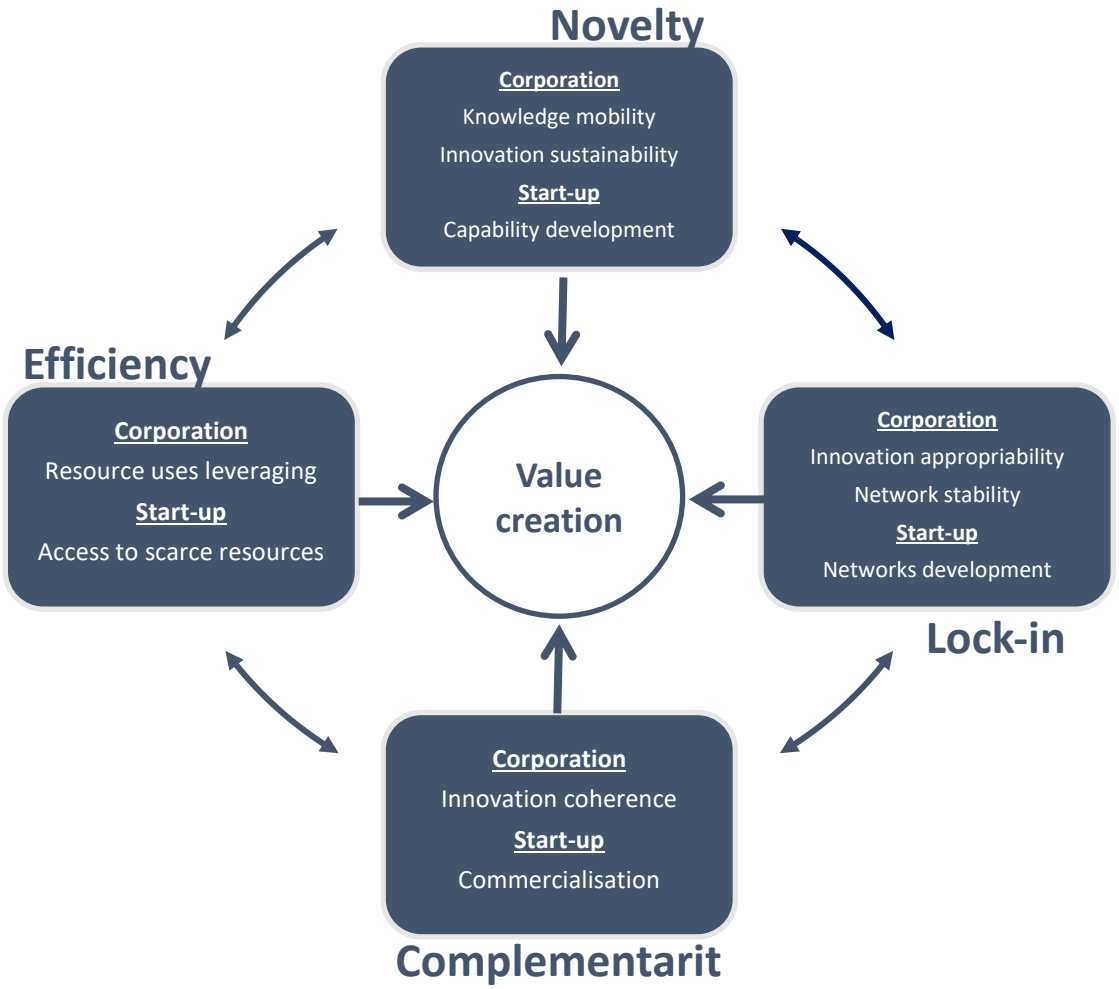
combine the knowledge they gained with their existing knowledge; and Indigo helps start-ups to implement and combine the knowledge gained during the programme. These indicate that knowledge transfer occurs within the corporate accelerator programme through mentoring and developing start-ups' capabilities, and also that knowledge transfer affects exploration and exploitation. From the results of the data analysis, it can be concluded that, during the corporate accelerator programme, start-ups successfully develop creative ideas, discover opportunities for patents, and discover ideas for transferring products to new markets. Moreover, related to exploitation, start-ups can also refine and improve existing products, produce relevant knowledge for the targeted technology, and generate follow-on projects.

The hypothesis testing results indicate that knowledge transfer significantly mediates the relationship between the development of start-ups' social capital and innovation outcome, that the corporate accelerator programme provides resources and training/mentoring that benefit start-ups in terms of gaining knowledge and skills, and that this has a beneficial effect in generating innovation outcome.

6.3 Value creation in the corporate accelerator programme

The previous analysis has shown that both the corporation and start-ups create value from the orchestration of an innovation network within the corporate accelerator programme. The findings are depicted in Figure 35, where the drivers of value creation for each element are visualised. The following section will discuss the drivers for each element in more detail.

Figure 35. Source of value creation of the corporate accelerator programme



6.3.1 Novelty

The essence of the novelty element is the adoption of new activities (content), and/or new ways of linking activities (structure), and/or new ways of governing activities (governance) (Zott and Amit, 2010). This study has revealed that corporations do not expect an innovation outcome in terms of a new product or new technology emerging from the corporate accelerator programme. Telkom implements open innovation via the corporate accelerator programme as a strategic decision that allows the corporation to remain close to innovation, and up to date with the latest trends in the digital creative industry. Telkom has gradually shifted its business focus from the telecommunications industry to the digital industry. The corporate accelerator

programme is one way to move into, gain access to, and become a leader in this industry.

This strategic shift demands a new notion of competition. Instead of treating start-ups as competitors, Telkom views start-ups as important players that support the creative digital industry. Facilitating the growth of start-ups will affect the development of the creative digital industry overall, and encouraging start-ups to join Telkom's innovation network as a way for Telkom to better leverage and shape inter-firm relations, understand the industry dynamics, scope our new opportunities for product development, and discover new markets. Utoyo (2016) regarded this as Telkom's innovation sustainability strategy. According to Iansiti and Levien (2004), such a strategy will improve the health of innovation ecosystem and, in return, provide benefit to the corporation.

The discussion in Section 5.1 describes knowledge mobility as a source of novelty. Socialisation with start-ups prompted Telkom to apply the new 'Lean Start-up' method in its internal innovation process. The method is used during the corporate accelerator programme to evaluate and measure the start-ups' progress and achievements.

The survey analysis identified that knowledge transfer has a positive relationship with innovation outcome. From the survey results, the item measuring knowledge transfer had excluded business management training, technical skill training, strategic plan training, and mentors' capability. This means that knowledge transfer happens in ways other than through those activities. However the results also show that start-ups gained new knowledge and experience during the programme. From the interviews, the other ways that start-ups gained knowledge were through mentoring, informal meetings with other start-ups, and gatherings or events with investors. This relationship indicates that the corporate accelerator services are proven to develop start-ups' capability to create new ideas. This finding confirms that that capability development is a source of value creation for the start-up, within the novelty element.

The novelty element is linked with lock-in, in the sense that the capability development curriculum encourages start-ups to reach certain achievements and evaluate their progress over a particular period. The evaluation process forces start-

ups to make progress if they want to remain in the programme. Novelty is also linked to efficiency. As start-ups have access to scarce resources, such as mentoring, shared office space, and funding, their search and operational costs can be reduced. In addition, corporation resources that are offered to support start-ups' development will open up possibilities to find new products or services, both for Telkom and the start-ups.

6.3.2 Lock-in

Lock-in may be related to the activities that attract member to keep in he system (Zott and Amit, 2010). Telkom, as the hub firm, has a coordinator role in the network and must perform critical orchestration tasks to keep the network stable (Dhanaraj and Parkhe, 2006). One way to increase network stability is by enhancing reputation. The reputation of Telkom as a market leader in the telecommunications industry encourages start-ups, new and emerging firms that seek legitimacy in the market, to link themselves to Telkom. Telkom's reputation has two effects on network stability: first, it sustains the connection between start-ups and Telkom; second, it attracts the formalisation of new ties with new start-ups (i.e. by registering to the corporate accelerator programme). Additionally, promotion is needed to attract start-ups to apply for and participate in the corporate accelerator programme, which helps to keep the number of members in the network stable.

For start-ups, being a part of the Telkom network by participating in the corporate accelerator programme motivates them to remain in the programme. The Telkom network offers opportunities for start-ups to meet important people that could help develop their company. The survey results support this from start-ups network development as item measurement for the structural dimension of social capital (SD6). Moreover, the interviews with start-ups confirmed that Telkom's network is one the main advantages of being in the programme (Jarvis, Kakatu, Goers). Solidarity was particularly observed in the qualitative and quantitative parts of this study. Chapter 4 showed that solidarity, i.e. the feeling that bonds start-ups enrolled on the same programme together, was developed during the accelerator programme. The existing literature states that solidarity is one of the factors that motivates start-ups to remain in the system. This means that solidarity creates value for the start-up. However, the

survey results showed that solidarity does not support knowledge transfer, and thus, cannot be said to provide any value to start-ups.

As discussed in the previous novelty section, novelty is a source of lock-in, and vice versa. Another element of value creation that is related to lock-in is complimentarity. Start-up product commercialisation through bundling of products or collaboration with the corporation will keep start-ups connected to the network through the corporate accelerator programme. For example, a Jarvis start-up product was used and bundled with Telkomsel, which ensured Jarvis remained in the network even after its participation in the programme was complete.

6.3.3 Complementarity

Complementarities present whenever bundling activities within a system provide more value than each activity does separately (Zott and Amit, 2010). The Digital Service Division in Telkom, which operates the corporate accelerator programme, continually searches for opportunities to incorporate a start-up product in a Telkom business. For this reason, coherence is one of the criteria used in start-up selection (see Chapter 4 Section 4.2.1) and progress evaluation (see Chapter 4 Section 4.2.2). Such opportunities are identified through one-on-one meetings with subsidiaries that can potentially collaborate with a start-up enrolled on the corporate accelerator programme. Before the start-up's product is finally adopted by Telkom or its subsidiaries, coherence efforts, such as capacity leverage and business model alignment, are required, aiming to create value in the form of innovation for the corporation.

For start-ups, one way to commercialise their product is by bundling it with a Telkom business. This also becomes a reason to participate in the corporate accelerator programme. It was evident that the majority of the successful start-up products were those that were bundled with Telkom products. The product developed by Jarvis was a mobile commerce application for SMEs, which was bundled with Telkomsel's mobile card; hence, customers who used the Telkomsel mobile card would also get the Jarvis app. The survey data revealed that one of the measures of exploration is that the start-up is able to find new markets (or a new market). This result supports previous research, which has found that with an external source of innovation, the product

primarily complements, rather than substitutes, the corporation's main product (West and Bogers, 2014).

The previous lock-in section has shown that complementarity is related to lock-in, and vice versa. Complementarity is also a source of value creation, in the form of efficiency. Using Telkom resources in product commercialisation supports value creation via complementarity and decreases the start-ups' marketing costs.

6.3.4 Efficiency

Efficiency refers to the effect of using the activities system in that it reduces the transaction costs (Zott and Amit, 2010). It was evident from the survey results that start-ups gained knowledge from mentoring and classes. This knowledge could then be applied to their product development. This result indicates that participating in a corporate accelerator programme can reduce the knowledge search burden for start-ups. The survey results also showed that being in a corporate accelerator programme gave start-ups access to scarce resources, such as funding and shared office facilities, which leads to operational cost reduction for start-ups.

Chapter 4 also showed that Telkom adopted the product of Privy-ID (a start-up), an online document processing product, to reduce contract processing time for Indihome, one of Telkom's integrated entertainment services. This shows that efficiency is one of the sources of complementarity.

6.4 Conclusion

This chapter has identified the value created by the corporate accelerator for the corporation and the start-ups. The data used was based on: 1) a series of interviews with six corporation and corporate accelerator managers to identify the value creation for the corporation, and 2) surveys distributed to 36 start-ups to identify the value created for them. As an additional conclusion, in terms of the value created for start-ups from the corporate accelerator programme, based on social capital theory: it is proved that structural social capital has a positive relationship to innovation outcome with the mediation of knowledge transfer. The results are summarised in Table 45 below.

Table 45. Summary of the findings of this chapter

Value creation	Corporation	Start-ups
Novelty	Knowledge mobility	Capability development (Knowledge transfer)
	Innovation sustainability	
Lock-in	Innovation appropriability	Network development
	Network stability	
Complementarity	Innovation coherence	Commercialisation/new market (exploration)
Efficiency	Resource uses leveraging	Access to scarce resources (social capital)

CHAPTER 7
DISCUSSION AND CONCLUSION

This is the final chapter in a study that aims to understand the orchestration role of the innovation intermediary and identifies the value that is created from a corporate accelerator programme. Through such a programme, a corporation builds, develops, and manages (orchestrates) its innovation network and becomes the innovation intermediary for both itself and the start-ups around it. The research questions this study aimed to answer were:

RQ1: How does a corporate accelerator perform the orchestration role of an innovation intermediary?

