UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Power of Togetherness - Open Innovation through the Lens of Institutional Logics

Authors:
Christina Norderyd 980811
Miriam Volgger 980827

Supervisor:
Fredrik Lavén

Department:
Graduate School

Course:
GM0861 Master Degree Project in Management

June 2022

Power of Togetherness - Open Innovation through the Lens of Institutional Logics

Christina Norderyd

Master of Science in Management, Graduate School

School of Business, Economics and Law at the University of Gothenburg

Miriam Volgger

Master of Science in Management, Graduate School

School of Business, Economics and Law at the University of Gothenburg

---

Abstract

Innovation has been the topic of conversation within the field of management for several years. Scientific research regarding innovation management includes numerous concepts and theories such as the closed and open innovation models. Nevertheless, previous studies often overlook the practical implications of said theories, creating a research gap that this study attempts to fill. This study, therefore, focuses particularly on the open innovation model with its Outside-In and Inside-Out approaches used by organisations to navigate through an accelerating VUCA environment. The aim of the study is to analyse how open innovation is organised in practice and to investigate what guides an organisation's actions. Thus, a case study on an international pharmaceutical company was conducted by interviewing and observing employees regarding their applied managerial innovation activities. In order to analyse the gathered findings, the concept of institutional logics is applied and two local logics, the traditional pharmaceutical logic and the open innovation logic, are defined. By observing how the company's open innovation actions are guided by the local logics and vice versa, a recursive relationship is identified. Further on, to understand their dynamics, differences, and co-existence, both logics are explained through an institutional knot and the act of institutional knotting. This results in a better understanding of the company's innovation activities and, herewith, contributes to several managerial implications of how to apply open innovation in practice.

Key words: Innovation Management, Open Innovation, Open Innovation Model, Institutional Logics, Institutional Knot

---

Introduction

Today's business environment is characterised by fast paced changes in consumer demands and technologies as well as by external pressures not only originating from different industries but also other macro elements such as political systems and society. Over several years, globalisation and the growing international connectivity of diverse actors have led to the creation of a volatile, uncertain, complex, and ambiguous environment, in short *VUCA* (Millar, Groth, & Mahon, 2018). VUCA elements are especially apparent in the pharmaceutical industry, where changing technologies, continuous scientific discoveries and new health reforms are the norm (Bass, Pugsley, Sannajust, Yoshinaga, & Valentin, 2019). The COVID-19 pandemic is one example where the interconnected and constantly changing world forced pharmaceutical companies to innovate their products by developing new technologies and implementing novel scientific solutions. In addition, the pandemic also gave rise to new collaborations, such as AstraZeneca working with the University of Oxford (EFPIA, 2022). In a VUCA environment, organisations notice a higher pressure to develop new ideas and continuously bring innovations to the market in order to remain competitive and defend their market position. VUCA can, therefore, in addition to being the result of disruptive developments, be a driver of innovation (Millar et al., 2018). The ongoing innovation challenges resulted in a drastic increase of academic papers on innovation management, however, the rapidly changing environment demands more than the often suggested "one-size-fits-all" solutions. Therefore, research exploring new possible solutions and concepts is required (Goffin & Mitchell, 2017).

Today, it may not be enough to solely rely on internal knowledge paired with in-house research and development (R&D); organisations should in addition consider opening up their company boundaries and start interacting with the external world (Chesbrough, 2003a). One way of increasing a company's innovation output is to adopt an open and collaborative approach to innovation. This could not only lead to new products or services but more importantly provides an opportunity to change the organisation's ways of working while restructuring old innovation processes which in turn help to identify new opportunities and innovation possibilities. Open innovation allows companies to increase their own potential by collaborating with external parties and herewith to benefit from new input such as knowledge and technologies (Chesbrough, 2003a). Despite open innovation being a rather novel concept, research is not scarce since it includes a wide variety of topics, such as crowdsourcing and user-centric platforms (Remneland Wikhamn & Styhre, 2019a). However, previous research mainly focused on defining open innovation and collaboration, instead of giving examples and explaining how the concepts can be performed and implemented in practice (Remneland Wikhamn & Styhre, 2019b).

Organising is defined as the actions of a collective that are shaped by an established institutionalised pattern (Lindberg & Czarniawska, 2006). Therefore, the aim of this paper is to investigate, through the lens of institutional logics, how open innovation is organised and guided in practice within a company navigating a VUCA environment. This is done by conducting a case study on AstraZeneca, an international pharmaceutical organisation, which focuses on being innovative by implementing open innovation. The findings contribute to

filling the research gap on how innovation can be organised and present practitioners as well as researchers with new ideas of how to implement open innovation activities. In addition, the study also aims to contribute to a better understanding of how local institutional logics are applied and performed in practice as well as how open innovation within an organisation can help to develop a new local logic. Therefore, the research question is:

How is open innovation organised in practice and what guides an organisation's actions?

The thesis is structured as follows: Previous literature gives an overview of past research on innovation management with a particular focus on open innovation. The theoretical framework introduces the theory of institutional logics with its different perspectives, including the institutional knot and the act of knotting. Further on, the methodological section clarifies the research purpose, data collection and analysis as well as ethical limitations to the study. In the empirical section, the collected data on the selected company is presented to demonstrate how innovation activities can appear in practice. The discussion connects the theory to the empirics and focuses on how institutional logics could be used to understand open innovation in practice by knotting together an organisation's institutional logics. In the final chapter a conclusion, managerial implications, and suggestions for further research are presented.

Previous Literature

The following section provides an overview of previous research on innovation management with a focus on the topic of open innovation. This includes the introduction of the closed versus the open innovation model and highlights several research gaps specifically referring to how the concept can be applied in practice.

Innovation Management and Open Innovation

Innovation is defined as the "introduction of something new" (Merriam-Webster, n.d.). In comparison to an invention, which is simply an idea for a new product or service, an innovation also includes the commercialization of said product or service and, therefore, creates an economic benefit for the innovator (Zhou & Wang, 2020). In relation to the field of management, innovation concerns the innovation activities performed at an organisation. This includes the idea generation, selection and implementation of an innovation, all involved business units as well as the top management's perspective on the overall development (Goffin & Mitchell, 2017). Traditionally, especially the initial phases of the innovation generation, including R&D, were considered valuable strategic assets and were consequently performed inside the organisation to keep them secretive to the external world (Chesbrough, 2003a). This means that in the past companies relied solely on ideas coming from their own employees by performing in-house research. At the same time, they protected their generated intellectual properties (IP) to remain competitive and strengthen the barriers for other companies to enter the markets (Bogers, Chesbrough, Heaton, & Teece, 2019). Chesbrough (2003a) described this as the *Closed Innovation Model*. An example of a closed industry was the traditional pharmaceutical industry which heavily relied on in-house research while securing their IP through patents (Chiaroni, Chiesa, & Frattini, 2009). Figure 1 illustrates the traditional innovation model of an organisation's closed boundaries to its environment. The model

highlights that bringing an innovation to the market did not involve any interactions with the external world, hence the marked black line.

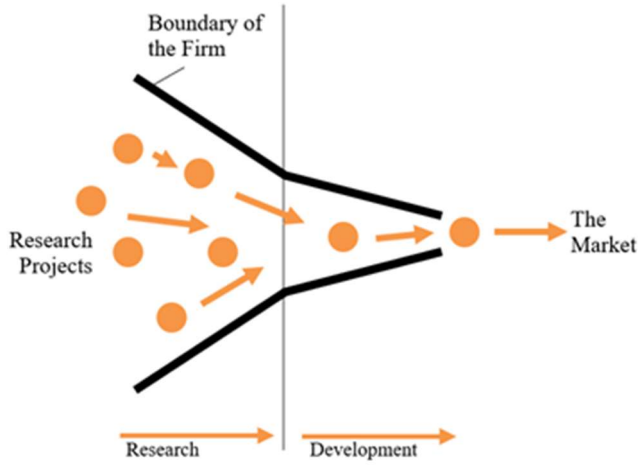

Figure 1: Closed Innovation Model (adapted from Chesbrough, 2003a)

Innovation is often described as "the single most important driver of economic value creation" (Chiaroni et al., 2009, p. 285). This explains an organisation's dependence on its innovation processes and puts pressure on their successful implementation. However, an increasingly complex and ambiguous environment with fast changing demands and new developments has resulted in a drastic shift from the traditional closed innovation model to organisations opening up their boundaries to collaborate with external parties (Millar et al., 2018; Chesbrough, 2003a). External parties include companies from the same or other industries, academia, NGOs, state organisations, and society at large. The shift to more open innovation activities is accelerated by the fact that today's knowledge is widely distributed, not only globally but also through different industries, which makes it crucial for organisations to also leverage on external knowledge (Lee, Fong, Barney, & Hawk, 2019). Opening up the organisation's boundaries and collaborating with external parties are the building blocks of *open innovation*.

Open innovation has been one major trend in innovation management research for the last decade (Goffin & Mitchell, 2017). The concept was initially introduced by Chesbrough (2003b) in his book *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Years later, Chesbrough and Bogers (2014) defined open innovation as "a distributed innovation process based on purposefully managed knowledge flows across organisational boundaries" (p. 17). In other words, open innovation is the process where innovation is created through connections and interactions of the focal organisation with its external environment (Chesbrough, 2017).

Since the introduction of open innovation, the concept has become widely researched in academia and includes a broad array of sub-topics. Research ranges from open innovation at project-levels to studies focusing on whole ecosystems as well as the many different forms of open innovation (Bogers et al., 2019). Herzog and Leker (2010), for example, focused on the innovation culture and all people involved in open innovation activities. They concluded that employees in an open environment display a less prominent *not-invented-here* mentality and

take more risks than employees in a closed system (Herzog & Leker, 2010). More recent trends in the research of open innovation regarded the development of new business models and the shift to more service-oriented innovations (Chesbrough, 2017). Remneland Wikhamn and Styhre (2020; 2019a; 2019b; 2017) focused in their recent studies on how the biopharmaceutical company AstraZeneca performs open innovation in practice, mainly analysing their innovation Hub while looking at the phenomena from the perspective of the corporation. One of the most important concepts within open innovation is the differentiation between the two forms of knowledge streams: Outside-In and Inside-Out (Bogers, Chesbrough, & Moedas, 2018). The majority of previous research focuses on the Outside-In process, where a company's innovation activities are open to external influences (Bogers et al., 2019). Further on, Outside-In implies that an organisation should be able to evaluate and filter innovative ideas that can be beneficially implemented. The less explored as well as less commonly applied Inside-Out approach describes the process where an organisation makes its unused and forgotten resources available for its environment (Chesbrough, 2017). This approach is strongly connected to the creation of new business models and opportunities for out-licensing (Bogers et al., 2019). Figure 2 depicts the *Open Innovation Model* by showing the company's relation to the outside as well as differentiating between the Outside-In and Inside-Out approach.

