Acknowledgements

to Sladjana and all those after her
that "saw" the researcher in me

A woman must have money and a room of her own if she is to write.

I wish this wisdom belonged to me, but it actually belongs to English novelist Virginia Woolf. She first articulated this phrase in 1928 in an address about "Women and Fiction" in Cambridge. A year later, this phrase became part of an extended essay called "A Room of One's Own", one of Woolf's finest and most referenced works.

Fast-forward to 2018, and to the life of a non-fiction writer (yours truly), Woolf's words continue to inspire. I first leafed through "A Room of One's Own" in late May 2018, while on a short research stay at the Institute for Manufacturing at Cambridge University. It was a quiet evening at The Architect, a little fish & chip and pie & mash bar on 43 Castle Street, and I had just sunk comfortably into a couch to the left of the entrance. Book in hand and eyes peered at the passers-by, I could not help but think about my own journey towards personal and professional independence. Truth be told, in my life too, having "money" (a scholarship in Belgium) and a "room" of my own (the comfort and privacy of a small office in Campus Diepenbeek) had been critical to my ability to "write" (complete my research on new forms of collaboration). And to my ability to "make it" all the way to Cambridge. And to Anaheim. And to Milan. And to Bergen. And to New York. And to many other significant places. Without these two elements, the money and the room, and without the support and guidance of a handful of wonderful people, this PhD thesis would not have seen the light of day.

In as follows, I'd like to extend some long overdue thanks to a number of people who have not only inspired me to do good research, but also to be a better person.

While my journey as a researcher in strategy and innovation management officially began in November 2014, this (wild) possibility was anticipated much earlier by a number of people I met and experiences I acquired.

The first person that has ever formally encouraged me to take the path of research was one of my professors at Aarhus University in Denmark. In 2010, in the middle of a course on "Innovation Within the Firm", Prof. Sladjana Nørskov (the course responsible) approached me with a unique proposal. She was looking for student assistants to do data collection and processing for a research project on the success/ failure of innovation projects. Though not convinced I was fully "ready" for this job, I nevertheless jumped in. It was my very first contact with case study work and the experience has stayed with me to this day. Not only did the assistant work appealed to me, it also elevated me. Thank you Sladjana, for seeing the researcher-to-be, and for encouraging me to keep a steady-course despite the difficulties/ uncertainties in Denmark.

A significant experience that brought me up-and-close with strategy and innovation management was joining InnovationManagement.se (IM.se) between 2012-2013. While start-up life had its ups and downs, the possibility to interact with so many inspiring innovation management professionals (including innomediaries) helped me develop a deep appreciation for the field and for those contributing to it. To the latter, my thanks go to Karin and Lars, co-founders of the IM.se platform, for bringing me on board and for making me part of the MOOI project (that was how I first engaged with Hasselt University), and especially to Amelia and Camille, for being high-grade professionals as well as wonderful friends. Your positive outlook on life, your entrepreneurial spirit and your humor helped me bounce back more times than you know.

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entrepreneurship after meeting you. Same goes for the ex-Nokia team led by Cristiano Cairo, formerly at Leikr by Acorn Projects (they designed a cutting-edge training device). Thank you for letting me be part of your start-up (community building was a lot of fun), and for showing me how product testing is done - in a "tumble dryer"! I learned a lot about structures for open innovation while being around you, and I learned how a great culture can enable progress and change.

It was the move to Belgium, however, that helped me experience what good research should be and how to produce it. In other words, **my true development as a researcher happened while at Hasselt University (UHasselt).**

At Hasselt University, my foremost thanks go to my supervisors, Prof. Wim Vanhaverbeke and Prof. Sara Leroi-Werelds, as well as to my colleagues.

Wim, thank you for both endorsing and being a harsh critic on my work along the years. Moreover, thank you for the opportunity to work with cases like P.R.O.F., Curana and Quilts of Denmark – they really helped me sharpen my writing.

Sara, thank you for your rigorousness (you coined the term "structuroholic" - which I now consider a true virtue!), your humor, your resourcefulness, and more generally, your "let's do this!" attitude – especially when working with conflicting reviewer feedback. I'm also grateful for all the pointers and for the constant encouragement throughout the years. While we both needed to adapt to each other's style (not always easy), the ultimate result was a pretty powerful symbiosis.