RQ2: What is the value created for corporations through a corporate accelerator programme?

RQ3: From a social capital perspective, what is the value created for start-ups from participating in corporate accelerator programmes?

This chapter will summarise the research, and consist of three sections: the answers to the research questions, a discussion, and conclusion. The section that answers the research questions will summarise all of the findings related to each question; the discussion section will compare and contrast the main findings with supporting and opposing literature, and outline the theoretical and practical implications for management research. The chapter will end with a conclusion that summarises the study findings and identifies issues that could be explored further in future research, along with the researcher's personal reflections.

7.1 Answers to the research questions

Research Question 1

RQ1: How does a corporate accelerator perform the orchestration role of an innovation intermediary?

Using design elements of the business model framework (Zott and Amit, 2010) that guide the content, structure, and governance of an organisation, this study has revealed the activities, function, roles, and staged processes of the corporate accelerator programme. Related to the orchestration of an innovation ecosystem, this

study also identified the process sequence and the roles that correspond to the process. The process and the functions are: 1) pre-engagement: promotion and selection; 2) the accelerator programme: business capability development, market infrastructure development, and social capital development; 3) integration adoption and channelling; 4) knowledge incorporation: absorption and combination; 5) exploration: scoping and delivery. This study also revealed the various roles of the corporate accelerator programme: as a reputation enhancer, gate-keeper, capability developer, bond creator, innovation broker, knowledge integrator, and foresight.

Previous studies have acknowledged the corporate accelerator programme as an innovation intermediary (Nambisan and Sawhney, 2007); however, it has not been made clear how the corporate accelerator performs this role. This study contributes additional knowledge that the corporate accelerator programme is an innovation intermediary institution that performs an orchestration role (e.g. activities, functions, roles, and stages).

Research Question 2

RQ2. What is the value created for corporations through a corporate accelerator programme?

The value created from the corporate accelerator programme for the corporation includes: 1) knowledge mobility and innovation sustainability, which leads to novelty; 2) innovation appropriability and network stability for lock-in, keeping members in the network and increasing relationship quality; 3) innovation coherence as a source of complementarity; and 4) resource efficiency.

The answer to the second research question provides a better understanding of the values gained for the corporation from the corporate accelerator programme by playing the orchestration role. The values come from integrating the orchestration concept (Dhanaraj and Parkhe, 2006, Nambisan and Sawhney, 2011, Iansiti and Levien, 2004) and the value creation framework (Amit and Zott, 2001).

Research Question 3

RQ3. From a social capital perspective, what is the value created for start-ups from participating in corporate accelerator programmes?

Value is created for start-ups through increased access to a new network that results in capability development, for creating new ideas and leveraging existing knowledge. This finding reflects the positive relationship between the structural dimension and innovation outcome, where knowledge transfer mediates this relationship.

This finding provides another perspective regarding the relationship between the dimensions of social capital, knowledge transfer, and innovation outcome. Previous research has identified the structural dimension as an antecedent of the relational dimension (Tsai and Ghoshal, 1998, Bstieler et al., 2015, Camps and Marques, 2014, Zheng, 2010) relates to knowledge transfer as a mediating factor and to innovation outcome. In this study, no relationship was found between the relational dimension and knowledge transfer. Hence this study concludes that start-ups that more frequently use or attend social relationship activities and events that are provided by the corporate accelerator programme, will gain more knowledge, and more innovation outcome will result.

7.2 Discussion

This section will compare and contrast the findings of this study with the extant relevant literature. If a finding conflicts with existing literature, it is important to address and explain the contradiction. Comparison with similar literature is also important to identify underlying similarities in phenomena not normally associated with each other. This section comprises three subsections, corresponding to the findings related to each of the three research questions.

7.2.1 Comparison with literature on the orchestration role, innovation intermediary, and corporate accelerator

The first finding of this study relates to the model of a corporate accelerator programme that presents the activities, function, roles, and stages that occur during the accelerator programme in a circular fashion. A circle represents the cyclical process of the programme, which begins with pre-engagement and ends with exploration and commonly takes place over a six-month period. The model reflects the process model for leveraging external sources of innovation (West and Bogers, 2013), which consists

of four phases: obtaining, integrating, commercialising, and interacting, that connects the first three phases. The process stages identified in this study are similar, consisting of: obtaining (pre-engagement), integrating (accelerator programme and integration), commercialising (integration), and interacting (cycle process).

The most notable difference between the processes is that this study highlighted how the knowledge from external sources is then incorporated with the corporation's knowledge and used to inform future strategy; this was not discussed by West and Bogers (2014). The commercialisation phase in West and Bogers (2014) emphasised business model creation and measurement of value creation or value capture. By contrast, this study, besides explaining the use of external knowledge for commercialisation in channelling activities, also explored the incorporation of new knowledge with internal knowledge to understand the current business condition and develop a strategic future plan (scoping and discovery).

Regarding the roles that have been identified in the orchestration process: pre-engagement, acclerator programme, integration, this study identified a similar function that also appears in another type of innovation intermediary. Howells (2006) identified ten functions of the innovation intermediary: foresight and diagnostics, scanning and information processing, knowledge processing and combination, gate keeping and brokering, testing and validation, accreditation, validation and regulation, protecting the results, commercialisation, and evaluation of outcomes. Bessant and Rush (1995) also identified the intermediary functions of the consultants: articulation, selection, training, networking, project management, and organisational development. This study proposed similar functions to both of these articles (e.g. gatekeeper, channelling, knowledge combination, and foresight). In this study, the term 'role' was used to refer to specific functions regarding the orchestration role (see Chapter 4, Section 4.2).

In the context of the corporate accelerator, this study particularly identified the reputation-enhancing and capability development functions, which are not mentioned in the previous literature. The reputation-enhancing function is related to pre-engagement activities where the corporate accelerator attempts to nurture creativity and encourage participation in the corporate accelerator programme. Capability development is related to corporate accelerator services provided to start-ups to develop their new venture capability. Prior literature had recoggnised many types of

innovation intermediary, and there is no one model that is able to explain the function of all types of innovation intermediary. Howells (2006) suggested that the function of the innovation intermediary is widening along the innovation value chain into new roles/functions. Hence, this study provides additional knowledge regarding the different functions within the orchestration role of the innovation intermediary, which are not mentioned in previous literature: reputation enhancer and capability developer.

The reputation enhancer and capability developer functions are specific to the orchestration role, and are a point of difference from other types of intermediary, where the function is mainly in bridging or transferring (see Chapter 2, Section 2.3.1). In the orchestration role, besides supporting the bridging and transferring functions, other firms are invited to build an ecosystem. The orchestration role involves encouraging other firms to join and then remain in the network. Therefore, the reputation enhancer function is to promote the programme and build its reputation, and the capability developer function is to ensure members remain in the network through providing the facilities to support members' business.

This study provides a comprehensive view of the orchestration process that unifies the orchestration activities identified in the previous literature: knowledge mobility, innovation appropriability, network stability (Dhanaraj and Parkhe, 2006), innovation leverage, innovation coherence (Nambisan and Sawhney, 2011), and innovation sustainability (Iansiti and Levien, 2004). Existing literature discussing orchestration process mainly evaluates only some of the activities (Feller et al., 2012, Michelfelder and Kratzer, 2013, Usman and Vanhaverbeke, 2017), which results in an incomplete understanding. All of the orchestration activities identified in the literature were also included in this study. Therefore it can be concluded that the case in this study provides richer insight into the orchestration process.

The results of this study thus extend the corporate accelerator programme research stream to the area of innovation intermediary research. The accelerator programme is known as the development model of incubator (Pauwels et al., 2016, Cohen and Hochberg, 2014) and an incubator is identified as an innovation intermediary (Nambisan and Sawhney, 2007). Except Kohler (2016) specific research to understand the intermediary roles of accelerator programme is less discussed before nor corporate accelerator programme. Discussions aiming to understand the

accelerator programme are mainly based on the open innovation literature (Battistella, 2017; Weiblan and Chesbrough, 2015) and entrepreneurship and new venture creation (Carayannis, 2005; Clarysse, 2015; Cohen, 2014; Miller, 2011). Therefore, this study contributes to innovation intermediary research, and views corporate accelerator programmes as part of this type of intermediary institution.

7.2.2 Comparison with value creation literature

This study also recognised the value of the orchestration process. This focus extends the existing research, particularly in network studies, by adding the values of a position or structure network, as understanding position alone does not create benefit (Burt, 1992). This study has investigated how a hub firm performs a central network position role: builds, preserves, exploits, and manages a network (Dhanaraj and Parkhe, 2006). In addition, this study also increases understanding of how external sources are used to facilitate knowledge brokering that leads to enhanced innovation by identifying the source of value creation using design themes (Amit and Zott, 2001).

Value identification in this study was based on the fundamental process involved in orchestration, where previous literature has also acknowledged this process (Dhanaraj and Parkhe, 2006, Feller et al., 2012). Values identification in this study adds to the existing knowledge regarding reverse causality issues. This issue is related to benefits identification that drove from the process outcome. Beyond benefit identification, this study also identified the source of activities that lead to value creation.

The sources of value creation in the orchestration process that were identified in this study related to the five areas of innovation for value creation in any organisation (Lee et al., 2012). These five areas are: introducing new products, services or even new ventures; architecture efficiency; reinventing the concept of customer value; expand the customer base; and new business models. Knowledge mobility resulting in novelty covers the newness area, and innovation leverage comprises efficiency. In line with Amit and Zott (2011), lock-in design themes are also a source of value; this study added innovation appropriability and network stability as ways that the corporation creates value. Any attempts to retain existing customers or current

innovation member engagement also create value (Amit and Zott, 2001) by reducing switching cost and increasing loyalty.

Regarding value creation from the social capital perspective, this study concludes that the relational and cognitive dimensions have no positive relationship with knowledge transfer. This indicates that the services provided within and by the corporate accelerator programme to develop the behavioural and actual relational between the corporation and start-ups do not result in knowledge transfer. The results of this study therefore do not support the claims of Vlaisavljevic et al. (2016b), who stated that relational social capital improves innovation performance. Based on the observations of this study, it is evident that the diversity amongst start-ups is high, and each has very diverse knowledge leading to difficulties in mitigating the knowledge in the network. Although the corporate accelerator provides a shared office, a social space for start-ups, few of them use this facility. Hence, the frequency with which they met, socialised, and identified similarities and opportunities to collaborate were limited to once a month, during mentoring. This affected the level of trust building between them, and therefore hindered knowledge transfer.

7.2.3 Contribution to the field

Regarding the contributions made by this research, the results of this study provide a theoretical contribution to the literature and have practical implications for corporations to take into account when designing a corporate accelerator programme. This study is distinctive because it examines the innovation intermediary focusing on the orchestration role, which is underdeveloped. It used innovation intermediary literature as a reference source. This study makes contributions from both theoretical and practical perspectives.

Theoretical contribution

First, this study contributes to research on the innovation intermediary topic in terms of the orchestration role. This study proposes one way to leverage external sources of innovation, a corporation needs the innovation intermediary to support or facilitate its relationships with external sources. According to Gould and Fernandez (1989), there are five types of brokerage relationship: coordinator, representative, gatekeeper, liaison, and cosmopolitan. This study focuses on the coordinator type of

brokerage, where a hub firm in a central network position performs the orchestration role of an innovation intermediary. This study thus increases understanding of the activities, functions, roles and stages of the orchestration process.

Second, in terms of orchestration, this study has revealed the various roles of the corporate accelerator: reputation enhancer, gate-keeper, capability developer, bond creator, innovation broker, knowledge integrator, and foresight. Howells (2006) identified some of the roles of the innovation intermediary that are also identified in this study. However, this study contributes by adding further functions that are closely related to the corporate accelerator type of innovation intermediary: capability developer, and reputation enhancer. Reputation enhancement is related to promotional and marketing activities that increase start-up interest in participating in the programme and build trust. Capability development is related to the provision of services to develop start-ups' new venture capability.

Third, by providing an understanding of the orchestration process this study also contributes to an understanding of the value that is gained during the process. By combining the value creation framework that comprises novelty, lock-in, efficiency, and complementarity (Amit and Zott, 2001) and the concept of orchestration (Dhanaraj and Parkhe, 2006, Nambisan and Sawhney, 2011, Iansiti and Levien, 2004), this study identifies the value that a corporation derives from a corporate accelerator programme.