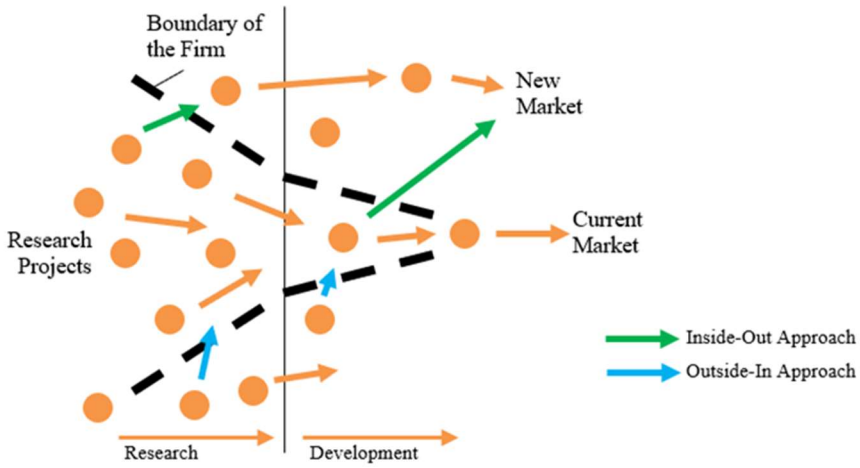

Figure 2: Open Innovation Model (adapted from Chesbrough, 2003a)

Despite open innovation being a widely researched field, the question of how an organisation should implement and perform suggested forms in practice remains largely unanswered (Remneland Wikhamn & Styhre, 2019b). In order to contribute to this area of research, the theory of institutional logics will be used to understand and explain underlying activities of an organisation and its employees.

Theoretical Framework

The theoretical framework consists of an introduction of institutional logics leading from a macro perspective into a micro practice perspective. Furthermore, by focusing on local logics, the institutional knot is introduced and described as the arrangement of multiple logics co-existing in practice and forming a recursive relationship with an organisation's actions.

Institutional Logics

Institutional logics derived from institutional theory and have become a central aspect in research with the main focus lying on understanding how a social context actively influences and guides organisational behaviour (Lindberg, 2014). Thornton and Ocasio (1999) defined institutional logics as a "socially constructed, historical pattern of material practices, assumptions, values, beliefs and rules" (p. 804). Further on, the logics provide meaning for social reality by producing and reproducing themselves (Thornton & Ocasio, 1999). The authors described logics to generate rules that are either formal or informal, taking a material or symbolic shape to give social reality a meaning. Initially, research regarding institutional logics referred to how logics are used to explain the importance of social meaning determined by one main logic which directs the actors' behaviours and actions (Goodrick & Reay, 2011; Friedland & Alford, 1991). Since Friedland and Alford's (1991) introduction of institutional logics, several researchers have been using the term to generate an understanding of an organisation's field and its ongoing actions based on social constructions of different belief systems (Thornton, 2004). Additionally, logics have been discussed from a perspective where they are viewed as the organising principles creating taken-for-granted rules that continuously impact behaviours of actors (Reay & Hinings, 2009).

Institutional Logics from a Practice Perspective

Institutionalists have historically provided examples of main ideal logics and their attributes by comparing them as well as putting them into relation to professional work (Goodrick & Reay, 2011). Goodrick and Reay (2011) acknowledged and defined four main ideal logics, viewed from a macro perspective: The ideal *professional logic*, refers to the organised work determined by a specific profession (Goodrick & Reay, 2011; Freidson, 2001). Furthermore, this ideal logic concerns the professional knowledge needed in practice to organise work and command control, individually or in collaboration with other people from the same profession. The second ideal logic, the *corporate logic*, concerns the establishment of routines made by a firm's managers situated within a hierarchical structure (Goodrick & Reay, 2011; Thornton, 2004). In comparison to the ideal professional logic, the ideal corporate logic states that managers within a firm are in charge of determining the needed education and credentials, the number of products and services offered as well as setting a relevant price. The third ideal logic, the *state logic*, has attributes which describe the state as the responsible party for professional work and its desires. Moreover, the logic also acknowledges the state as the policy-making organ, controlling the needed knowledge, credentials and structure identified in organisational work (Goodrick & Reay, 2011). In comparison to the ideal state logic, the fourth ideal logic, the *market logic*, concerns preferences and choices originating from consumers, which in turn determine an organisation's success (Goodrick & Reay, 2011; Freidson, 2001). Contrary to the other above-mentioned ideal logics, the ideal market logic has no initial predetermined requirements of specific education nor credentials needed for professional work. Instead, the logic reflects the lack of control deriving from one of the previously mentioned controlling organs, portraying the ideal market logic as free and unregulated (Goodrick & Reay, 2011).

The above-described ideal logics explain how strategies and practices of institutions are influenced and directed by institutionalised principles on a macro-level. However, more recent

literature has challenged this perspective by acknowledging how micro-level actions of local actors actively contribute to the establishment of an institution and its everyday activities (McPherson & Sauder, 2013). In order to further understand how logics impact organisational work in practice, the enactment at a local level needs to be considered and explored. This can be done by acknowledging the local ground level processes influencing the relevant ideal macro logics. Such a perspective derives from local level actions, originating from logics enacted upon from the ground, resulting in the creation of tools used by local actors in their everyday activities to manage organisational complexity (McPherson & Sauder, 2013). This gives room for researchers to identify new local logics that are being used in practice and have not been analysed before. When researching institutional logics on a local level, Reay and Jones (2016) highlighted three ways of analysing them through qualitative research: The first approach, pattern deducing, involves comparing organisational activities mainly articulated in text to reveal patterns in order to identify which logic is applied in practice. Secondly, pattern matching is an approach where first, patterns from ideal logics in previous research are identified by understanding their behaviours and activities. Only afterwards are the patterns connected and compared to the collected data. Lastly, pattern inducing means that, by using a bottom-up approach, researchers collect, code and group data to identify patterns in practice and then compare them with previous research in such ways to present the connection to a guiding local logic.

The Role of Co-Existing Local Institutional Logics

Capturing logics, a term introduced by Reay and Jones (2016), concerns the importance of spotting, describing, and measuring logics in order to understand how multiple competing logics can co-exist in an organisational environment. Historically, the topic of how logics can co-exist (Thornton & Ocasio, 2008), their difference in size and power (Greenwood, Díaz, Li, & Lorente, 2010; Lounsbury, 2007) as well as how they can collaborate and compete (Reay & Jones, 2016), has been widely discussed. Early research on coexistence of multiple logics within an organisational environment often pointed to one logic being more dominant than others (Reay & Jones, 2016). Such a perspective on their coexistence has focused on how a source of organisational change originates from a shift in which logic is determined as dominant. In contrast, Lindberg (2014) challenged recent literature while concluding that it is not only institutional logics that shape actions but also actors that construct new local logics through their day-to-day activities. Additionally, Lounsbury (2007) wrote that a focus on the actors' local actions is helpful to understand the re-construction of institutional logics. As acknowledged by above-mentioned authors, Lindberg (2014) adds that previous research failed to acknowledge how the ideal macro logics are translated into practice and how local actions continuously contribute to the establishment and reproduction of structures. Such a perspective also fails to acknowledge the micro-level meanings which explain the everyday actions of actors within an organisation (Lindberg, 2014). The author, therefore, argues that such an exclusion of the local perspective of logics results in researchers not contributing to a practical perspective. Such a practical perspective is concerned with how the logics co-exist, how people apply them as well as the consequences of their guidance. Accordingly, McPherson and Sauder (2013) pointed to the micro-level base of logics in order to fully understand how they are used and reproduced, while determining the actions of an organisation.

In order to understand how logics can be arranged in practice, Nicolini, Delmestri, Goodrick, Reay, Lindberg and Adolfsson (2016), introduced a concept called the *institutional knot*. The institutional knot captures the active and temporary configurations of institutional logics co-existing at a local level. The authors further described the knot as consisting of multiple identifiable logics intertwined to demonstrate their coexistence while still being separate and influencing actors' activities. By being woven together, the existence of the multiple logics is not directly characterised by domination, as other research (e.g., Reay & Jones, 2016) suggests. Instead, they exist in a temporary state at a local level, which can be undone and reassembled in different arrangements (Nicolini et al., 2016). Building on the concept of the knot, the action of *institutional knotting* is further discussed by the authors. This action concerns the dynamic act of weaving together logics in order for them to co-exist on a local level. In addition, the action of knotting is viewed as an ongoing activity, meaning that the arrangements are constantly changing and thereby creating different outcomes. In addition, weaving certain logics results in actions dependent on the logics, its guiding principles, and its specific impacts, which together constitute the creation of an institutional knot. The authors, therefore, describe the institutional knot as a result of the action of knotting, where the arrangements of the logics are impacted by the aspect of agency. Agency is an element that is considered to be crucial for creating the different arrangements of the knot through the action of knotting (Nicolini et al., 2016). The authors build their research on how Lindberg and Czarniawska (2006) described the action of knotting as a way to showcase how actions are translated into each other. Egels-Zandén, Lindberg and Hyllman (2015) also challenged the traditional view of how multiple logics exist and explored how an organisation copes on a local level. In addition, the authors also explained how the use of segmentation enables different local logics with different demands to co-exist and become more cooperative (Egels-Zandén et al., 2015).

Methodology of the Study

To research how open innovation is organised in practice and what guides an organisation's actions, the paper was written in the format of a qualitative case. The qualitative method allowed deep insights into a studied social phenomenon, which constituted a rich base for the data analysis (Silverman, 2015). Furthermore, the qualitative method was chosen to understand how the selected company, AstraZeneca, manages innovation projects, sets up collaborations as well as how it works with open innovation. Bell, Bryman, and Harley (2019) described case studies as enabling researchers to receive in-depth perspectives on a studied phenomenon. The context dependent insights derived from a single case study could be applied in future research situated in other contexts (Flyvbjerg, 2006). For the analysis of the collected data, the grounded theory approach was selected. This methodological theory constitutes an iterative approach where the proposed theory naturally derives from the collected data (Bell et al., 2019). Further, the iterative process is categorised by the data collection process with which the analysis process is aligned. This connection enables researchers to go back and forth in order to challenge the initial codes, which contributes to additional perspectives being acknowledged.

The Setting

To conduct a qualitative study with the aim of understanding how open innovation and collaboration are organised, AstraZeneca was selected for the research. The company is an international science-led biopharmaceutical company with major focuses on R&D and marketing of medicines (AstraZeneca, 2021a). The company operates in over 100 countries with around 76 000 employees to fulfil its overarching purpose to research and develop new medicine to treat patients. The major areas of R&D are Cardiovascular Renal Metabolism (CVRM), Respiratory and Immunology as well as Oncology (AstraZeneca, 2021b). The company has been located in Sweden for over 100 years and employs 7 400 employees, of which 2 600 are situated at the site in Gothenburg. This site is the focus of the study since it is one of the three global R&D centres for the above-mentioned areas. AstraZeneca's local and global footprint, within the pharmaceutical industry, was created through their innovative ways of working. Their ways of innovating through collaboration with several companies has historically enabled the pharmaceutical industry to progress and grow (AstraZeneca, 2021c). By creating an open environment through different structures and set-ups, the company nurtures their partnerships with external parties such as smaller start-up companies and academia. The BioVentureHub (BVH), which constitutes the company's innovation lab, offers an arena for smaller biotech companies and academia to interact in research and development. The BVH has allegedly contributed to the company gaining a global reputation of being innovative and actively working with open innovation (AstraZeneca, 2021c).

