Walking the tightrope of Open Innovation

A study of barriers and the individual's behaviour in the transition phase

by

Marc Flachmann

Ragnhild Aurora Jonasdottir

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Abstract

The open innovation process is complex and requires adoption throughout to be successful and much has been accounted for in the initial stages, the front-end. However, research calls for a better understanding of the back-end, meaning the downstream activities of the organisation. The part of the process connecting the front-end to the back-end is understood as the transition phase and is considered important to the process. Therefore, the purpose of this study is to gain a deeper understanding of the individual's behaviour in the transition phase. In more detail, an understanding of what barriers the individual employee, who performs open innovation practices, is facing in the transition phase, and what behaviour the individual chooses to cope with these. The multiple case study followed an inductive, qualitative research methodology involving four external open innovation projects including nine individuals from different multinational organisations within various industries. Case-specific barriers and individual coping behaviours are identified, grouped into dimensions and compared across cases. In a final step the dimensions and individual coping behaviours are synthesised and the topic of power and politics emerged. By connecting the front-end to the back-end, the findings reveal 16 shared barriers in the transition phase, which can be categorised into the barrier dimensions *Organisation, People, Senior management support, Funding and Immaturity.* The individuals transferring the outcome of an external open innovation project cope with these either by *accepting and working with the given conditions, showing educational and pedagogical behaviours* or by *networking*. The interrelation of barriers and the corresponding individual coping behaviours in the transition phase seem to be better explained by the interdependency of political acts and degrees of power within an organisation.

Keywords: Open innovation, inbound open innovation, front-end, back-end, transition phase, barriers, barrier dimensions, individual coping behaviour, power and politics

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1. Introduction

More often than one assumes, the most unknown and unexpected places carry the solution to your problem, just look at the recent example of the National Aeronautics and Space Administration, NASA (Lifshitz-Assaf, 2018). In order to continue and extend safe and convenient human space travel, difficult tasks and complex problems needed to be addressed and ultimately solved. One of which was the current unreliable forecasts of solar flares, eruptions from the sun that lead to an increase of radiation (Chesbrough, 2020). This radiation poses a threat to the equipment but more importantly the astronauts in space if not detected at an early stage. Knowing the unreliability of their calculation and their inability to improve it themselves, NASA asked the world for help (Chesbrough, 2020). The answer was found by a weather forecasting specialist with no previous experience in neither astrophysics nor astronomy (Chesbrough, 2020). The provided solution found outside of NASA's organisational boundaries led to a forecast that could predict solar flares 16 hours ahead of time and an almost doubled accuracy rate (Lifshitz-Assaf, 2018). This example shows that even the brightest engineers need occasionally unconventional inspiration from the outside to develop a more advanced and safer space travel for astronauts.

The example of NASA is only one of many organisations going beyond their own boundaries in order to innovate and improve. Searching for answers in this manner, meaning outside the organisational boundaries, is academically termed as open innovation (Chesbrough, 2003). It is defined as "a distributed innovation process based on purposely managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model" (Chesbrough & Bogers, 2014, p. 32). To put it differently, the process of organisations deliberately seeking or sharing knowledge outside of the organisational boundaries, either through monetary or non-monetary operations. Open innovation is based on the notion that sources of knowledge for innovation are widely distributed in the economy (Chesbrough & Bogers, 2014), and the concept has, since its emergence in 2003, become an increasingly notable area of research (e.g. Bogers et al, 2018; Bogers & Horst, 2014; Dahlander & Gann, 2010; Gassmann, Enkel & Chesbrough, 2010; Huizingh, 2011; Randhawa, Wilden & Hohberger, 2016; West & Bogers, 2014). Even though the case of NASA can be considered a success as the problem posed was given an answer, the process of open innovation is far from

straightforward (Bogers et al, 2018; Marcolin, Vezzetti & Montagna, 2017; Salter, Criscuolo & Ter Wal, 2014). It is a context related, complex and multi-dimensional phenomena, presenting obstacles that need to be overcome to practice it successfully (Mahdad, De Marco, Piccaluga & Di Minin, 2020). Thus, simply opening up is not a determining factor for successful innovation (Lazzarotti, Manzini & Pellegrini, 2015).

1.1 Motivation and Research Problem

Even though the initial focal point of open innovation research is found on the organisational or business unit level, Bogers et al. (2017, p. 11) reinforce West et al. (2014) conclusion that "there is a growing recognition that other units of analysis need to be considered as well in order to get a more detailed understanding of the antecedents, processes and outcomes of OI [open innovation]". The organisational or business unit level refers to the unit of analysis, understood as the perspective of a single organisation or a single business unit within an organisation. Bogers et al. (2017) adopt the widely used framework by Chesbrough and Bogers (2014) to organise determinants, processes and outcomes inside, outside or among the organisation. This framework summarises and illustrates different practices of open innovation, from upstream activities, like research and development, to more downstream activities, like manufacturing and marketing, and stresses the importance of the latter for a comprehensive innovation process (Chesbrough & Bogers, 2014). At the same time, West and Bogers (2014) identified that most research focuses on the upstream activities, the front-end of open innovation, meaning the stages of obtaining knowledge from external sources. Factors such as the selection of partners (Guertler & Lindemann, 2016; Meulman et al, 2018) and search strategies for external knowledge (Laursen & Salter, 2006) have been discussed. Consequently, the questions of how to start practising open innovation and how to approach the external environment have been researched extensively (e.g. Alexy, George & Salter, 2013; Aquilani, Abbate & Codini, 2017; Dahlander & Gann, 2010; Henkel, 2006).

However, the actual integration of externally gained knowledge and the commercialisation of it still lacks understanding (West & Bogers, 2014), which links back to the downstream activities acknowledged by Chesbrough and Bogers (2014). Chesbrough (2020) describes this part of the process, which are internal organisational activities, as the back-end of open innovation. Hence,

the back-end describes the stages of the process after external knowledge crosses back over the organisational boundaries into the organisation. Chesbrough (2020) compares the organisation to a black-box, where the knowledge that has been sourced externally disappears and little is known about how the organisation attempts to transfer the external knowledge into a commercialised outcome. West and Bogers (2014) share the same understanding and state that it remains vague how the external knowledge transits throughout the organisation to a final commercialised product. During these unknown practices, between crossing the organisational boundaries and the business unit that is intended to take the innovation to the market, the external knowledge needs to cross a "valley of death", a transition phase, which varies among each specific organisation (Chesbrough, 2020, p. 67). In addition, implementing and sustaining open innovation requires focus and adoption throughout the whole innovation process to enable the organisation to benefit from it (Chesbrough, 2020). Thus, a holistic view of the whole process is required for organisations to excel in the open innovation context, leaving the back-end with its transition phase an important area to investigate further.

The need to understand different units of analysis is among others acknowledged by West, Vanhaverbeke and Chesbrough (2006), who identify the individual human being as a crucial factor to consider with regards to contributing to innovation outcomes. Furthermore, organisations are highly dependent on the individual behaviour, meaning the individual employee's actions, when it comes to practising open innovation (Bogers et al, 2017). Felin, Foss and Ployhart (2015, p. 576) identified a growing interest in this so-called micro-foundations, which means to understand "how the interaction of individuals leads to emergent, collective, and organisation-level outcomes and performance". Consequently, an understanding of the individual employee, who performs open innovation practices, and how they impact the organisation with their behaviour is of high importance.

It is evident from the aforementioned that open innovation presents new ways for organisations to innovate. However, the process is not without complexity and just being open is not a guarantee for success. An initial survey by Chesbrough and Brunswicker (2013), revised by Brunswicker and Chesbrough (2018) supports this fact as it is identified that 78% of the surveyed organisations adopted open innovation, but are not satisfied with the metrics to manage and organise it. The

transition phase presents barriers for organisations that impede the transition of externally gained knowledge into the back-end of the open innovation process. Therefore, these barriers hinder the commercialisation and potential success of a product or service for the organisation. Furthermore, the crucial role of employees as drivers of the process further validates the need for an understanding of their behaviour. Therefore, it is necessary to understand the individual's behaviour, meaning an understanding of how the employee, who performs open innovation practices, behaves in the context of open innovation, particularly in the transition phase.

1.2 Research Purpose

The purpose of this study is to gain a deeper understanding of the individual's behaviour in the transition phase, when externally gained knowledge transits from the front-end to the back-end of open innovation. In more detail, an understanding of what barriers the individual employee, who performs open innovation practices, is facing in the transition phase, and what behaviour the individual chooses to cope with these. Therefore, the contribution of the multiple case study is to connect the front-end of open innovation to the back-end of open innovation by looking at the barriers in the transition phase and how individuals cope with these, thereby connecting the two.

The purpose of this study is pursued through a multiple case study of four external open innovation projects including nine individuals from different multinational organisations. Each project was held outside of the organisations. The projects were run by employees holding different positions in an organisation, who continued working at their formal position, but partly assigned separate time to the external open innovation project. The employees managed the specific project outside the organisation, developed an outcome and are responsible for the transition of the externally gained knowledge back into the organisation and the facilitation within the organisation, thus setting the scope of the study. For the purpose of this multiple case study the project outcome in form of knowledge which refers to any kind of new idea, prototype or learning the individual gained and transfers back into the organisation. In addition, throughout the case study the terms individual and individual employee is used interchangeably, meaning the individual employee who performs open innovation practices.

1.3 Research Question

Deriving from the above-written motivation and purpose the research question is as follows:

What barriers hinder the transition phase from the front-end to the back-end of open innovation and what behaviour does the individual employee choose to cope with these?

1.4 Thesis Outline

The following multiple case study follows a distinctive structure in order to answer the posed research question thoroughly. At the beginning of each chapter, a brief introduction outlines the structure in more detail. Firstly, the literature review sets the multiple case study in the context of current open innovation literature, followed by an elaboration and motivation of the methodology for the multiple case study. Secondly, the findings of the primary data collections are presented, followed by an in-depth analysis of these. Thirdly, the discussion relates the analysed findings to and beyond presented literature and the conclusion deduces the key insights. Finally, limitations and suggestions for future research are given.

2. Literature Review

The following chapter presents a comprehensive literature review that sets the context of the multiple case study. It relates the study to the broader topic of open innovation, provides insights into the ongoing academic discussion and suggests a conceptual framework for the analysis. In the beginning, a definition of open innovation is given, followed by an examination of its practices. In addition, the front-end and back-end of open innovation are illustrated and a reasoning for its distinction is provided. As a last step, the main focus point of the multiple case study, the transition phase, is defined and a conceptual framework for the analysis of its findings established.

2.1 Definition of Open Innovation

The concept of open innovation was originally introduced by Henry Chesbrough in 2003 and has been a phenomenon of interest in academia since (West, Salter, Vanhaverbeke & Chesbrough 2014). Given the considerable attention devoted to the concept, the definitions have evolved. The first definition Chesbrough (2003) provided, modestly explained open innovation as follows:

Open Innovation means that valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well. This approach places external ideas and external paths to market on the same level of importance as that reserved for internal ideas and paths (Chesbrough, 2003, p. 43).

The concept contradicted the previous advocated closed models of innovation by emphasising the centrality of the business model, meaning the way organisations work, and the equal importance of external and internal knowledge (Chesbrough, 2006). The definition was revised after receiving practical implications, a consequence of observing the intention behind the knowledge flows crossing organisational boundaries (West, Salter, Vanhaverbeke & Chesbrough 2014). Thus, Chesbrough incorporated this dimension and expanded the definition of open innovation to "open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" (Chesbrough, 2006, p. 2). Hence, organisations deliberately share knowledge and seek knowledge outside their organisations. As a response to the growing critique of the lack of accuracy in the definition of

openness, Dahlander and Gann (2010) attempted to clarify the definition by looking at prior research (e.g Chesbrough & Crowther, 2006; Laursen & Salter, 2006) on open innovation distinguishing the different definitions of openness. Thus, the term open was broken down to pecuniary, monetary, and non-pecuniary, non-monetary actions (Dahlander & Gann, 2010). Furthermore, these actions are categorised in the two different types of open innovation, inbound and outbound open innovation (Dahlander & Gann, 2010). The first describes the process of organisations utilising external knowledge while the latter describes the process of sharing internal knowledge (Gassman & Enkel, 2004). Following the reconceptualisation of openness, the definition of open innovation was further specified acknowledging the different types of openness as "a distributed innovation process based on purposively managed knowledge flows across organisational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organisation's business model" (Chesbrough & Bogers, 2014, p. 32).

2.1.2 The Cognitive Model and Practices of Open Innovation

Even though the most recent definition of open innovation describes it as one process (Chesbrough & Bogers, 2014), West, Vanhaverbeke and Chesbrough (2006, p. 286) state that "open innovation is both a set of practices for profiting from innovation, and also a cognitive model for creating, interpreting and researching those practices". The cognitive model refers in this context to the mindset or mentality, which allows an organisation to adopt open innovation practices. The two perspectives of open innovation leave space for different interpretations of the specific meaning of openness and consequently, academia uses the term to describe various aspects, without consistency (Dahlander & Gann, 2010). As a result, open innovation is under the influence of a conceptual ambiguity (Dahlander & Gann, 2010; Marcolin, Vezzetti & Montagna, 2017; Randhawa, Wilden & Hohberger, 2016), which enriches the concept but also hinders a comprehensive theoretical understanding (Huizingh, 2011). Huizingh (2011, p. 6) elaborates on the two perspectives of open innovation and describes them as a "process of opening up innovation practices", meaning adopting the cognitive model of open innovation for innovating and a process of "practices of open innovation", meaning performing open innovation practices. Therefore, for an organisation to practise open innovation, it is mandatory to move from a closed innovation model to an open innovation model (Marcolin, Vezzetti & Montagna, 2017). This means that the adoption of the cognitive model of open innovation is seen as a prerequisite of performing open

innovation practices. At the same time, Dahlander and Gann (2010) advocate for a continuum perspective of openness, as there is an organisation specific need for variation in the status of closeness towards openness. This claim is supported by Marcolin, Vezzetti and Montagna (2017), who determine the necessity for organisations to assess their status regarding openness in order to be able to practice open innovation. In addition, they identify based on literature by Dahlander and Gann (2010), Huizingh (2011) and Lazzarotti and Manzini (2009) different intermediate levels of openness. Moreover, Alexy, Henkel and Wallin (2013) identify the transformation from closed to open innovation as challenging. Chiaroni, Chiesa and Frattini (2011) see the necessity for an organisation to undergo an extensive organisational change to adopt the cognitive model of open innovation as it needs to change the permeability of its boundaries. Bader and Enkel (2014) add that a higher degree of openness is directly linked to a higher level of organisational and managerial complexity.

The variation of openness is acknowledged by the authors of this study, but not elaborated in more detail as the authors understand the adoption of the cognitive model of open innovation as any level of openness on the continuum in order to practice open innovation. To gain a clearer and more detailed understanding of open innovation and consequently the transition phase, the authors of this study focus, and therefore limit the study to the practices of open innovation.

2.2 The Process of Open Innovation

Chesbrough and Bogers' (2014, p. 32) definition states further that open innovation should be thought of as a deliberate process, where "innovation refers to the development and commercialisation of new or improved product, processes, or services, while the openness aspect is represented by the knowledge flows across the permeable organisational boundary". Even though the number of research on open innovation implementation patterns is scattered (Randhawa, Wilden & Hohberger, 2016) a few research studies attempted to describe these open innovation practices (e.g. Chesbrough & Bogers, 2014; Dahlander & Gann, 2010; Fetterhoff & Voelkel, 2006; West & Bogers, 2014).

Fetterhoff and Voelkel (2006) emphasise Abernathy and Clark's (1985) understanding that with innovation it is important to have both inventiveness, referring to technology, and market relatedness, referring to commercialisation, in mind. They refer to an innovation space, which is situated between customers needs and novel technology and results in commercialisation. This innovation space is in open innovation linked through an innovation value chain consisting of five key stages: (1) seeking opportunities, (2) evaluating their market potential and inventiveness, (3) recruiting potential development partners, (4) capturing value through commercialisation, and (5) extending the innovation offering (Fetterhoff & Voelkel, 2006).

Dahlander and Gann (2010) identify the necessity to distinguish the process between acquiring and sourcing innovation. Acquiring relates in this context to the pecuniary perspective by buying-in or licensing-in expertise from the outside, whereas sourcing relates to the non-pecuniary perspective by scanning the external environment, absorbing these external ideas and internalising them (Dahlander & Gann, 2010).

West and Bogers (2014) analyse open innovation practices from the perspective of leveraging external sources of innovation. They identify a four-phase model of leveraging external sources of innovation based on prior research concerned with the utilisation of innovations from outside the seeking organisation (e.g. Chesbrough & Crowther, 2006; Freeman & Soete, 1997; Teece, 1986; West & Gallagher, 2006). The model consists of obtaining, integrating, commercialising and a backwards directed interaction between these steps. Obtaining innovations from external sources include the discovery of external sources of innovation and the acquisition of these. Integrating innovations is related to factors which enable and disable the integration of external sources of innovation. Furthermore West and Bogers (2014) identify this phase as important as the obtaining phase. Commercialising innovations are related to the value creation and value capture of the innovation. The interaction phase reconsiders the initial idea of a linear process of leveraging external sources of innovation and emphasises the overarching need for interaction of open innovation (West & Bogers, 2014).