Fourth, this study revealed that the structural dimension of social capital has a positive relationship to innovation outcome, with the mediation of knowledge transfer. This indicates that participating in a corporate accelerator helps start-ups to find resources and develop a network. From these new social relations, start-ups are able to search, acquire, combine, and implement new knowledge that later impacts their innovation outcome related to the development of new creative ideas, discovery of opportunities for future licensing, and discovery of new markets.

Fifth, the positive relationship between the structural dimension, knowledge transfer, exploitation, and exploration observed in this study is in line with the findings of previous research that also emphasise the roles of the innovation intermediary roles (Hargadon and Sutton, 1997, McEvily and Zaheer, 1999). This implies that the more start-ups take advantage of the corporate accelerator services and activities, the more their exploration ability will develop. The way for start-ups to maximise exploration

output is related to knowledge transfer activities, such as implementing the knowledge gained, combining the knowledge with their existing knowledge, and using the corporate accelerator facilities to implement and combine the knowledge. The result of the empirical analysis in this study also support the argument that knowledge transfer as a link that connects structural dimension of social capital with innovation (Filieri and Alguezaui, 2014).

Sixth, this study implements the concepts of new organisational form and network dynamics (Miles and Snow, 1986), platform leader (Gawer and Cusumano, 2014), and ambidextrous organisation (O'Reilly and Tushman, 2011). Therefore, it contributes to an understanding of those concepts in real world. Having a corporate accelerator programme is Telkom's strategy to understand and adapt to the business changing environment. Telkom, with its accelerator programme, has become an analyser firm in an attempt to reconfigure the network and take advantage from it, as a platform leader. It has built an innovation ecosystem of start-ups around the Telkom business. This creates opportunities for Telkom to explore new products/services/markets and exploit its existing business. This strategy of exploration and exploitation also reflects the implementation of the ambidextrous organisation concept.

Practices and managerial implications

This study has provided a framework and guidelines for practitioners and managers of corporations on how to orchestrate their innovation network or ecosystem by conducting a corporate accelerator programme. The framework will support them in designing the corporate accelerator programme and determining how to gain maximum value from the programme. The corporate accelerator programme has the potential to generate powerful impacts through engaging with external sources of innovation by removing obstacles to select, improve, and combine the knowledge from potential start-ups, as the sources of innovation. As such, the results of this study are helpful for the manager that is interested in developing a corporate accelerator programme to provide valuable advantages for the corporation and start-ups.

During the framework development of this study, questions had arisen regarding how to design an accelerator programme with activities that create value.

The answer to this question can support the corporate accelerator programme manager. Additionally, for start-up CEOs, this study also provides some questions that should be considered in an attempt to participate in a corporate accelerator programme.

For the corporation manager who is responsible for conducting a corporate accelerator programme, the following questions should be considered:

- What advantages should be provided to facilitate frequent interaction between start-ups and the corporation's network, consisting of subsidiary managers, heads of departments, and amongst start-ups, customers, and potential investors?
- Do the current mentors have the necessary experience and competence to transfer knowledge and skills, and also to support the start-up-corporation relationship in knowledge integration?
- Which of the corporation's employees have mentoring capabilities and could be assigned as a mentor for start-ups?
- How can start-ups be encouraged to use the corporation's technology in their products?
- What are the criteria for potential start-ups to be recruited for the corporate accelerator programme?
- How can the number of successful start-ups be increased, and how can they be encouraged to remain in the programme until graduation, and to produce new or improved products or services?
- Does the corporation have a mechanism to share formal and informal knowledge which could assist in knowledge transfer across corporate boundaries?

For start-up CEOs, the following should be considered:

- Can you define your idea or product that has the potential to be integrated with any of the corporation's products or businesses?
- How many relationships do you have that help you to survive as a new venture, and can you develop more?

- Can you identify any corporation that could support your start-up's growth?
- What are the weaknesses of your start-up, and how can these be addressed? Do the aims of the accelerator programme align with your start-up's objectives?

7.3 Conclusion

This study concludes that the corporate accelerator programme is an innovation intermediary that plays an orchestration role. As part of the corporation, the programme is a way for the corporation to orchestrate its innovation network. The functions, roles, and stages in the corporate accelerator programme are: 1) a pre-engagement stage, with promotion and selection functions, where the programme acts as a reputation enhancer and gatekeeper; 2) the accelerator programme stage, with business capability development, market infrastructure development, and social capital development functions, where the programme acts as a capability developer and bond creator; 3) the integration stage, with adoption and channelling functions, where the programme acts as an innovation broker; 4) the knowledge incorporation stage, with absorption and combination functions, where the programme acts as a knowledge integrator; the 5) exploration stage, with scoping and discovery functions and where the programme is engaged in providing foresight.

The value created from the corporate accelerator programme for the corporation includes: 1) knowledge mobility and innovation sustainability, which leads to novelty; 2) innovation appropriability and network stability for lock-in, keeping members in the network and increasing relationship quality; 3) innovation coherence as a source of complementarity; and 4) leveraging resource for efficiency. Value is created for start-ups is the form of increased access to a new network, which results in capability development for new ideas and leverage of existing knowledge. This is reflected in the positive relationship between the structural dimension and innovation outcome, with knowledge transfer mediating the relation.

7.3.1 Study quality

To ensure the quality of this research, four tests were conducted (Yin, 2009, Lincoln and Guba, 1985): 1) construct validity, or confirmability; 2) internal validity, or credibility; 3) external validity, or transferability; and 4) reliability, or

dependability. Construct validity or confirmability in qualitative research involves generalising the measure used to the concept underlying the measurement. To determine construct validity, this study applied and developed interview questions and survey items based on the literature review, so the items measured had been used in previous research. A statistical validity test was then performed to ensure it categorised in accepted value. This study also used multiple sources of evidence to ensure the construct validity (see Chapter 5). Internal validity or credibility refers to the level of confidence in the 'truth of the findings'. In this study, internal validity was addressed through persistent observation at the corporate accelerator's sites and in start-ups' offices. This study also compared the findings with the supporting and opposing articles (Section 6.2). External validity or transferability refers to whether a study's findings are generalisable beyond the study. Using innovation intermediary concept as the underpinning theory for this study as a way to test external validity. Reliability, or dependability, refers to whether the operations of a study can be repeated. This study ensured reliability by developing a research design with the thesis supervisor as an auditor to challenge all of the research processes. A detailed explanation of the actions taken to ensure the quality of the study, and the chapters that present each action, is provided in Table 46, below.

Table 46. Four quality tests of this study

(adapted from (Yin, 2009, Lincoln and Guba, 1985))

Quality of research criteria	**Actions were taken to meet the criteria**	**Addressed in this thesis**
Confirmability (objectivity – construct validity)	Items measured and interview questions based on existing literature and research adapted to the context of this study. Multiple sources of data used.	Chapter 4
Credibility (internal validity)	Peer reviewer, corporate accelerator and start-up site observation, study findings compared and contrasted with other literature in the field.	Chapter 5, 6, 7
Transferability (external validity)	Detailed understanding of the innovation intermediary concept.	Chapter 2, 3
Dependability (Reliability)	Supervisor, as an auditor, challenged the research design: qualitative and quantitative data collection and analysis process.	Chapter 4

7.3.2 Limitations and avenues for future research

Efforts were made at the design stage of this study to obtain reliable and valid findings, as presented in the research philosophy and methodology chapter. However, a number of limitations can be identified; these can be used as the basis to identify opportunities for further research, as explained below:

- In term of context, this study investigated only one corporate accelerator in one country, Indonesia, a developing country. Innovation implementation may be different in a developed country in terms of funding support, technology advances, and human resources. Further research could compare the model to a corporate accelerator programme in a developed county, or compare it to another programme in the same country to increase the reliability of the model.
- The structural dimension of social capital measured in this study used a qualitative indicator and did not particularly implement the social network analysis that measures the network structure. Future research could implement the network structure measurement and test its relation to knowledge transfer and also innovation outcome.
- The innovation outcome indicators used in this study were exploration and exploitation. Different innovation outcome indicators, such as financial expense, a patent, or number of new products/services could be used in future research.
- The framework to identify value creation in the corporate accelerator programme was based on a business model framework (Zott and Amit, 2010). Another value creation model, such as that of Ritala et al. (2013) or Han et al. (2012), that uses different indicators could be used to enrich the identification of corporate accelerator value creation.
- This study selected one of the identified gaps from the literature review related to the orchestration role. There are various gaps regarding the role of the corporate accelerator, with multiple possible levels of analysis that could be explored in future research.

7.3.3 Research reflection

This section will present the identified knowledge, skill, and experiences gained throughout the course of conducting this study.

The different stages of the research process, i.e. finding gaps and understanding the research problem from the literature review, developing a research methodology, collecting and analysing the data, and writing the thesis, can be perceived as a series of learning activities over a PhD journey. The supporting factors and the challenges faced in producing a good quality study will be discussed in the following paragraph.

The first challenge was the use of a quantitative approach in the literature review, applying bibliographic coupling. In addition to the requirement to understand the process of a literature review, such as how to determine keywords, define inclusion and exclusion criteria, decide which journals to search, it was also necessary to understand the method of conducting a literature review. Bibliographic coupling and other bibliometric methods were of interest to the author. However, there are limited review articles that have implemented such methods. Hence, acquiring an understanding of the method (e.g. becoming familiar with bibliometric data, learning how to collect the data directly from online literature databases, and to connect the data with reference management software), finding the right tools (e.g. Bibexcel and VOSViewer), and analysing the findings, was a trial and error process. Through self-learning, an innovation intermediary framework and gaps that were further developed to become research questions were identified. The important learning point gained during this process was that the bibliometric method, like other quantitative methods, is best implemented in a research area with a large number of publications. Using this method and the supporting software to analyse the data can simplify the process of clustering articles, as it is mainly based on identifying similarities. Despite the method's usefulness in grouping similar publications, interpreting the results of the bibliographic coupling required critical thinking to produce valuable and useful findings.

The particular challenges associated with the mixed-methods research design followed in this study are specific to the qualitative approach. The author's limited experience in interviewing represented a challenge. This was overcome by conducting a pilot study and frequent practice to communicate better with the interviewees.

Moreover, in a qualitative study, which requires an ability to ascertain evidence for the findings, presenting data that was based on the views and experiences of individuals, as well as the researcher's own observations, to support the findings was challenging. Using graphics to explain the researcher logic and to present the findings, as well as the use of evidence tables, was done to reveal assumptions and mitigate bias. The collection and analysis of primary data was considered the biggest contribution to the development of the author's research skills.

The other challenge related to the mixed-methods research design was in combining the qualitative and quantitative research results. In this study, the quantitative research results were used to complement the qualitative research results. When some of the quantitative research findings did not support the qualitative research, a contradiction arose. Analysing such findings improved the author's ability to compare and contrast with references, in other words, it improved the author's critical thinking ability.

REFERENCES

AALBERS, H. L. & DOLFSMA, W. 2015. Bridging firm-internal boundaries for innovation: Directed communication orientation and brokering roles. *Journal of Engineering and Technology Management,* 36**,** 97-115.

ADAMS, P., FONTANA, R. & MALERBA, F. 2013. The magnitude of innovation by demand in a sectoral system: The role of industrial users in semiconductors. *Research Policy,* 42**,** 1-14.

ADLER, P. S. & KWON, S. W. 2002. Social capital: Prospects for a new concept. *Academy of Management Review,* 27**,** 17-40.

ADNER, R. 2017. Ecosystem as Structure: An Actionable Construct for Strategy. *Journal of Management,* 43**,** 39-58.

AFUAH, A. & TUCCI, C. L. 2012. CROWDSOURCING AS A SOLUTION TO DISTANT SEARCH. *Academy of Management Review,* 37**,** 355-375.

AGOSTINI, L., NOSELLA, A. & FILIPPINI, R. 2016. Towards an Integrated View of the Ambidextrous Organization: A Second-Order Factor Model. *Creativity and Innovation Management,* 25**,** 129-141.

AKHAVAN, P. & MAHDI HOSSEINI, S. 2016. Social capital, knowledge sharing, and innovation capability: an empirical study of R&D teams in Iran. *Technology Analysis & Strategic Management,* 28**,** 96-113.

AL-TABBAA, O. & ANKRAH, S. 2016. Social capital to facilitate 'engineered' university-industry collaboration for technology transfer: A dynamic perspective. *Technological Forecasting and Social Change,* 104**,** 1-15.