Data Collection Method

The selection process of interviewees was determined by the initial goal of interviewing employees involved and directly affected by the company's innovation activities. This was required to gain insights from different departments of the company and analyse their ways of setting up and maintaining innovation processes. After contacting the Gothenburg Site Communication Manager at AstraZeneca, a list of five interviewees, which are involved and actively work with innovation, was provided. The employees were contacted, thereafter interviews were booked and conducted. During each interview additional potential interviewees were discussed, which enabled new interviews to be performed. This refers to the approach named *snowball sampling*, a form of convenience sampling, where contact to additional interviewees derives from the ones that were initially contacted (Bell et al., 2019). Furthermore, snowball sampling was also used to find relevant interviewees from start-up companies who collaborate with AstraZeneca. Four start-up companies, namely OnDosis, Profundus, LuceroBio and Inorbit Therapeutics, were contacted and interviewed for an additional perspective on collaborations and open innovation at AstraZeneca.

To collect primary data, a total of 17 semi-structured interviews were conducted with employees at AstraZeneca as well as with employees from start-up companies at the BVH. The semi-structured interviews contained open-ended questions to obtain respondents' own definitions and terminations of crucial concepts for the research (Silverman, 2015). The questions constituting the interview guide derived from five overarching themes to keep a clear structure and a natural flow during the interviews. Initially, the respondents were asked to introduce themselves and describe their roles at the company, this information constituted the

first theme, called general information. This was followed by four additional themes, namely innovation, open innovation, collaboration, and coordination. The majority of the questions was characterised as *how*-questions, allowing the respondents to talk freely about the predetermined themes. Additional follow-up questions were created during the interviews, depending on what was mentioned (Bell et al., 2019). Due to the COVID-19 pandemic and the recommended restrictions, all interviews were held online over *Zoom* to avoid any unnecessary physical meetings. Each interview lasted between 30-60 minutes and with the interviewees' approval, all meetings were recorded. During each interview, the interviewers took turns asking questions and taking notes that were summarised directly after the interviews. The summaries from each interview contained initial thoughts about each interview and were discussed between the interviewers to ensure a smooth coding process. Moreover, the summaries functioned as a way of recapturing what was said in the interviews, which later supported the writing process of the empirical section.

In addition to the conducted interviews, two observations were made to further understand how the company interacts with external parties within an open environment. The first observation was made at AstraZeneca's location in Gothenburg, where the researchers had the opportunity to attend a guided tour through the company's buildings. The guided tour lasted for an hour where the tour guide showed and explained the site with its departments and their different purposes. The observation complemented the data collected from the interviews since given examples could be confirmed through practical explanations. The second observation gave additional insights into where the company is located and how the different departments are structured in order to perform R&D. By conducting two observations, additional information was gathered on how actors within the open environment interact and behave, which is of great value for the analysis (Silverman, 2015).

To mitigate the limiting subjective perspectives originating from conducting qualitative semi-structured interviews as well as conducting two observations, a document analysis was chosen to broaden the perception of the studied phenomenon (Bell et al., 2019). The secondary data includes useful documents regarding the company, the BVH and the additional start-up companies to enable a richer information base for the analysis. In addition, the documents were used as guidelines for supporting the descriptions of the company, its collaborating partners, and the pharmaceutical industry.

Data Analysis Method

Grounded theory builds on researchers not formulating their own hypotheses a priori but first thoroughly analysing their collected data (Silverman, 2015). Therefore, a detailed data analysis, where data is subject to constant comparisons to find significant similarities and differences, was performed (Corbin & Strauss, 2015). Each conducted interview was recorded for the purpose of transcribing it afterwards. The transcription included a two-step process: With the programme *Microsoft Word Online*, a first automated transcript was created, this was subsequently reviewed in-depth by both authors to correct any generated mistakes. Additionally, all used direct quotes in the empirical section were transcribed by the authors again to ensure the correct usage of the interviewees' statements. The following coding process was based on Corbin and Strauss' (2015) coding model. The authors defined coding as a

necessary process to fracture and analyse data in order to form relevant theory. In the initial step, each sentence or subsentence was studied to identify key concepts such as terms and metaphors. Thereafter, with these codes, clusters were created, e.g., *formal collaborations at AstraZeneca*, *patents needed for innovation*, and *industry needs to be more open*. In the next stage, 28 sub-categories were created in which the first codes were grouped. During this stage, a first hierarchy and different levels of importance were identified. Some examples are *benefits for start-ups*, *ecosystem*, and *type of collaboration at AstraZeneca*. In the final coding stage, the codes were integrated and classified into seven categories: *background*, *innovation process*, *open innovation at AstraZeneca*, *AstraZeneca's perspective on open innovation*, *in-house open innovation*, *Set-up/Structure BVH*, *BVH's perspective on BVH*, and *start-ups' perspective on BVH*. Following the grounded theory approach, the coding was an ongoing process, and its structure was constantly revised and adjusted to better fit the collected data (Corbin & Strauss, 2015).

In accordance with the grounded theory approach applied to this research, the discussion builds on institutional logic pattern inducing as suggested by Reay and Jones (2016). This concept allows researchers to first collect data, mainly in the form of interviews and observations, to afterwards identify patterns and consequently match activities to previously researched institutional logics (Reay & Jones, 2016). Further, the authors explained that this approach also allows researchers to add newly identified institutional logics, especially on a local level, if gaps are identified. To correctly define two new local logics for this research, first the findings from the interviews and observations were analysed and categorised. The identified key characteristics from both logics, which can be found in the discussion, were afterwards compared to Goodrick & Reay's (2011) four ideal logics, whereas the professional and corporate logic separately best matched certain aspects of each local logic. In addition, research regarding the traditional pharmaceutical industry (e.g., Paul, Mytelka, Dunwiddie, Persinger, Munos, Lindborg, & Schacht, 2010) and open innovation (e.g., Chesbrough, 2003a) was utilised to further define both new logics.

Ethical Reflections

The conducted research is subject to ethical limitations, therefore, a reflection on the process of collecting and analysing data was needed (Miles, Huberman, & Saldana, 2014). One limitation is the choice of writing a case study on one company and its collaboration partners. This means that no general conclusions on innovation management can be drawn for a whole industry. In addition, the selection of interviewees, who mainly hold high positions at AstraZeneca, may lead to a biased view on the company's ways of working with innovation. However, most interviewees started their careers as scientists, researching in the labs at AstraZeneca and only afterwards took on managerial roles. This helps to view the phenomena of innovation not only from a management perspective but also from a scientific one. As Flyvbjerg (2006) wrote, case studies do not intend to summarise, instead they act as a study of an example and "should be read as narratives in their entirety" (p. 241). Therefore, the empirics contain several in-depth descriptions of specific innovation activities to facilitate the adoption of open innovation in other companies and inspire managers to establish similar practices.

An additional limitation to the research concerns the interviewees. As all interviews were recorded and direct quotes were published in the empirical section, the interviewees might hold back on confidential information, which may be crucial for the research, to protect their employer and their own interests. To minimise this limitation, all interviewees were anonymised, and the recordings of the interviews were kept private. Before starting each interview, to follow Silverman's (2015) suggestions, the interviewees were informed about the purpose of the study and how their statements would be processed and analysed. All interviewees confirmed their statements once more, as the used direct quotes were sent to them after writing the empirical section. In addition, all participants agreed to be referred to by their role description in the research.

Empirical Section

The empirical section is structured as follows: First, background information on the pharmaceutical industry and AstraZeneca is presented. This is followed by the topic of innovation which includes a description of how AstraZeneca organises its innovation activities. Thereafter, the company's approach to open innovation and how it is integrated within the organisation is described. Finally, the BVH is presented and it is explained how it is perceived by AstraZeneca as well as by the collaborating entrepreneurial companies.

The Pharmaceutical Industry and AstraZeneca

The traditional approach of innovating within the pharmaceutical industry was for several decades characterised by being secretive with a major focus on obtaining patents on innovations originating from in-house projects (Paul et al., 2010). The closed boundaries to the external environment limited the number of collaborations as organisations were distinguished by an *innovating on your own* mentality. Traditionally, companies within the pharmaceutical industry have had control over their processes of discovery, R&D, and commercialization of the produced medicines. This also concerned the companies' ability to have the control over the decision-making processes by being the owner of every part of the innovation process (Paul et al., 2010). However, because of the continuous changes in the environment within the pharmaceutical industry, new challenges arose, which called for new innovation approaches to be established. According to all interviewees, to solve the new problems, AstraZeneca's innovation processes, which were originally inspired by this traditional approach, had to be opened up to invite external parties to collaborate. With the support from new digital solutions and by integrating the sharing economy into the company, opening up the innovation processes contributed to new ways of sharing information, resources, and people. The new sharing environment created an ecosystem where the company, in order to stay relevant while innovating, contributed to an overarching culture dependent on openness. Further on, the open environment was needed for generating research and development of new medical solutions for patients. The Head of Business Planning and Operations summarised this change in the following:

> A big change, as compared to when I started in the company as a chemist once upon a time, is that the pharma sector is much more open today, both with the various sorts of problems and difficulties and how to go about and maybe

> approach a larger area that's new for everyone. *(Head of Business Planning and Operations, AstraZeneca)*

As the creator of their ecosystem, AstraZeneca established a so-called *cluster-effect* as a result of leveraging on external parties. The cluster-effect refers to the open approach of working together with external parties while innovating, to avoid ending up in isolation. The open approach derives from the collective understanding that "innovation is not really happening in isolation" (Senior Director, AstraZeneca). Further on, the cluster-effect considered the open-ended collaborations determined by the freedom to openly share in order to reach a higher purpose for the industry as a whole, which was enabled through the ecosystem. This newly created ecosystem could also be valuable for the company in the future, as described by the Site Executive Director:

> Then the cluster-effect has just started, and that's going to accelerate, that's going to be really big. The big driving forces to innovation, not only in products but also in services and business models in the pharmaceutical industry, are huge and the cluster-effect can help with that. *(Site Executive Director R&D, AstraZeneca)*

According to AstraZeneca, the ecosystem is continuously accelerating and generating new ways of innovating. Moreover, the company created a set-up and an organisational environment where openness enabled innovation through collaboration both internally and externally. The ecosystem gives AstraZeneca the opportunity to engage with smaller biotech companies and academia in a way that was not thought to be possible for the company 20 years ago. Working with the ecosystem has, according to AstraZeneca, not only beneficial outcomes for the company but simultaneously serves a greater purpose, generating benefits for the whole pharmaceutical industry.