To my closest colleagues, Hamzeh and Usman, thank you for the friendship and for the regular pep talk. I can safely label some afternoons as purely "therapeutic". Pegah, Joanna, Jasinta, Jim, Marek and all other PhD students: it was great meeting you all. Thank you for letting me in on your cultures and views on all things academic and non-academic. I am definitely a more open-minded person after being immersed into your worlds.

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While no longer in Hasselt, I'd also like to thank my former promoter, Prof. Nadine Roijakkers, for seeing the researcher in me long before I did, for helping me find my "voice" (style) as a researcher, and for introducing me to so many great professionals along the years; notably: Ms Marjolein Hins, Dr. Diana Rus, Prof. Andreas Zynga, and Prof. Angelo Natalicchio. It was thanks to these shared connections that my thesis chapters also became publications. Thank you, Nadine, for all the long talks, for all the constructive (and sometimes brutally honest) feedback, for the teaching skills, for supporting my personal creativity, for helping me love and help my own country (through the SME Innovation Days in Romania) and for involving me in a variety of academic and consulting activities. I'm deeply grateful for the time you've invested in me and I hope you are proud of what became of the "ecosystem research". I know I am.

Outside the boundaries of UHasselt, three other female researchers bear special mention due to the influence they have had on my work. They are: Dr. Eva Diedrichs at IMP³rove - European Innovation Management Academy, Dr. Annika Lorenz at the Copernicus Institute of Sustainable Development and Prof. Letizia Mortara at the Institute for Manufacturing, Cambridge University. Eva, thank you for teaching me about diplomacy and delivering great work under immense time pressure. Annika, thank you for teaching me about work-life balance, about resilience and about solid research work (that need not be boring). Letizia, thank you for sharing your research enthusiasm, for showing nothing but support for my project and for giving me the unique possibility to meet you and your colleagues in Cambridge. Being there gave me a tremendous confidence boost and helped me successfully finalize my PhD project.

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Because **there is more to life than research**, I'd also like to thank those that have helped me stay motivated, happy, well exercised and well fed in the process.

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Thank you for also being skeptical about my work - something inherent to civil engineers I believe. Your skepticism actually helped me explain in simple terms what my research was all about.

To Alex: I should perhaps say something about you being the stone and I being the high-flying kite but I know better than that. Instead I will say this: thank you for the "assistance" - solicited or otherwise - with everything from biking to driving, and from knowing technology to knowing my worth. Thank you for being so many things to me and for making everything better. My thesis included.

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To all the Belgians, Danes, Hungarians, Swedes, Dutch and Germans that have made me feel at home while far away from home: thank you for your friendship

and kindness. I've grateful for all the help you've provided me with, and I look forward to returning the favor.

Summing up, my PhD journey has been a phenomenal life lesson and if I could start over, I would very likely take the same path. Perhaps learn more Flemish along the way. Thank you everyone – I am grateful for your guidance and advice. These past 4,5 years have taught me a lot about pushing your boundaries, facing your fears, diplomacy, the importance of asking for help and listening to your head as well as to your heart. And while I might feel many things as this journey is ending: one sentiment prevails. Pure gratitude.

Gratefully yours,
Oana

Leuven, December 2018

Summary

Ecosystems, which can be defined as relatively self-contained, self-adjusting systems of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange, are an increasingly widespread form of collaboration. As knowledge and resources become more distributed in the economy and as risk and uncertainties loom, firms in a variety of industries and inhabiting a variety of geographies are progressively using ecosystems to address complex challenges and effectively co-create value with their stakeholders. In light of this trend, ecosystems deserve the continued attention of strategy and innovation management scholars and practitioners alike.

While there are a number of important studies addressing ecosystems, a unified understanding of these new and complex forms of collaboration is currently lacking. In fact, the present understating on ecosystems is severely fragmented and often confined to the boundaries of single research fields. With this challenge in mind, this doctoral research aims to advance the current understanding of ecosystems as new forms of collaboration by using an inter-disciplinary approach.