As seen by the different practices of open innovation Randhawa, Wilden and Hohberger (2016) and Marcolin, Vezzetti and Montagna (2017) conclude that there is still not a clear structure on

how to manage it in the organisational context and the terminology is often ambiguous, scattered and overlapping. However, Chesbrough and Bogers (2014) integrate the prior findings into the now widely used framework, the multi-level framework of open innovation, which summarises the different practices and perspectives of open innovation. The multi-level framework shows the open innovation process as a funnel, from the origin of knowledge to the market, with different flows and origins of knowledge. It distinguishes between research and development processes as upstream activities of open innovation and manufacturing and marketing processes as downstream activities of open innovation. In addition, it illustrates that the upstream activities of open innovation contain various kinds of knowledge and ideas and that towards the downstream activities the knowledge and ideas become concentrated and only selective ideas reach the market. Figure 1 illustrates the described multi-level framework.
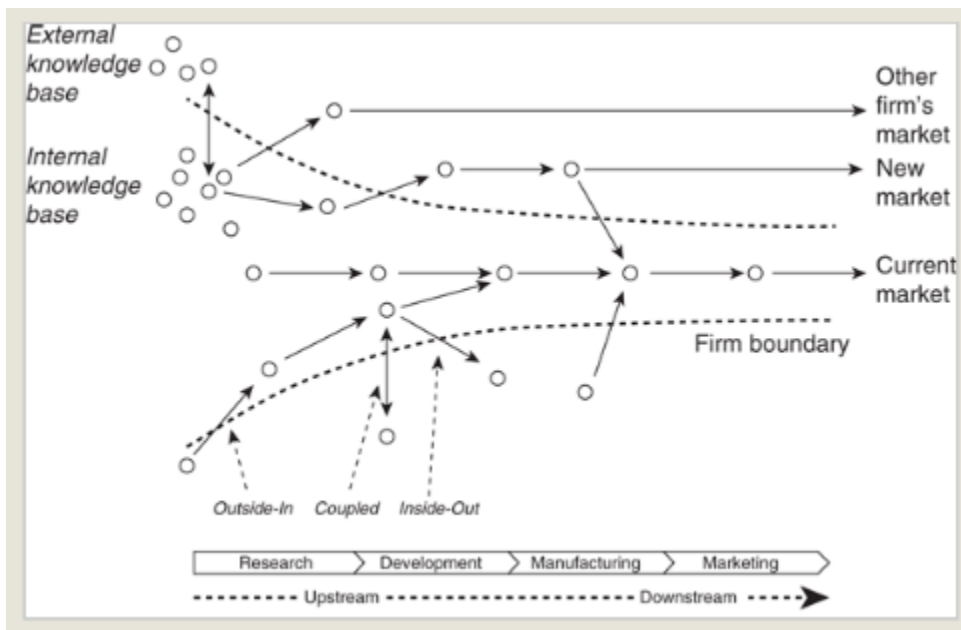
Figure 1: Multi-level Framework (Chesbrough & Bogers, 2014)

Furthermore, the multi-level framework makes a clear distinction between the internal and external knowledge base. These two origins of knowledge lead to the two different directions knowledge crosses the organisational boundaries, in the context of open innovation known as inbound or outbound open innovation. The first describes the process of organisations utilising external knowledge while the latter describes the process of sharing internal knowledge (Gassman & Enkel,

2004). Chesbrough and Bogers (2014) combines the two processes and introduces coupled open innovation, which includes both directions knowledge crosses the organisational boundaries. The two, respectively three directions of knowledge flow allow commercialisation of the final outcome inside or outside of the organisations market.

As the multiple case study focuses on the transition phase of open innovation with knowledge gained from outside the organisational boundaries, the open innovation process is seen and understood as inbound open innovation. Therefore, in this study the term open innovation refers to inbound open innovation.

2.2.1 The Individual Perspective

The different viewpoints towards the practices of open innovation show that the research field is still emerging. The initial focus on the organisational level as the unit of analysis is followed by the call in academia to consider different units of analysis inside, outside or among the organisation to examine the concept of open innovation holistically (Bogers et al, 2017). The key role of the individual employee was brought up early in the open innovation research (Chesbrough, 2003). Burcharth, Knudsen and Søndergaard (2014) identified for example circumstances under which individuals create an aversion against practising open innovation (see Section 2.3.3.1). West, Vanhaverbeke and Chesbrough (2006) identify the individual human being as a crucial factor to consider with regards to contributing to innovation outcomes, which is elaborated on in Section 2.4.2. Felin, Foss and Ployhart (2015, p. 576) identify a growing interest in this so-called micro-foundations, which is understood as the individual perspective and means to understand "how the interaction of individuals leads to emergent, collective, and organisation-level outcomes and performance", which examined in further detail in Section 2.6.

In line with Bogers et al. (2017), it can be said that the individual in open innovation is widely acknowledged in academia but poorly researched, therefore the individual perspective is separately looked at in the following sections.

2.3 The Front-end of Open Innovation

West & Bogers (2014) define the front-end of open innovation as the practices of obtaining knowledge from external sources. Chesbrough & Bogers (2014) connected the front-end of open innovation to the upstream activities of research and development and Brunswicker, Hutschek and Wagner (2012) characterise it as the stage when organisations search and explore new knowledge. Chesbrough (2020) interprets the front-end of open innovation broadly as the practices at the beginning of the innovation process.

This wide spectrum of definitions and perspectives of the front-end is in line with the aforementioned often perceived ambiguity of open innovation, the absence of specific theoretical conceptualisation and the continued emergence of the topic. In order to understand the individual behaviour in the transition phase, the front-end of open innovation is defined in this multiple case study as all practices of open innovation that take place before the externally gained outcome crosses back over the organisational boundaries. These include for example partner selection, search strategies for obtaining and researching new knowledge, but also the development of new ideas and prototypes outside the organisation.

2.3.1 Practices in the front-end

According to Gassmann, Enkel and Chesbrough (2010) open innovation practices often start with reaching out to contract service organisations in order to gain corresponding assets and to decrease risk. This initial starting point is then succeeded by different practices of open innovation (Huizingh, 2011). The different practices of open innovation in the front-end are closely linked to the organisation's willingness to reveal intellectual property, meaning disclose prior confidential and internal knowledge to a broader public in order make it accessible and useful for others (Alexy, George & Salter, 2013; Dahlander & Gann, 2010; Henkel, 2006). Although the revealing of knowledge is primarily connected to outbound open innovation (Dahlander & Gann, 2010) it is important to understand its impact, as organisations, whether practising inbound or outbound open innovation, are confronted with finding the right balance between knowledge revealing and protection (Henkel 2006). Henkel (2006) describes the different degrees of willingness to reveal knowledge as selective revealing. Alexy, George and Salter (2013) recognise the importance of

revealing knowledge, because only by disclosing certain internal insights other parties can support, co-develop and in the end benefit the seeking organisation. Nevertheless, this practice is by many organisations perceived as difficult as they are rooted around intellectual property protection. However, when organisations reveal, they are well aware to which degree they selectively reveal knowledge. Henkel (2006) concludes that the more support an organisation seeks, the more knowledge is revealed and that organisations take the decision under the consideration of a cost versus benefits analysis. The benefits of selective revealing are especially fruitful under high partner uncertainty, high search costs and the unwillingness of known partner collaboration (Alexy, George & Salter, 2013).

As seen in Section 2.3, What is the front-end, the initial practice of open innovation is the exploration, search and acquisition of new knowledge. Research so far identifies different practices of search strategies as important to the success of open innovation (Laursen & Salter, 2006; Randhawa, Wilden & Hohberger, 2016). Leiponen and Helfat (2011) identified in addition that the decentralisation of the search processes and therefore the search at different locations is strongly correlated with its success, referring back to the common perception that sources for innovation are widely distributed in the economy (Chesbrough & Bogers, 2014).

Laursen and Salter (2006) examined an organisation's external search practices in more detail and distinguished between two concepts. External search breadth refers to the number of external sources or channels an organisation seeks, whereas external search depth refers to the quality extent an organisation is using different external sources. Laursen and Salter (2006) elaborate on Katila and Ahuja (2002) who state that external search breadth is a time-intensive, trial and error process which is shaped by significant uncertainty, as it is difficult to assess the quality of the source prior to the engagement. Therefore, one needs to try to establish the best possible understanding of the characteristics and traits of the source during this process. Once the external source or channel is found the external search depth is a determining factor. Laursen and Salter (2006) draw upon Hippel (1988) and state that organisations commonly acquire new knowledge from a small number of key sources like users, suppliers or universities and source these deeply. This, in turn, means that the interaction and relationship with these deep sources of knowledge need to be satisfactory in order to be fruitful.

Besides these common key sources of knowledge specialised open innovation intermediary services or open innovation intermediaries are a more and more recognised source of external knowledge (Aquilani, Abbate & Codini, 2017; Chesbrough & Brunswick, 2014; Randhawa, Wilden & Gudergan, 2018; Spithoven, Clarysse & Knockaert, 2010). Open innovation intermediaries are seen as part of universal innovation intermediaries who have supported the innovation management process of organisations so far (Randhawa, Wilden & Gudergan, 2018). The central role of innovation intermediaries is to enable and facilitate external cooperation and knowledge exchange between different parties (Randhawa, Wilden & Gudergan, 2018). According to Howells (2006, p. 720) an innovation intermediary ist defined as "an organization or body that acts [as] an agent or broker in any aspect of the innovation process between two or more parties". The actual process of intermediation, the service offered by innovation intermediaries, is broken down into two major tasks, information-sourcing and spreading. Nonetheless, the specific intermediation consists of various tasks depending on the client's requirements, ranging from support of adopting (open) innovation processes, to product design and innovation diffusion (Randhawa, Wilden & Gudergan, 2018). However, the intermediary's role with regards to specific technologies is often neglected. Howells (2006) identified that due to their information sourcing, innovation intermediaries become experts in specific technologies or knowledge fields. This knowledge accumulation makes them themselves a valuable source of knowledge, which is then facilitated between prior unrelated parties. Colombo, Dell'Era and Frattini (2015) summarises these insights into two key dimensions of the intermediation process of open innovation intermediaries, access and delivery. Accesses refers to the interaction of the open innovation intermediary with its network to provide the needed source or to post a proposal within its network to access the knowledge. Delivery refers to specific practices of the open innovation intermediary to support and address its customer's problem and deliver the required solutions.

Coming back to the search strategies of external search breadth and external search depth practising the two different concepts with varying intensity result in different types of innovation activities. Both strategies can be performed from the organisation itself or with the help of an open innovation intermediary. Search depth is more related to radical innovations and initial stages of product development, whereas in a mature development stage external search breath is favoured.

Nevertheless, Laursen and Salter (2006) also conclude that the search procedures for external knowledge are costly, that there is a risk of over searching, which may restrict the success of sourcing external knowledge. Therefore it is of crucial importance to explore, search and acquire the right knowledge through the right processes in the right place in order to successfully perform open innovation practices.

2.3.2 Characteristics of the front-end

Besides open innovation practices, research describes different antecedents connected to the front-end of open innovation. Chiaroni, Chiesa and Frattini (2011) determine the commitment of the organisation's top management as an unquestionable prerequisite for open innovation, which means that without the support of the top management the comprehensive open innovation process cannot be unfolded.

The partner selection and their competences are considered to be crucial for the success of open innovation (Guertler & Lindemann, 2016; Meulman et al, 2018). The partner or external source of knowledge selection in the front-end shape the outcome of the open innovation process. Guertler and Lindemann (2006) summarise that the right choice leads for example to a shorter time-to-market development and increases the product-market fit. However, organisations are under the risk to choose a less fitting partner and therewith fail to source the required knowledge. On the one side, Solesvik and Gulbrandsen (2013) determine that organisations tend to focus on already known external partners and therefore miss out on sourcing untouched and new external knowledge. On the other side, Meulman et al. (2018) describe that organisations tend to search for partners outside their regular scope and therefore overlook the potential of local partners. A third perspective is added by Guertler and Lindemann (2016), who describe that the focus on the external partner selection may bypass internal stakeholders. Therefore, it is summarised that the partners need to be purposefully selected to not hamper the innovation process already in the front-end and create unnecessary barriers to the open innovation processes.

Furthermore, the organisational design is perceived as important antecedents to open innovation (Bogers, Foss & Lyngsie, 2018). Foss, Laursen and Pedersen (2011) link a necessary shift in internal organisational practices to innovation performance when sourcing external knowledge.

Traditional organisational practices are understood as various variables related to organisational structure, including specialisation and hierarchical levels, communication channels and rewards systems. When sourcing external knowledge, a positive link towards increased innovation performance is found when these practices are loosened up and new organisational routines are introduced, which focus on decision making based on community and project thinking (Foss, Laursen & Pedersen, 2011). The specific organisational design is also important for the external partner selection as it determines the specific choice of the seeking organisation (De Groote & Backman, 2020).

Closely connected to the organisational design is the organisational culture within an organisation, which is also important to consider when engaging in open innovation (Burcharth, Knudsen & Søndergaard, 2014; Sivam et al., 2019). Kratzer, Meissner and Roud (2017) connect organisational culture to the degree of openness (see Section 2.3.2) towards open innovation and argue for the need to develop an innovation culture within the organisation in order to practise open innovation. Sivam et al. (2019) identity that a shift in organisational culture may also be an outcome of open innovation and not necessarily only a prerequisite.

2.3.3 Barriers in the front-end

The research concerning a comprehensive understanding of open innovation barriers is hitherto sparse and identifies, due to the focus of prior studies, barriers predominantly in the front-end of open innovation (Bogers et al., 2017; Chesbrough 2020; Mahdad et al., 2020; Oumlil & Juiz, 2016; West & Bogers, 2014). Research thus far determines barriers, both internal and external to the organisation, with internal barriers allowing the organisation to alter them, whereas external barriers cannot directly be influenced by the organisation (Hadjimanolis, 2003; Moraes Silva, Lucas & Vonortas, 2020; Sandberg & Aarikka-Stenroos, 2014). Salter, Criscuolo and Ter Wal (2014) conclude that the promising preconception of open innovation has not been accomplished for many organisations. Mahdad et al. (2020) stresses Pisano's (2015) idea that a challenging part of innovation is connected to uncertainty, which makes the undertaking per se complex as the exact procedures and outcomes cannot be known beforehand, especially with open innovation. Tucci et al. (2016, p. 284) identify in their opening paper for the World Open Innovation Conference 2016 at the University of California, Berkeley that organisations "tend to highlight their achievements,

and downplay or omit the failures, challenges, and problems they had to address to reach these achievements".

Oumlil and Juiz (2016) describe different barriers of open innovation that emerged since 2009 and identified their significance, where managerial and organisational barriers and legal barriers were considered most important. Vanhaverbeke, Chesbrough and West (2014) and Chesbrough and Brunswicker (2014) classifies the organisational and cultural shift from closed to open innovation as difficult and states that it requires various changes on different levels of the organisation. Mahdad et al. (2020) acknowledge these and advocate for a better understanding of the challenges as they depend and vary among each organisation. These challenges and their resolutions are also a determining factor of whether open innovation will become a permanent practice in an organisation (Zynga et al., 2018). Lüttgens et al. (2014) for example identify an important difference between a pilot test and established practices with regards to open innovation. They allocate barriers chronologically along the open innovation practices and conclude that "open innovation predominantly has focused on the advantages and opportunities of these methods, neglecting the laborious path of their implementation" (Lüttgens et al., 2014, p. 367).

2.3.3.1 Individual barriers in the front-end

When individuals are externally engaged Salter, Criscuolo and Ter Wal (2014, p. 81) determine barriers on four different stages of the engagement, namely, "getting the right mindset, building partnerships, starting the conversation and taking advantage". The study is limited to R&D professionals and identifies for example that the perception of external knowledge was secondary to internal knowledge. Meaning that individuals at the outset have negative attitudes towards external parties and knowledge. Even though these attitudes are expressed by individuals, they are rooted in the organisational context connected to organisational norms, values and social principles and therefore related to the innovation culture of an organisation (Herzog & Leker, 2010). Similarly, Burcharth, Knudsen and Søndergaard (2014) investigate not-invented-here (NIH) syndrome and the not-shared-here (NSH) syndrome. Both of which describe the phenomena of individual negative attitudes towards the acquisition and exploitation of external knowledge. The NIH syndrome is coined by Katz and Allen (1982) who identify it as the attitude of an unquestionable possession of the right knowledge and a simultaneous rejection of outside

knowledge. As the nature of inbound open innovation is the sourcing of external knowledge the NIH syndrome occurs mainly in these open innovation practices (Burcharth, Knudsen & Søndergaard, 2014). Burcharth, Knudsen and Søndergaard (2014) explain that both syndromes lead to opposing perceptions of engaging beyond organisational boundaries, meaning that both syndromes cause a rejection of inbound open innovation practices and therefore miss valuable external insights.

2.3.4 Summary

As seen the front-end of open innovation is intensively researched. Even though academia calls for a holistic understanding of open innovation antecedents, processes and outcomes a detailed and theorised breakdown of it is still missing. With the above-presented literature, the authors attempt to provide a more detailed view of the front-end of open innovation. The focus in these practices lays in the exploration, search and acquisition of external knowledge. However, these initial practices of open innovation are not without barriers, as it is crucial to explore, search and acquire the right knowledge through the right processes in the right place. Critical factors in the front-end are for example found in management support of the practices and the dependency on the right external partner selection. Moreover, the organisational design and with it the organisational culture are important drivers for successful open innovation practices in the front-end. Only with a flexible organisational design in combination with an open and innovation-driven culture open innovation practices are fruitful. These factors and drivers help organisations to overcome the barriers of complexity and uncertainty the concept of open innovation carries. Furthermore, they decrease the individuals negative attitudes of NIH and NSH syndrome in the front-end of open innovation. This shows the need to acknowledge the individual employee in the given context, especially concerning organisational barriers as it allows a better understanding of the open innovation process.

2.4 The Back-end of Open Innovation

According to West and Bogers (2014), the front-end of open innovation only accounts for half the battle of the process and to profit from the external obtaining of knowledge the innovation has to be integrated into the organisation. The back-end of the open innovation process can be described

as the internal activities of the organisation, such as the manufacturing and marketing activities (Chesbrough and Bogers, 2014). West and Bogers (2014) describe the back-end as the integration and commercialisation phases of the process. Building on these definitions the back-end of open innovation is defined in this multiple case study as all practices of open innovation that take place after the externally gained knowledge crosses back over the organisational boundaries.