Innovation Activities at AstraZeneca

Innovation is at the core of AstraZeneca. The company's dependence on innovation is strong since every product needs to be new in order to compete with substitutes on the market. When new ideas and inventions, such as newly designed compounds, have a noticeable impact on the company and start reaching the customers, they can be referred to as innovations. Therefore, innovation is "about making it happen" (CEO BVH, AstraZeneca), it is not enough to have good ideas without realising them and making them accessible to the public. However, innovation does not only concern AstraZeneca's medicines and formulations but also new production technologies, new distribution channels and new research methods. AstraZeneca views innovation as the driver for value creation and value capturing to create an ecosystem that benefits its participants and the company itself. This puts the importance of innovation in focus and explains the employees' strong linkage to their work and innovation:

> All of our products are the result of innovation. So, for us it's really an embedded part of our DNA. It's our business, period! I mean everything we do is different pieces of the innovation puzzle. [...] So, the whole organisation is an organism that is all about making innovation happen. [...] It's the whole DNA of the company. *(CEO BVH, AstraZeneca)*

AstraZeneca has established certain requirements for its innovations. Every product needs to be novel in the pharmaceutical industry, target unmet medical needs or be significantly better than current treatments. This also refers to innovation being a part of AstraZeneca's DNA since every product should be something that can be marketed and patented, therefore, every product "has to be an innovation, otherwise you can't patent it" (CEO BVH, AstraZeneca). As AstraZeneca mainly generates its profits through innovation, such as selling newly designed compounds, it is crucial to keep the created IP protected and secretive. Zumdahl and Zumdahl (2003) explained compounds as arrangements of atoms creating unique structures indicated by a chemical formula. The atoms are arranged with the help of chemical bonds, where their active nature is determined by the electrons that are negatively charged, and the protons, which are positively charged (Zumdahl & Zumdahl, 2003). The respondents further state that it is important to patent the compounds, otherwise competing pharma companies would be able to produce cheaper generic drugs without needing to invest in research. Therefore, innovation projects at AstraZeneca are selected based on their potential to produce new IP, the generated profit can then be used to finance future research. Another important factor to successfully work with innovation are, according to the BVH's CEO, the people: "Innovation is a contact sport. It's people that create innovation". This is further highlighted by installed art at the Gothenburg AstraZeneca building. One sculpture, for example, reacts to noise by lightning up and makes ongoing conversations more visual which, according to the tour guide, can lead to new collaborations between the employees.

AstraZeneca focuses on establishing small teams with different levels of expertise to create an enthusiastic, motivated, and supportive work climate. As most innovation projects are highly complex, failure is common, therefore, it is important to work transparently in the whole organisation and support colleagues' projects. Such collaborations between AstraZeneca's employees are necessary to build up basic knowledge, find innovation opportunities and implement new capabilities. The company organises introductory tours for new employees, in this way they not only learn about AstraZeneca's history but more importantly, they hear about the established purpose and thereby become part of the organisation, learn how to collaborate with other departments and further strengthen their capabilities. A third requirement for innovation at AstraZeneca is the publications in scientific journals. Publishing one's own research, presenting ideas at conferences, and simultaneously creating new networks, encourages employees to stay creative and focus on the creation of novel compounds and products. In the fast-moving pharmaceutical industry, constant research, personal development, and education are necessary to drive innovation activities.

One of the biggest changes at AstraZeneca occurred in 2012 with the introduction of a new management team led by a new CEO. The company moved from a focus on the late-stage development of drugs to today's approach of improving the early discovery phases and actively working on innovating new products by reorganising the business development team. The new business activities are highlighted by the slogan "Science First" (Senior Director, AstraZeneca), and push the company, according to its employees, to the intersection of the pharmaceutical industry and academia. A major part of the new management team, especially in the R&D departments, is formed by employees with a scientific background. This is needed

to understand ongoing projects and helps the company to stay innovative. A member of the management team explains:

> And absolutely you can't just have a management that doesn't understand it. It might sound harsh, or maybe arrogant, but it's not meant to be that at all. [...] If you want to be an innovative technology company for example, your management at the very top also needs to be genuinely interested in understanding what is happening in the company. *(Head of Business Planning and Operations, AstraZeneca)*

All requirements for innovation at AstraZeneca are strongly supported by the management. This support is visible in their daily work, where all employees are encouraged to work on their own interests and ideas by giving them credit for their efforts. The management focuses on their employees' personal progress by giving them time to read and research on new developments in science by inviting them to share newly gained knowledge with their colleagues. The Head of Innovation Strategies explained:

> We give our people time to work on innovations. [...] Then we also very much support the innovation culture. We encourage people to be innovative, be creative, think a little bit outside of the box. *(Head of Innovation Strategies, AstraZeneca)*

It is very much the management's role to build and strengthen AstraZeneca's innovation mindset. Besides giving employees time to be creative, they are also encouraged to build their own networks and find collaborations inside as well as outside of the company. The management supports this by connecting young PhD students at the company with mentors. The Site Executive Director explained the management's role of acting as an example to implement their ideas:

> The most important lever I have for culture change is always myself. So, what I say, how I act, is making a difference in terms of what people then actually perceive as important. *(Site Executive Director R&D, AstraZeneca)*

The management's support for innovation, however, "is not just words, but also money and time and resources to drive it" (Executive Director, AstraZeneca). Constant reviewing is also described to be the *bloodstream* of the company. Initially, to start a project, approval from senior management is required. Here, decisions regarding the size of the budget and IP outcomes are taken. In order to get approval, a clear scientific concept of the novel idea and its possible impact for AstraZeneca are crucial. The value is often estimated by calculating the Net Present Value (NPV) of the project in question. As the project is fully established at AstraZeneca, constant reviews in the form of quarterly or yearly updates to the science directors and weekly meetings with middle management are added to the project's process.

The changes at the top management level and new development approaches at AstraZeneca led the company in a new strategic direction and were necessary to establish a new perspective on the ongoing innovation processes. It initiated the introduction of open innovation at AstraZeneca by changing the internal innovation activities and making them more open.

Open Innovation at AstraZeneca

During the last 20 to 25 years AstraZeneca established an innovation agenda where an open environment helped to create new innovative ideas originating both internally and externally. The company is currently performing around 50% of their projects in partnerships while 50% is still done in-house. The company's drive to open their boundaries is visualised through a glass front at the entrance of the company's building at the site in Gothenburg. The multi-level glass facade is supposed to act as a symbol, demonstrating to the external world AstraZeneca's openness to collaborate with different external parties as well as an overall openness to diversity. In today's fast-changing environment, AstraZeneca realised that this approach, which includes sharing resources, knowledge, and people with the external community, would help to create an ecosystem where such collaborations are initiated.

> There was a lot of the pharma industry going together and setting objectives and agreements around what to drive together. And I think in those areas we don't need to be competitive; we just need a solution for all of us. (*Executive Director, AstraZeneca)*

Further on, the Head of Innovation Strategies explained that AstraZeneca realised that they "don't have all the capabilities inside our company and much of the capabilities sit outside" (Head of Innovation Strategies, AstraZeneca)**.** To maintain an ecosystem in the external community, AstraZeneca invites its environment to be involved in their innovation projects. By inviting external parties, long-term collaborations can be secured. In accordance with the fast-changing environment, the company understood that focusing solely on *what* to innovate would become limiting for their innovation activities and therefore, today also emphasises on *how* to innovate. Since people are one of the most important drivers of creating new innovations, acknowledging how to innovate is important. AstraZeneca focuses on creating a safe environment where innovation is fostered. This aspect is further considered through collaboration with externals, which enabled the company to create a culture of togetherness with the external community. The CEO of the BVH explained:

> It's people that create innovation. And if you believe in the power of togetherness, which is what we do, I think you need to create an environment where it's safe to interact basically. It boils down to the how, not to the what. *(CEO, BVH, AstraZeneca)*

According to AstraZeneca, without the collaborations with external parties, the company would not be a driving factor in the fast-growing ecosystem within the pharmaceutical industry. An interviewee argued that any "organisation who thinks that they can do that in isolation, they are going to be left behind" (Site Executive Director R&D, AstraZeneca). Therefore, actors involved in external collaborations could solve problems that actors in isolation cannot. Moreover, without the ecosystem and its outcome, the cluster-effect, the company would have struggled to be innovative and keep up with the changing industry. AstraZeneca, therefore, actively leverages on external parties to keep their leading position in the ecosystem, generating benefits for the company itself as well as the industry as a whole:

> It's about leveraging the external world, so academia, other companies, working with the regional government and authorities to make sure that we can attract international talents in a good way and creating the ecosystem that enables us to make the best innovation possible. *(Site Executive Director R&D, AstraZeneca)*

By establishing additional ways of innovating through collaborations with internal as well as external parties, the company created a structure aiming to generate new innovative solutions. Through an online portal all the company's departments have the opportunity to post questions or challenges which seek to be solved with the help from the outside external community. The portal acts as a link between the company and external parties, where a special group spots opportunities to find a good fit between them. In order for the potential collaboration to create a win-win situation, the fit needs to be carefully considered. AstraZeneca provides clear feedback, input, and guidance to the external parties to receive an overview of how potential collaborations could be performed. In addition, the company also learns from the biotech companies and academia, where meetings generate new insights for both parties involved. The company also focuses on identifying current and future trends in the industry, academia and at other biotech companies. Being aware of the company's surroundings allows AstraZeneca, according to its employees, to stay relevant in terms of how, what, and when to innovate.

External collaborations include the ones with academia and biotech companies, these can either be characterised by having a formal or informal set-up. By establishing a formal collaboration, a restricted and more pronounced contract is created, describing the terms and conditions of the ways of working. The contracts are built on predetermined resources, efforts and achievements required to reach a wishful result. After agreeing on such a contract, a non-binding term sheet will be defined. In the non-binding term sheets aspects, such as ownership of IP and financials, are agreed upon to ensure that the collaboration is defined by both parties involved. To be able to secure and maintain a formal collaboration, a commitment of a win-win outcome, beneficial to the parties involved, must be mutually agreed upon. A Senior Director at AstraZeneca mentioned:

> A collaboration for me is usually a win-win arrangement. [...] It's really something between two parties, where you make a clear commitment to each other and where you clearly define what comes out for both parties. *(Senior Director, AstraZeneca)*

In contrast to the formal collaborations, the company also engages in informal collaborations, where the focus is on value creation and value capturing. The informal collaborations do not explicitly require a predefined commitment to reach the same goals, however, it is essential to have a clear coordination framework describing how to organise the parties. While engaging in informal collaborations the results are still dependent on creating a beneficial outcome for the parties involved as well as for the pharmaceutical industry at large. Even though an informal collaboration with a looser set-up sometimes fails in terms of the initial wishful outcome, the result can still contribute to new valuable knowledge, new ways of working together and create a culture of openness:

> So, it [open collaborations] can become tangible and it can become, you know, a real valuable outcome. Whether or not it succeeds, it builds knowledge, and it

> creates a culture of openness and it communicates a culture of openness. *(Site Executive Director R&D, AstraZeneca)*

Collaborating through a more informal open approach is viewed by some employees as a riskier way to innovate, due to the looser set-up, which is more undetermined. In addition, the informal collaboration does not require the parties to have the same goals, which concerns the aspect of not necessarily sharing the same commitment. Nevertheless, for an informal collaboration, within an open environment, to leverage beneficial results for all parties involved, certain requirements need to be in place. These requirements may not be formally determined or defined in a contract; however, they must be mutually understood between the parties involved in order to support and maintain an informal collaboration:

> So, I think that's really understanding. You both understand what you want to get out and keep on fulfilling their needs as well, not just thinking about your own needs. It's a bit like a marriage in a way. *(Executive Director, AstraZeneca)*

When collaborating in an open environment, an understanding of how to work openly is important. The aspect of openness considers sharing knowledge, resources, and people, which enables a free setting to interact, engage and innovate. Openness creates an inflow of new knowledge, where it needs to be acknowledged that "the more knowledge you want to gain, the more open you need to be" (Head of Innovation Strategies, AstraZeneca). In addition, trust aligns with the requirement of transparency, which is important while establishing a work environment of speaking up, giving input, and constantly challenging each other to reach results. However, companies within the pharmaceutical industry, who are dependent on obtaining patents on their products and services in order to be profitable and grow, need to keep some information closed to the outside community. Therefore, a certain degree of closeness is also required to be able to interact with external parties and innovate within an open environment. This is further demonstrated by how the site at AstraZeneca is set up and structured, while most of the departments are open for all employees, certain departments are closed off and kept secretive.