ALEXANDER, A. T. & MARTIN, D. P. 2013. Intermediaries for open innovation: A competence-based comparison of knowledge transfer offices practices. *Technological Forecasting and Social Change,* 80**,** 38-49.

ALGUEZAUI, S. & FILIERI, R. 2010. Investigating the role of social capital in innovation: sparse versus dense network. *Journal of Knowledge Management,* 14**,** 891-909.

AMIT, R. & ZOTT, C. 2001. Value creation in e-business. *Strategic Management Journal,* 22**,** 493-520.

ANDRIOPOULOS, C. & LEWIS, M. W. 2009. Exploitation-Exploration Tensions and Organizational Ambidexterity: Managing Paradoxes of Innovation. *Organization Science,* 20**,** 696-717.

ANTHONY, S. D. 2012. THE NEW CORPORATE GARAGE. *Harvard Business Review,* 90**,** 44-+.

ARORA, S. K., FOLEY, R. W., YOUTIE, J., SHAPIRA, P. & WIEK, A. 2014. Drivers of technology adoption - the case of nanomaterials in building construction. *Technological Forecasting and Social Change,* 87**,** 232-244.

ASIF, M. 2017. Exploring the antecedents of ambidexterity: a taxonomic approach. *Management Decision,* 55**,** 1489-1505.

AUDRETSCH, D. B., ALDRIDGE, T. T. & SANDERS, M. 2011. Social capital building and new business formation: A case study in Silicon Valley. *International Small Business Journal,* 29**,** 152-169.

BAKER, W. E., GRINSTEIN, A. & HARMANCIOGLU, N. 2016. Whose Innovation Performance Benefits More from External Networks: Entrepreneurial or Conservative Firms? *Journal of Product Innovation Management,* 33**,** 104-120.

BAKICI, T., ALMIRALL, E. & WAREHAM, J. 2013. The role of public open innovation intermediaries in local government and the public sector. *Technology Analysis & Strategic Management,* 25**,** 311-327.

BALDWIN, C. & VON HIPPEL, E. 2011. Modeling a Paradigm Shift: From Producer Innovation to User and Open Collaborative Innovation. *Organization Science,* 22**,** 1399-1417.
BARRATT, M., CHOI, T. Y. & LI, M. 2011. Qualitative case studies in operations management: Trends, research outcomes, and future research implications. *Journal of Operations Management,* 29**,** 329-342.
BATTISTELLA, C., DE TONI, A. F. & PILLON, R. 2015. The Extended Map methodology: Technology roadmapping for SMES clusters. *Journal of Engineering and Technology Management,* 38**,** 1-23.
BATTISTELLA, C., TONI, A. F. D. & PESSOT, E. 2017. Open accelerators for start-ups success: a case study. *European Journal of Innovation Management,* 20**,** 80-111.
BENASSI, M. & DI MININ, A. 2009. Playing in between: patent brokers in markets for technology. *R & D Management,* 39**,** 68-86.
BESSANT, J. & RUSH, H. 1995. BUILDING BRIDGES FOR INNOVATION - THE ROLE OF CONSULTANTS IN TECHNOLOGY-TRANSFER. *Research Policy,* 24**,** 97-114.
BIDWELL, M. & FERNANDEZ-MATEO, I. 2010. Relationship Duration and Returns to Brokerage in the Staffing Sector. *Organization Science,* 21**,** 1141-1158.
BILLINGTON, C. & DAVIDSON, R. 2013. Leveraging Open Innovation Using Intermediary Networks. *Production and Operations Management,* 22**,** 1464-1477.
BIRKINSHAW, J. & GIBSON, C. 2004. Building ambidexterity into an organization. *Mit Sloan Management Review,* 45**,** 47-+.
BIRLEY, S. 1985. The role of networks in the entrepreneurial process. *Journal of Business Venturing,* 1**,** 107-117.
BLANK, S. 2013. Why the Lean Start-Up Changes Everything. *Harvard Business Review,* 91**,** 64-+.
BOARI, C. & RIBOLDAZZI, F. 2014. How knowledge brokers emerge and evolve: The role of actors' behaviour. *Research Policy,* 43**,** 683-695.
BOON, W. P. C., MOORS, E. H. M., KUHLMANN, S. & SMITS, R. E. H. M. 2011. Demand articulation in emerging technologies: Intermediary user organisations as co-producers? *Research Policy,* 40**,** 242-252.
BOYACK, K. W. & KLAVANS, R. 2010. Co-citation analysis, bibliographic coupling, and direct citation: Which citation approach represents the research front most accurately? *Journal of the American Society for Information Science and Technology,* 61**,** 2389-2404.
BROWN, J. S. & DUGUID, P. 2001. Knowledge and Organization: A Social-Practice Perspective. *Organization Science,* 12**,** 198-213.
BRUNEEL, J., RATINHO, T., CLARYSSE, B. & GROEN, A. 2012. The Evolution of Business Incubators: Comparing demand and supply of business incubation services across different incubator generations. *Technovation,* 32**,** 110-121.
BSTIELER, L., HEMMERT, M. & BARCZAK, G. 2015. Trust Formation in University-Industry Collaborations in the US Biotechnology Industry: IP Policies, Shared Governance, and Champions. *Journal of Product Innovation Management,* 32**,** 111-121.
BURT, R. S. 1992. *THE SOCIAL-STRUCTURE OF COMPETITION,* Boston, Harvard Business School Press.
BURT, R. S. 2000. The network structure of social capital. *Research in Organizational Behavior, Vol 22, 2000,* 22**,** 345-423.
BURT, R. S. 2004. Structural holes and good ideas. *American Journal of Sociology,* 110**,** 349-399.
CAIAZZA, R. & VOLPE, T. 2017. Innovation and its diffusion: process, actors and actions. *Technology Analysis & Strategic Management,* 29**,** 181-189.

CAMPS, S. & MARQUES, P. 2014. Exploring how social capital facilitates innovation: The role of innovation enablers. *Technological Forecasting and Social Change,* 88**,** 325-348.
CASSIMAN, B. & VEUGELERS, R. 2006. In search of complementarity in innovation strategy: Internal R&D and external knowledge acquisition. *Management Science,* 52**,** 68-82.
CAVIGGIOLI, F. & UGHETTO, E. 2013. The drivers of patent transactions: corporate views on the market for patents. *R & D Management,* 43**,** 318-332.
CECCAGNOLI, M., FORMAN, C., HUANG, P. & WU, D. J. 2012. COCREATION OF VALUE IN A PLATFORM ECOSYSTEM: THE CASE OF ENTERPRISE SOFTWARE. *Mis Quarterly,* 36**,** 263-290.
CHATAWAY, J., HANLIN, R., MUGWAGWA, J. & MURAGURI, L. 2010. Global health social technologies Reflections on evolving theories and landscapes. *Research Policy,* 39**,** 1277-1288.
CHEN, C.-Y. 2011. Managing projects from a client perspective: The concept of the meetings-flow approach. *International Journal of Project Management,* 29**,** 671-686.
CHEN, C. J. & HUANG, J. W. 2009. Strategic human resource practices and innovation performance - The mediating role of knowledge management capacity. *Journal of Business Research,* 62**,** 104-114.
CHEN, R. R. & KANNAN-NARASIMHAN, R. P. 2015. Formal integration archetypes in ambidextrous organizations. *R & D Management,* 45**,** 267-286.
CHEN, S. & TSENG, M. M. 2010. A Negotiation-Credit-Auction mechanism for procuring customized products. *International Journal of Production Economics,* 127**,** 203-210.
CHEN, S. H., EGBETOKUN, A. A. & CHEN, D. K. 2015. Brokering knowledge in networks: institutional intermediaries in the Taiwanese biopharmaceutical innovation system. *International Journal of Technology Management,* 69**,** 189-209.
CHESBROUGH, H. 2006. *Open Innovation: The New Imperative for Creating and Profiting from Technology,* Boston, Harvard Business School Press.
CHESBROUGH, H. 2010. Business Model Innovation: Opportunities and Barriers. *Long Range Planning,* 43**,** 354-363.
CHESBROUGH, H. & BRUNSWICKER, S. 2014. A Fad or a Phenomenon? The Adoption of Open Innovation Practices in Large Firms. *Research-Technology Management,* 57**,** 16-25.
CHESBROUGH, H. W. 2003. The era of open innovation. *Mit Sloan Management Review,* 44**,** 35-41.
CHIANG, Y. H. & HUNG, K. P. 2010. Exploring open search strategies and perceived innovation performance from the perspective of inter-organizational knowledge flows. *R & D Management,* 40**,** 292-299.
CHOI, B., KUMAR, M. V. S. & ZAMBUTO, F. 2016. Capital Structure and Innovation Trajectory: The Role of Debt in Balancing Exploration and Exploitation. *Organization Science,* 27**,** 1183-1201.
CLARK, V. L. P. & CRESWELL, J. W. 2008. *The Mixed Methods Reader,* Nebraska, USA, Sage Publications.
CLARYSSE, B., WRIGHT, M. & VAN HOVE, J. 2015. A Look Inside Accelerators. London: NESTA.
CLAUSEN, T. & RASMUSSEN, E. 2011. Open innovation policy through intermediaries: the industry incubator programme in Norway. *Technology Analysis & Strategic Management,* 23**,** 75-85.
COHEN, D. & PRUSAK, L. 2001. *In Good Company: How Social Capital Makes Organizations Work*, Harvard Business School Press.

COHEN, S. 2013. What do accelerators do? Insights for incubators and angels. *Innovations,* 8.
COHEN, S. & HOCHBERG, Y. V. 2014. Accelerating Startups: The Seed Accelerator Phenomenon.
COHEN, W. M. & LEVINTHAL, D. A. 1990. ABSORPTIVE-CAPACITY - A NEW PERSPECTIVE ON LEARNING AND INNOVATION. *Administrative Science Quarterly,* 35**,** 128-152.
COLLINSON, S., KATO, H. & YOSHIHARA, H. 2005. Technology strategy revealed: patterns and influences of patent-licensing behaviour in Japanese firms. *International Journal of Technology Management,* 30**,** 327-350.
COLLIS, J. & HUSSEY, R. 2013. *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*, Macmillan Education UK.
COLOMBO, G., DELL'ERA, C. & FRATTINI, F. 2015. Exploring the contribution of innovation intermediaries to the new product development (NPD) process: a typology and an empirical study. *R & D Management,* 45**,** 126-146.
CRESWELL, J. W. 2009. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, SAGE Publications.
CRESWELL, J. W. & CLARK, V. L. P. 2011. *Designing and Conducting Mixed Methods Research*, SAGE Publications.
CROZIER, J., GILMOUR, L. & HUCKER, H. 2013. *Collins English thesaurus,* Glasgow, HarperCollins.
DAHLANDER, L. & GANN, D. M. 2010. How open is innovation? *Research Policy,* 39**,** 699-709.
DHANARAJ, C. & PARKHE, A. 2006. Orchestrating innovation networks. *Academy of Management Review,* 31**,** 659-669.
DIEZ-VIAL, I. & MONTORO-SANCHEZ, A. 2016. How knowledge links with universities may foster innovation: The case of a science park. *Technovation,* 50-51**,** 41-52.
DITTRICH, K. & DUYSTERS, G. 2007. Networking as a means to strategy change: The case of open innovation in mobile telephony. *Journal of Product Innovation Management,* 24**,** 510-521.
DONG, A. & POURMOHAMADI, M. 2014. Knowledge matching in the technology outsourcing context of online innovation intermediaries. *Technology Analysis & Strategic Management,* 26**,** 655-668.
DU, W. Y., PAN, S. L. & ZUO, M. Y. 2013. How to Balance Sustainability and Profitability in Technology Organizations: An Ambidextrous Perspective. *Ieee Transactions on Engineering Management,* 60**,** 366-385.
DUARTE, V. & SARKAR, S. 2011. Separating the wheat from the chaff – a taxonomy of open innovation. *European Journal of Innovation Management,* 14**,** 435-459.
DUTRENIT, G., ROCHA-LACKIZ, A. & VERA-CRUZ, A. O. 2012. Functions of the Intermediary Organizations for Agricultural Innovation in Mexico: The Chiapas Produce Foundation. *Review of Policy Research,* 29**,** 693-712.
DUTT, N., HAWN, O., VIDAL, E., CHATTERJI, A., MCGAHAN, A. & MITCHELL, W. 2016. HOW OPEN SYSTEM INTERMEDIARIES ADDRESS INSTITUTIONAL FAILURES: THE CASE OF BUSINESS INCUBATORS IN EMERGING-MARKET COUNTRIES. *Academy of Management Journal,* 59**,** 818-840.
EASTERBY-SMITH, M., THORPE, R. & JACKSON, P. R. 2012. *Management Research*, SAGE Publications.
EASTERBY-SMITH, M., THORPE, R. & LOWE, A. 2004. *Management Research,* London, Sage Publications.
ECK, N. J. V. & WALTMAN, L. 2010. Software Survey: VOSviewer, A Computer Program for Bibliometric Mapping. *Scientometrics***,** 523-538.