2.4.1 Integration in the back-end

According to West and Bogers (2014), the external knowledge integration is dependent on both the culture as well as the technical capability to incorporate the external knowledge into the organisation. Wallin and von Krogh (2010) define a five-step knowledge integration process including (1) defining the process for innovation, (2) identifying the relevant innovation knowledge, (3) selecting an applicable mechanism for integration, (4) design an effective governance mechanism and, (5) balancing controls and incentives. Step three of choosing a mechanism for integration is, in particular, relevant for the back-end of open innovation. Integrating knowledge represents determining in what way various sources both external and internal to the organisation will contribute to the different steps of the open innovation process (Wallin & von Krogh, 2010). Furthermore, the authors propose four different mechanisms to integrate knowledge, termed as managers formulating rules, sequencing tasks, establishing routines and group problem-solving. They argue that most organisations can testify that they integrate knowledge through one of the first three mechanisms in standard innovation processes. Thus, managers should use the term open with caution in combination with research and development (Wallin & von Krogh, 2010). As a last note, Wallin and von Krogh (2010) conclude that performing open innovation practices is not easy and advise managers to make knowledge integration the central locus.

According to West and Bogers (2014), the largest single body of research on the integration of external knowledge in the open innovation context is absorptive capacity. It is defined as "the ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends." (Cohen & Levinthal 1990, p. 128). Research uses absorptive capacity as a lens to examine how organisations successfully identify and integrate external knowledge (Randahwa, Wilden & Hohberger, 2016). Lowik, Kraaijenbrink and Groen (2017) examine the individual

employee and its characteristics and identify the individual's absorptive capacity as important when integrating knowledge. Zahra and George (2002) develop the concept further and distinguish between realised absorptive capacity in terms of transforming and exploiting and potential absorptive capacity in terms of acquiring and exploring external knowledge. Lichtenthaler and Lichtenthaler (2009) compile based on prior research a six knowledge capacity framework to manage knowledge processes on an organisational-level. They integrate these with the dynamic capability view of an organisation by Helfat et al. (2007), which relates additionally to the overall strategy of an organisation. Lichtenthaler and Lichtenthaler (2009) therefore conclude that these capacities in the form of organisational capabilities are necessary foundations for successful open innovation practices. Thus, absorptive capacity is rather a prerequisite of open innovation (Huizing, 2011), but it helps to describe organisations abilities to integrate knowledge.

2.4.2 Commercialisation in the back-end

When discussing the leveraging of external sources of innovation one of the main phases described by West and Bogers (2014) is the commercialisation of innovation, which takes place in the receiving business unit. According to them, this phase is distinguished by the value creation and value capturing of the organisation. West, Vanhaverbeke and Chesbrough (2006) identify the individual employee as a crucial factor to consider with regards to contributing to innovation outcomes. Chesbrough, Lettl and Ritter (2018, p. 933) generally define value creation as "an actor's attempt to increase value" and value capture "as the process of securing financial or nonfinancial return from value creation". Chesbrough's (2003) initial idea was that organisations need alignment with the business model in order to profit from open innovation. Thus, a commercialisation strategy has to be set in place alongside the innovation. Research thus far spend considerable effort in showing the link between open innovation and increased performance by researching both value creation and value capture (West & Bogers, 2014). The benefits of value creation are researched by quantifying the benefits, using standard metrics from new product development research such as revenue growth (Chesbrough & Crowther, 2006), the portion of revenues trackable to radical innovations (Laursen & Salter 2006), and product performance (Lau et al, 2010). The value creation possibilities of leveraging external sources has up until now continuously been endorsed while value capture has been partially overlooked with conflicting results of the actual performance enhancements (West & Bogers, 2014). Chesbrough, Lettl and

Ritter (2018) identify the progress of the research stream of value creation and capturing as hampered by the conceptual ambiguity of the two terms. Consequently, they developed a new conceptualisation of the two and propose different value processes that need to be managed. They argue that to maintain open innovation over time, value has to be generated for all parties involved along the innovation process or afterwards.

2.5 Distinction of front-end and back-end

The initial definition of open innovation by Chesbrough (2003) recognised the importance of bringing the new idea to market, meaning the process of open innovation includes the commercialisation of a new idea since the establishment of the concept. This understanding shows that open innovation is thought of as a comprehensive process from idea generation to final commercialisation. Strikingly, the common view in academia is that the front-end of open innovation has been the main focus of open innovation research and the back-end still misses understanding (Chesbrough 2020; Chesbrough & Bogers, 2014, West & Bogers, 2014). Thus, the whole open innovation process and its practices have not yet been accounted for. Much devotion has been allocated to the initial stages of the process, the practices of opening up, finding the appropriate partners and searching for external knowledge. At the same time, Chesbrough (2020) describes how measures have to be taken throughout the whole process to achieve the suggested success of open innovation. Given the relatively new research stream of open innovation, the focus on the front-end seems legitimate, as the practices surrounding external collaboration and sourcing may be more unfamiliar than the internal practices of commercialising a product in the back-end. However, as the practices of the two seem to differ, with the first focusing on the organisation's interaction with the external environment (West & Bogers, 2014), while the latter focuses on the internal practices of the organisation (Chesbrough, 2020), one can assume a difference in possible barriers.

The following section connects the front-end to back-end of open innovation by introducing a transition phase which contributes to the overall understanding of the open innovation process.

2.6 The Transition Phase

So far, the literature review distinguished between the adoption of the cognitive model of open innovation and open innovation practices. The multi-level framework by Chesbrough and Bogers (2014) illustrated the different processes of practising open innovation and differentiated between inbound and outbound open innovation. Furthermore, the crucial role of the individual with regards to barriers in the front-end and its contribution to innovation outcomes in the back-end was described. In addition, the two ends of the open innovation process, the front-end and the back-end were differentiated and clarified even though research to the largest extent comprises them all together (see Section 2.2). The differentiation emphasised the importance of preparing for open innovation, the limits and possibilities of acquiring knowledge in the front-end of open innovation and lastly defined and accounted for the hitherto known practices and research involved in the back-end of open innovation. The back-end of open innovation was further broken down into the practices of knowledge integration and knowledge commercialisation, where the knowledge integration is shaped by the absorptive capacity of an organisation and the knowledge commercialisation refers to the business unit, which is intended to bring the innovation to the market. It is important to recall, that for this multiple case study, knowledge refers to any kind of idea, prototype or learning the individual gained and transfers as the outcome back into the organisation.

With the absorption and the integration, external knowledge crosses the organisational boundaries back into the organisation and with this Chesbrough (2020) identifies an organisational black-box where externally sourced knowledge disappears in the organisation. Chesbrough (2017) argues that the outcomes of open innovation need to be transferred to the receiving business unit and that little to no attention has been allocated to explain this transfer of outcomes. During these unknown practices, between crossing the organisational boundaries and the business unit that is intended to take the innovation to the market, the external knowledge needs to cross a "valley of death" (Chesbrough, 2020, p. 67).

Following Chesbrough (2017) description of the specific transfer of outcomes to the intended business unit, the authors of this study term this specific part of the process the transition phase of

open innovation. The transition phase includes the transfer of outcomes from the organisational boundary up to the point of a handover to the business unit intended to take the product to market. Figure 2 illustrates the transition phase and its connection to the front-end and back-end.
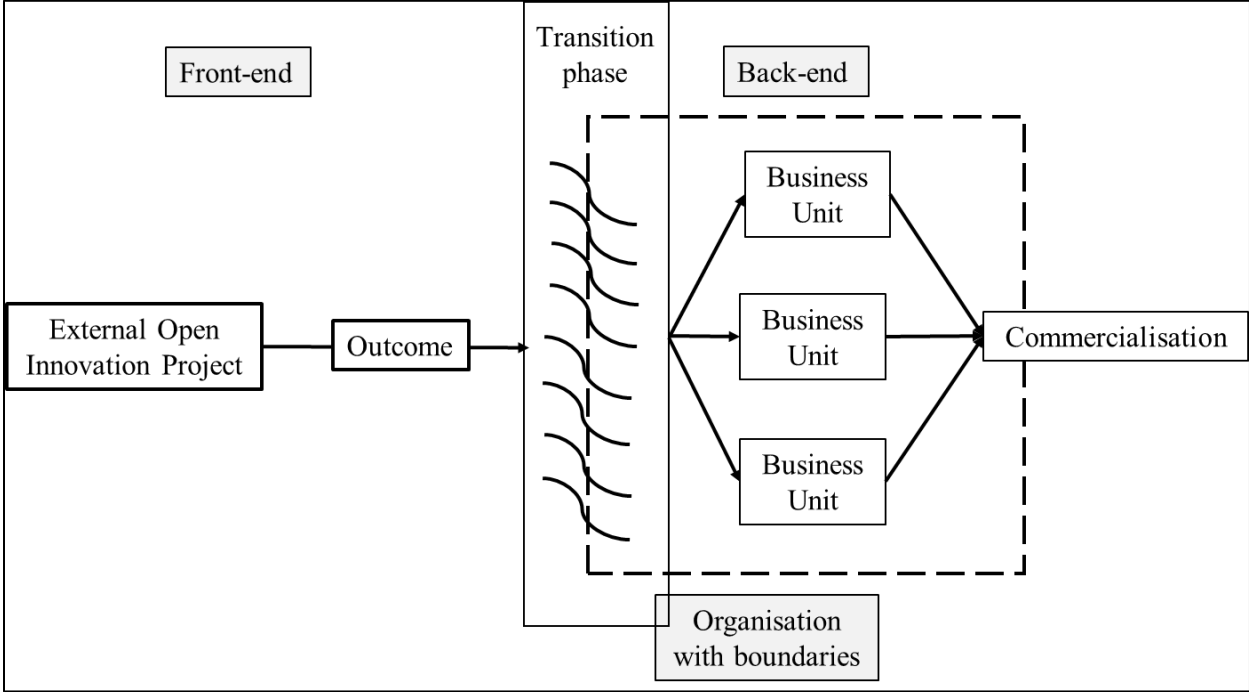
Figure 2: The Transition Phase (Own figure)

2.7 The Conceptual Framework

As seen by the NASA example at the beginning of the multiple case study, the introduction and the literature review, open innovation practices are neither obvious nor straightforward, are shaped by ambiguity and come not without challenges. Besides the elaborated antecedents, processes, outcomes and barriers in the front-end and the described back-end, Chesbrough (2017, p. 36) identifies that one of the two major challenges of open innovation are today related to "transferring results to the business unit", meaning that the outcomes of open innovation need to be transferred to the receiving business unit and despite several success stories of open innovation, little to no attention has been allocated to explain this transfer of outcomes. Thereby, calling for research to connect the front-end to the back-end of open innovation. In further elaboration and conceptualisation, Chesbrough (2020) develops this notion by identifying internal bottlenecks relating to people, funding and senior management support within the organisation, which he argues are a result of not adopting open innovation throughout the whole process. Thus, the innovation process stagnates. Ergo, implying the aforementioned dimensions as barriers which inhibit a successful transfer of the outcomes. This transfer of outcomes is strongly related to the integration phase elaborated in Section 2.4.1, as it describes the transfer of knowledge from the outside to the inside of the organisation.

With the identification of internal bottlenecks, Chesbrough (2020) encountered company-specific barriers that can prevent the successful transfer of open innovation outcomes from the front-end of the open innovation process to the back-end, meaning the business unit that will commercialise it. Deriving from the above-presented reasoning and the identification of internal bottlenecks, a conceptual framework, in the form of barrier dimensions in the transition phase of open innovation is developed to guide the multiple case study. With the help of the dimensions, the authors of this study group the barriers individual employees are facing in the transition phase, together, thereby gaining a deeper understanding of the individual's behaviour in the transition phase. Even though Chesbrough (2020) does not directly define these dimensions it becomes clear from the given examples in the presented study, how these are understood. The three dimensions are People, Funding and Senior management support.

People: According to Chesbrough (2020) people refer to any type of employee of an organisation, who is involved in open innovation and their individual actions, behaviours and set of competencies and characteristics.

Funding: Funding is according to Chesbrough (2020, p. 79) understood as the problem of a "mismatch between innovation budgets and opportunities". This funding is often set yearly and without the possibility of modification.

Senior management support: An internal organisational competition for an organisation's top management executives consideration and their time allocation, especially among ambiguous and uncertain alternatives (Chesbrough, 2020).

The dimensions serve as a guide to structure the multiple case study around the research question: What barriers hinder the transition phase from the front-end to the back-end of open innovation and what behaviour does the individual employee choose to cope with these? The conceptual framework is initially applied to identify and analyse the first part of the research question, what barriers hinder the transition phase from the front-end to the back-end of open innovation. Secondly, it assists to arrange the findings around the second part of the research question regarding the individual coping behaviour (ICB).

3. Methodology

The following chapter presents the methodological choices of the multiple case study, starting with the general research approach and the research design. Furthermore, the research method including data collection, choice of context, sampling strategy, choices of cases, choice of individuals and the interview process are described. Besides, the data analysis, including the topic of power and politics is described, followed by a reflection of the method.

3.1 Research Approach

As stated by Creswell and Creswell (2018), the formulation and nature of the research problem determines its research approach, design and method. There are two main research approaches, qualitative and quantitative, which are appropriate in different contexts (Creswell & Creswell, 2018). The purpose of this multiple case study is to gain a deeper understanding of the individual's behaviour in the transition phase. In detail, what barriers the individual employee is facing in the transition phase and what behaviour the individual chooses to cope with these. The specific formulation and the nature of the research purpose based in the emerging field of open innovation determined the adapted qualitative research approach as it supported the exploratory purpose of the study. According to Saunders, Lewis and Thornhill (2016, p. 52) "an inductive approach is intended to allow meanings to emerge from data as you collect them in order to identify patterns and relationships to build a theory.". With the limited research on the practices of open innovation in the transition phase and the broadly defined barriers suggested by Chesbrough (2020), the choice of an inductive approach is deemed most appropriate as there is an empirical gap in this part of the process. The specific research question of, what barriers hinder the transition phase from the front-end to the back-end of open innovation and what behaviour does the individual employee choose to cope with these, suggests that experiences are meant to be described and a phenomenon explored. This further supports the inductive approach of the study.

3.2 Research Design

The chosen research approach is closely connected to the procedures of inquiry, the research design, which defines the path of this study (Creswell & Creswell, 2018). Case studies are in-depth

inquiries within an authentic setting of a phenomenon (Yin, 2014). Creswell and Creswell (2018) also identify that a multiple case study design is deemed appropriate to analyse specific individuals. As this multiple case study aimed to define and explore the transition phase and the behaviour of the individuals participating in open innovation projects, this study follows a multiple-case design. A multiple case study design enables comparison between cases while simultaneously highlighting the uniqueness of each case (Bryman & Bell, 2011). This fact furthermore increases the variety of findings and reduces the bias of relying on a set of conditions, which are solely case-specific (Yin, 2014). In this multiple case study, each case refers to an organisation, which conducted an open innovation project outside its organisational boundaries.

3.3. Research Methods

3.3.1 Data collection

The data in this multiple case study is based on primary sources and was collected in the form of interviews. Interviews as the method of data collection were chosen since the purpose of this multiple case study is to gain a deeper understanding of the individual's behaviour in the transition phase, the individual employee's experiences were aimed to be captured. The choice of interviews as the primary data collection method is beneficial as it can aid the collection of reliable and valid data through more detailed answers (Saunders, Lewis & Thornhill, 2016). Furthermore, the nature of the research problem required more detailed answers as it aimed to understand the behaviour of individuals. Thus, the choice of interviews was deemed most appropriate. There are different types of interviews ranging from more structured to less structured and therefore the choice depends highly on the purpose of the study (Saunders, Lewis & Thornhill, 2016). In this multiple case study, semi-structured interviews were used to ensure that the themes concerning the purpose were addressed. Furthermore, the use of semi-structured interviews allows for flexibility in the interview, provides the opportunity to ask follow up questions and leaves room for the interviewee to freely describe their experiences (Bryman & Bell, 2011). All of which was relevant to this study as the research required interviewees to describe their own experiences and behaviours and the cases were distinctive. Thus, there was a need to adapt questions to each interview. The semi-structured interviews included both open and closed questions to retrieve factual information but

also let the interviewee speak freely about their experience. The questions asked were partially inspired by the conceptual framework described in Section 2.7, however, they were formulated more generally to avoid leading the interviewee to a certain answer. Referring back to the research question (see Section 1.3) and to capture the possible barriers and an understanding of the ICBs, the interview guide (see Appendix A) covered topics related to 'positive and negative personal experiences', 'implementation of the outcome' and 'solution to the difficulty'.

3.3.2 Choice of Context

A multiple case study needs to have clearly defined boundaries in order to determine the scope of data collection (Yin, 2014). This multiple case study is defined by the context of individuals from MNCs who participated in open innovation projects that have taken place outside of the organisational boundaries. Meaning that the individuals physically left the organisation to temporarily develop an idea outside the organisation, which then was brought back into the organisation. This context was found in the open innovation intermediary Ideon Open, which provides organisations with tools for practising open innovation through offering their premises and network. This setting was beneficial as the external projects had a set end, which clearly marked the front-end and the back-end, thus, providing an indication of the transition phase and further defining the boundaries of the cases.