In-House Open Innovation at AstraZeneca

In addition to collaborating with external parties, AstraZeneca also innovates internally. By creating an open innovation environment in-house, departments not usually working together can interact and jointly leverage on each other's expertise and knowledge. The internal collaborations are initiated by employees posting questions on a platform named *Inbox* and can be monitored through a system called *Tracker*. When posting new ideas through the internal systems, the ideas become available for other employees to get invited to build on previous, new, or stopped innovation projects:

> An important bit of what we do is that we have an Inbox. It's a place where anybody in the organisation can come with an idea, it's just a short abstract of an idea and then the Inbox is open to everybody else, so everybody else can come in and comment and build on that idea. *(Head of Innovation Strategies, AstraZeneca)*

The decision to accelerate the in-house open innovation approach originated from the management team initiating a change where employees had to increase their number of published research. The announcement was met with initial reluctance, as the expected number of publications was higher than anticipated, contributing to a fear of not being able to combine it with their daily work. However, the employees quickly understood that the change was necessary to keep up with academic research in order to improve everyday work. In addition, the understanding and the realisation had a great impact on the organisation, whereas being curious and aware of the company's surroundings in the industry became highly encouraged and integrated in the company's ways of working:

> Staying curious is a very important bit for us, and the innovation culture is absolutely something really, really important to make sure that people in the company understand that they are expected to look for new opportunities." *(Head of Innovation Strategies, AstraZeneca)*

At the site, AstraZeneca has a wall of articles that continuously gets updated and plays an important part in actively encouraging the employees to publish and simultaneously build the company's reputation and credibility. All documents are shared within the organisation, which enables other departments at the company to share their expertise while becoming a part of an innovation project. The system is described as transparent and open, which is required to be able to access the needed information and data to initiate a collaboration. With openness while initiating collaboration between the company's departments, AstraZeneca created an in-house open innovation approach, which is mirrored with the ones held externally, without actively inviting external parties. A director further explained:

> And I think that, you know, the critical mass is so big here so there is always someone to ask and reach out to, so that's really, you know, probably the biggest component of how we work. *(Director, AstraZeneca)*

By leveraging the company's internal capabilities, deriving from different departments in-house, the company can simultaneously build up knowledge and contribute to an open organisational environment.

BioVentureHub

AstraZeneca's strong focus on open innovation led in 2014 to the establishment of the BVH, which is an open ecosystem "to further strengthen competitiveness and dynamism in the life science industry" (BioVentureHub, 2020). Being a subsidiary of AstraZeneca, the BVH was initiated by today's CEO of the Hub and is set up as a non-for-profit organisation, allowing external companies to co-locate with AstraZeneca. In the beginning of 2022, the BVH held more than 30 entrepreneurial companies, which set up their offices and labs right at the centre of AstraZeneca's building complex where the Hub is located. The BVH enables the co-located start-ups to interact relatively independently with each other to share knowledge and resources, while also allowing them access to most labs that are part of other AstraZeneca departments. This open and collaborative approach is still unusual for the pharmaceutical industry, as one co-founder of a collaborating start-up explained: The BVH "is very unique, [...] it's one of the

only places in the world that has this approach to life science" (Co-Founder & Business Developer, LuceroBio).

The BVH was established as a "huge experiment in both culture and business development" (CEO BVH, AstraZeneca) with the purpose of trying to change the way the company collaborates with small firms between industries by implementing a philosophy of the sharing economy. This means that the BVH shares AstraZeneca's knowledge and opens its infrastructure. Matchmaking is described by both parties involved as the *Tinder* approach; the CEO of the Hub calls the BVH "the industry version of Tinder" (CEO BVH, AstraZeneca). By locating start-ups' needs, the BVH tries to provide them with resources, guide them in the initial business phases and support their journey towards growth. Further, the CEO of the BVH explained:

> See it as a kitchen where we have secured that there is a refrigerator, there is a stall and there is a sink. We have now put all the spices on the bench, and we think we have mixed them in such a way that it is possible to make a nice dish. *(CEO BVH, AstraZeneca)*

In this way, the BVH acts as a hybrid by directly and indirectly exposing itself to new technology in a loose fashion without much legal commitment between the parties. By creating this environment, the company makes sure not to disqualify itself from disruptive innovation happening on the outside and instead bringing it inside the company. This also means that AstraZeneca is trying to become more transparent and to secure upcoming start-ups as potential successful partners for the future.

Most collaboration activities start with spontaneous interactions and spontaneous exchanges of ideas. This initial phase is described as informal and not regulated by any other contracts than the rental contract for the offices and labs. It should serve to find communalities between AstraZeneca and the start-ups as well as to identify aspects from which both partners can benefit from another. The BVH is actively working on increasing this type of informal collaboration. The CEO of a collaborating start-up explained how this first step is necessary to create a good basis for the upcoming collaboration:

> In a good collaboration you should, in my view, not have to go to the formal document, you know, to read what you're supposed to do or not. That you work without that, so that's kind of more an umbrella or a platform on which we work. *(CEO & Co-Founder, OnDosis)*

However, once innovation projects mature, contracts are needed to regulate the created value of the collaboration and how resources should be further utilised. Over the years, the BVH has come to over 70 agreements with their collaborating companies. One example of such a start-up is OnDosis. In 2017 employees at AstraZeneca decided to spin out a new technology and co-locate at the BVH as a separate company. However, AstraZeneca is one of the company's shareholders and holds formal rights to certain information. Therefore, the collaboration was more formal from the beginning, especially during the first years when AstraZeneca supported the company on strategic topics and their expert areas. Starting the collaboration at the BVH was "the natural instinct [...] and a logical thing to" (CEO & Co-Founder, OnDosis). Besides

the formal relation, especially informal communication between AstraZeneca and OnDosis are of importance since both parties believe that value is mainly created in the informal, collaborative exchange of ideas.

According to the BVH, all parties involved need to understand that a balance between exploitative and explorative activities are necessary to prepare AstraZeneca for the future. As the BVH creates an environment with low entry barriers and open boundaries where the exploration of novel ideas is fostered, an open mindset is required. This includes an organisational mindset of trust, where people feel free to share their ideas and knowledge. The BVH tries to create an open platform to strengthen the "Power of Togetherness" and start a "synergy with respect to knowledge technology ideas", all under the slogan "Dare to Share" (CEO BVH, AstraZeneca).

AstraZeneca gains benefits from the BVH in three different aspects: knowledge, serendipity, and strategic intent. Acknowledging that most of the world's brain power sits in the external environment, the Hub is used to invite experts from niche fields that work on innovative projects of particular interest to AstraZeneca. By collaborating with such entrepreneurial companies, AstraZeneca acquires new knowledge that can be implemented in other processes in the organisation. Secondly, focusing on serendipity, science is never straightforward: Incoming start-ups and their unique technologies allow AstraZeneca to continue with abandoned projects as new inputs help to push the development further. A third benefit is the strategic intent of the collaboration with smaller companies. By working with the upcoming start-ups, AstraZeneca gets access to technology before anyone else. The partnership allows them to influence any developments to suit the company's own needs and attain advantages over its competitors. The benefits, however, are not only on AstraZeneca's side, the CEO of the BVH explains: "It's really a synergy, where it's a win-win for both parties" (CEO BVH, AstraZeneca).

Starting a collaboration with AstraZeneca at the BVH requires the start-ups to openly share their knowledge with the bigger pharmaceutical company, let people freely work together, and in that sense also partly let go of their control over their own invention. They work according to the BVH's saying "Dare to Share" (CEO, Profundus). This is necessary to establish a trusting relationship between both parties where no one feels that they are being taken advantage of. This is further described by the CEO of OnDosis:

> We are in an industry which is extremely protective, extremely confidential but to some extent I would say that our industry is taking itself, you know, extremely seriously on what they believe. Everybody believes they sit on the best idea. And everybody believes that they have the Golden Nugget, and the other people only have silver in their hands, so, therefore, they protect it, but that's not true. [...] How can you together nurture the best idea or to put two good ideas together to become better and then also be more powerful in developing them? *(CEO & Co-Founder, OnDosis)*

This sort of openness, however, still requires the start-ups to have a set framework in place by signing a contract with AstraZeneca. The contract helps to secure rights regarding the IP, future

profits of the collaboration, and allows the start-ups to remain independent. Independency is especially important for entrepreneurial companies spinning out of AstraZeneca to let them fully maximise their potential: "If you decide to have a spin out model you need to dare to let go of that spin out" (CEO & Co-Founder, OnDosis). Therefore, it is essential to build a firewall of information between AstraZeneca and the start-ups to also secure partnerships with other companies to which AstraZeneca might be a competitor.

Although AstraZeneca has the limitation of being a big company and, therefore, working at a slower pace than the start-ups, the benefits of working at the BVH are significant and can be sectioned into three categories: resources, knowledge, and future partnerships. AstraZeneca provides the start-ups with expensive equipment and technologies needed for research that would otherwise be difficult to maintain in the early stages of a newly founded company. The Co-founder of LuceroBio adds: "I don't think that you can build a company in this industry without having collaborations". The second benefit, knowledge, is gathered through strategic advice directly from the BVH on topics such as the science of the product at scope, potential customer portfolios, financing, and selecting the right external development partners. Additionally, start-ups also largely benefit from formal and informal conversations at the BVH with other founders or experts from different departments at AstraZeneca. The different start-ups often experience similar challenges when starting their projects or work with technologies that can be helpful for other parties at the BVH as well. Therefore, the collaborative environment at the Hub is especially stimulating for young companies. Regular "networking lunches, *fika* and information- and dare-to-share-meetings" (CEO, Profundus) support to further strengthen the relations between the start-ups and the BVH. A good collaboration also typically leads to the third benefit, future partnerships. Most start-ups at the BVH work with business-to-business models and are, therefore, in need of collaborations throughout their whole business life cycle. Collaborating at the BVH in the initial stages of the start-ups brings them the opportunity to also work with AstraZeneca in the future: "We actually believe that AstraZeneca in the future could be [...] a partner" (CEO & Co-Founder, OnDosis).