EFTEKHARI, N. & BOGERS, M. 2015. Open for Entrepreneurship: How Open Innovation Can Foster New Venture Creation. *Creativity and Innovation Management,* 24**,** 574-584.
EISENHARDT, K. M. 1989a. Agency Theory: An Assessment and Review. *The Academy of Management Review,* 14**,** 57-74.
EISENHARDT, K. M. 1989b. BUILDING THEORIES FROM CASE-STUDY RESEARCH. *Academy of Management Review,* 14**,** 532-550.
EISENHARDT, K. M. & GRAEBNER, M. E. 2007. Theory building from cases: Opportunities and challenges. *Academy of Management Journal,* 50**,** 25-32.
ELLIS, P. D. 2003. Social structure and intermediation: Market-making strategies in international exchange. *Journal of Management Studies,* 40**,** 1683-1708.
ESCRIBANO, A., FOSFURI, A. & TRIBO, J. A. 2009. Managing external knowledge flows: The moderating role of absorptive capacity. *Research Policy,* 38**,** 96-105.
EUN, J. H., LEE, K. & WU, G. S. 2006. Explaining the "University-run enterprises" in China: A theoretical framework for university-industry relationship in developing countries and its application to China. *Research Policy,* 35**,** 1329-1346.
FELLER, J., FINNEGAN, P., HAYES, J. & O'REILLY, P. 2012. 'Orchestrating' sustainable crowdsourcing: A characterisation of solver brokerages. *Journal of Strategic Information Systems,* 21**,** 216-232.
FILIERI, R. & ALGUEZAUI, S. 2014. Structural social capital and innovation. Is knowledge transfer the missing link? *Journal of Knowledge Management,* 18**,** 728-757.
FJELDSTAD, O. D., SNOW, C. C., MILES, R. E. & LETTL, C. 2012. The architecture of collaboration. *Strategic Management Journal,* 33**,** 734-750.
FLEMING, L. & WAGUESPACK, D. M. 2007. Brokerage, boundary spanning, and leadership in open innovation communities. *Organization Science,* 18**,** 165-180.
FONTES, M. 2007. Technological entrepreneurship and capability building in biotechnology. *Technology Analysis & Strategic Management,* 19**,** 351-367.
FRANZONI, C. & SAUERMANN, H. 2014. Crowd science: The organization of scientific research in open collaborative projects. *Research Policy,* 43**,** 1-20.
FREEMAN, J. & ENGEL, J. S. 2007. Models of innovation: Startups and mature corporations. *California Management Review,* 50**,** 94-+.
FRENZ, M. & IETTO-GILLIES, G. 2009. The impact on innovation performance of different sources of knowledge: Evidence from the UK Community Innovation Survey. *Research Policy,* 38**,** 1125-1135.
FRYKFORS, C. O. & JONSSON, H. 2010. Reframing the multilevel triple helix in a regional innovation system: a case of systemic foresight and regimes in renewal of Skane's food industry. *Technology Analysis & Strategic Management,* 22**,** 819-829.
GALLEGO, J., RUBALCABA, L. & SUAREZ, C. 2013. Knowledge for innovation in Europe: The role of external knowledge on firms' cooperation strategies. *Journal of Business Research,* 66**,** 2034-2041.
GASSMANN, O., DAIBER, M. & ENKEL, E. 2011. The role of intermediaries in cross-industry innovation processes. *R & D Management,* 41**,** 457-469.
GAWER, A. 2014. Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research Policy,* 43**,** 1239-1249.
GAWER, A. & CUSUMANO, M. A. 2008. How companies become platform leaders. *Mit Sloan Management Review,* 49**,** 28-+.
GAWER, A. & CUSUMANO, M. A. 2014. Industry Platforms and Ecosystem Innovation. *Journal of Product Innovation Management,* 31**,** 417-433.
GILBERT, M. & CORDEY-HAYES, M. 1996. Understanding the process of knowledge transfer to achieve successful technological innovation. *Technovation,* 16**,** 301-312.

GLENNIE, A. & KIRSTEN, B. 2016. How Innovation Agencies Work: International Lessons to Inspire and Inform National Strategies. London: NESTA.
GOULD, R. V. & FERNANDEZ, R. M. 1989. Structures of Mediation: A Formal Approach to Brokerage in Transaction Networks. *Sociological Methodology,* 19**,** 89-126.
GRANOVET.MS 1973. THE STRENGTH OF WEAK TIES. *American Journal of Sociology,* 78**,** 1360-1380.
GREDEL, D., KRAMER, M. & BEND, B. 2012. Patent-based investment funds as innovation intermediaries for SMEs: In-depth analysis of reciprocal interactions, motives and fallacies. *Technovation,* 32**,** 536-549.
GROTE, M., HERSTATT, C. & GEMUNDEN, H. G. 2012. Cross-Divisional Innovation in the Large Corporation: Thoughts and Evidence on Its Value and the Role of the Early Stages of Innovation. *Creativity and Innovation Management,* 21**,** 361-375.
GROZA, M. D., LOCANDER, D. A. & HOWLETT, C. H. 2016. Linking thinking styles to sales performance: The importance of creativity and subjective knowledge. *Journal of Business Research,* 69**,** 4185-4193.
GUAN, J. C., ZHANG, J. J. & YAN, Y. 2015. The impact of multilevel networks on innovation. *Research Policy,* 44**,** 545-559.
HAHN, R. & GOLD, S. 2014. Resources and governance in "base of. the pyramid"-partnerships: Assessing collaborations between businesses and non-business actors. *Journal of Business Research,* 67**,** 1321-1333.
HAIR, J. F., JR, HULT, G. T. M., RINGLE, C. M. & SARSTEDT, M. 2017. *A Primer on Partial Least Squares Structural Equation Model (PLS-SEM),* Los Angeles, SAGE.
HAKANSON, L., CAESSENS, P. & MACAULAY, S. 2011. InnovationXchange: A case study in innovation intermediation. *Innovation-Management Policy & Practice,* 13**,** 261-274.
HALLEBONE, E. & PRIEST, J. 2008. *Business and Management Research: Paradigms and Practices*, Macmillan Education UK.
HAN, K., OH, W., IM, K. S., CHANG, R. M., OH, H. & PINSONNEAULT, A. 2012. VALUE COCREATION AND WEALTH SPILLOVER IN OPEN INNOVATION ALLIANCES. *Mis Quarterly,* 36**,** 291-315.
HANSEN, M. T. 2002. Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization Science,* 13**,** 232-248.
HARGADON, A. & SUTTON, R. I. 1997. Technology brokering and innovation in a product development firm. *Administrative Science Quarterly,* 42**,** 716-749.
HARGADON, A. B. 1998. Firms as knowledge brokers: Lessons in pursuing continuous innovation. *California Management Review,* 40**,** 209-+.
HARLAND, P. E. & NIENABER, A. M. 2014. Solving the matchmaking dilemma between companies and external idea contributors. *Technology Analysis & Strategic Management,* 26**,** 639-653.
HAUGE, A. & POWER, D. 2013. Quality, difference and regional advantage: The case of the winter sports industry. *European Urban and Regional Studies,* 20**,** 385-400.
HE, Z. L. & WONG, P. K. 2004. Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science,* 15**,** 481-494.
HENSELER, J., RINGLE, C. M. & SARSTEDT, M. 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science,* 43**,** 115-135.
HODSON, M. & MARVIN, S. 2009. Cities mediating technological transitions: understanding visions, intermediation and consequences. *Technology Analysis & Strategic Management,* 21**,** 515-534.
HOLZMANN, T., SAILER, K. & KATZY, B. R. 2014. Matchmaking as multi-sided market for open innovation. *Technology Analysis & Strategic Management,* 26**,** 601-615.

HOWELLS, J. 2006. Intermediation and the role of intermediaries in innovation. *Research Policy,* 35**,** 715-728.
HUGGINS, R. 2010. Forms of Network Resource: Knowledge Access and the Role of Inter-Firm Networks. *International Journal of Management Reviews,* 12**,** 335-352.
HUTTER, K., HAUTZ, J., FULLER, J., MUELLER, J. & MATZLER, K. 2011. Communitition: The Tension between Competition and Collaboration in Community-Based Design Contests. *Creativity and Innovation Management,* 20**,** 3-21.
IANSITI, M. & LEVIEN, R. 2004. *The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*, Harvard Business School Press.
INKINEN, T. & SUORSA, K. 2010. Intermediaries in Regional Innovation Systems: High-Technology Enterprise Survey from Northern Finland. *European Planning Studies,* 18**,** 169-187.
INKPEN, A. C. & TSANG, E. W. K. 2005. Social capital, networks, and knowledge transfer. *Academy of Management Review,* 30**,** 146-165.
INKPEN, A. C. & TSANG, E. W. K. 2016. REFLECTIONS ON THE 2015 DECADE AWARD-SOCIAL CAPITAL, NETWORKS, AND KNOWLEDGE TRANSFER: AN EMERGENT STREAM OF RESEARCH. *Academy of Management Review,* 41**,** 573-588.
JANSEN, J. J. P., BOSCH, F. A. J. V. D. & VOLBERDA, H. W. 2006a. Exploratory Innovation, Exploitative Innovation, and Performance: Effects of Organizational Antecedents and Environmental Moderators. *Management Science,* 52**,** 1661-1674.
JANSEN, J. J. P., VAN DEN BOSCH, F. A. J. & VOLBERDA, H. W. 2006b. Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science,* 52**,** 1661-1674.
JIMENEZ-JIMENEZ, D., MARTINEZ-COSTA, M. & SANZ-VALLE, R. 2014. Knowledge management practices for innovation: a multinational corporation's perspective. *Journal of Knowledge Management,* 18**,** 905-918.
JOHNSON, W. H. A. 2008. Roles, resources and benefits of intermediate organizations supporting triple helix collaborative R&D: The case of Precarn. *Technovation,* 28**,** 495-505.
KARAMI, A. 2010. *Management Research Custom Publication*, Palgrave Macmillan Limited.
KATZY, B., TURGUT, E., HOLZMANN, T. & SAILER, K. 2013. Innovation intermediaries: a process view on open innovation coordination. *Technology Analysis & Strategic Management,* 25**,** 295-309.
KETOKIVI, M. & CHOI, T. 2014. Renaissance of case research as a scientific method. *Journal of Operations Management,* 32**,** 232-240.
KIDWELL, D. K. 2013. Principal investigators as knowledge brokers: A multiple case study of the creative actions of PIs in entrepreneurial science. *Technological Forecasting and Social Change,* 80**,** 212-220.
KIM, K., CHOI, Y., CHOI, C. Y. & KIM, H. J. 2010. The role of intermediaries on technological risk management and business development performance in Korea. *Technological Forecasting and Social Change,* 77**,** 870-880.
KIRKELS, Y. & DUYSTERS, G. 2010. Brokerage in SME networks. *Research Policy,* 39**,** 375-385.
KIVIMAA, P. 2014. Government-affiliated intermediary organisations as actors in system-level transitions. *Research Policy,* 43**,** 1370-1380.
KLERKX, L. & AARTS, N. 2013. The interaction of multiple champions in orchestrating innovation networks: Conflicts and complementarities. *Technovation,* 33**,** 193-210.
KLERKX, L. & LEEUWIS, C. 2008. Balancing multiple interests: Embedding innovation intermediation in the agricultural knowledge infrastructure. *Technovation,* 28**,** 364-378.