3.3.3 Sampling Strategy

The choice of the sampling strategy is guided by the purpose and research question (Saunders, Lewis & Thornhill, 2016). Purposive sampling describes the sampling of cases which the researcher purposely selects, meaning cases that enable the answer to the research question (Saunders, Lewis & Thornhill, 2016). Given the multiple case study design, the purpose of gaining a deeper understanding of the individual's behaviour in the transition phase and the set of criteria a purposive sampling technique was applied. Purposive sampling is beneficial when conducting a multiple case study with a smaller sample size as it enables the researcher to select cases that are information-rich in nature (Saunders, Lewis & Thornhill, 2016). There are several strategies under the umbrella of purposive sampling (Saunders, Lewis & Thornhill, 2016). In this multiple case study, a combination of heterogeneous and homogeneous sampling was applied. The first round of sampling was homogeneous as all cases are set in the same context of the innovation

intermediary. The second round of sampling was of a heterogeneous sampling as organisations from different industries were sampled. Nevertheless, applying a purposive sampling technique poses the risk of a selection bias and because of the nature of the technique, the cases are not statistically representative (Saunders, Lewis & Thornhill, 2016). However, as the nature of the multiple case study was to get a deeper understanding of a phenomena in a specific context, the statistical representativeness was not attempted to be achieved. Consequently, the purposive sampling approach was deemed most appropriate.

3.3.4 Choice of Cases

This multiple case study is compiled of four different open innovation projects. The choice of projects was based on a set of criteria. The overall criteria was that the projects were comparable to enable a possible generalisation of the findings without statistical representativeness. Since Ideon Open provides similar services, the cases had access to similar frameworks, tools and networks. These contextual factors motivated the choice of cases and therefore the cases were selected from the clientele of Ideon Open. Furthermore, the projects needed to be externally conducted, meaning that they took place outside the organisation. This was necessary to receive a clear indication of the front-end and the back-end of the process. Lastly, the transition phase of the project needed to be initiated. The mentioned criteria for the choice of the cases allowed for homogeneity in terms of the intermediary but heterogeneity in terms of organisations and industries. Thus, enabling multiple perspectives of the individuals practising open innovation in different types of organisations and industries. The presented selection criteria led to the four presented Cases 1, 2, 3, 4 initiated by MNCs all operating in traditional industries (see Table 1).

Besides the four cases, a pilot interview was conducted to test the interview guide. Furthermore, an informal interview was held with a representative of Ideon Open to get a deeper understanding of the intermediary and its practices. In addition, two other cases were sampled initially. During the research process, the cases and individuals were continuously revised to verify their fulfilment of the selection criteria. This led to the exclusion of Case 6 due to the set-up of the external project as it was conducted over two days instead of over several months and was thereby considered to be too contrasting to the other cases. Case 5 was included as a supplementary case as it did not

fulfil the criteria of having initiated the transition phase but contributed to important insights for the researchers. In Table 1 an overview of the cases is presented.

Table 1: Overview of Cases

Case	Industry	Type
Pilot	Energy	Pilot
Case 1	Engineering	Case
Case 2	Manufacturing	Case
Case 3	Construction	Case
Case 4	Environmental services	Case
Case 5	Manufacturing	Supplementary
Case 6	Fast Moving Consumer Goods	Excluded

3.3.5 Choice of Individuals

Considering the research question several criteria had to be met. The individuals had to actively participate in the project at Ideon Open and had to have been active in the transition phase of the outcomes, which lead to the selection of nine individuals. The selection enabled a variety of individuals as they were participating in different projects with different backgrounds. Moreover, several individuals were interviewed from the same project adding to the multiple-perspective of the study. Interviewing several individuals in the same project enabled different perspectives as the individuals had different roles in the project as well as at the organisation, consequently, deepening the understanding. Furthermore, it enhances the quality of the study as the individuals within a case might have different recollections of details and facts. Thus, triangulation of data was applied (Saunders, Lewis & Thornhill, 2016). Table 2 provides an overview of the chosen individuals.

Table 2: Overview of Individuals

Name	Case	Type	Date of interview	Duration of interview	Sampling criteria (yes/no)
Innovation Strategist	Pilot	Pilot	14.04.2020	54 Minutes	no
Innovation Advisor	Case 1	Case	17.04.2020	57 Minutes	yes
Business Developer 1	Case 1	Case	04.05.2020	50 Minutes	yes
Vice President R&D	Case 2	Case	16.04.2020	50 Minutes	yes
Business Developer 2	Case 2	Case	20.04.2020	45 Minutes	yes
Development Manager 1	Case 3	Case	17.04.2020	45 Minutes	yes
Salesman	Case 3	Case	21.04.2020	41 Minutes	yes
Area Manager	Case 3	Case	23.04.2020	50 Minutes	yes
Head of R&D	Case 4	Case	06.05.2020	38 Minutes	yes
Technology Strategy Manager	Case 4	Case	05.05.2020	52 Minutes	yes
Development Manager 2	Case 5	Supplementary	21.04.2020	45 Minutes	no
Business Developer 3	Case 5	Supplementary	06.05.2020	42 Minutes	no
Member of Supervisory Board	Case 6	Excluded	15.04.2020	46 Minutes	no
Sustainability Manager	Case 6	Excluded	22.04.2020	41 Minutes	no

3.3.6 The Interview Process

In the initial stage of the process, Ideon Open was contacted and a request for a potential collaboration was made. An informal interview was scheduled where the procedures of Ideon Open were discussed to get an understanding of their perception and practices of open innovation. After further conceptualisation of the research topic, Ideon Open contacted on the researchers' behalf possible interview partners that were a fit to the criteria mentioned (see Section 3.3.4 and 3.3.5) After the initial contact by Ideon Open seven interview partners were confirmed and the authors took over the communication. In the following email communication, video interviews were scheduled, more information about the study was provided and a short questionnaire confirmed the fit of the individual with the criteria. Prior to the scheduled interviews, an additional email with the topics to be covered during the interview was sent. Preparing the interviewee in this manner may help to improve validity and reliability as it informs the interviewee of the topics prior to the interview and allows for verification of details beforehand (Saunder, Lewis & Thornhill, 2016). Therefore, the topic outline included broad themes and served as a guide for the interviewees to start thinking about the participated project. When conducting the interview the first minutes were spent describing the nature of the research, informing the interviewees of the data handling, the possibility to decline an answer and the anonymisation of the collated data. Providing this information at the start of the interview increases the level of security for the interviewees which hopefully leads them to be more open in their answers (Saunders, Lewis &

Thornhill, 2016). Furthermore, permission to record the interview was asked in order to transcribe the interviews. Audio recordings provide several advantages as it enables direct quoting, avoids biases such as misinterpretations, and allows the interviewer to give the interviewee their full attention (Saunders, Lewis & Thornhill, 2016). To gain a deeper understanding of each case the first set of interviewees were asked if they had a project member that would also be available for an additional interview. One to two additional individuals from each case were contacted and scheduled for an interview (see Table 2).

3.4 Data Analysis

The data analysis of the study was shaped by a segmentation of the collected data and a followed rearrangement, thus an exploratory purpose was applied to the collected data. The inductive analysis of the study included data assessment already during the collection in order to identify emerging themes (Creswell & Creswell, 2018). One of the key factors of qualitative research is to achieve qualitative rigour and the process starts already in the approach to the analysis (Gioia, Corley & Hamilton, 2013). To identify the barriers and the ICBs of the individuals in the transition phase, the interviews were first transcribed and re-read to recall the content of the interviews. Thereafter, all answers indicating any sort of difficulty or obstruction in the process were highlighted in the transcripts. For example, the Innovation advisor in Case 1 described in a long paragraph an interaction with IT of which all was highlighted and summarised in comments. As a following step, the comments were in turn condensed in shorter phrases. As a result, the aforementioned paragraph was summarised into 'project outcome not compatible with IT policies'. These phases are inspired by words and explanations provided by the informant. This approach is defined by Gioia et al. (2013) as the first-order concept of data. These first-order categories of data were then compared within and across the cases allowing similar themes and categories to emerge. Thus, an axial coding approach was applied (Saunders, Lewis and Thornhill, 2016). Consequently, reducing the first-order barriers into a more comprehensive number of shared barriers. Thus, a second-order categorisation was applied (Gioia et al, 2013). At this stage, a similar process was applied to the ICB of each specific individual within each case to identify which behaviour was specific to which barrier. Thereafter, the shared barriers were grouped across cases into dimensions of barriers, following the conceptual framework (see Section 2.7). For example, all identified

barriers of which were related to senior management support were grouped as it reflects the open innovation literature terminology. This became the final categorisation of the barriers that were specific to the transition phase of open innovation. Correspondingly, the ICBs were categorised into three distinct but broad patterns of behaviour, Networking, Education and pedagogy, accept and work with given the condition.

3.4.1 The emergent topic of power and politics in open innovation

As the purpose of the multiple case study is to gain a deeper understanding of the individual's behaviour in the transition phase, when externally gained knowledge transits from the front-end to the back-end of open innovation, the ICBs are found inside the organisational black-box and therefore inside the organisational boundaries.

The data collected from the four cases revealed that the barriers and the ICB are interrelated and that the categorisation into dimensions as proposed by the conceptual framework based on Chesbrough (2020) give only limited guidance to understand the interrelation fully. Especially the chosen ICBs seem to not only depend on the encountered barriers, but also a form of individual influence and individual interrelation with other stakeholders in the organisation. This became particularly visible during the supplementary interview of Case 5, where the team members encountered barriers and showed ICBs before the transition phase. According to the Business Developer in Case 5 an imbalance in the power structure between different departments caused barriers and that these were grounded in political reasons to attack and downplay the project outcome.

These insights indicated that besides the formal categorisation of barrier dimensions, also more informal causes affect the ICBs, which the individual described as degrees of power and political reasons. These terms were also found in other cases, for example in Case 1 and 4. The Innovation Advisor in Case 1 stated that internal politics in the organisation caused problems. Furthermore, political aspects on how to execute certain things were encountered by the Technology Strategy Manager in Case 4. These first indications led to the assumption that with regards to the individual behaviours to cope with the barriers in the transition phase of open innovation the topic of power

and politics within the organisation seem to be of importance. Therefore, the transition phase is further elaborated with regards to the topic of power and politics.

For an overview and understanding of the topic, the study turned to the research study Organizational Power in Management and Organization Science by Fleming and Spicer (2014). In their study, Fleming and Spicer (2014) concluded that power is inevitable in organisations and that without it the organisation could not function, which seemed to be an interesting approach towards the barriers and ICBs in the transition phase of open innovation. Furthermore, the research study provided an overview of the current literature regarding the topic and highlighted the fact that power has, besides its often negative connotations, a positive side, which can realise exceptional things. The idea of a positive perspective of power to cope with barriers motivated the adaptation for this multiple case study. In addition, Fleming and Spicer (2014) mapped different forms of power into two dimensions.

The topic of power and politics within the organisation is part of the broader topic of organisational theory and relates back to the classical dichotomy between the strict rationality of an organisation and the behavioural and political dynamics of an organisation (Cyert & March, 1961). For the purpose to gain a deeper understanding of the individual's behaviour in the transition phase of open innovation, the multiple case study adapts the power and politics definition by Fleming and Spicer (2014, p. 240):

Politics consists of activity that rearranges relations between people and the distribution of goods (broadly defined) through the mobilisation of power. In turn, power is the capacity to influence other actors with these political interests in mind. It is a resource to get things done through other people, to achieve certain goals that may be shared or contested.

3.5 Method reflection

The issues of validity and reliability were continuously revised during the process of this inductive multiple case study. "Reliability refers to replication and consistency" (Saunders, Lewis & Thornhill, 2016, p. 202). While validity refers to "the appropriateness of the measures used,

accuracy of the analysis of the results and generalisability of the findings" (Saunders, Lewis & Thornhill, 2016, p. 202). To promote validity, structured parts of the findings were sent back to the interviewees to avoid misinterpretation. Thereby verifying the authenticity and credibility of the findings (Saunders, Lewis & Thornhill, 2016). Furthermore, the findings are described in great detail including contradictory findings. Participants are expected to have different understandings and experiences thus providing both confirming and contradictory results, therefore contributing to the validity of the study. Besides, possible biases held by the researchers are discussed and reflected upon during the data collection and analysis. According to Saunders, Lewis and Thornhill (2016), the researchers bias and errors include possible misunderstanding of interviewee responses and the subjective view of the researcher. To deal with these, interviews were audio-recorded and codings were discussed together. Lastly, case studies are conducted to describe the particular and thus generalisability is not possible to the same extent as with a quantitative research approach (Creswell & Creswell, 2018). However, for future research to possibly generalise the findings in other studies, the procedure and coding is described in detail. Consequently, enabling future research to understand and replicate the multiple case study thereby contributing to the reliability of this study.

4. Findings

In the following chapter, the findings from the primary data collection are described and summarised. An additional step identifies barriers and ICBs. Each case is presented separately, divided into a case description and the individual interviewees. In the end, a summary of each case presents the major findings. For the description of the findings, the original formulation of the interviewees is used.

4.1 Case 1

4.1.1 Case Description

Case 1 is divided into two separate parts, which are closely connected. The Innovation Advisor (IA) started already during the first part of the case, whereas the Business Developer (BD1) joined during the second part. The start of the second part marks the focus for this study, as the development of the idea took place afterwards outside the organisational boundaries. At this point, in spring 2018, the BD1 joined the IA and both worked on the development of the project outside the organisational boundaries. The purpose of the project was to develop a digital and artificial intelligence-based minimum viable product, which would optimise internal processes. The project was run in three months intervals and according to the BD1 30% of the working time was dedicated during approximately one year to the development of the project outside the organisational boundaries. The result of the project was a minimum viable product. An overview of the case setting is shown in Table 3.

Table 3: Overview Case 1

Purpose	Project duration	Project set-up
Part 1: Get these unlucky ideas and do something different with them	Part 1: Autumn 2017	Run in 3 months intervals; spent at least 1 day a week at Ideon Open for project development
Part 2: digital and artificial intelligence based minimal viable product.	Part 2: Spring 2018 - Spring/Summer 2019	

4.1.2 The Transfer of the Project Outcome

4.1.2.1 Innovation Advisor

The IA experienced the point in time when the engagement as a team member ended as problematic. The problems arose as the project outcome needed to go somewhere into the business unit and the team was not supposed to be involved anymore. The first problem is connected to the policies of the information technology (IT) department as the software development of the outcome was executed externally and not according to the policies of the internal IT. Thus one barrier in the transition phase can be identified as the project outcome was not compatible with the IT policies.

Moreover, the IA described the outcome as very agile, saw the necessity to adapt it to the organisation and assessed that the outcome needed to be re-built step by step. Nevertheless, the organisation's policies required a direct rebuild, as without, the outcome cannot be taken in. This circumstance was according to the IA the starting point of the problems as then budgetary issues intervened, which was feared by management. Hence a barrier connected to the rigidity of organisational policies can be identified, which was coped with by finding and educating supporters to fight for your cause.

"And that is the starting of the problems because then suddenly the budgets and stuff is...they are talking millions to rewrite this thing. And it was a scare from management and also that okay, we have gone from full agile development into totally no agile development".

The IA felt that it is important to talk to strong people and give them ammunition to fight the war for you, which can be identified as the ICB of finding and educating supporters to fight for your cause.

"Because you cannot expect them to fight for you unless they understand the purpose, the reason and why they should fight for you. Because if you do not tell them or get them to understand that, of course, they will not fight for you".

Asked for the reason why people changed their mindset when a budget is involved, the IA detected on the one hand that there are a lot of policies and sadly people like to hide behind these policies as it is more comfortable. This can be identified as a barrier of employee's resistance to change. On the other hand, there are still a lot of people voting for the outcome and trying to promote it, as otherwise the discussion will not go on. Therefore, the right people need to be found by working with them or through other people you trust, which can be identified as an ICB.

The potential of the outcome is that it benefits one business unit today but maybe ten additional business units at a later stage. Nevertheless, it was experienced that questions regarding the handling of the investments and the ownership of the outcome arose as the organisation has no function, which handles these questions, which translates into the barrier of missing corporate function of distributing project outcome leads to ownership unclarity. The IA experienced that when transferring something from the outside that is not planned, it is difficult to understand the overall vision for the people as they are not educated in this long-term thinking. This circumstance can be identified as the barrier of explaining the project outcome to uninvolved employees. The IA explained that it is important to talk to all stakeholders one can imagine just to get them to understand not just the short-term vision, but the long-term vision as well to clear the understanding. This shown reaction can be identified as an ICB and is termed as involve and talk to all stakeholders.

With regards to the budget, it was noticed that the business unit was interested but only willing to pay for things that they have a value from, which can be translated into the barrier of proving the value of the project outcome to the receiving business unit. Besides, the business units do not have

huge budgets to take on new stuff, which indicated another barrier termed no huge budgets available.

Besides the mentioned, the IA perceived that there are all kinds of things which needed to be figured out, for example, who will gain and who will not gain from the outcome. It was identified that with the outcome the employees of the receiving business unit might see this software as taking over their job as engineers, which is identified as the barrier of employee's fear project outcome takes over their job. According to the IA, it was important to reach out to the engineers and say that the outcome is augmenting the engineer and helping by lowering the threshold. This reaction can be termed as showing employees that outcome enhances their job and is identified as an ICB.

Asked for the major takeaways from the project, the IA stated that it went partly well as parts of the problem were solved and that the solution in the end worked, was received and used within the organisation. However, the IA pointed out that it is sometimes difficult to separate oneself from the organisation in order to be innovative while still staying close to the organisation to not lose connection. Nevertheless, with regards to the maintenance and further development of the outcome, the IA stated that there is no set-up. The organisation is not used to experiment and develop software and put it into production and the IT department is not used to get algorithms and maintain them. Therefore, the uncertainty of the project outcome and no preparation of the transition is identified as an additional barrier. The uniqueness of the outcome put the organisation under pressure and left it with unanswered questions of who is responsible.