Discussion

To answer the research question of how open innovation is organised in practice and what guides an organisation's actions, the empirical findings are analysed through the lens of institutional logics. Initially, the two logics at AstraZeneca are introduced and compared to Chesbrough's (2003a) two models of innovation. This is followed by an analysis of the logics' differences as well as how together, they can create an institutional knot. The concept of the institutional knot is challenged to better understand the organisation's open innovation actions, the dynamic between the different logics as well as the recursive relation between institutional logics and actions. Therefore, the concept of knotting is discussed and compared to a construction of a compound. The discussion focuses particularly on potential challenges AstraZeneca might encounter in a VUCA environment, as it is built on two contradicting logics, and discusses possible consequences.

Traditional Pharmaceutical Logic and Open Innovation Logic

Organisations exist through bundled actions of a collective and can, therefore, provide a meaningful setting to analyse multiple co-existing institutional logics (Lindberg & Czarniawska, 2006; Nicolini et al., 2016). The findings showcase that AstraZeneca's employees are influenced by two local institutional logics, the *traditional pharmaceutical logic* (TPL) and the *open innovation logic* (OIL). Both logics create a constellation similar to the institutional knot, originating from Nicolini et al. (2016) and affect the actors' actions, as most research on this topic acknowledges (Thornton & Ocasio, 1999; Reay & Hinings, 2009; Goodrick & Reay, 2011). However, by developing this theory, the effects of the actions impacting the logics cannot be overlooked as they form a recursive relationship which comes closer to Lindberg's (2014) as well as McPherson and Sauder's (2013) concepts.

The two contradicting logics both contain influences from Goodrick & Reay's (2011) ideal macro logics but are applied and combined with other concepts identified at the local level. The company reflects an environment where co-existing logics compete for dominance, resulting in several challenges. Nevertheless, both logics still need to collaborate in uniform to address the current VUCA environment, which creates tension within the company as it can be difficult to apply both. Table 1 summarises and describes the key characteristics of both logics and points out their differences.

Characteristics	Traditional Pharmaceutical Logic	Open Innovation Logic
Influences	Corporate logic (Goodrick & Reay, 2011) Traditional pharmaceutical industry	Professional logic (Goodrick & Reay, 2011) Open innovation (Goffin & Mitchell, 2017)
Innovation approach	Closed innovation model (Chesbrough, 2003a)	Open innovation model containing Inside-Out and Outside-In approaches (Chesbrough, 2003a)
Company focus	For-profit company focused on profit and growth	Company focused on research
Stakeholder focus of the company	Shareholders	All stakeholders/entire environment
Scope of activities	Managerial tasks	Research projects
Project measurements	NPV and other profitability calculations	Number of publications and company reputation
Working with external partners	Formal contracts securing profits and IP	Informal collaborations not based on any contracts

Table 1: Characteristics of the TPL and the OIL

The first apparent logic, the TPL, displays strong influences from the ideal corporate logic, defined by Goodrick & Reay (2011). In addition, this institutional pattern builds on the historical background of the pharmaceutical industry and has been a part of AstraZeneca for several decades. The secretive and isolated innovation activities from the past complement Chesbrough's (2003a) idea of the closed innovation model. In the past, pharmaceutical organisations, such as AstraZeneca, deliberately closed off their boundaries to the external world by focusing on internal collaborations and only sharing research results with employees in-house. A secretive approach was necessary in order to fulfil set requirements to obtain patents on their inventions to turn them into innovations which would generate profits for the company. Consequently, collaborations with external parties at AstraZeneca were rare. Additionally, projects were chosen based on their estimated revenue, as the TPL builds on the management's ability to guide an organisation to reach shareholders' goals of profit and growth. Today, despite a more collaborative environment which includes externals and the concept of open innovation, the TPL continues to guide AstraZeneca's actions. The logic is visible in the strict regulations regarding patents granting and formal contracts between collaborating partners. Keeping parts of a secretive environment is still necessary to generate profits in a VUCA environment. This explains why certain departments of the company are not open for external visitors, seemingly maintaining the organisation's closed boundaries from the past. Aspects of the TPL are moreover shown in the described reviewing processes by the management as, for example, research projects need to be authorised. The management team relies on typical key measurements such as the NPV and the general potential of the predicted outcome of such projects. Such decisions guided by the TPL are reflected by the employees' actions as they, in order to get projects approved, might mainly focus on financial aspects and educate themselves on similar subjects. These aspects then strengthen the TPL's influence on the company in turn.

The second noticeable institutional logic at AstraZeneca, the OIL, was implemented with the shift of the management team in 2012 and the introduction of open innovation. The company transitioned from a closed innovation model to an open innovation model, incorporating both the Inside-Out and Outside-In approach to better navigate the accelerating VUCA environment (Bass et al., 2019; Millar et al., 2018). Outside-In processes are apparent at AstraZeneca through the open collaborations with academia and smaller companies in order to gain new competencies such as knowledge and resources. This also includes the establishment of the BVH to invite aspiring start-ups and form collaborations with PhD students. AstraZeneca, however, also makes use of the Inside-Out approach. The company actively pushes information from within the organisation out to its external environment by publishing important research in academic papers. Benefits include a growing reputation in the science community, which increases the company's appeal for new employees. AstraZeneca's ecosystem is also involved in ongoing projects: The company poses questions to the outside environment to find new solutions to scientific problems and allows collaborating start-ups, such as OnDosis, to utilise unused resources or stopped projects for their own businesses. The OIL at AstraZeneca includes influences from the ideal professional logic's approach of collaborating with people of the same profession and the importance of the right academic education (Goodrick & Reay, 2011). Further on, it includes elements that actively impact the local level actions, guiding the

actors at AstraZeneca. Firstly, the aspect of trust guides the actor's action when involved in open innovation projects with external parties. Trust could, therefore, actively change actors' behaviours on a local level, constituting certain outcomes while steering the innovation actions. Secondly, the aspect of transparency was seen to guide the local level actions since the company expressed the need for transparency while working with external as well as internal parties. Such an element guides how interactions with others play out and also affects how future innovation actions are performed. Thirdly, knowledge impacts the actors' actions due to its requirement in order to actually perform R&D at the company. It has become an important element within the OIL, guiding employees to use their expertise and developing it through engaging in and publishing research. Today AstraZeneca concentrates on the early stages of the drug development and consequently allocates more resources to research, leading to a larger number of publications in scientific papers which strengthen the professional perspective. On top of these changes, the management decided to introduce a new concept that has previously not been included in the four ideal macro logics by Goodrick and Reay (2011). By opening up the organisation and applying both an Inside-Out as well as Outside-In approach, an open innovation perspective was established. This is not only visible through the implementation of the open innovation model at AstraZeneca, but also through the newly implemented internal ways of innovating. Examples are the internal databases with the purpose to facilitate collaborations between different departments within the organisation and posing research questions to the employees through the Inbox platform to encourage innovation initiatives. The new aspect is particularly emphasised through slogans that are commonly used by AstraZeneca's employees and collaborating partners as well as visual instalments at the site in Gothenburg. Typical slogans are "Science First", "Dare to Share" and "The Power of Togetherness". In addition, the strong focus of promoting AstraZeneca's cluster-effect, beneficial for all involved actors, is explained through the OIL's focus on all relevant stakeholders and enhances the company's positive perspective on open innovation.

Main Differences Between the Two Logics

The most apparent difference between the two logics is their approach to generating innovations at AstraZeneca. The TPL favours the closed innovation model since the included influences from the ideal corporate logic focus on strict regulations regarding the patenting process while generating profits for the shareholders. On the other hand, the OIL is appropriately described through the open innovation model; the company works on collaborating with external partners and in this way shares their resources, including research. Another difference becomes explicit when comparing interviewees' statements on what AstraZeneca's main purpose is. Employees who mainly focus on research projects and show strong influences from the professional logic, view the company as a place that values academic research and relies on collaborations with academia. Respondents with more managerial tasks, however, describe AstraZeneca as a for-profit organisation that needs to focus on generating profits to maintain its market position. As the management team consists of employees guided by both institutional logics, making business decisions and finding solutions can be viewed as a challenge. Employees involved in decision-making activities bring their own set of logics to discussions, these applied logics then determine the selected activities for the company. Depending on the composition of the management team, decisions can at times favour activities

that correlate with the TPL, while at other times they can be more connected to the OIL. Regardless of which of the two logics guides the management's decisions, the subsequent activities at the company change the team's individual thinking and their own institutional logics, resulting in a recursive relation. The question of how to select research projects displays an additional difference between the logics and poses a challenge for AstraZeneca. While some interviewees view research as generating innovations and adding to AstraZeneca's profitability, others mainly conduct research with the goal to work on their publications and fill research gaps in academia. In other words, AstraZeneca's innovation goal may vary depending on their employees' guiding institutional logics and consequently result in mismatched research projects. Working with external partners also displays another difference between both local logics. AstraZeneca collaborates and shares its knowledge with external partners initially without securing details regarding future profits or created IP. At the same time, the company, at later stages of collaborations, relies heavily on formal contracts that regulate these collaborations and clarify any uncertainties regarding the invested resources, generated IP, and future revenues of the project. A result may be an unclear and confusing transition for external parties going from an informal to a formal collaboration with AstraZeneca since contracts change noticeably. The differences show AstraZeneca's constant challenge of finding a solution between the two different logics as both influence all actions at the company. The logics' co-existence builds the basis for a constellation similar to an institutional knot, whose dynamics and consequences are further discussed in the upcoming section.

The Institutional Knot in Practice

As previously indicated, AstraZeneca's approach to innovation can be referred to as an institutional knot (Nicolini et al., 2016), since it bundles aspects from several logics determining local actions. While analysing the company, employees express that AstraZeneca's current work in a challenging VUCA environment would not reach the same impact without any of the guiding principles originating from the two logics. By building upon previous theories regarding the institutional knot, the concept of knotting is further developed here to better describe the active and dynamic innovation activities at AstraZeneca. Using the verb *knotting*, instead of the noun *knot*, emphasises the ongoing and ever-changing activity instead of a stable entity (Nicolini et al., 2016). By actively knotting together different logics and their contradicting aspects, the company's local innovation actions are determined and guided. The institutional knot is, through the action of knotting at AstraZeneca, actively undone and reassembled in different formations dependent on the everyday activities taking place within the organisation. The activities reflect the increasingly challenging VUCA environment and largely impact the local logics. However, the knotting itself is characterised by the challenges of finding the right composition between the two logics. As mentioned by McPherson and Sauder (2013), the local level actions of an organisation, guided by one or several macro-logics, add to the establishment of an institution. Therefore, the day-to-day activities performed by actors within the organisation are not only shaped by a logic but also contribute to the active establishment of the logic (Lindberg, 2014). The employees at AstraZeneca are affected by the above-mentioned logics in different ways, which in turn guide their individual actions. Since the employees indicate different purposes on how to innovate at

the company, the ecosystem is actively undone and joined back together in different constellations. Such a recursive relationship between actors being impacted and in turn impacting the guiding logics, can be identified within the act of knotting the logics together while mirroring how AstraZeneca innovates.