KLERKX, L. & LEEUWIS, C. 2009. Establishment and embedding of innovation brokers at different innovation system levels: Insights from the Dutch agricultural sector. *Technological Forecasting and Social Change,* 76**,** 849-860.
KNOCKAERT, M., SPITHOVEN, A. & CLARYSSE, B. 2014. The impact of technology intermediaries on firm cognitive capacity additionality. *Technological Forecasting and Social Change,* 81**,** 376-387.
KODAMA, T. 2008. The role of intermediation and absorptive capacity in facilitating university-industry linkages - An empirical study of TAMA in Japan. *Research Policy,* 37**,** 1224-1240.
KOHLER, T. 2016. Corporate accelerators: Building bridges between corporations and startups. *Business Horizons,* 59**,** 347-357.
LANDRY, R., AMARA, N., CLOUTIER, J. S. & HALILEM, N. 2013. Technology transfer organizations: Services and business models. *Technovation,* 33**,** 431-449.
LAURITZEN, G. D. 2017. The Role of Innovation Intermediaries in Firm-Innovation Community Collaboration: Navigating the Membership Paradox. *Journal of Product Innovation Management,* 34**,** 289-314.
LEE, C. Y., WU, H. L. & LIU, C. Y. 2013. Contextual Determinants of Ambidextrous Learning: Evidence From Industrial Firms in Four Industrialized Countries. *Ieee Transactions on Engineering Management,* 60**,** 529-540.
LEE, J. 2010. Heterogeneity, Brokerage, and Innovative Performance: Endogenous Formation of Collaborative Inventor Networks. *Organization Science,* 21**,** 804-822.
LEE, J. D. & PARK, C. 2006. Research and development linkages in a national innovation system: Factors affecting success and failure in Korea. *Technovation,* 26**,** 1045-1054.
LEE, S., PARK, G., YOON, B. & PARK, J. 2010. Open innovation in SMEs-An intermediated network model. *Research Policy,* 39**,** 290-300.
LEE, S. M., OLSON, D. L. & TRIMI, S. 2012. Co-innovation: convergenomics, collaboration, and co-creation for organizational values. *Management Decision,* 50**,** 817-831.
LEVINE, S. S. & PRIETULA, M. J. 2012. How Knowledge Transfer Impacts Performance: A Multilevel Model of Benefits and Liabilities. *Organization Science,* 23**,** 1748-1766.
LI, Y., VANHAVERBEKE, W. & SCHOENMAKERS, W. 2008. Exploration and Exploitation in Innovation: Reframing the Interpretation. *Creativity and Innovation Management,* 17**,** 107-126.
LIAO, S. H. & HU, T. C. 2007. Knowledge transfer and competitive advantage on environmental uncertainty: An empirical study of the Taiwan semiconductor industry. *Technovation,* 27**,** 402-411.
LIN, H., ZENG, S. X., LIU, H. J. & LI, C. 2016. How do intermediaries drive corporate innovation? A moderated mediating examination. *Journal of Business Research,* 69**,** 4831-4836.
LIN, L. H., GENG, X. J. & WHINSTON, A. B. 2005. A sender-receiver framework for knowledge transfer. *Mis Quarterly,* 29**,** 197-219.
LIN, Y. H. 2012. Knowledge brokering for transference to the pilot's safety behavior. *Management Decision,* 50**,** 1326-1338.
LINCOLN, Y. S. & GUBA, E. G. 1985. *Naturalistic Inquiry*, SAGE Publications.
LISSONI, F. 2010. Academic inventors as brokers. *Research Policy,* 39**,** 843-857.
LOYA, M. I. M. & RAWANI, A. M. 2016. Strategic framework for commercialisation of fly ash innovations. *Technology Analysis & Strategic Management,* 28**,** 555-567.
LUZON, M. D. M. & PASOLA, J. V. 2011. Ambidexterity and total quality management: towards a research agenda. *Management Decision,* 49**,** 927-947.

MARCH, J. G. 1991. EXPLORATION AND EXPLOITATION IN ORGANIZATIONAL LEARNING. *Organization Science,* 2**,** 71-87.
MARTINEZ, M. G. & WALTON, B. 2014. The wisdom of crowds: The potential of online communities as a tool for data analysis. *Technovation,* 34**,** 203-214.
MAS-VERDU, F., ORTIZ-MIRANDA, D. & GARCIA-ALVAREZ-COQUE, J. M. 2016. Examining organizational innovations in different regional settings. *Journal of Business Research,* 69**,** 5324-5329.
MATSUNO, K., ZHU, Z. & RICE, M. P. 2014. Innovation Process and Outcomes for Large Japanese Firms: Roles of Entrepreneurial Proclivity and Customer Equity. *Journal of Product Innovation Management,* 31**,** 1106-1124.
MAURER, I., BARTSCH, V. & EBERS, M. 2011. The Value of Intra-organizational Social Capital: How it Fosters Knowledge Transfer, Innovation Performance, and Growth. *Organization Studies,* 32**,** 157-185.
MCDERMOTT, C. M. & PRAJOGO, D. I. 2012. Service innovation and performance in SMEs. *International Journal of Operations & Production Management,* 32**,** 216-237.
MCEVILY, B. & ZAHEER, A. 1999. Bridging ties: A source of firm heterogeneity in competitive capabilities. *Strategic Management Journal,* 20**,** 1133-1156.
MELE, C. & RUSSO-SPENA, T. 2015. Innomediary agency and practices in shaping market innovation. *Industrial Marketing Management,* 44**,** 42-53.
MENDONCA, J. & HEITOR, M. 2016. The changing patterns of industrial production: How does it play for the Iberian Peninsula? *Technological Forecasting and Social Change,* 113**,** 293-307.
MICHELFELDER, I. & KRATZER, J. 2013. Why and How Combining Strong and Weak Ties within a Single Interorganizational R&D Collaboration Outperforms Other Collaboration Structures. *Journal of Product Innovation Management,* 30**,** 1159-1177.
MILES, M. B., HUBERMAN, A. M. & SALDANA, J. 2013. *Qualitative Data Analysis: A Methods Sourcebook*, SAGE Publications.
MILES, R. E. & SNOW, C. C. 1986. ORGANIZATIONS - NEW CONCEPTS FOR NEW FORMS. *California Management Review,* 28**,** 62-73.
MILLER, P. & BOUND, K. 2011. The Startup Factories: The rise of accelerator programmes to support new technology ventures. London, UK: NESTA.
MITCHELL, R., BOYLE, B., BURGESS, J. & MCNEIL, K. 2014. "You Can't Make a Good Wine without a Few Beers": Gatekeepers and knowledge flow in industrial districts. *Journal of Business Research,* 67**,** 2198-2206.
MOCKER, V., BIELLI, S. & HALEY, C. 2015. Winning Together A Guide to Successful Corporate-startup Collaborations. London: NESTA

Founders Intelligence

Startup Europe Partnership.
MOLINA-MORALES, F. X. & MARTINEZ-FERNANDEZ, M. T. 2009. TOO MUCH LOVE IN THE NEIGHBORHOOD CAN HURT: HOW AN EXCESS OF INTENSITY AND TRUST IN RELATIONSHIPS MAY PRODUCE NEGATIVE EFFECTS ON FIRMS. *Strategic Management Journal,* 30**,** 1013-1023.
MONTELISCIANI, G., GABELLONI, D., TAZZINI, G. & FANTONI, G. 2014. Skills and wills: the keys to identify the right team in collaborative innovation platforms. *Technology Analysis & Strategic Management,* 26**,** 687-702.
MOUNT, M. & MARTINEZ, M. G. 2014. Social Media: A TOOL FOR OPEN INNOVATION. *California Management Review,* 56**,** 124-143.

MYOKEN, Y. 2010. Demand-orientated policy on leading-edge industry and technology: public procurement for innovation. *International Journal of Technology Management,* 49**,** 196-219.
NAG, R. & GIOIA, D. A. 2012. From common to uncommon knowledge: foundations of firm-specific use of knowledge as a resource. *Academy of Management Journal,* 55**,** 421-457.
NAHAPIET, J. & GHOSHAL, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review,* 23**,** 242-266.
NAIR, S., NISAR, A., PALACIOS, M. & RUIZ, F. 2012. Impact of knowledge brokering on performance heterogeneity among business models. *Management Decision,* 50**,** 1649-1660.
NAMBISAN, S., BACON, J. & THROCKMORTON, J. 2012. The Role of the Innovation Capitalist in Open Innovation A Case Study and Key Lessons Learned. *Research-Technology Management,* 55**,** 49-57.
NAMBISAN, S. & BARON, R. A. 2009. Virtual Customer Environments: Testing a Model of Voluntary Participation in Value Co-creation Activities. *Journal of Product Innovation Management,* 26**,** 388-406.
NAMBISAN, S. & BARON, R. A. 2013. Entrepreneurship in Innovation Ecosystems: Entrepreneurs' Self-Regulatory Processes and Their Implications for New Venture Success. *Entrepreneurship Theory and Practice,* 37**,** 1071-1097.
NAMBISAN, S., LYYTINEN, K., MAJCHRZAK, A. & SONG, M. 2017. DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD. *Mis Quarterly,* 41**,** 223-238.
NAMBISAN, S. & SAWHNEY, M. 2007. A buyer's guide to the innovation bazaar. *Harvard Business Review,* 85**,** 109-+.
NAMBISAN, S. & SAWHNEY, M. 2011. Orchestration Processes in Network-Centric Innovation: Evidence From the Field. *Academy of Management Perspectives,* 25**,** 40-57.
NUCCIARELLI, A., LI, F., FERNANDES, K. J., GOUMAGIAS, N., CABRAS, I., DEVLIN, S., KUDENKO, D. & COWLING, P. 2017. From value chains to technological platforms: The effects of crowdfunding in the digital game industry. *Journal of Business Research,* 78**,** 341-352.
O'REILLY, C. A. & TUSHMAN, M. L. 2004. The ambidextrous organisation. *Harvard Business Review,* 82**,** 74-+.
O'REILLY, C. A. & TUSHMAN, M. L. 2011. Organizational Ambidexterity in Action: How MANAGERS EXPLORE AND EXPLOIT. *California Management Review,* 53**,** 5-+.
OBSTFELD, D. 2005. Social networks, the Tertius lungens and orientation involvement in innovation. *Administrative Science Quarterly,* 50**,** 100-130.
PAQUIN, R. L. & HOWARD-GRENVILLE, J. 2013. Blind Dates and Arranged Marriages: Longitudinal Processes of Network Orchestration. *Organization Studies,* 34**,** 1623-1653.
PAUWELS, C., CLARYSSE, B., WRIGHT, M. & VAN HOVE, J. 2016. Understanding a new generation incubation model: The accelerator. *Technovation,* 50-51**,** 13-24.
PERSAUD, A. 2005. Enhancing synergistic innovative capability in multinational corporations: An empirical investigation. *Journal of Product Innovation Management,* 22**,** 412-429.
PERSSON, O., DANELL, R. & SCHNEIDER, J. W. 2009. How to use Bibexcel for various types of bibliometric analysis. *In:* ASTROM, F., DANELL, R., LARSEN, B. & SCHNEIDER, J. W. (eds.) *Celebrating Scholarly Communication Studies.* International society for scientometrics and informetrics.

PIHL, C. & SANDSTROM, C. 2013. Value creation and appropriation in social media - the case of fashion bloggers in Sweden. *International Journal of Technology Management,* 61**,** 309-323.
PITTAWAY, L., ROBERTSON, M., MUNIR, K., DENYER, D. & NEELY, A. 2004. Networking and innovation: a systematic review of the evidence. *International Journal of Management Reviews,* 5-6**,** 137-168.
POWELL, W. W., KOPUT, K. W. & SMITHDOERR, L. 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly,* 41**,** 116-145.
PROVAN, K. G. & KENIS, P. 2008. Modes of Network Governance: Structure, Management, and Effectiveness. *Journal of Public Administration Research and Theory,* 18**,** 229-252.
QUINTANE, E. & CARNABUCI, G. 2016. How Do Brokers Broker? Tertius Gaudens, Tertius Iungens, and the Temporality of Structural Holes. *Organization Science,* 27**,** 1343-1360.
RAVEN, R., VAN DEN BOSCH, S. & WETERINGS, R. 2010. Transitions and strategic niche management: towards a competence kit for practitioners. *International Journal of Technology Management,* 51**,** 57-74.
REAGANS, R. & MCEVILY, B. 2003. Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly,* 48**,** 240-267.
REYPENS, C., LIEVENS, A. & BLAZEVIC, V. 2016. Leveraging value in multi-stakeholder innovation networks: A process framework for value co-creation and capture. *Industrial Marketing Management,* 56**,** 40-50.
RITALA, P., AGOURIDAS, V., ASSIMAKOPOULOS, D. & GIES, O. 2013. Value creation and capture mechanisms in innovation ecosystems: a comparative case study. *International Journal of Technology Management,* 63**,** 244-267.
RITTER, T. & WALTER, A. 2003. Relationship-specific antecedents of customer involvement in new product development. *International Journal of Technology Management,* 26**,** 482-501.
RONG, K., HU, G. Y., HOU, J., MA, R. F. & SHI, Y. J. 2013. Business ecosystem extension: facilitating the technology substitution. *International Journal of Technology Management,* 63**,** 268-294.
RYALL, M. D. & SORENSON, O. 2007. Brokers and competitive advantage. *Management Science,* 53**,** 566-583.
SANDMEIER, P. 2009. Customer integration strategies for innovation projects: anticipation and brokering. *International Journal of Technology Management,* 48**,** 1-23.
SAUNDERS, M. N. K., LEWIS, P. & THORNHILL, A. 2012. *Research Methods for Business Students*, Pearson Education Limited.
SCHREUER, A., ORNETZEDER, M. & ROHRACHER, H. 2010. Negotiating the local embedding of socio-technical experiments: a case study in fuel cell technology. *Technology Analysis & Strategic Management,* 22**,** 729-743.
SCILLITOE, J. L. & CHAKRABARTI, A. K. 2010. The role of incubator interactions in assisting new ventures. *Technovation,* 30**,** 155-167.
SHAPIRO, M. A., SO, M. & PARK, H. 2010. Quantifying the national innovation system: inter-regional collaboration networks in South Korea. *Technology Analysis & Strategic Management,* 22**,** 845-857.
SHOHET, S. & PREVEZER, M. 1996. UK biotechnology: Institutional linkages, technology transfer and the role of intermediaries. *R & D Management,* 26**,** 283-298.