"So that is the big challenge here that we poked with this project, we are kind of stressing the company, saying that this is something that the company has to handle, but nobody, nobody has handled it before. So it is a big challenge".

4.1.2.2 Business Developer 1

During the development phase, the BD1 picked out a few people from the organisation and brought them into the project since they have more knowledge and it is their day to day business. Asked for the experiences to get more resources from the organisation, the BD1 was faced with rejection

from the responsible team manager. Nevertheless, the project team was fortunate as two retired employees who worked their whole life with this specific task and were occasionally taken in on an hourly basis by the receiving business unit, could be utilised for the project.

However, from the organisation side and regarding the employees of the receiving business unit, the BD1 perceived a fear that the tool would take over their jobs. This was challenging and especially as one of the more experienced colleagues in the team was extremely negative and an important stakeholder. As a reaction, the BD1 tried to involve the colleague as an expert.

With the finalisation of the project at Ideon Open and the minimum valuable product, the BD1 was confronted with the introduction and the need to instruct the receiving business unit on how to use it. According to the BD1, it helped to be very careful with the audience and to be very transparent as to be more efficient does not mean that jobs will be lost. However, quickly it turned out that from a technical implementation perspective, issues were found and the BD1 went back to the external development partner and asked for a correction to relaunch the tool. These technical bugs can be identified as a barrier rooted in the immaturity of the project outcome.

"So yes, there was a time you know, with kind of pick-up meetings now and then, that was not really planned, but as they went along, they found more and more bugs for instance, and then we said at a point, okay, but please, you know, stop work, timeout at the moment".

4.1.3 Summary

Table 4 summarises and matches the barriers and ICBs of the IA and the BD1 in the transition phase of Case 1.

Table 4: Summary Case 1

Name	Case-specfic Barrier	Individual Coping Behaviour
IA	project outcome not compatible with IT policies	find and educate supporters to fight for your cause
	rigidity of organisational policies	find and educate supporters to fight for your cause
	employee's resistance to change	find and work with trustworthy people
	explaining project outcome to uninvolved employees	involve and talk to all stakeholders
	no huge budgets available	not solved
	missing corporate function of distributing project outcome leads to ownership unclarity	not solved
	proofing value of project outcome to receiving business unit	not solved
	employee's fear project outcome takes over their job	show employees that outcome enhances their job
	uncertainty of project outcome and no preparation of transition	not solved
BD1	immature project outcome	no individual coping behaviour identified

4.2 Case 2

4.2.1 Case Description

Case 2 consists of a two-year smart program to centrally develop a smartphone application for their products. In the beginning of 2017, the Vice President (VP) R&D and the Business Developer (BD2) built up a new research and development (R&D) department to focus on the development of smart solutions at Ideon Open. In total, the department consisted of around 20 different competencies and except the VP R&D and the BD2, the team were externally hired technicians to support the development. Within this two year smart program, individual initiatives were run to focus on specific components of their products. For the individual initiatives, employees of the organisation were brought in from different countries every week and ran three months intervals to work on a specific outcome. During this time, the employees were physically around 30% at Ideon Open. After three months they presented the business case and product idea and a decision was made if they were allowed to continue for another three months. Case 2 consists of two connected parts, the two-year smart program and individual initiatives. The collected primary data from the VP R&D focuses on the two-year smart program, whereas the primary data collection from the BD2 focuses on the individual initiatives. An overview of the case setting is shown in Table 5.

Table 5: Overview Case 2

Part	Purpose	Project duration	Project set-up
Two year smart program	Centrally develop a smartphone application for products	Spring 2017 - Summer 2019	Built up new R&D department with 20 different competencies at Ideon Open; 100% of work time spent at Ideon Open
Individual initiatives	Develop specific components for products	Autumn 2018 - Spring 2019	Run in 3 months intervals; spent at least 1 day a week at Ideon Open for project development

4.2.2 The Transfer of the Project Outcome

4.2.2.1 Vice President R&D

The VP R&D encountered that the CEO supported the smart program and with his support, the integration of the products to the existing business took place. Important was to always prove that the product was robust and reliable. To prove the product the VP R&D mentioned that it is important to not allocate too much time to convince negative people. It is better to focus on the people that believe in the project, because they will help you to make it a success. This behaviour can be identified as an ICB of focus on people who believe in the outcome. Even though good prototypes were developed, actually taking it to this reliable and robust product that the local business was asking for was difficult as it became very expensive according to the VP R&D. This barrier can be identified as the absence of a clear business case.

"We had to spend quite a lot of money here to do it. And then since we did not really understood how we are going to make money of this, there was a kind of a business decision: We cannot afford to spend this if we don't really know if this will fly".

Furthermore, the VP R&D was faced with the need to transfer the ownership of the project to the current organisation and convince people to take ownership, which is identified as the barrier of the need to transfer the ownership. Furthermore, it was important to build up internal competencies, as the external people were there only temporarily to help develop the technology or product, which can be identified as an additional barrier.

"So it is so important that you create an ownership in your current organization and also build up the competence so they can maintain the product when it is released in the market. And I think that is the challenge here".

In the end, the VP R&D experienced that there were many good learnings, but from the business perspective, it was not a success as the smart program was shut down due to costs and no promising business perspective, which led to the barrier of no buy-in from organisation to use outcome.

"But in the end, it was not a success. We did not manage to sell this. We did not manage to bring in enough money to fund all the maintenance work and to continue to develop products like this. It is very costly. And so many many good learnings but from a business perspective we did not succeed".

4.2.2.2 Business Developer 2

During the development of the individual initiatives, the BD2 experienced that working with the business model canvas helped to map up the most common critical items for making a first minimal viable product. Nevertheless, many of the people working in the organisations had no experience with these models and were sceptical in the beginning, which is identified as a barrier and termed as employees are unfamiliar with new methods.

"And they have no experience with this kind of models. So for them, it was totally new and a little bit off in the beginning, but then when they saw the benefits, they thought, why didn't we start with this a long time ago".

The BD2 experienced that it was not a coffee table discussion getting people on board, but each initiative had two people from each division, which meant that they could do it by themselves and show the difference instead of telling the difference. The BD2 encountered that as a big difference when it comes to implementing. Additionally, special cases were made where the success of each project was shown in small steps, instead of waiting until the final outcome, showing that own people from the organisation were doing it and not an external consultant. It was about internal marketing, sharing what people were up to, otherwise people would feel like organisational

resources were taken away. To get people interested, there is the need to sell the story by putting up some images and present a short story on the main log-in page of the organisation. It was promoted by the CEO as the stories were used during monthly communication meetings with the top management across the divisions and therewith people were aware of it. It was therefore sanctioned by the highest level in the organisation, otherwise "it would never fly" as expressed by the BD2.

4.2.3 Summary

Table 6 summarises and matches the barriers and ICBs of the VP R&D and the BD2 in the transition phase of Case 2.

Table 6: Summary Case 2

Name	Case-specfic Barrier	Individual Coping Behaviour
VP R&D	no buy-in from organisation to use outcome	focus on people who believe in the outcome
	absence of clear business case	no individual coping behaviour identified
	build up internal competences	no individual coping behaviour identified
	need to transfer the ownership	no individual coping behaviour identified
BD2	employees unfamiliar with new methods	no individual coping behaviour identified

4.3 Case 3

4.3.1 Case Description

The organisation reached out Ideon Open to explore new business opportunities, to explore whether or not they should prolong their customer journey and what additional services and products they could provide. The Development Manager (DM) describes the reason for going outside of the company as an attempt to be more innovative, as the home organisation is considered difficult to innovate within. Case 3 was run as a three months project and the team was composed of internal employees and an external project manager. The members of the team met at Ideon Open approximately once a week during these three months. The project in itself was considered problematic as the external project manager was perceived as lacking the competences and insights to push the external development forward. The Salesman was not there for all occasions as he was from an office further away from Ideon Open. The Project ended in a decision like manner whether

or not to continue with the two ideas. Both of which were considered interesting to take back to the organisation. An overview of the case setting is shown in Table 7.

Table 7: Overview Case 3

Purpose	Project duration	Project set-up
Explore new business opportunities and the possibility to prolong customer journey	Autumn 2018 - Spring 2019	Run as 3 months project; spent at least 1 day a week at Ideon Open for project development

4.3.2 The Transfer of the Project Outcome

4.3.2.1 Development Manager

The DM handed over the project to another employee within the company, who was not involved during the time at Ideon Open. The DM experienced the first meeting with the team, which was supposed to pursue the outcome inside the organisation and was held by the mentioned employee, as unsuccessful. It was held online and according to the DM, the new person missed the mark and the background where the outcome came from. Therefore, the why and how of the external project, meaning the new methods of thinking and working was not conveyed to the new team inside the organisation. The DM believed that the employee in charge should have exemplified the processes and methods learned from Ideon Open more to show the new team the intended working style and the benefits of it. The DM relates this missed opportunity to the new person's willingness to spend effort and time, which can be identified as different working cultures between the project team and the receiving employees. As a reaction the DM talked about expectations and took command to move forward, which can be identified as an ICB.

Furthermore, the DM experienced the process of getting buy-in from the organisation as tough. The company is a large organisation and the DM describes it as hierarchical and to get the buy-in, the higher levels of management need to be convinced. This is identified as the barrier of a strict hierarchy. The DM experienced it as difficult as the managers are busy people and therefore, the commitment during the set meetings may vary. "Many of these people that you want to buy in,

they have a very busy schedule. So even if you send them material, it's not always sure that they have read it before". This is identified as the barrier of busy top management. Knowing the organisational hierarchy, the DM response was to approach the management by the coffee machine to spread the word of the project and to target the higher levels of managers in a more relaxed setting. This is identified as the ICB of informal talks with management during the coffee break.

"The easiest way I think is to do it by the coffee machine though. If you see them go, stand by them, take a coffee, ask how they're doing and 'Oh did you know we've done this and this and this?', and you start to talk about it. That's probably the easiest way though. So they know something about it. And then when you come to the meeting, you have a bit heads up what it's about".

The DM described the outcomes of the project presented by the team to the organisation as being put in the back drawer. According to the DM, the management was not ready to deal with the questions that arose about the outcome of the project or even noticed that the outcome provided a solution to a problem that may be of importance. This is identified as the barrier, incompatibility of managers expectations.

According to the DM, the project outcome required competencies that the organisation do not currently have. This is identified as the barrier of missing competencies to put project outcome into action. Moreover, the DM believes that the organisation will not acquire these themselves. Therefore the DM described how insights will be retrieved within the organisation regarding demands and what the organisation itself wants and then find an appropriate partner to gain further insights and make the process as basic as possible. This is identified as the ICB of finding the right partner and making it as basic as possible.

The DM described the whole experience of taking back the learnings from the project at Ideon Open as challenging and expressed that it is easy to forget and fall back into old habits. This is identified as the barrier of keeping the new work routines. To cope with this, the DM allocated more time for meetings and recalled the learnings, which can be identified as an ICB.

4.3.2.2 Area Manager

The AM describes the outcomes of the project as vague and that the team after the project at Ideon were not at the stage the AM thought they would be. This is identified as the barrier of project outcomes too vague to transfer. The first step after the project was finished was to narrow the idea of the new service.

"I still think it's quite vague, I think that if the project had been really a success, then we should know more today. Okay, we know that customers prefer having an app, which is marked with our company name because then we can stand for quality and whatever it could be…".

The AM describes the process of re-entering the home organisation as filled with struggling with the same questions touched upon during the project. As a response, the AM together with the DM started a dialogue with higher management about the importance of the project, which led to the project to be incorporated in the digital plan of the company. This is identified as the ICB initiating dialogue and stressing the project's importance.

The AM describes the organisation as ready mentally but not organisationally to implement the new proposed service. Even if it at this stage is still vague, the AM describes colleagues as positive towards the idea of expanding the business to the new service. However, the question of how and who will commercialise the idea is still one to be answered. This is identified as the barrier of the non-existence of a receiving business unit. Moreover, the AM described that this question is not ready to be dealt with but mentioned the aftermarket unit as a possible one. Moreover, a dialogue has according to the AM been initiated with this unit to explore the possibilities and to get their feedback. However, this unit requires more information and a more developed idea before considering the possibility. This is identified as the ICB of reaching out to possible business units to get feedback. Therefore the AM described that the further narrowing of the new service will be conducted before approaching the aftermarket unit again.

The idea of the new service was put on hold and has only recently two years later been revisited for questioning. The AM believed that the outcome was not initiated directly because of budgetary reasons but mainly because of the hierarchical structure of the company and the AM's manager

that supported the idea but did not push for it. The new service did not have ownership high up in the hierarchy and there was a lack of commitment. This is identified as the barrier, missing ownership of project outcome high up in the hierarchy. As a response, the AM together with the DM started a dialogue with higher management about the importance of the project. This is identified as the ICB initiating dialogue and stressing the project's importance.

4.3.2.3 Salesman

After the project, a decision was made on using an external partner for the product part of the project outcomes. The Salesman, in general, experienced the return to the organisation as positive, and described the colleagues as being more or less positive towards the idea of expanding the organisation's business to the new type of products. However, the uncertainty of the end value for customers made colleagues hesitant about the actual implementation of these new products. This is identified as the barrier, uncertainty of the final value of project outcome. The Salesman described the project developers of the organisation as particularly sceptical of the added costs and the long-term investment on something that they do not know the end value of. Furthermore, the Salesman described that despite the positive feedback, no project wanted to be the trial project.

"People find it important to develop the company and that we have to follow into the future … the products impressed everyone but no one wanted to be the trial project".

This is identified as employee fear of being the pilot project. As a response to the concerns of costs and uncertainty, the Salesman initiated a dialogue with the DM and the overall organisation to conclude how to best handle the uncertainty. A decision was made to allocate the costs on a separate account and thereby avoiding extra costs on the specific project. This decision was then promoted by the Salesman to all possible trial projects using a power-point presentation showing the possible benefits. The possibility to allocate the additional costs on another account encouraged the people in the intended trial project to accept the new products. This is identified as the ICB, allocating additional costs and visualising the benefits.

The Salesman experienced working with a new partner as challenging as it involves new forms of communication and procedures. And it requires keeping both the external partner at ease but also

the developers. This is identified as the barrier, communication coordination. For the new communication to please both parties, the Salesman set up two meetings with the project developers to let them decide when and how they receive information from the external partner. This is identified as an ICB of scheduling extra meetings to ensure that the internal party is satisfied. The Salesman is currently the middleman between the two but expressed that preferably in the future it is not needed.

4.3.3 Summary

Table 8 summarises and matches the barriers and ICBs of the DM, the AM and the Salesman in the transition phase of Case 3.

Table 8: Summary Case 3

Name	Case-specfic Barrier	Individual Coping Behaviour
DM	different working cultures between project team and receiving employees	talk about expectations and take command to move forward
	missing competencies to put project outcome into action	find the right partner and make it as basic as possible
	strict hierarchy	informal talks with management during coffee break
	busy top management	informal talks with management during coffee break
	project outcomes incompatability with managemt expectations	not solved
	keep up new work routines	allocate more time for meetings and recall learnings
AM	uncertainty of final value of project outcome	allocating added cost on another account and visualising the benefits
	employees fear of being the pilot project	allocating added cost on another account and visualising the benefits
	Communication coordination	scheduled extra meeting to ensure that internal party is satisfied
Salesman	too vague project outcome to transfer	initiating dialogue and stress the projects importance
	nonexistence of receiving business unit	reaching out to possible business units to get feedback
	missing ownership of question (problem and outcome) high up in hiearchy	initiating dialogue and stress the projects importance.

4.4 Case 4

4.4.1 Case Description

In the search for a business model for their new technology, the organisation turned to the external world for assistance. The project at Ideon open was run for about six months where the project members gathered to work on developing the potential business models. The Head of R&D (HRD) described how the members explored several of Ideon Open's methods to identify for example the customers and other important aspects such as key stakeholders and decision-makers. Furthermore, the HRD describes how the team of solely internal employees met on approximately five occasions to take part in workshops to further develop the business models. As Case 4 is an organisation within a larger MNC the project team invited the "manager's manager" as the HRD explained it to inform and show the higher management what they were doing and their progress during the

time spent in the Ideon Open facilities. After the six months, the HRD defines the results of the external project as being two very different business models which were taken back into the organisation for further development. An overview of the case setting is shown in Table 9.

Table 9: Overview Case 4

Purpose	Project duration	Project set-up
Explore new potential business models	Summer 2019 - Winter 2019	Run as 6 months project; spent approximately five days during this time at Ideon Open for project development

4.4.2 The Transfer of the Project Outcome

4.4.2.1 Head of R&D

The HRD experienced the initial part of the transition phase as one misfortune. Moreover, although the team themselves were ready to continue to further develop a suiting business model a change of management interfered with the process.

"So, the manager's manager, that was here and participated in the workshop. He left so now there's a new manager. So we are right now in the stage of introducing the new manager to what we have been doing. Getting him on board again on these two different business models".

The process of further developing the business models within the organisation has been stagnant since the end of the project in October 2019. Much of which depends on the change of management according to the HRD. This is identified as the barrier, loss of anchor due to management change. However, the results of the project at Ideon Open still needed clarification and that has been the first step to solve to implement a business model suiting the new technology. The HRD re-introduced the project to the new manager by summarising the conclusions drawn from the project and the two business models. Which has been experienced as successful so far by the HRD. This is identified as the ICB, re-anchoring managers manager with project outcomes.

The HRD describes her experience during the project at Ideon Open as very inspiring and that it gave valuable insights on customers. However, returning to the organisation after the project was experienced as challenging in regards to keeping up the new methods learned and keeping the focus on the project within the organisation. Apart from the change of management, the HRD highlighted one thing that she believed affected the speed of development within the organisation.