Deriving from the inside of the company, at the in-house innovation processes, the findings indicate a stronger influence of the TPL. The logic's active influence creates outcomes that are predetermined by the company, in order to align with the company's purpose to generate a profitable result in an accelerating VUCA environment. One example of how the company steers their innovation actions to achieve desirable outcomes are the in-house innovation projects. The conscious decision to perform in-house research without external parties in some departments follows the TPL and closed innovation model of keeping certain information confidential and protected through patents. The elements of trust and transparency are apparent while guiding the actors when performing in-house innovation. Trust is viewed as crucial to engage in projects with different departments and transparency is viewed as necessary in order to share information needed for collaborating openly. An example of how the company is in charge of knotting the ecosystem together with influences from both logics is the BVH. The BVH, set up as a non-for-profit organisation, has the managerial goal of growth. Knotting together aspects from the TPL and OIL results in AstraZeneca having the sole right to be in charge of the BVH, its interactions and collaborations. The examples, including the ways of openly innovating through the Outside-In and the Inside-Out approaches at AstraZeneca, therefore, highlight that the company has in these cases found a way to work with both institutional logics. While knotting them together, the company challenges the more static institutional knot by being in charge of balancing the logics. In accordance, the company takes on a position with direct impact and ability to balance different innovation approaches to generate beneficial outcomes. A benefit that can be identified through the gathered data is, therefore, AstraZeneca's ability to determine its own approach to innovation. It demonstrates how open innovation can be utilised, while at the same time, pointing out the closed boundaries of the company to secure IP and research to generate profits. The two local logics working together in the form of an institutional knot and their relation being constantly adjusted can be understood as a reaction to the increasing challenges of the VUCA environment. In a growing global interconnectivity and complexity between different actors, simple solutions and decisions following just one ideal macro logic are not enough. It seems as if AstraZeneca felt the need to react to the upcoming challenges by acknowledging local logics and blending them together. Being influenced by two different logics can help to better navigate a complex environment since managerial decisions are viewed from different perspectives and are, therefore, more open-minded and flexible.

Inspired by AstraZeneca's way of inducing scientific terms in their corporate language, the institutional knotting can be viewed as the construction of a compound, which is the medical term for arranging a certain variation of atoms (Zumdahl & Zumdahl, 2003). The elements of knowledge and expertise are showcased when actors are guided in their ways of working, interacting, and communicating at the company. Such guidance originates from the logics which actively guide the local actions while innovating. Therefore, the institutional knot can be seen as the configuration of multiple logics co-existing and enabling local level actions to

take place (Nicolini et al., 2016). As the compound consists of a set of atoms it creates a certain arrangement which in turn determines its specific form and structure (Zumdahl & Zumdahl, 2003). Conforming with the compound, the institutional knot reflects the woven together logics creating a specific constellation, while the logics are still identifiable separately (Nicolini et al., 2016). The constellation is the reaction to navigating upcoming VUCA challenges. Within the institutional knot created by AstraZeneca, the TPL and the OIL could individually be viewed as atoms attached to each other while creating a specific compound, the ecosystem. This compound is the result of the constituting atoms, their own individual guiding principles, and their particular attachments to each other including their active existence. The logics, viewed as atoms, can fluctuate in dominance and size, where one could be seen as more dominant in certain contexts which in turn could affect the activities and its outcomes, changing the ecosystem (Reay & Jones, 2016). A logic's existence is as previously mentioned never to be viewed as static, this due to its size and dominance continuously changing and creating new arrangements where new activities can be identified (Nicolini et al., 2016). The active decisions taken by the management team at the company, therefore, determine the ways of innovating by knotting the guiding principles originating from the logics. In accordance, the employees' differences in how the logics guide them actively impact their actions while being creators of the knot. Their local level actions steer the innovation projects guided by aspects from the knotted logics. These elements regard trust, transparency, and knowledge, all originating from the OIL and TPL, impacting the local level actions which in turn constitute a future arrangement of the knot. Additionally, by knotting logics, the knot comes undone and is reassembled in different constellations dependent on the purpose of innovating. When the knot is readjusted into a different constellation, new actions appear due to them now being guided by other logics and their principles. In addition, the action of knotting is, therefore, a way of determining outcomes and results while strengthening the organisation's guiding principles. Moreover, the active local level actions, guided and shaped by the institutional logics, continuously affect and impact their coexistence as well as their set up arrangements (Egels-Zandén et al., 2015).

In order to understand the constellation and the effects of the compound created by AstraZeneca, the logics' existence and relationship to each other on a local level needs to be further discussed. For example, the CVRM department at AstraZeneca consists of highly trained scientific professionals and needs to openly work with external parties to innovate new drug solutions while also securing the company's future by obtaining the rights on IPs. The purpose of the department showcases how the guided principles of the OIL impact their innovation project. These actions in turn strengthen the logic when expressing the need for employees with the right expertise of working with innovation. Another example is the BVH and its main focus originating from the OIL. This is due to the Hub only existing due to collaborations with start-ups and academia, while other departments still rely on internal collaboration and only work with the ecosystem on selected projects.

The Act of Balancing the Institutional Knotting

As previously mentioned, the institutional knot could actively be knotted together in different constellations in order to create different activities. Currently, the company has knotted an

ecosystem where they, despite some challenges, achieve beneficial outcomes from their ways of innovating. By supporting the open collaborations and interactions at the BVH as well as by maintaining the in-house innovation projects, the company is, on its own, the main creator of the ecosystem and is able to actively address trends coming from the VUCA environment. AstraZeneca has the potential to guide start-ups into their preferred direction by providing resources and giving advice on strategies. This means that the created cluster-effect, which is promoted as being beneficial for all involved actors, is mainly beneficial for AstraZeneca since they hold the power over the ecosystem. Signs of this are the BVH selecting start-ups that are valuable for the whole organisation and the goal of establishing a good relation to the start-ups to secure future partnerships that the competition is unable to attain. The company's current way of innovating, influenced by several aspects originating from the TPL and the OIL, is carefully determined and chosen in order to reach profitable outcomes and growth. Such a balance, however, can easily become uneven and create different outcomes for the company. One example of the current approach to balance both logics is the collaboration between AstraZeneca and the start-up company OnDosis at the BVH. The open innovation logic could be identified through AstraZeneca opening up their boundaries by spinning out an innovative idea and inviting external expertise. Despite the start-up being organised as a separate organisation, AstraZeneca is still one of the largest shareholders and by holding rights to certain aspects of the company, the traditional pharmaceutical logic can be identified. This example showcases how AstraZeneca, by possessing the main decision-making organ for the ecosystem, determines the ways of organising for innovation at the company as well as the actions needed to pursue them. The collaborating parties such as the smaller biotech companies and academia could be viewed as crucial contributors to the ecosystem. However, the actions taken by AstraZeneca are guided by the knotted logics which are needed in order to achieve the desired outcomes and results for the company.

According to AstraZeneca, without collaborations with external parties, the company would not be a driving actor in the fast-growing ecosystem within the pharmaceutical industry. Historically, it seems that the company has put a stronger emphasis on the TPL while, therefore, naturally minimising its focus on the OIL. This imbalance would lead to the company running the risk of focusing too strongly on the closed innovation model and ending up in isolation while the rest of the industry is developing through collaborations, which seem to have become the norm in today's VUCA environment. By not holding an active position in the ecosystem, the cluster-effect could decrease, which may make the company lose important aspects crucial for their relevance. Moreover, the company, therefore, runs the risk of losing important connections to research performed by academia, the development and niche competences from smaller biotech companies. It may further miss current and upcoming trends within the industry. The findings indicate that AstraZeneca recognised that in today's environment working in isolation would exclude the company from the created ecosystem. Opening up the company's boundaries and collaborating with external parties to access widely distributed knowledge and expertise, is, according to the employees at AstraZeneca, one of the main reasons why the company is still competitive despite external challenges. This realisation came with the management shift and was described as a major contributor to acknowledging the open

innovation logic. The change was viewed by all respondents as crucial in order to keep up to date with R&D, stay relevant within the ecosystem as well as to grow and make a profit.

In contrast, if the company would focus mainly on opening up the company's boundaries according to the open innovation logic, by decreasing the actions determined by the traditional pharmaceutical logic, they may run the risk of neither growing nor being profitable. In addition, the company would also not be fully in control over their own ways of innovating, which would go against the company as a for-profit organisation. If the company is not the creator of its own ecosystem, other external actors gain control over the act of knotting. This would in turn contribute to the company losing their main position of creating, steering, and effecting the actions needed to reach their desired outcomes. Therefore, as the different ways of innovating with the external world as well as with the in-house departments is dependent on being transparent, building trust and sharing information, the company needs to actively support this. However, AstraZeneca as well as the whole industry are based on the fact that some aspects need to be kept secret in order to retain their purpose. In case all information regarding R&D would be available for the whole pharmaceutical industry, the company would not be able to claim the rights to protect their products, which would jeopardise their ability to stay profitable.

Finding the right balance between opening up the company and keeping parts of it secretive can be the result of both institutional logics co-existing, determined by the company itself as a reaction to the VUCA environment. Without setting clear boundaries on what can be shared with external partners and determining what must be protected, the company might lose its control over crucial research projects. Therefore, it seems like the active institutional knotting is essential for a valuable collaboration between AstraZeneca and its external partners.

Conclusion

The study showcases how AstraZeneca, a global pharmaceutical company, organises for innovation by supporting their own in-house projects while actively participating in open innovation collaborations with external partners. With the aim to develop an understanding of how open innovation is organised within a company situated in an accelerating VUCA environment, the research included several interviews with employees at AstraZeneca as well as two observations. By investigating how open innovation is apparent and performed in practice through the lens of institutional logics, the aim of the study can be viewed as fulfilled. The findings indicate several ways of how open innovation is performed in practice at the company including Inside-Out and Outside-In innovation projects which are ongoing and actively changing activities. Additionally, the act of knotting logics together is apparent at AstraZeneca as employees are continuously influenced by different guiding logics and contribute to their co-existence. Guided by two local logics, the TPL and the OIL, actions taken by the employees continuously affect the decision-making foundations of the organisation. While actively engaging in in-house innovation activities, the company has established a clear vision, with aspects from the ideal corporate logic, for how R&D should be performed to create beneficial innovation results. Selected aspects of different in-house innovation projects are needed to be kept secret in order to turn inventions into innovations and protect the generated IP. Additionally, by creating and maintaining an open innovation approach, with aspects

originating from the ideal professional logic, external parties are actively invited to collaborate with AstraZeneca. This approach supports the company's ability to secure a future where innovation in isolation is diminished. Leveraging on external parties' new knowledge and expertise adds to the internal resources which showcases how the company created an ecosystem dependent on collaborations in order to innovate. The company managed to find a beneficial balance between a closed and an open innovation model, suited to their needs. Findings from the case study of AstraZeneca indicate that by actively being guided by the two local logics, the company's actions are performed in accordance to fulfil their innovation purpose to generate profit and growth. Since current actions are strongly influenced by the two local logics, which strengthen the logics through their implementation, a recursive relationship could be identified. Furthermore, the company's several ways of organising for innovation as well as the actions needed to reach innovation goals are mirrored through the act of knotting. By taking charge and consciously maintaining and supporting the act of knotting different local logics together, the outcomes at AstraZeneca are determined by their employees. The company, viewed as the main creator of the ecosystem, invites and includes other external parties to together establish its existence and function. In this way, the company has created a beneficial position where decisions on how to innovate and actions needed to do so are guided by the two logics the employees consciously knot together.