SHU, C., PAGE, A. L., GAO, S. & JIANG, X. 2012. Managerial Ties and Firm Innovation: Is Knowledge Creation a Missing Link? *Journal of Product Innovation Management,* 29**,** 125-143.

SIEG, J. H., WALLIN, M. W. & VON KROGH, G. 2010. Managerial challenges in open innovation: a study of innovation intermediation in the chemical industry. *R & D Management,* 40**,** 281-291.

SKOLD, M. & KARLSSON, C. 2012. Technology Sharing in Manufacturing Business Groups. *Journal of Product Innovation Management,* 29**,** 113-124.

SNOW, C. C., FJELDSTAD, O. D., LETTL, C. & MILES, R. E. 2011. Organizing Continuous Product Development and Commercialization: The Collaborative Community of Firms Model. *Journal of Product Innovation Management,* 28**,** 3-16.

SNOW, C. C., MILES, R. E. & COLEMAN, H. J. 1992. MANAGING 21ST-CENTURY NETWORK ORGANIZATIONS. *Organizational Dynamics,* 20**,** 5-19.

SPITHOVEN, A., CLARYSSE, B. & KNOCKAERT, M. 2010. Building absorptive capacity to organise inbound open innovation in traditional industries. *Technovation,* 30**,** 130-141.

SPITHOVEN, A. & KNOCKAERT, M. 2012. Technology intermediaries in low tech sectors: The case of collective research centres in Belgium. *Innovation-Management Policy & Practice,* 14**,** 375-387.

SPRAGGON, M. & BODOLICA, V. 2012. A multidimensional taxonomy of intra-firm knowledge transfer processes. *Journal of Business Research,* 65**,** 1273-1282.

STEENSMA, H. K., CHARI, M. & HEIDL, R. 2016. A Comparative Analysis of Patent Assertion Entities in Markets for Intellectual Property Rights. *Organization Science,* 27**,** 2-17.

STOKES, P. 2011. *Key Concepts in Business and Management Research Methods*, Palgrave Macmillan.

STUART, T. E., OZDEMIR, S. Z. & DING, W. W. 2007. Vertical alliance networks: The case of university-biotechnology-pharmaceutical alliance chains. *Research Policy,* 36**,** 477-498.

TAHERI, M. & VAN GEENHUIZEN, M. 2016. Teams' boundary-spanning capacity at university: Performance of technology projects in commercialization. *Technological Forecasting and Social Change,* 111**,** 31-43.

TAI, S. & DAVIDS, M. 2016. Evolving roles and dynamic capabilities of an innovation agency: the Dutch Rijksnijverheidsdienst, 1910-1940. *Technology Analysis & Strategic Management,* 28**,** 614-626.

TEDDLIE, C. & TASHAKKORI, A. 2009. *Foundations of Mixed Methods Research: Integrating Quantitative and Qualitative Approaches in the Social and Behavioral Sciences*, SAGE Publications.

TETHER, B. S. & TAJAR, A. 2008. Beyond industry-university links: Sourcing knowledge for innovation from consultants, private research organisations and the public science-base. *Research Policy,* 37**,** 1079-1095.

THEODORAKOPOULOS, N., PRECIADO, D. J. S. & BENNETT, D. 2012. Transferring technology from university to rural industry within a developing economy context: The case for nurturing communities of practice. *Technovation,* 32**,** 550-559.

TIWANA, A. & BUSH, A. A. 2005. Continuance in expertise-sharing networks: A social perspective. *Ieee Transactions on Engineering Management,* 52**,** 85-101.

TOTTERMAN, H. & STEN, J. 2005. Start-ups - Business incubation and social capital. *International Small Business Journal,* 23**,** 487-511.

TRAN, Y., HSUAN, J. & MAHNKE, V. 2011. How do innovation intermediaries add value? Insight from new product development in fashion markets. *R & D Management,* 41**,** 80-91.

TSAI, W. & GHOSHAL, S. 1998. Social Capital and Value Creation: The Role of Intrafirm Networks. *The Academy of Management Journal,* 41**,** 464-476.
TSEKOURAS, G., KANELLOU, D. & RAI, N. 2013. Redefining learning networks through ICT capabilities: representations, behaviours and intermediation strategies. *Technology Analysis & Strategic Management,* 25**,** 257-279.
TUSHMAN, M. L. & OREILLY, C. A. 1996. Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review,* 38**,** 8-&.
TZABBAR, D., AHARONSON, B. S. & AMBURGEY, T. L. 2013. When does tapping external sources of knowledge result in knowledge integration? *Research Policy,* 42**,** 481-494.
USMAN, M. & VANHAVERBEKE, W. 2017. How start-ups successfully organize and manage open innovation with large companies. *European Journal of Innovation Management,* 20**,** 171-186.
UTOYO, I. 2016. *Silicon Valley Mindset: Developing Indonesian Digital Start-up Ecosystem,* Jakarta, PT Gramedia Pustaka Utama.
VALKOKARI, K. 2015. Business, Innovation, and Knowledge Ecosystems: How They Differ and How to Survive and Thrive within Them. *Technology Innovation Management Review,* 5**,** 17-24.
VAN DE VRANDE, V., DE JONG, J. P. J., VANHAVERBEKE, W. & DE ROCHEMONT, M. 2009. Open innovation in SMEs: Trends, motives and management challenges. *Technovation,* 29**,** 423-437.
VAN DEN BERG, W. E., VERBEKE, W., BAGOZZI, R. P., WORM, L., DE JONG, A. & NIJSSEN, E. 2014. Salespersons as Internal Knowledge Brokers and New Products Selling: Discovering the Link to Genetic Makeup. *Journal of Product Innovation Management,* 31**,** 695-709.
VARGO, S. L., WIELAND, H. & AKAKA, M. A. 2015. Innovation through institutionalization: A service ecosystems perspective. *Industrial Marketing Management,* 44**,** 63-72.
VASUDEVA, G., ZAHEER, A. & HERNANDEZ, E. 2013. The Embeddedness of Networks: Institutions, Structural Holes, and Innovativeness in the Fuel Cell Industry. *Organization Science,* 24**,** 645-663.
VILLANI, E., RASMUSSEN, E. & GRIMALDI, R. 2017. How intermediary organizations facilitate university-industry technology transfer: A proximity approach. *Technological Forecasting and Social Change,* 114**,** 86-102.
VIVAS, C. 2016. Commercializing technological research and skills: drivers from European technology institutes. *Innovation-Management Policy & Practice,* 18**,** 389-410.
VLAISAVLJENIC, V., CABELLO-MEDINA, C. & PEREZ-LUNO, A. 2016. Coping with diversity in alliances for innovation: the role of relational social capital and knowledge codifiability. *British Journal of Management,* 27**,** 304-322.
VLAISAVLJEVIC, V., CABELLO-MEDINA, C. & PEREZ-LUNO, A. 2016a. Coping with diversity in alliances for innovation: the role of relational social capital and knowledge codifiability. *British Journal of Management,* 27**,** 304-322.
VLAISAVLJEVIC, V., CABELLO-MEDINA, C. & PÉREZ-LUÑO, A. 2016b. Coping with Diversity in Alliances for Innovation: The Role of Relational Social Capital and Knowledge Codifiability. *British Journal of Management,* 27**,** 304-322.
VOGEL, R. & GUETTEL, W. H. 2013. The Dynamic Capability View in Strategic Management: A Bibliometric Review. *International Journal of Management Reviews,* 15**,** 426-446.
VRGOVIC, P., VIDICKI, P., GLASSMAN, B. & WALTON, A. 2012. Open innovation for SMEs in developing countries - An intermediated communication network model for collaboration beyond obstacles. *Innovation-Management Policy & Practice,* 14**,** 290-302.

WANG, D. 2015. Activating Cross-border Brokerage: Interorganizational Knowledge Transfer through Skilled Return Migration. *Administrative Science Quarterly,* 60**,** 133-176.
WANG, Y., VANHAVERBEKE, W. & ROIJAKKERS, N. 2012. Exploring the impact of open innovation on national systems of innovation - A theoretical analysis. *Technological Forecasting and Social Change,* 79**,** 419-428.
WATKINS, A., PAPAIOANNOU, T., MUGWAGWA, J. & KALE, D. 2015. National innovation systems and the intermediary role of industry associations in building institutional capacities for innovation in developing countries: A critical review of the literature. *Research Policy,* 44**,** 1407-1418.
WEI, Z. L., YI, Y. Q. & GUO, H. 2014. Organizational Learning Ambidexterity, Strategic Flexibility, and New Product Development. *Journal of Product Innovation Management,* 31**,** 832-847.
WEIBLEN, T. & CHESBROUGH, H. W. 2015. Engaging with Startups to Enhance Corporate Innovation. *California Management Review,* 57**,** 66-90.
WEST, J. & BOGERS, M. 2014. Leveraging External Sources of Innovation: A Review of Research on Open Innovation. *Journal of Product Innovation Management,* 31**,** 814-831.
WEST, J. & BOGERS, M. 2017. Open innovation: current status and research opportunities. *Innovation-Management Policy & Practice,* 19**,** 43-50.
WEST, J., SALTER, A., VANHAVERBEKE, W. & CHESBROUGH, H. 2014. Open innovation: The next decade. *Research Policy,* 43**,** 805-811.
WOLPERT, J. D. 2002. Breaking out of the innovation box. *Harvard business review,* 80**,** 76-148.
WURMSEHER, M. 2017. To each his own: Matching different entrepreneurial models to the academic scientist's individual needs. *Technovation,* 59**,** 1-17.
YIN, R. K. 2009. *Case Study Research: Design and Methods*, SAGE Publications.
YU, S. H. 2013. Social capital, absorptive capability, and firm innovation. *Technological Forecasting and Social Change,* 80**,** 1261-1270.
YUSUF, S. 2008. Intermediating knowledge exchange between universities and businesses. *Research Policy,* 37**,** 1167-1174.
ZENG, S. X., XIE, X. M. & TAM, C. M. 2010. Relationship between cooperation networks and innovation performance of SMEs. *Technovation,* 30**,** 181-194.
ZHANG, Y. & LI, H. 2010a. INNOVATION SEARCH OF NEW VENTURES IN A TECHNOLOGY CLUSTER: THE ROLE OF TIES WITH SERVICE INTERMEDIARIES. *Strategic Management Journal,* 31**,** 88-109.
ZHANG, Y. & LI, H. Y. 2010b. INNOVATION SEARCH OF NEW VENTURES IN A TECHNOLOGY CLUSTER: THE ROLE OF TIES WITH SERVICE INTERMEDIARIES. *Strategic Management Journal,* 31**,** 88-109.
ZHENG, W. 2010. A Social Capital Perspective of Innovation from Individuals to Nations: Where is Empirical Literature Directing Us? *International Journal of Management Reviews,* 12**,** 151-183.
ZOTT, C. & AMIT, R. 2010. Business Model Design: An Activity System Perspective. *Long Range Planning,* 43**,** 216-226.
ZOTT, C., AMIT, R. & MASSA, L. 2011. The Business Model: Recent Developments and Future Research. *Journal of Management,* 37**,** 1019-1042.