"I think that we should have directly afterwards sat down and decided on some actions that we will use so we didn't. We slowed down very much after we had this good speed when we worked [at Ideon Open] but then we slowed down. Because when you get home, there are a lot of other things that take your focus as well. This is very important, but still there are so many other things that pull on your attention".

This is identified as the barrier, daily work routines taking over.

4.4.2.2 Technology Strategy Manager

According to the Technology Strategy Manager (TSM), the team from the external project is still intact, however, it has expanded with more colleagues that have joined to provide more insights. The TSM further described the process after returning to the organisation as the continuous refinement of the two business models where attempts have been made to align it the best way possible to the larger MNC. There are many aspects to consider and the TSM described it as having a lot of economical and political aspects in mind. For example, the potential use of external partners is perceived by the TSM as one factor affecting the alignment of the new business model. This is identified as the barrier of project outcome needs to be aligned with the corporate business model. The TSM further described how this was dealt with by following guidelines and understanding the overall strategy. This is identified as the ICB, following set guidelines. "I think this is based on the guidelines that we know we need to follow and we understand what the strategy at least is, even though it may be dynamic".

Apart from the alignment with the overall strategy, the TSM highlights the set amount of resources allocated towards the project as one of the major reasons why it has not yet developed to a more

mature stage. This is identified as the barrier, too little resource allocation to develop faster. Only the people involved in the project were focusing on the business model and if more resources in the form of human and financial were allocated, the project may be at a more developed stage. Furthermore, TSM stated that business model development is not something he is familiar to and refers to all project members.

"[Y]ou know, there are always things caught up. So that's why it gets delayed, you know, until you try to pick it up. And we are not business developers, we are engineers that are also developing the technical aspects and doing everything. So I think that has been a bit of a challenge … we are not experts on business development we do it in a way inherently or naturally, sometimes for good or for bad".

The TSM approached this by trying to be more efficient, utilise the resources that were present and by retrieving external financing for the project. This is identified as an ICB of innovating with the resources available, trying to minimise costs and retrieving external funding.

4.4.3 Summary

Table 10 summarises and matches the barriers and ICBs of the HRD and the TSM in the transition phase of Case 4.

Table 10: Summary Case 4

Name	Case-specfic Barrier	Individual Coping Behaviour
HRD	loss of anchor due to management change	reanchoring managers manager with project outcomes
	daily work routines take over	no individual coping behaviour identified
TSM	project outcome needs to be aligned with corpoate business model	following set guidelines
	too little resource allocation to develop faster	innovate with the resources available, try to minimise costs and retrieve external funding

5. Analysis

In the following chapter, the barriers and ICBs from the four cases are analysed, moving from an individual case perspective to a cross-case perspective. Firstly, the case-specific barriers are compared and grouped across cases. Secondly, the shared barriers are categorised in barrier dimensions. Thirdly, the ICBs are grouped along the shared barriers. The final part analyses and synthesises the barrier dimensions and ICBs together and recognises ICB patterns. A summary in the end provides an overview of the analysis.

5.1 Shared Barriers across Cases

The prior section identified 31 case-specific barriers among all four cases. Analysing these in more detail and comparing the case-specific barriers among the four cases, similarities in the barriers were identified. Therefore, the case-specific barriers can be grouped into 16 barriers which are shared across all four cases. The grouping and comparison assist in deepening the understanding of the barriers in the transition phase. The transformation from the case-specific barriers to the shared barriers can be found in table in Appendix B.

5.2. Barrier Dimensions

The 16 prior identified shared barriers are summarised and further categorised into barrier dimensions as shown in Table 11. As introduced in Section 2.7 three barrier dimensions were adopted from the conceptual framework, namely People, Funding and Senior management support. However, shared barriers were analysed which did not seem to suit in the aforementioned categorisation. Therefore, two new barrier dimensions, Organisation and Immaturity were introduced to categorise these shared barriers. In the following the reasoning for the categorisation of barrier dimensions is provided, starting with the dimensions based on the conceptual framework, followed by the newly emerged dimensions.

Table 11: Overview Barrier Dimensions

People	Funding	Senior management support	Organisation	Immaturity
clarification of outcomes to organisation	absence of budget	lack of management support	lack of internal competencies	immature project outcomes
employee's fear of losing job (attitude)	proof of value for recipient	organisational hierarchies	no organisational structure for outcomes	uncertainty of commercial value of outcome
employee's fear of pilot testing (attitude)		time constraints of management	organisational policies	
employee's resistance to change (attitude)				
habit of former work routines				
negative perception of new methods				

5.2.1 Barrier Dimensions People, Funding, Senior management support

In the following section, the categorisation of the shared barriers based on the conceptual framework is analysed and the reasoning behind the categorisation is given.

5.2.1.1 People

Recalling Chesbrough's (2020) description of the dimension People as barriers which are related to employees and their actions, behaviours and set of competencies and characteristics, the following shared barriers are categorised under People: (1) clarification of outcomes to the organisation, (2) employee's fear of losing job (attitude), (3) employee's fear of pilot testing (attitude), (4) employee's resistance to change (attitude), (5) habit of former work routines and (6) negative perception of new methods.

The first shared barrier is linked to the need of previously uninvolved employees within the organisation to comprehend the project outcome, which relates to the competences of people. The third to the fourth shared barriers are associated with the attitudes of an employee and therefore connected to the characteristics part of the definition. The shared barrier habit of former work routines refers to an employee's actions and therefore fulfils the criteria of the dimension. The sixth shared barrier is related to the behaviour towards new methods and is, therefore, people related.

5.2.1.2 Funding

As seen in the conceptual framework (2.7) Funding is according to Chesbrough (2020, p. 79) understood as the problem of a "mismatch between innovation budgets and opportunities". The

shared barrier absence of budget is related to the financial support of the outcome within the organisation and is therefore related to funding. Furthermore, the shared barrier of proof of value for the recipient is analysed as showing accurate financial numbers to prove value and is therefore related to solving the aforementioned mismatch.

5.2.1.3 Senior management support

Referring back to the conceptual framework in Section 2.7 the internal competition for the organisation's top management executives consideration and time is described as senior management support (Chesbrough, 2020).

The shared barrier, lack of management support and time constraints of management are directly linked to the given definition and need no further justification for the categorisation into this dimension. The shared barrier of organisational hierarchies is linked to strict and old hierarchical orders of an organisation and therefore directly linked to the competition arising around top senior management's consideration.

5.2.2 Barrier Dimensions Organisation and Immaturity

Besides the categorisation of the shared barriers into the three dimensions in the previous section, five shared barriers were identified, which did not seem to suit the categorisation based on their definition in Section 2.7. Therefore, two new barrier dimensions, Organisation and Immaturity were introduced to categorise these shared barriers. The emergence of these two new barrier dimensions is elaborated in the following, alongside with the reasoning for the categorisation of the five shared barriers. These five shared barriers are separately shown in Table 12.

Table 12: New Barrier Dimensions

Organisation	Immaturity
lack of internal competencies	immature project outcomes
no organisational structure for outcomes	uncertainty of commercial value of outcome
organisational policies	

5.2.2.1 Organisation

During the analysis of the barriers, difficulties and issues emerged which are related to the overall structure of an organisation and are therefore summarised under the dimension Organisation. The dimension Organisation reflects constitutional and structural matters, which span across the organisation on a higher level. Besides, these barriers describe more formal and long-term obstacles. One might argue that the dimensions, People, Funding and Senior management support are also connected to the organisational structure. However, as there is the indication that these barriers are present across the whole organisation on a long-term perspective, they are categorised separately. The following analysed shared barriers clarify the emergence of the dimension Organisation.

The absence of an organisational structure for outcomes is connected to the lack of an internal understanding of how to proceed with the outcomes. An outcome might be developed with a certain purpose in mind, but as soon as it crosses back into the organisational boundaries the ownership is unclear. This might appear due to a lack of preparation of the transfer or the nonexistence of a receiving business unit, which both strengthens the argumentation for a dimension, which spans across the organisation. Furthermore, the coordination of the right communication seems to possess additional stress on the shared barrier.

Closely connected to the first shared barrier is the shared barrier of lack of internal competencies, which underlines the structural perspective of the dimension Organisation. The missing competencies are needed to realise the outcome and therefore the transfer does not take place. As

a result, internal competencies need to be built up, which argues for the long-term perspective of the dimension.

Lastly, the shared barrier of organisational policies poses a risk to the outcome, which argues for the constitutional perspective of the dimension Organisation. For example, organisational policies might be too rigid to allow a transfer of an agile outcome. Outcomes, which are developed outside the organisation are not always aligned with internal policies for example security and IT policies. Hence, the outcome needs to be re-worked in order to align it, which potentially leads to unavoidable additional investments.

5.2.2.2 Immaturity

The analysis of the barriers revealed uncertainty and ambiguity with the outcome itself and are therefore summarised under the dimension Immaturity. The focus of this dimension is the outcome itself and its features and attributes which innovations carry. As the four aforementioned dimensions are of a procedural and structural nature, barriers which relate to the outcome itself are categorised under the dimension Immaturity. The following analysed shared barriers clarify the emergence of the dimension Immaturity.

The shared barrier immature project outcomes are directly connected to the developed innovation. It is analysed that even with a broad and open purpose of a project, a too vague project outcome hinders the transfer of if back into the organisational boundaries. If there is no clear business case, the project shows an immaturity, which can not be understood from the receiving business unit and the outcome will not be transferred. Therefore, it is important to focus on the features and attributes of an outcome, which argues for the dimension of Immaturity.

The first shared barrier is interrelated with the second shared barrier of the uncertainty of the commercial value of the outcome. It is analysed that the described immature project outcomes lead to a sceptical perception of the value of the project outcome. Therefore it needs to be proven to the receiving business unit and without proof, the business unit is not willing to invest in the transition of the outcome.

5.3 Individual Coping Behaviours

Each ICB is specific to the encountered barrier as identified in Section 4. With the translation from case-specific barriers into shared barriers across the cases in Section 5.2, the ICBs follow alongside. This means that the ICBs are not actively grouped, but summarised under the 16 shared barriers as presented in Table 13. This accumulation enables a comprehensive understanding of the ICBs and its appearance in the transition phase of open innovation.

Nevertheless, it needs to be recognised that an ICB could not be identified for all case-specific barriers. However, with the summary under the 16 shared barriers, the ICBs could be compared among cases. Besides, for certain case-specific barriers, no ICB was shown and the barrier could therefore not be solved.

Table 13: Overview Individual Coping Behaviour

Second order themes: shared barriers across cases	Individual Coping Behaviour (ICB)
absence of budget	innovate with the resources available, try to minimise costs and retrieve external funding
	not solved
clarification of outcomes to organisation	involve and talk to all stakeholders
employee's fear of losing job (attitude)	show employees that outcome enhances their job
employee's fear of pilot testing (attitude)	allocating added cost on another account and visualising the benefits
employee's resistance to change (attitude)	find and work with trustworthy people
habit of former work routines	allocate more time for meetings and recall learnings
	no individual coping behaviour identified
immature project outcomes	initiating dialogue and stress the projects importance
	no individual coping behaviour identified
lack of internal competencies	find the right partner and make it as basic as possible
	no individual coping behaviour identified
lack of management support	focus on people who believe in the outcome
	initiating dialogue and stress the projects importance.
	not solved
	reanchoring managers manager with project outcomes
negative perception of new methods	no individual coping behaviour identified
	talk about expectations and take command to move forward
no organisational structure for outcomes	no individual coping behaviour identified
	not solved
	reaching out to possible business units to get feedback
	scheduled extra meeting to ensure that internal party is satisfied
organisational hierarchies	informal talks with management during coffee break
organisational policies	find and educate supporters to fight for your cause
	following set guidelines
proof of value for recipient	not solved
time constraints of management	informal talks with management during coffee break
uncertainty of commercial value of outcome	allocating added cost on another account and visualising the benefits

5.4 Synthesis of Barriers and Individual Coping Behaviours

After grouping and categorising the barriers and ICBs the following part analyses the shared barriers and the ICBs in more detail. Table 14 provides an overview of the shared barriers and the across the four cases, whereas an 'x' indicated that the shared barrier was found in the case.

Table 14: Overview of shared barrier across cases

Second order themes: shared barriers across cases	Case 1	Case 2	Case 3	Case 4
absence of budget	x			x
clarification of outcomes to organisation	x			
employee's fear of losing job (attitude)	x			
employee's fear of pilot testing (attitude)			x	
employee's resistance to change (attitude)	x			
habit of former work routines			x	x
immature project outcomes	x	x	x	
lack of internal competencies		x	x	
lack of management support		x	x	x
negative perception of new methods		x	x	
no organisational structure for outcomes	x	x	x	
organisational hierarchies			x	
organisational policies	x			x
proof of value for recipient	x			
time constraints of management			x	
uncertainty of commercial value of outcome			x	

Comparing the four cases among these five barrier dimensions it is shown that the dimensions Organisation and People were encountered in all four cases. The dimensions Senior management support and Immaturity were experienced in three of the four cases and the barrier dimension Funding were solely faced in two cases. Table 15 provides a summary of the matching between the five dimensions and the four cases.

Table 15: Distribution of barrier dimensions across cases

Barrier Dimensions	Case 1	Case 2	Case 3	Case 4
Organisation	4	2	3	1
People	3	1	3	1
Senior management support		1	4	1
Immaturity	1	1	2	
Funding	2			1

5.4.1 Barrier Dimension and Individual Coping Behaviours

Besides the distribution of barrier dimensions and cases, the ICB as a reaction to the encountered barriers is of crucial importance for the transfer of the outcome. Therefore, the following section analyses the barrier dimensions and the ICBs together in order to gain a deeper understanding of

the transition phase of open innovation. Table 16 summarises the findings of the synthesis by showing barrier dimensions, shared barriers, cases and the ICB.

Table 16:Barrier Dimensions and Individual Coping Behaviours

Barrier Dimensions	Second order themes: shared barriers across cases	Case	Individual Coping Behaviour (ICB)
Organisation	lack of internal competencies	Case 2	no individual coping behaviour identified
		Case 3	find the right partner and make it as basic as possible
	no organisational structure for outcomes	Case 1	not solved
		Case 2	no individual coping behaviour identified
		Case 3	reaching out to possible business units to get feedback
		Case 3	scheduled extra meeting to ensure that internal party is satisfied
	organisational policies	Case 1	find and educate supporters to fight for your cause
		Case 4	following set guidelines
People	clarification of outcomes to organisation	Case 1	involve and talk to all stakeholders
	employee's fear of losing job (attitude)	Case 1	show employees that outcome enhances their job
	employee's fear of pilot testing (attitude)	Case 3	allocating added cost on another account and visualising the benefits
	employee's resistance to change (attitude)	Case 1	find and work with trustworthy people
	habit of former work routines	Case 3	allocate more time for meetings and recall learnings
		Case 4	no individual coping behaviour identified
	negative perception of new methods	Case 2	no individual coping behaviour identified
		Case 3	talk about expectations and take command to move forward
Senior management support	lack of management support	Case 2	focus on people who believe in the outcome
		Case 3	initiating dialogue and stress the projects importance.
		Case 3	not solved
		Case 4	reanchoring managers manager with project outcomes
	organisational hierarchies	Case 3	informal talks with management during coffee break
	time constraints of management	Case 3	informal talks with management during coffee break
Immaturity	immature project outcomes	Case 1	no individual coping behaviour identified
		Case 2	no individual coping behaviour identified
		Case 3	initiating dialogue and stress the projects importance
	uncertainty of commercial value of outcome	Case 3	allocating added cost on another account and visualising the benefits
Funding	absence of budget	Case 1	not solved
		Case 4	innovate with the resources available, try to minimise costs and retrieve external funding
	proof of value for recipient	Case 1	not solved

5.4.1.1 Organisation

The barrier dimension Organisation seems to appear most frequently in the transition phase. These barriers were also encountered several times within one case and are therefore prevalent among all four cases. Referring back to Section 5.2.2.2, these barriers span across organisations, are of constitutional matters and have a more long-term perspective. In more detail there is no organisational structure for the outcomes, organisational policies are perceived as barriers and there is a lack of internal competences. Referring back to the cases in Section 4, it becomes evident that even though all four cases are rooted in different industries, had a different case set-up and were experienced by different individual employees, the barriers show similarities. In more detail, the individual employee encountered, for example, case-specific barriers connected to ownership uncertainty, the nonexistence of receiving business unit, the rigidity of organisational policies or

the barrier to build up internal competences. Striking is that in Case 1, the organisational shared barriers seem to play a major role as four different case-specific were identified. Taking a closer look at the ICBs connected to the shared barriers in the dimension of Organisation from Section 5.3, it becomes evident that the individual was not always able to cope with the exposed barriers. To cope with no organisational structure of outcomes, the individual for example scheduled extra meetings to ensure the satisfaction of internal parties and reached out to the possible business unit to retrieve feedback. However, it was also shown that for example in Case 1 the individual employee was not able to cope with that barrier. For Case 2 no individual behaviour for that barrier was identified. With regards to organisational policies, the individual chose to either follow the set guidelines to cope with the barrier or to find and educate supporters to fight for their cause. To cope with the lack of internal competencies, the individual made the further development as basic as possible. Table 17 provides a summary of the synthesis.