The managerial implications from this study focus in particular on how a management team can support a successful implementation of open innovation practices at an organisation that is challenged by a VUCA environment. In order to work openly with external parties, an environment of trust and transparency is necessary to establish the power of togetherness. This is mirrored by the creation of small teams and strengthening employees' motivation as well as establishing a supportive work climate. Ongoing encouragement coming from the management team to work on innovative ideas and giving credit to inventors when new solutions are found can further add to a collaborative work environment. Besides establishing a beneficial organisational culture, the management also needs to support the collaborations with external parties. It is important to provide such collaborations with the right resources, including money, time, and space, as well as to secure an open and trusting communication between the different partners. Furthermore, analysing different local institutional logics and their relation to each other helps the management to actively guide the whole company. By understanding the underlying principles of an organisation, the management team is more aware of how to make beneficial decisions and which perspectives need to be considered to maintain appropriate innovation activities. AstraZeneca and especially the BVH provide a meaningful example for other companies on how to introduce open innovation to an organisation as well as how to incorporate several local logics actively and beneficially. At the company, creating a transparent environment based on trust and respect for each other's businesses is viewed as crucial in order for collaborations to happen. In addition, the open innovation environment also works as a practical example of how to continuously maintain and support external partners to meet challenges in a fast-changing VUCA environment.

This study contributes to the literature of open innovation, in particular addressing the question of how open innovation is organised within companies. As previous research mainly focused on defining the concept of open innovation and explaining *what* it is, this paper offers valuable

insights on *how* it can be applied in practice by giving real examples. In addition, research gaps are filled by addressing not only the Outside-In approach of open innovation but also the less researched Inside-Out approach. For the future, as the concept of open innovation seemingly will be implemented at an increasing number of organisations, further research is still necessary. This is especially true for research regarding *how* open innovation can be implemented in practice within different industries. Case studies may be a good choice to demonstrate how different industries and their organisations apply open innovation projects. Secondly, the study also addresses research gaps within the theory of institutional logics. By applying the concept of local logics, two institutional logics, the traditional pharmaceutical logic and the open innovation logic, were identified from the gathered data at the focal company. Analysing the relation of the two logics within the organisation resulted in challenging the established theory of the institutional knot by developing it further. Consequently, the act of consciously knotting local actions together was introduced. The concept of knotting helped to better understand what guides an organisation's actions when implementing open innovation. Further research is needed to apply this theory by analysing which institutional logics shape an organisation's action in industries other than the pharmaceutical sector.

In order to survive in a constantly changing VUCA environment and to overcome its challenges, organisations need to be in charge of actively knotting their local institutional logics together. Open innovation activities combined with traditional ways of working that have proven to be successful can support companies in such a challenging environment. As the creator of its own ecosystem, consciously steering the act of knotting and defining its own actions can enable a company to reach its full innovation potential and successfully conquer VUCA challenges.

Acknowledgments

We would like to thank Kajsa Lindberg and Fredrik Lavén at the School of Business, Economics and Law at the University of Gothenburg for guiding us through the process of writing our master thesis. In addition, we would like to thank the employees at AstraZeneca and their collaborating start-ups for sharing their knowledge during the conducted interviews and inviting us to visit the organisation. These insights are truly appreciated because they constitute the foundation for our study.

References

AstraZeneca. (2021a). *Our Company*. Retrieved 2022-02-23 from https://www.astrazeneca.com/our-company.html

AstraZeneca. (2021b). *Our Therapy Areas*. Retrieved 2022-02-23 from https://www.astrazeneca.com/our-therapy-areas.html

AstraZeneca. (2021c). *What's in it for you?* Retrieved 2022-02-23 from https://www.azbioventurehub.com/whats-in-it-for-you.html

Bass, A. S., Pugsley, M. K., Sannajust, F., Yoshinaga, T., & Valentin, J.-P. (2019). Response of safety pharmacologists to challenges arising from the rapidly evolving changes in the pharmaceutical industry. *Journal of Pharmacological and Toxicological Methods, 98*, 1-9.

BioVentureHub. (2020). *About.* Retrieved 2022-03-12 from https://www.azbioventurehub.com/about.html

Bell, E., Bryman, A., & Harley, B. (2019). *Business research methods* (5th ed.). Oxford: Oxford University Press.

Bogers, M., Chesbrough, H., & Moedas, C. (2018). Open Innovation: Research, Practices, and Policies. *California Management Review, 60*(2), 5-16.

Bogers, M., Chesbrough, H., Heaton, S., & Teece, D. J. (2019). Strategic Management of Open Innovation: A Dynamic Capabilities Perspective. *California Management Review, 62*(1), 77-94.

Chesbrough, H. (2003a). The era of open innovation. *MIT Sloan Management Review, 44*(3), 35-41.

Chesbrough, H. (2003b). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston, MA: Harvard Business School Press.

Chesbrough, H. (2017). The Future of Open Innovation, *Research-Technology Management, 60*(1), 35-38.

Chesbrough, H., & Bogers, M. (2014). Explicating Open Innovation: Clarifying an Emerging Paradigm for Understanding Innovation. In H. Chesbrough, W. Vanhaverbeke, & J. West (Eds.), *New Frontiers in Open Innovation* (pp. 3-28). Oxford: Oxford University Press.

Chiaroni, D., Chiesa, V., & Frattini, F. (2009). Investigating the adoption of open innovation in the bio-pharmaceutical industry: A framework and an empirical analysis. *European Journal of Innovation Management, 12*(3), 285-305.

Corbin, J. M., & Strauss, A. L. (2015) *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (4th ed.). California: SAGE Publications.

EFPIA. (2022). *European pharmaceutical industry response to COVID-19*. Retrieved 2022-03-16 from https://www.efpia.eu/covid-19/member-updates/

Egels-Zandén, N., Lindberg, K., & Hyllman, P. (2015). Multiple Institutional Logics in Union-NGO Relations: Private Labor Regulation in the Swedish Clean Clothes Campaign. *Business Ethics: A European Review, 24*(4), 347-360.

Flyvbjerg, B. (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, *12*(2), 219-245.

Freidson, E. (2001). *Professionalism: The third logic*. Chicago, IL: University of Chicago Press.

Friedland, R., & Alford, R. R. (1991). Bringing Society Back In: Symbols, Practices, and Institutional Contradictions. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 232-263). Chicago: University of Chicago Press.

Greenwood, R., Díaz, A. M., Li, S. X., & Lorente, J. C. (2010). The multiplicity of institutional logics and the heterogeneity of organizational responses. *Organization Science, 21*(2), 521-539.

Goffin, K., & Mitchell, R. (2017). *Innovation Management: Effective Strategy and Implementation* (3rd ed.). London: Palgrave.

Goodrick, E., & Reay, T. (2011). Constellations of Institutional Logics: Changes in the Professional Work of Pharmacists. *Work and Occupations, 38*(3), 372-416.

Herzog, P., & Leker, J. (2010). Open and closed innovation: different innovation cultures for different strategies. *International Journal of Technology Management, 52*(3/4), 322-343.

Lee, Y., Fong, E., Barney, J. B., & Hawk, A. (2019). Why Do Experts Solve Complex Problems Using Open Innovation? Evidence from the U.S. Pharmaceutical Industry. *California Management Review, 62*(1), 144-166.

Lindberg, K. (2014). Performing multiple logics in practice. *Scandinavian Journal of Management, 30*(4), 485-497.

Lindberg, K., & Czarniawska, B. (2006). Knotting the action net, or organizing between organizations. *Scandinavian Journal of Management, 22*, 292-306.

Lounsbury, M. (2007). A tale of two cities: Competing logics and practice variation in the professionalizing of mutual funds. *Academy of Management Journal, 50*(2), 289-307.

McPherson, C. M., & Sauder, M. (2013). Logics in Action: Managing Institutional Complexity in a Drug Court. *Administrative Science Quarterly, 58*(2), 165-196.

Merriam-Webster. (n.d.). *Innovation*. Merriam-Webster.com dictionary. Retrieved 2022-03-31 from https://www.merriam-webster.com/dictionary/innovation

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative Data Analysis: A Methods Sourcebook* (3rd ed.). California: SAGE Publications.

Millar, C., Groth, O., & Mahon, J. (2018). Management innovation in a VUCA world: Challenges and recommendations. *California Management Review, 61*(1), 5-14.

Nicolini, D., Delmestri, G., Goodrick, E., Reay, T., Lindberg, K., & Adolfsson, P. (2016). Look What's Back! Institutional Complexity, Reversibility and the Knotting of Logics. *British Journal of Management, 27*(2), 228-248.

Paul, S., Mytelka, D., Dunwiddie, C., Persinger, C., Munos, B., Lindborg, S., & Schacht, A. (2010). How to improve R&D productivity: The pharmaceutical industry's grand challenge. *Nature Reviews: Drug Discovery, 9*(3), 203-214.

Reay, T., & Hinings, C. R. (2009). Managing the Rivalry of Competing Institutional Logics. *Organization Studies, 30*(6), 629-652.

Reay, T., & Jones, C. (2016). Qualitatively capturing institutional logics. *Strategic Organization, 14*(4), 441-454.

Remneland Wikhamn, B., & Styhre, A. (2017). Open Innovation as a Facilitator for Corporate Exploration. *International Journal of Innovation Management, 21*(6), 1-20.

Remneland Wikhamn, B., & Styhre, A. (2019a). Corporate hub as a governance structure for coupled open innovation in large firms. *Creativity and Innovation Management, 28*(4), 450-463.

Remneland Wikhamn, B., & Styhre, A. (2019b). Managerial challenges of outbound open innovation: a study of a spinout initiative in AstraZeneca. *R&D Management, 49*(4), 652-667.

Remneland Wikhamn, B., & Styhre, A. (2020). Open Innovation Groundwork. *International Journal of Innovation Management, 24*(2), 1-29.

Silverman, D. (2015). *Interpreting Qualitative Data* (5th ed.). London: SAGE Publications.

Thornton, P. H. (2004). *Markets from Culture: Institutional Logics and Organizational Decisions in Higher Education Publishing*. Stanford, CA: Stanford Business Books.

Thornton, P. H., & Ocasio, W. C. (1999). Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry, 1958-1990. *American Journal of Sociology, 105*(3), 801-843.

Thornton, P. H., & Ocasio, W. C. (2008). Institutional logics. In R. Greenwood, C. Oliver, R. Suddaby, & K. Sahlin (Eds.), *The SAGE handbook of organizational institutionalism* (pp. 99-129). London, UK: SAGE Publications.

Zhou, C., & Wang, R. (2020). From invention to innovation: the role of knowledge-intensive business services in technology commercialisation. *Technology Analysis & Strategic Management, 32*(12), 1436-1448.

Zumdahl, S. S., & Zumdahl, S. A. (2003). *Chemistry* (6th ed.). Boston: Houghton Mifflin Company.