APPENDIECS

Appendix 1 : Interview transcript

Corresponding to figure 11 page 115

Appendix 2 : The Questionnaire Survey

APPENDIX 1 INTERVIEW TRANSCRIPT

Corresponding to figure 11 page 115

Sources of Information

Interviewee	Position
Goers start-up (SR)	Start-up CEO
Jarvis start-up (JS)	Start-up CEO
Kakatu start-up (RT)	Start-up CTO
Kartoo start-up (ML)	Start-up CEO
Privy_ID start-up (HW)	Start-up CEO
Zelos start-up (ZS)	Start-up CEO
Arief Mustain (AM)	Head of Digital Service Division
Ery Punta (EP)	Executive General Manager of the Digital Services Division
Dinoor Susatijo (DS)	SM of Open Innovation Management
Johannes Adi (JA)	Manager of Incubation Management
Agnesia Candra Sulyani (ACS)	Incubation Assessment Management
Indra Utoyo (IU)	The Silicon Valley Mindset Book Author

TRANSCRIPT

Stages of process	Activities	Transcript Interview
Pre-engagement	Workshop and training	I knew about Indigo because it held **workshops** in several cities. From those events, I knew what Indigo was, the benefits and why we should join, and then I decided to join Indigo (JS)
		The creative camp focuses on nurturing creativity. The programme aims to competency development, idea creation, and start-up forming. It's very basic preparation for start-ups. It taking place at DiLOs that distributed at 14 cities in Indonesia. The facilities are free spaces, **workshop and training**, and pre-incubation activities (JA)
		Nurturing creativity events are spread around Indonesia, like competition, gathering, matchmaking, **workshop management, design workshop**, and technical workshop (JA)
	Media advertising	Our first **media** is our web, indigo.id. Indigo.id is the tool to introduce indigo, to

		share news about indigo, then to startup registering (DS)
		In Indigo annual report mentioning the **media they used to advertise Indigo programme** (document)
The accelerator programme	Business mentoring	mentor, whenever we needed and every week there were 3 mentoring sessions with mentor. Beside those mentoring, there's also **mentoring for business** and technical twice a week. Beside the mentoring with a mentor, we also got mentoring with expert in business and technical specially invited every alternate week (JS).
		So mentoring we often did were **business mentoring** rather than technical product (RT).
		From the market understanding side, we did understood from the **business mentorings** (HW)
	Product and business model development	As explained earlier, there are incubation and acceleration process because we follow the startup modelling, started with customer validation, **product validation then business model validatio**n until to market exploration (AM)
		Customer validation is when you ask to the community, that is in **product development** (DS)
		Technical related to the **making of the product in term of the technology** such as how to make server, the programming, application optimization (JS)
		First…**product developin**g process. We got mentor whose background was IT, very technical person. And it helped us to develop application ideally. Second, actually we had problem with business model. **So in the validation stage of business mode we tried some business model,** one of them was school, beside B to C. and we felt that the business model was not valid at that time.
	Co-working space	Yes, we meet some people, but that's when we go to the office and not necessary relevant. For example with Pak Ama, we by chance met at the **shared office** and we had same language thus we could talk (ZS)

		Product validation (product development, product develop in minimum level scale then test to customer). For three months duration and funding 120millions. Facilitated with **office space**, tutor and knowledge update (JA).
		Probably during garage patch, we met the owner of the **working space** then we chatted so it wasn't direct. So when Indigo held an event, we participated, we met some people (ML)
	Funding	Acceleration also needs committee approval, started from accepting into acceleration, then the **funding**, we give them funding, its matrix until finish (DS)
		First, at micro level related to stakeholder value, by producing digital-preneur, start from digital creative to digital commerce in domestic and global scale by providing creative place, mentorship, and **funding** in incubation and acceleration activities (JA)
		They have ideas, then they are recruited, giving **funding** and so on (DS)
	Events to meet people	Telkom held the demo day. All start-ups would present and investors were invited. There's also **networking event**. There's presentation there (JS)
		During incubation, Indigo held demo day. From the **event we're given access to have pitching in front of investors** invited by Indigo (RT)
		So when I**ndigo held an event, we participated, we met some people** (RT)
		To step forward, we made an **introduction event related to programming, apps and entrepreneurship**, to provoke them initiate the startup. What we trying to do was facilitate personal and communities to gather in our creative place. They could meetups, discuss about digital, personal could meet other person (EP)
	Reputation	**Reputation as part of Indigo Incubator (Telkom) bring trust to investor to invest in start-up.** Meet up with investor/angel at investor day (SR)

		There're two things namely **investor networking, it became more because we have entered but if there's reference from here,** it became easier (Zelos)
Integration	Relation to Telkom subsidiaries	By synergizing with Telkom Group, we just need to meet, jus make it realized. So, they have corporation, **introduced us to their CFU or subsidiaries** (Zelos)
		Third, access, because under the auspices of Telkom group, arguably very **easy to enter and work with subsidiaries of Telkom** (RT).
		Access to subsidiaries of Telkom such as Telkomsel, currently we work together to run campaign of good internet, toured eleven cities in Indonesia to campaign the good internet (RT).
	Integrate start-ups product and Telkom's business model	So its not necessary for us, copying and applying innovation in the internal. All we had to do according to our incubation and accelerator program, we tried **to integrate it to our existing channel** (EP)
		But we want more than that, later on after give motivation, **we try to integrate, until it can create a value,** or even propose into bigger scope (EP)
		Secondly, it needs to be customizes because **it will be integrated with other products.** That process has to be identified and we need to meet up the startups with others who might be need them. If there is a deal which is what they will do then they enter into engagement area (DS).
		Some of start-ups are outstanding and already entered the market. Some of them completed the incubation programme and **the product could be integrated to Telkom as part of digital services** (JA)
		Some of them continue the incubation programme to the next stage, some of them started their engagement with our client in B-to-B, **succeed integrated its product become Telkom's**, like InfoKes for e-community health centre, Jarvis store for digital small medium enterprises (ACS)

Knowledge incorporation	Understand customer better	We move from telecommunication industry to digital industry, by engage with main player in digital industry which is start-up, **we will understad the market better. And its mean we can understand our customer better** (AM)
	Understand start-up world	From that event also we know major capital and other incubators. So, that can be a way for us to build or develop the networking larger. From the networking, related to our job this is how we can get qualified startups, t**hen how we understand start-up world so we can get more inputs (EP)**
		Because if we see the Telkom structural, most of them are in 45 or more, so their interaction ability are not like **most of people in startup world. It is quite hard but we slowly help them understanding** and there will be new kids in Telkom
	Compile working tools with start-up	**There will be a pilot first, so we can say it is insight startup**. They name it Amuba, the organisation is little bit different. However we see there is something good in startups that we dont have, we want to learn. Eventhough they have small organization and have nothing, but the spirit, the culture appear. Not too beuracratic, stratified decision making so make it long and extensive (AM)
		Being honest, we actually wanat to copy the way of work of the startups because they are ignorant, less beurocracy, line organisation. So, we are developing it, that culture (AM)
		Not yet, the concept is preparing. Next monday and tuesday, there will be 2 days workshop to discuss about it. But the awareness has already emerged after a long discussion observing the startup actions. **Then this concept, how if it is implemented in a big corporation.** That will need adaptation because it can not be just copied (AM)
	Lean start-up as Telkom internal	For now, we already start to **apply every things we do with Indigo like Lean Start-up Method in our internal** (EP).

	innovation method	As explained earlier, there are incubation and acceleration process because we follow the startup modelling, started with **customer validation, product validation then business model validation until to market exploration-Lean Start-up** (AM)
		Telkom implements incubation method (Lean start-up) in its product innovation process as in start up incubation: problem validation, product validation, business model validation, and market validation(IU)
		We tried to implement the method and its mechanism, its name is Lane Starup. The aspiration was from the retrieve, later on we met Steve Plane as well as an "early adopter". Because it still early periode, we are still new in this. And also not many entity had implement the method. To be honest, for telpus, for telkom, its 180 degree different, the principle is totally different (EP).
Exploration	Market information update	the second was the idea, which is the **good idea, that could be a new growth or the new business driver for Telkom in the future** (EP)
		Other benefit is we will try to be **updating with the development because we are assingned to develop digital products**, innovating in digital world, so whether we want it or not, we will come inside the current digital wave, which is happening outside (DS)
		In simple, we've got job to **develop scooping products, so these are products for future digital**. To get these products, we have three major roles : to discovery, incubation and acceleration (AM).
	Digital product	once we found product that we could package and develop, we could make it as **a new digital product** offering for Telkom (EP)
		Digital product categories for start-ups follow Telkom's market and consumer (Home, personal, SMEs, Enterprise and Gov) (IU)

		Scoping means find **a new target market for a new digital product.** Like: big data, standardisation, quality assurance, etc. (JA)
		DSD dedicated to create new digital product never exist before (IU)
	Finding information for innovation	It is just the same from product variation, startups are more. S**ometime we also need to have something new continously and it is usually from the startups** (AM)
		So that startup give an innovation or new idea. **They become the key for innovation enter to us**, to become our part (EP)
		with our coaching we made, our channelling, market access, we can bridging them, h**elp them to change ideas into useful innovation** (EP)
		The benefit is clearly so we have an innovation resource. Maybe if what have been developed by startups we developed by ourself, I am not sure that we could do that fast, moreover they are focused (DS).

Appendix 2 : The questionnaire Survey

THE ROLES OF A CORPORATE ACCELERATOR PROGRAMME

Please answer all the questions in this questionnaire. Incomplete answers could not be processed further.

Start-up Name : _____

City : _____

Year of Established :_____

Number of employee : a. under 3 people

b. 3 – 5 people

c. more than 5 peoples

Product category : a. Government solution c. Commerce

b. Business solution d. Personal apps

c. Home solution e. Social media and community

Year involved in Indigo Incubator : a. 2012 b. 2013 c. 2014

d. 2015 e. 2016

Job position in start-up: _____

Gender : a. Male b. Female

Educational background : a. High School b. Bachelor

c. Master e. Dr

For each of the following statements indicate whether you are: strongly disagree, disagree, neutral, agree, and strongly agree.

NO	STATEMENT	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Indigo accelerator provides assistance to find appropriate resources for ourstart-up.					
2	Indigo acceleratorhas capability to provide scarce resources.					
3	We can benefit from other start-up in Indigo accelerator.					
4	Indigo accelerator's personnel support networking and social interaction among start-ups.					
5	Indigo accelerator facilitates our interaction with other start-ups.					
6	We have possibilities to have benefit from other start-ups.					
7	We have developed our network from Indigo accelerator's network relation.					
8	Indigo acceleratorfacilitates spaces for stimulating the level of social interaction among start-ups.					
9	We believe that being part of indigo accelerator's					

	network is the future of our start-up.					
10	Indigo accelerator builds climate of cooperation and mutual trust for every element in the network.					
11	Indigo accelerator maintains the commitments of start-ups to keep continue in the accelerator's network.					
12	Indigo accelerator has agreement that specifies the obligations of each party.					
13	We know the goals of indigo accelerator.					
14	All other start-ups share the same goals and interest in indigo accelerator.					
15	We feel solidarity with other start-ups.					
16	Being in accelerator, we had access to knowledge we need.					
17	Indigo accelerator provided training related to start-up business management.					
18	Indigo accelerator provided training to develop start-up technical skill.					
19	Indigo accelerator provided training related to start-up strategic plan knowledge.					

20	Mentor and trainer for training were capable in his/her area of expertise.					
21	The knowledge we gained from accelerator's programme are useful for our start up.					
22	We implement the knowledge we got from the accelerator's programme to our start-up.					
23	We combine the knowledge we got for the accelerator's programme with knowledge we already had to our start-up.					
24	Indigo accelerator facilitated our start-up to implement and combine the new knowledge.					
25	During or after in Indigo accelerator,our start-up developed creative ideas for completely new and very innovative products/process/methods that could become very valuable in the future.					
18	During or after in Indigoaccelerator,our start-up discover opportunities for future patents, licenses, or publications that could be very valuable in the future.					
19	During or after in Indigo accelerator, our start-up					

	discovered ideas to transfer products/processes/methods to other markets or new product application.					
20	During or after in Indigoaccelerator,out start-up got new contacts that could lead in future to new cooperation projects.					
21	During or after in Indigo accelerator our start-up refined and improved existing products/process/methods.					
22	During or after in Indigoacceleratorour start up produced patents or licenses with high potential value for the organization.					
23	During or after in Indigo acceleratorour start-up produced scientific publications with high scientific value.					
24	During or after in Indigo accelerator,our start-up produced relevant knowledge for the targeted technology (new product, new process, new methods).					
25	During or after in Indigo accelerator,our start-up generated follow-on projects that target using and refining existing products/processes/methods.					