Table 17: Synthesis Organisation

Barrier Dimensions	Second order themes: shared barriers across cases	Case	Individual Coping Behaviour (ICB)
Organisation	lack of internal competencies	Case 2	no individual coping behaviour identified
		Case 3	find the right partner and make it as basic as possible
	no organisational structure for outcomes	Case 1	not solved
		Case 2	no individual coping behaviour identified
		Case 3	reaching out to possible business units to get feedback
		Case 3	scheduled extra meeting to ensure that internal party is satisfied
	organisational policies	Case 1	find and educate supporters to fight for your cause
		Case 4	following set guidelines

5.4.1.2 People

The barrier dimension People were encountered the second most in the transition phase and are present in all four cases, with Cases 1 and 3 showing multiple barriers in this dimension. As seen in Section 5.2.1.1, the shared barriers categorised under People relate to actions, behaviours, competencies and characteristics of employees. In turn, there is a negative perception of the new methods, the need to clarify the outcomes to the organisation, several individual attitudes and the habit of former work routines. Looking at the case-specific barriers (see Section 4) the individual, for example, encountered different working cultures between the project team and the receiving employee, the barrier to explain outcome to uninvolved employees and that daily work routines take over. Furthermore, it was analysed that the receiving employees within the organisation showed different negative attitudes as they fear losing their job or being the pilot test and showed a resistance to change. Even though the shared barriers are scattered, it is evident that the individual

employees experienced similar shared barriers in the transition phase. Particularly in Case 1 and 3, the People dimension seems to play an important role as in each case three were found. To cope with these shared barriers, the individual showed different ICBs (see Section 5.3). Nevertheless, it needs to be mentioned that for Case 2 and 4 no ICB was identified regarding the negative perception of new methods and habit of former work routines. In order to cope with the negative perception of new methods, the individual talked about the expectations and took command to move forward. In addition, to cope with the clarification of the outcomes, the individual for example involved and talked to all stakeholders. To overcome the habit of former work routines, the individual allocated more time for meetings and recalled the gained learnings. The negative attitudes were coped with by reducing their fear by showing the employees that the outcome enhances their job or allocate added costs to another account and visualise the benefits. To cope with the resistance to change the individual employee for example focused on finding and working with trustworthy people. Table 18 provides a summary of the synthesis.

Table 18: Synthesis People

Barrier Dimensions	Second order themes: shared barriers across cases	Case	Individual Coping Behaviour (ICB)
People	clarification of outcomes to organisation	Case 1	involve and talk to all stakeholders
	employee's fear of losing job (attitude)	Case 1	show employees that outcome enhances their job
	employee's fear of pilot testing (attitude)	Case 3	allocating added cost on another account and visualising the benefits
	employee's resistance to change (attitude)	Case 1	find and work with trustworthy people
	habit of former work routines	Case 3	allocate more time for meetings and recall learnings
		Case 4	no individual coping behaviour identified
	negative perception of new methods	Case 2	no individual coping behaviour identified
		Case 3	talk about expectations and take command to move forward

5.4.1.3 Senior management support

The barrier dimension of Senior management support was analysed among three cases in the transition phase with the exception of Case 1. Furthermore, it is striking that Case 3 is faced with four shared barriers in this barrier dimension. As stated in Section 5.2.1.3, the barriers connected to Senior management support are based around the internal competition of the consideration and time of the organisation's top management. In more detail, organisational hierarchies, time constraints of the management and a lack of management support are identified as barriers. Referring back to the cases in Section 4, the individual encountered, for example, case-specific barriers in form of a strict hierarchy, a busy management and a missing ownership of the problem and the outcome high up in the hierarchy. Even though all these examples are case-specific, they share similarities with regards to the consideration of top management. As seen in Section 5.3, to

cope with organisational hierarchies and time constraints of management, it is analysed that the individual engaged in informal talks with the management during coffee breaks. For the lack of management support, the individual, for example, initiated dialogues to stress the project importance and re-anchored the manager's manager with the project outcome. Nevertheless, the barrier dimension of Senior management support contains barriers, which could only partially be coped with as seen in Case 3 and the lack of management support. Table 19 provides a summary of the synthesis.

Table 19: Synthesis Senior management support

Barrier Dimensions	Second order themes: shared barriers across cases	Case	Individual Coping Behaviour (ICB)
Senior management support	lack of management support	Case 2	focus on people who believe in the outcome
		Case 3	initiating dialogue and stress the projects importance.
		Case 3	not solved
		Case 4	reanchoring managers manager with project outcomes
	organisational hierarchies	Case 3	informal talks with management during coffee break
	time constraints of management	Case 3	informal talks with management during coffee break

5.4.1.4 Immaturity

The barrier dimension of Immaturity was identified in all cases in the transition phase, except Case 4. In addition, the shared barriers in this dimension are more equally divided among the cases and there is no indication of a direct accumulation. As seen in Section 5.2.2.2, these barriers are related to the outcome itself and its features and attributes. In greater detail the project outcomes are immature and the commercial value of the outcome is uncertain. Taking a closer look at the cases (see Section 4), the individuals, for example, encountered an uncertainty of the final value of project outcome, the absence of a clear business case and a too vague project outcome to transfer. All these examples show the barriers with regards to an immature outcome and are therefore considered similar. Analysing the ICBs (see Section 5.3), the uncertainty of the commercial value of the outcome is coped with by allocating added cost to another account and visualising the benefits. This ICB was also encountered to cope with the People dimension's barrier of employee's fear of pilot testing. The immature project outcomes were overcome by initiating dialogues and stressing the project importance, similar to the lack of management support in the Senior management support dimension. However, for Case 1 and 2, no ICB was identified regarding the immature project outcomes. Table 20 provides a summary of the synthesis.

Table 20: Synthesis Immaturity

Barrier Dimensions	Second order themes: shared barriers across cases	Case	Individual Coping Behaviour (ICB)
Immaturity	immature project outcomes	Case 1	no individual coping behaviour identified
		Case 2	no individual coping behaviour identified
		Case 3	initiating dialogue and stress the projects importance
	uncertainty of commercial value of outcome	Case 3	allocating added cost on another account and visualising the benefits

5.4.1.5 Funding

The shared barriers categorised under Funding appeared only in two of the four cases, namely Case 1 and 2. The definition from Section 5.2.1.2 relates them to a "mismatch between innovation budgets and opportunities" (Chesbrough, 2020, p. 79). In more detail, the barriers are understood as the absence of a budget and the proof the value for a recipient. Referring back to the cases in Section 4., the individual was for example faced with too little resource allocation to develop faster and the need to prove value to the receiving business unit, which shows similarities with regards to funding. With regards to the ICBs (see Section 5.3), Case 1 was not able to solve the barrier of proof of value for the recipient and the absence of a budget, whereas Case 4 innovated with the resources available, tried to minimise costs and retrieved external funding to cope with the absence of a budget. Table 21 provides a summary of the synthesis.

Table 21: Synthesis Funding

Barrier Dimensions	Second order themes: shared barriers across cases	Case	Individual Coping Behaviour (ICB)
Funding	absence of budget	Case 1	not solved
		Case 4	innovate with the resources available, try to minimise costs and retrieve external funding
	proof of value for recipient	Case 1	not solved

5.4.2 Individual Coping Behaviour Patterns

The comparison of barrier dimensions and ICBs in Section 5.4.1 gave insights into the interrelation of booths. With regards to the analysed ICBs as reactions to the encountered barriers, which are rooted in the case-specific barriers, certain patterns arose when analysing them among the barrier dimensions. The insights that the barrier was not solved and when no ICB was identified are not considered for the pattern recognition. In addition, two ICBs did not allow for pattern recognition, namely allocating added cost on another account and visualising the benefits and allocate more time for meetings and recall learnings.

The first pattern which arose is termed accept and work with the given condition and is connected to the acceptance and adherence to the given circumstances related to the encountered barriers in the transition phase. Thereby the individual shows two general forms of ICBs. Firstly the individual actively tried to overcome the barriers by simplifying the outcome or minimising connected investments. Secondly, the individual showed a more inactive form of ICB by following set guidelines. This pattern is analysed with shared barriers categorised under Funding and Organisation.

The second pattern retrieved from the analysis is termed education and pedagogy. As the terminology indicates the individual chose to prepare and tutor, but also listen to responses in order to cope with barriers encountered in the transition phase. Hence, the individual actively initiated dialogues, explained the relevance of an outcome, showed the benefits and engaged in reciprocal feedback. This pattern is analysed and found in the barrier dimensions Immaturity, Organisation, People and Senior management support.

The third pattern which arose among the ICBs is termed networking and is related to introducing and popularising the outcome in the transition phase in the form of spreading the idea to many people within the organisation. To achieve this the individual focused and found supporters within the organisation, who believed and therefore engaged in the cause and talked to all possible stakeholders. Furthermore, the individual scheduled extra meetings to ensure satisfaction. Besides that, the individual also showed ICBs in forms of informal talks during breaks. This pattern is analysed with shared barriers categorised under Organisation, People and Senior management support.

Table 22 summaries the emerged ICB patterns among the barrier dimensions and provides the relation to the initial ICB.

Table 22: Individual Coping Behaviour Patterns

Individual Coping Behaviour Patterns	Barrier Dimensions	Individual Coping Behaviour (ICB)
Accept and work with given condition	Funding	innovate with the resources available, try to minimise costs and retrieve external funding
	Organisation	find the right partner and make it as basic as possible
		following set guidelines
Education and pedagogy	Immaturity	initiating dialogue and stress the projects importance
	Organisation	reaching out to possible business units to get feedback
	People	find and work with trustworthy people
		show employees that outcome enhances their job
		talk about expectations and take command to move forward
	Senior management support	initiating dialogue and stress the projects importance.
Networking	Organisation	find and educate supporters to fight for your cause
		scheduled extra meeting to ensure that internal party is satisfied
	People	involve and talk to all stakeholders
	Senior management support	focus on people who believe in the outcome
		informal talks with management during coffee break
		reanchoring managers manager with project outcomes
No individual behaviour	Funding	not solved
	Immaturity	no individual coping behaviour identified
	Organisation	no individual coping behaviour identified
		not solved
	People	no individual coping behaviour identified
	Senior management support	not solved
No pattern	Immaturity	allocating added cost on another account and visualising the benefits
	People	allocate more time for meetings and recall learnings
		allocating added cost on another account and visualising the benefits

As a last step, the ICB patterns are matched with the barrier dimensions and summarised in Table 23. Even though the three ICB patterns show differences in the exact choice behaviour, they seem to share similarities regarding their grounding in social interaction with different parties. Through these social interactions, the individuals attempt to solve the encountered barriers in order to fulfil their goal of a successful transition of the outcome. Shared barriers under Organisation are inactively coped with by accepting and working with the given condition, show active networking and educate and pedagogy ICBs. However, also the absence of any ICB is present. Barriers dimensions under People are mainly coped with by education and pedagogy and Senior management support is best coped with by networking ICBs. Barriers regarding Immaturity might be solved with education and pedagogy ICBs. It is indicated that barriers categorised under Funding are coped with by acceptance and work with the given condition or the absence of an ICB. Nevertheless, this comparison has no claim of any quantitative significance. However, illustrates first indications on the interrelation of barriers and ICBs on a higher and more general level.

Table 23: Barrier Dimensions and Individual Coping Behaviour Patterns

Barrier Dimensions	Aaccept and work with given condition	Education and pedagogy	Networking	No individual behaviour	No pattern
Organisation	2	1	3	4	
People		3	1	2	2
Senior management support		1	4	1	
Immaturity		1		2	1
Funding	1			2	

5.5 Summary

The following section summaries the findings from the analysis in order to provide a comprehensive overview and serve as a preparation of the discussion of the findings.

To deepen the understanding of the individual's behaviour in the transition phase, the 31 case-specific barriers were compared, similarities identified and finally grouped together in 16 shared barriers across the four cases. Appendix B provides an overview of the transformation. Based on the conceptual framework the shared barriers were further categorised into the three existing barrier dimensions of People, Funding and Senior management support and a proof of their affiliation was given. This step of the analysis also revealed two new barrier dimensions, Organisation and Immaturity, which were not priorly affiliated with the existing framework. Consequently, a reasoning for the emergence of these two barrier dimensions was given and the shared barriers were categorised accordingly. Table 11 provides an overview of the barrier dimension and the related shared barriers. In addition, the ICBs were summarised alongside the shared barriers, in order to gain a comprehensive understanding of their appearance in the transition phase (see Table 13).

In an almost final step, the barrier dimensions and the ICBs were analysed together. Firstly, the distribution of barrier dimension, self-evidently including the shared barriers, among the four cases was shown (see Table 13 + 14) and secondly, the ICBs were synthesised with each barrier dimension (see Table 16). The synthesis highlighted similarities and differences among the cases, barrier dimensions and the ICBs. It was shown that individuals behave differently with regards to the encountered barriers when attempting to transit the outcomes of external open innovation projects. However, it was shown that barrier dimension and ICBs are interrelated on a higher level,

detached from a single case, which allowed interpretations beyond the scope of each case. As a final step, the interrelations of both lead to ICB pattern recognition (see Table 22).

6. Discussion

The following section discusses the finding of the analysis, examines them in relation to the existing theory of open innovation and its contributions. Firstly, the barrier dimensions are discussed, followed by the ICBs and the topic of power and politics is introduced. Lastly, a summary of the discussion is presented.

6.1 Barriers

From the above-written analysis barrier dimensions and ICBs were identified and matched, compared across cases highlighting similarities and differences. It is evident that the individuals attempting to transit the outcomes of external open innovation projects are confronted with several barriers in the transition phase and behave differently in an attempt to cope with these. More importantly, the analysis provided a categorisation of the barriers placing the cases in a broader perspective where common themes have emerged.

The barriers identified under the dimension of Organisation are in particular interesting as many seem to be related to adopting the cognitive model of open innovation, meaning that the organisation has to be prepared for the practices of open innovation (West, Vanhaverbeke & Chesbrough, 2006). Policies and the absence of receiving business units could be a result of the organisation not committing fully to the concept and thereby the practices are not adopted throughout the process. Leaving the front-end disconnected to the back-end as argued by Chesbrough (2020). Thus, it seems like these barriers follow throughout the process of practising open innovation and become the most prevalent when the individual returns to the organisation in the transition phase. Another aspect highlighted during the conducted study was the relatively abstract goals set for the cases to explore opportunities. With the uncertainty of the project, the organisation is left without a clear expectation of the outcome which may contribute to the rise of the barrier dimension Organisation since it is uncertain whether a satisfying solution will be identified.

The dimension of barriers related to People was present across all cases. This indicates that the interaction between the individuals participating in the external open innovation project and the

receiving employees within the organisation is important to manage for a successful transit. The barriers identified share similarities to the NIH syndrome in the front-end of open innovation literature (c.f Herzog & Leker, 2010; Burcharth, Knudsen & Søndergaard, 2014). Even though the identified barriers in the transition phase are not directly linked to the negative attitude towards external knowledge, the barriers stem from the negative attitude of individuals towards something they are unfamiliar with. Despite that the project members are from within the organisation, it could be argued that the act of leaving the organisation hampers the transition phase since the project members may be perceived as external by the internal employees when crossing the boundary of the organisation. This became clear in the findings (see Section 4.), especially in Case 1 where the Innovation Advisor highlighted the difficult balance of separating oneself from the organisation in order to be innovative while still staying close to the organisation to not lose connection.

In three of the cases, the barrier dimension of Senior management support was identified. This supports Chesbrough (2020) notion that the bottlenecks of the receiving organisation hamper the transit from the front-end to the back-end. It was in particular present in Case 3 and Case 4 that senior management hindered the transition of the project outcome. Although the dimension presented itself for diverse reasons, where the former was regarding senior management not prioritising the outcome and the latter was due to change of management, it all seems to stem from the same origin of senior management's critical power of stopping or promoting a project. The analysis showed that in the dimension the individuals engaging in open innovation are dependent on this support in order to successfully transfer the outcomes. These findings in the transition phase of open innovation can be related to the category of managerial and organisational barriers identified by Oumlil and Juiz (2016) in the front end. Furthermore, the findings support Chiaroni, Chiesa and Frattini (2011) conclusion that the commitment of top management is crucial for a comprehensive open innovation process. However, in the particular setting of this study, all cases have been authorised to leave the organisation to explore new opportunities. Thus, there was support in the front-end of the cases' open innovation process, as the individuals were encouraged or at least given permission to engage in it. However, there seems to be a difference between support of management for a project leaving the organisation and committed management in the transition phase as seen especially in Case 2 and 3. These findings support Chiaroni, Chiesa and

Frattini (2011) even further and also, Chesbrough's (2020) argumentation that an open front-end does not equally result in an open back-end.

In all cases, barriers within the Immaturity dimension, except Case 4, were identified. This dimension includes barriers where the actual outcome per se is too vague, does not have a clear business case and uncertainty about the commercial value (see Section 5.2.2.2). This gives implications that the transition phase becomes even more difficult when the outcomes are vague. As seen by Pisano (2015) uncertainty is one of the challenging parts of innovation and Mahdad et al. (2020) support the study's findings that this is even more true in the setting of open innovation. Furthermore, the findings suggest that the barrier dimension Immaturity is a critical aspect to overcome in the transition phase as the uncertainty may lead to direct rejection by the organisation.

Barriers within the dimension of Funding were only identified in two of the cases. Even though these barriers arise, its relevance to the transition phase can be discussed. It is relevant as it has a direct link to the possibility to hand the project outcomes over to the business unit intended to commercialise it. Which is in line with the definition of the transition phase (see Section 2.6). However, the saliency of the dimension is low in comparison to the other dimensions, which could be a result of the selection of cases in this particular study.

The analysis revealed two additional dimensions beyond Chesbrough's (2020) broad dimensions of barriers. Thus, providing an even deeper understanding of the transition phase and by extension the back-end of open innovation. However, organisational characteristics have already been discussed in the open innovation literature and considered important predecessors to open innovation in general (Bogers, Foss & Lyngsie, 2018). Nonetheless, the analysis of this study further stresses the importance of such characteristics by identifying the consequences of these in the form of barriers in the transition phase. Thus, it is proposed that this dimension is important to separate from the three initial dimensions and that these barriers are critical for the transit from the front-end to the back-end.

6.2 Individual Coping Behaviours

The above-written analysis revealed the interrelation between barriers and ICBs in the transition phase of open innovation. It became evident that even though the ICBs vary among the cases as they are performed by individuals, certain patterns could be recognised and allocated to the barrier dimensions. Taking a close look at the patterns, relations to existing research can be drawn. The ICBs are understood as reactions to encountered barriers in the transition phase as discussed in Section 6.1 and are therefore relatable to the back-end of open innovation described in Section 2.4 and in particular to the transition phase described in Section 2.6. Nevertheless, association with the front-end of open innovation is drawn as well.

The ICB pattern of education and pedagogy seems to be related to a shift in the front-end of open innovation in the organisation design towards new organisational routines and a loose organisational design (Foss, Laursen & Pedersen, 2011) and an organisational culture based on an innovation culture (Burcharth, Knudsen & Søndergaard, 2014; Sivam et al., 2019). The shown ICBs relate to the preparation and training of people in order to explain and show the relevance and importance of the outcome, which hitherto was perceived as a barrier. Similar to the organisational design and culture shift, the individual attempts to initiate a shift in the receiving people's understanding in order to cope with the barrier and therefore allow a transition of the outcome.

The partner selection in the front-end of open innovation is a critical factor for successful open innovation (Guertler & Lindemann, 2016; Meulman et al., 2018). With the barriers encountered in the transition phase, the individual shows, for example, ICBs related to networking, which can be understood as the selection of the right partner to overcome the encountered barriers. Within this pattern, the individual involves all stakeholders, finds supporters, focuses on people who believe in the outcome and engages in informal talks during breaks and selects partners purposefully in order to realise the transitions of the outcome.

However, as stated previously open innovation is not a straightforward process (Bogers et al, 2018; Marcolin, Vezzetti & Montagna, 2017; Salter, Criscuolo & Ter Wal, 2014) and simply opening up

in the front-end is not a determining factor for success (Lazzarotti, Manzini & Pellegrini, 2015). These settings seem to be related to the ICB pattern of accept and work with given conditions in the transition phase, where the experienced barriers relate to the given circumstances within the organisation. The individual chose to follow set guidelines or actively simplify the outcome in order to allow a transition of the outcome, which in turn indicated that the anticipated outcome could not be transferred as wished. Also, the absence of an ICB might hint in a similar direction as the individual was not able to cope with an experienced barrier and the transfer of the outcome did not take place. The absence can be related to Salter, Criscuolo and Ter Wal (2014), who conclude that the promising preconception of open innovation in the front-end has not been accomplished for all organisations, which can be understood as the missing transition of the outcome.

Deriving from the analysis it is evident that individuals behave differently when faced by similar barriers. The individual actively chose a behaviour in an attempt to cope with these. It can both lead to purposeful actions but also inaction. However, for some case-specific barriers, individual ICBs were not identified and for some, the informants simply answered that the barrier had not yet been solved. The barriers of which individuals experienced have not yet been solved may be a result of the fact that the internal development is not yet completed meaning that the organisations have not yet commercialised the outcome. Furthermore, the non-identification of an ICB may also be a result of the bounded time of the transition phase. This multiple case study adds to the open innovation literature by shedding light on these behaviours and thereby provides a deeper understanding of the individual that practices open innovation, in particular in the transition phase. Thereby addressing the empirical gaps of both the back-end of open innovation (Chesbrough, 2017; Chesbrough, 2020; West & Bogers, 2014) and the understanding of the individual behaviour (Bogers et al. 2017; West, Vanhaverbeke & Chesbrough, 2006). However, it is important to note the body of research devoted to absorptive capacity, when it comes to external knowledge integration (e.g Cohen & Levinthal 1990; Lichtenthaler & Lichtenthaler, 2009; Zahra & George 2002). Nevertheless, this multiple case study is narrowed to the important part of the transition phase and describes the behaviours of individuals and their importance to cope with these, thereby adding another perspective. It is noticeable that the ICBs of the individuals involved informal, social interactions with their colleagues, convincing such colleagues and management and

reducing the uncertainty of open innovation. This needs to be achieved in an organisation that has its set policies, budgets and hierarchical structure. It is prevalent that these boundaries limit the individual's possibilities to freely transfer the outcomes of an open innovation project into the organisation. Thus the individual has to move around these barriers by any means of their disposal.

6.3 Power and Politics

As introduced in Section 2.3.3.1 of the methodology the analysis of findings revealed that the ICB does not only depend on the encountered barriers, but also the individual influence and individual interrelations with other stakeholders within the organisation (see Section 5.4.1). These more informal causes, described by the interviewees as degrees of power and political reasons gave rise to the organisational theory topic of power and politics. The ICB pattern analysis in Section 4.5.2 strengthened this assumption and therefore the topic of power and politics seem to provide the possibility to understand the individual behaviour in the transition phase beyond the scope of current open innovation literature, as hitherto research omitted the topic of power and politics in relation to open innovation. Therefore, the following discussion elaborates the emerging topic in relation to the multiple case study, but sets it as well in the broader context of open innovation and provides opportunities for future examination of open innovation with a perspective of power and politics.

The analysis revealed that even though the encountered barriers are understood as organisational barriers and are often initially connected to tangible resources (e.g. Immaturity and Funding), they also seem to be connected to relational resources (e.g. Organisation, People and Senior management support) based on the individual affiliation of the conflicting parties towards the outcome. As a consequence, the chosen ICBs towards these barriers are as well of personal interpretation and execution, which proved a reciprocal interrelation of barriers and ICBs based on individual viewpoints. The mentioned reciprocal interrelation can be related to the interdependency of power and politics within an organisation as described by Fleming and Spicer (2014, p. 240) where politics mainly relates to the rearrangement activities of "relations between people and the distribution of goods" and power to the capacity to influence these in order to reach certain intentions. Consequently, at this stage, the chosen behaviours of the individual seem to be

comparable to political activities. Hence, the individual mobilises its power in order to successfully transfer the outcome into the back-end, meaning overcoming the encountered barriers.

In terms of politics the individual attempts to influence the rearrangement of relations between parties and the distribution of commodities in a personal favourable way. The rearrangement of relations between parties is for example shown in the pattern of networking by informal talks with the management during breaks, the focus on supporters who believe and engage in the cause and the scheduling of extra meetings to ensure satisfaction (see Section 5.4.2). All these political activities are undertaken to introduce and popularise the outcome and thus rearranging the relations in order to allow the transition. The rearrangement of the distribution of commodities is for example shown in the pattern of education and pedagogy by initiating dialogues to explain the relevance and benefits of the outcome (see Section 5.4.2). All these political activities are chosen to prepare, tutor and listen to responses, meaning employees or business units and thus rearranging the distribution of these commodities in order to allow the transition.

Even though power is seen as an individual capacity, it might also be seen from a relational perspective between parties (Hickson, Hinings, Lee, Schneck & Pennings, 1971) and relates, therefore, more to a general resource, which might also shift in their possession. Pfeffer and Salancik (1974) stress this understanding by identifying the establishment and maintenance of relations between parties as the basis of intra-organisational power. Therefore, the ICBs might also be understood as the execution of power in the form of influence on the relationship between parties, which often include the individual as part of the relation itself. This means that the individual chose certain behaviours to shift and most likely increase its power in order to overcome the encountered barrier. According to Fleming and Spicer (2014), power can appear in many different forms, but can broadly be differentiated between episodic and systemic forms of power, where the first refers to the direct and identifiable execution of power through behaviours and the latter to the less visible and explicit mobilisation of institutional and ideological resources to influence the organisational activity.

The first given insights into the possibility to gain a deeper understanding of the interrelation of barriers and ICBs in the transition phase of open innovation with the help of power and politics

shows the need to broaden the understanding of open innovation beyond its current scope. The applied conceptual framework by Chesbrough (2020) gave valuable insights into the origins and points of appearance of the encountered barriers and helped to categorise and compare them across cases. However, during the categorisation in barrier dimensions of shared barriers, the conceptual framework revealed its limitations, as shared barriers were analysed which did not suit with the provided dimension. Besides, the framework gave only limited guidance in the form of barrier dimensions when analysing and synthesising barriers and ICB.

6.4 Summary

The barriers presented within the five dimensions all highlight the difficulties in the transition phase. The identification and categorisation of the barriers in the analysis contributes to a more holistic understanding of the process thereby extending the understanding of open innovation beyond the front-end. It opens up the black-box of the organisation as described by Chesbrough (2020) and provides a deeper understanding of the transition phase in particular. Thus, the study contributes the hitherto scarce research on later stages of open innovation. In the same manner, the ICBs and the identified patterns suggest that the individual engaging in open innovation practices is indeed important in the transition phase of open innovation. The analysis showed that even though similarities occurred, certain barriers and ICBs are case-specific. This may be a consequence of the cases represented by organisations of various industries.

Concluding, the rise of power and politics gave the possibility to go beyond a categorisation of barrier dimensions. Moreover, it examined interrelations of barriers and ICBs in a new theoretical perspective which focuses on informal causes connected to degrees of power and political reasons. Nevertheless, the initial analysis of barriers with the given conceptual framework set the foundation and was indispensable for the rise of the topic of power and politics in relation to open innovation.

7. Conclusion

The purpose of this study was to gain a deeper understanding of the individual's behaviour in the transition phase, when externally gained knowledge transits from the front-end to the back-end of open innovation. Previous research identified open innovation as a complex phenomenon with ambiguous theorisation and therefore a straightforward practice is often difficult. Although extensively researched in the front-end, little is known of the back-end, when external knowledge, meaning project outcomes crosses back over organisational boundaries. Furthermore, the importance of the individual practising open innovation is acknowledged, but a deeper understanding was asked. Thus, there was a call in academia to examine these practices and to understand how the individuals behave in this context. Consequently, the authors of this study posed the question of what barriers hinder the transition phase from the front-end to the back-end of open innovation and what behaviour does the individual employee choose to cope with these. Through the inductive approach of this multiple case study consisting of four cases including nine individuals, several insightful conclusions drawn from the analysis answer the research question. Firstly, there are 16 shared barriers in the transition phase, that can be categorised into the barrier dimension of Organisation, People, Senior management support, Funding and Immaturity. Secondly, the individual transferring the outcome of an external open innovation project copes with these either by accepting and working with given conditions, showing educational and pedagogical behaviours or networking. Lastly, the interrelation of barriers and the corresponding ICBs in the transition phase seem to be better explained by the interdependency of political acts and degrees of power within an organisation.

7.1. Managerial and Theoretical Implications

The findings of this multiple case study provide several managerial implications for organisations practising open innovation. Firstly, the barriers identified give implications to managers to first and foremost be aware of these barriers and actively support the transfer of open innovation project outcomes into the organisation in order to bypass these. Furthermore, managers should purposefully choose the employee who participates in open innovation as they are important for a successful transition. In the same manner, the study provides theoretical implications for open innovation by addressing the empirical gap of the latter stages of the process, in particular the

transition phase. Two additional barrier dimensions were identified thereby going beyond Chesbrough (2020) three barrier dimensions. Thus, a deeper understanding of the transition phase is provided. Furthermore, the identification of ICBs and its grouping give implications on how the individual engaging in open innovation behaves, and that these ICBs seem better explained as political acts, thereby implications are given to examine open innovation through the perspective of power and politics.

8. Limitations and Future Research

The major limitation of this study is its research design as a multiple case study with four cases classified as MNC including nine participating individuals in the context of the same open innovation intermediary Ideon Open. A greater choice of cases, different organisational classification and project environments would have allowed for a higher degree of generalisability of the findings. With the focus on the transition phase, the study is limited to a specific point in time when outcomes cross the organisational boundaries. To fully understand and close the gap between the front-end and back-end of open innovation, an extension of the time horizon would allow for an even better and time unrelated study of the gap. Nevertheless, the study provided valuable insights into the transition phase of open innovation and led to the rise of hitherto unrelated topics. Therefore, future research is encouraged to take the purpose of this study beyond the scope of a multiple case study and gain more insights which allow for a greater generalisability.

Finally, the topic of power and politics in relation to open innovation needs further investigation. Initial insights based on the power and politics understanding of Fleming and Spicer (2014) helped to synthesise barriers and ICBs to shed light into the transition phase. Therefore, the authors of this study encourage future research to apply the topic of power and politics in a broader context of open innovation in order to fulfil the general call of academia to theorise the concept of open innovation where the discovery of the affiliation with power and politics paths the way for a holistic understanding of open innovation.

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Appendix A

Interview guide

The interview guide served as the outline of the semi-structured interviews. It was composed of a mixture of open, probing, and closed questions. In addition, the interview guide includes question regarding the project itself at Ideon Open, to get an understanding of the context leading up to the transition phase, followed by questions regarding the transition phase.

Introduction questions

- What is your current position and responsibilities in the organisation?
- Could you please briefly describe your organisation and working routine?

Questions regarding the project conducted at Ideon Open

- Could you please describe the project at Ideon Open?
- What was the purpose and goals of the project?
- What was the duration of the project at Ideon Open?
- How many people participated in the Ideon Open project from your company?
- How many hours did you spend with the project?
- Please explain the processes and experiences during the Ideon Open project?
- Please explain the structure (types of meeting, work routine, time-frame) of the project
- What went well during the project?
- Did you experience any obstacles during the project? What was difficult? Did you overcome these issues? How?
- What and how did you feel/experience after the project at Ideon Open was finished?
- Do you feel you reached the goal of the project when finishing at Ideon Open?

Questions regarding the transition phase

- Please describe what happened after the project was finished at Ideon Open.
- How did you implement the outcomes of the Ideon Open project into your organisation?
- What went well during the implementation?

- Did you experience any difficulties during the implementation?
- How did you overcome these issues?

Closing questions
- What do you believe you learned from participating in the project?
- How do you personally make use of the lessons learned from the project?
- How did the participation in the project affect you in your everyday working life?

Appendix B

Table 24: Overview of Findings

Case	Name	Condensed in shorter phrases	First order concept: case-specific barriers	Second order themes: shared barriers across cases	Barrier Dimensions
Case 1	IA	outcome needs to go somewhere; different IT standards and procedures	project outcome not compatible with IT policies	organisational policies	Organisation
	IA	understanding of company regarding policies and agility of development of outcome; need million budget to rebuild to organization's policies	rigidity of organisational policies	organisational policies	Organisation
	IA	people like to hide behind policies which hinder implementation	employee's resistance to change	employee's resistance to change (attitude)	People
	IA	injecting outcome from the outside	explaining project outcome to uninvolved employees	clarification of outcomes to organisation	People
	IA	no specific budget is available	no huge budgets available	absence of budget	Funding
	IA	question which business unit pays and owns the outcome; focus on their interest	missing corporate function of distributing project outcome leads to ownership unclarity	no organisational structure for outcomes	Organisation
	IA	business unit is only interested in paying for value	proofing value of project outcome to receiving business unit	proof of value for recipient	Funding
	IA	engineers are threatened by outcome to lose their job and fight the outcome	employee's fear project outcome takes over their job	employee's fear of losing job (attitude)	People
	IA	stressing the company with the outcome as they didn't handle outcome before	uncertainty of project outcome and no preparation of transition	no organisational structure for outcomes	Organisation
	BD1	technical bugs with outcome	immature project outcome	immature project outcomes	Immaturity
Case 2	VP R&D	didn't manage to sell it internally, too much money needed for the maintenance to continue to develop it	no buy-in from organisation to use outcome	lack of management support	Senior management support
	VP R&D	didn't' really understand how to make money out of this	absence of clear business case	immature project outcomes	Immaturity
	VP R&D	build up competences to maintain the product when releasing it to the market	build up internal competences	lack of internal competencies	Organisation
	VP R&D	need to transfer the ownership of a project to the current organization	need to transfer the ownership	no organisational structure for outcomes	Organisation
	BD2	new way of thinking a bit off for people; only when see benefits start using it	employees unfamiliar with new methods	negative perception of new methods	People
Case 3	DM	fist meeting missed out on background and why we want to do it; missed workshop, event style	different working cultures between project team and receiving employees	negative perception of new methods	People
	DM	need to find someone that can realize the outcome, we don't have the competencies ourselves, need to find someone who can help us	missing competencies to put project outcome into action	lack of internal competencies	Organisation
	DM	have quite a hierarchy in the organization so buy in there is kind of hard	strict hierarchy	organisational hierarchies	Senior management support
	DM	many people you want to buy in have very busy schedule, not always read the material you send before	busy top management	time constraints of management	Senior management support
	DM	were where too early with those kind of questions to be noticed as an issue	project outcomes incompatability with managemt expectations	lack of management support	Senior management support
	DM	taking what we learned back inside the organization can be some kind of challenge; easy to forget and get on the same track you always do	keep up new work routines	habit of former work routines	People
	AM	uncertainty regarding the benefit in the end	uncertainty of final value of project outcome	uncertainty of commercial value of outcome	Immaturity
	AM	nobody wanted to be the trial project	employees fear of being the pilot project	employee's fear of pilot testing (attitude)	People
	AM	communicating the right things	Communication coordination	no organisational structure for outcomes	Organisation
	Salesman	still a vague idea.	too vague project outcome to transfer	immature project outcomes	Immaturity
	Salesman	not ready internally to integrate	nonexistence of receiving business unit	no organisational structure for outcomes	Organisation
	Salesman	big company, budget, missing ownership of question high up in hierarchy	missing ownership of question (problem and outcome) high up in hiearchy	lack of management support	Senior management support
Case 4	HRD	change of management	loss of anchor due to management change	lack of management support	Senior management support
	HRD	keeping up the speed when coming back to home org	daily work routines take over	habit of former work routines	People
	TSM	aligning new business model with company	project outcome needs to be aligned with corpoate business model	organisational policies	Organisation
	TSM	too little resources dedicated to project	too little resource allocation to develop faster	absence of budget	Funding