Chapter 1 introduces the concept of an ecosystem and spells out the research objectives of the PhD thesis. To begin with, Chapter 1 illustrates ecosystems in action via three tales of collaboration. Starting from these examples, the chapter further elaborates on: the macro-economic context that has enabled ecosystems to gain popularity, the potential of ecosystems as new forms of collaboration (they represent means to a variety of strategic ends), the importance of developing a unified understanding of ecosystems and finally, on the power of studying ecosystems using an inter-disciplinary approach. Next, the chapter briefly puts forward a definition and elaborates on the general aim, research philosophy embraced and approach to theory building. Finally, the chapter spells out the four specific research objectives addressed by each of the subsequent chapters.

Chapter 2 provides a comprehensive literature review on ecosystems. The chapter starts by addressing the issue of inter-firm collaboration in general. As such, Chapter 2 discusses two important facets of collaboration (cooperation and coordination) and how firms can achieve success with each. Next, the chapter illustrates the evolution of collaboration by noting the various collaborative forms that precede ecosystems as well as their particularities. Ecosystems are also briefly described. Having a number of basic notions about ecosystems in mind, the chapter then discusses the value of joining various research streams and perspectives to study ecosystems. Here, the chapter aggregates insights primarily from the strategy and innovation management (strategy/IM), entrepreneurship and service marketing literature. The chapter also provides brief insights from connected fields such as biology, organizational science, game theory etc. Finally, the chapter discusses available definitions of ecosystems, puts forward the most comprehensive one and elaborates on the defining elements of an ecosystem as illustrated by the definition. Here, key themes include: actors and resource integration, mutual value creation (value co-creation), as well as the self-contained, self-adjusting nature of ecosystems.

Chapter 3 investigates how ecosystems develop and the dynamics of their development using a single case-study approach. Specifically, Chapter 3 provides a rich account of the complex interplay between strategy and implementation in a Dutch ecosystem of small and medium-sized enterprises over a period of time. By applying the lenses of strategy/IM and entrepreneurship, the study provides unique evidence on how an ecosystem self-adjusts to changing internal and external circumstances as well as on how the personality of the entrepreneurial orchestrator influences the journey of the ecosystem from initiation, throughout growth and eventually maturity. By zooming in on the individual in an ecosystem and by scrutinizing micro-level processes, the chapter provides importance evidence as to how SMEs organize for increasingly complex strategic challenges.

Chapter 4 investigates institutions and institutional change in ecosystems using a multiple case study approach. Specifically, Chapter 4 puts forward a context-specific typology of institutions – i.e., institutions in healthcare, and illustrates this typology using two examples. The two case companies provide rich evidence of

the complex journey toward patient-centricity. The theoretical lenses used for this purpose are strategy/ IM and service marketing. Studying institutions in ecosystems is particularly important because such rules and norms of collaboration can both help or hinder collaboration. Hence, by observing institutions in context, researchers can better understand how tensions between ecosystem actors and their environment can be effectively overcome.

Chapter 5 investigates ecosystem actors and their capabilities using a mixed-method approach. Specifically, Chapter 5 puts forward a capability framework for actors collaborating with innomediaries - i.e., entities that help firms accelerate their open innovation processes. Once again, the theoretical lenses applied include strategy/ IM and service marketing. Since the general wellbeing of an ecosystem is contingent on the wellbeing of its individual actors, studying the capabilities which actors must develop to make more effective use of their resources and relationships is extremely important. In Chapter 5, the study of these capabilities is limited to the innomediary-innovating firm dyad. Within this dyad, the study zooms in on the capabilities of the innovating firm.

Finally, Chapter 6 presents a conclusion of the main findings, a reflection on the process of conducting inter-disciplinary research (including avenues for further research), as well as implications for practitioners.

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Chapter 1: A theoretical understanding of ecosystems

1.1 Three tales of collaboration

> When relationships embrace more than two people or organizations, complex patterns and contextual dimensions will emerge. (Gummersson, 2006, p. 342)

Understanding the nature of modern society is a complex endeavor. As more people and assets (resources) come together in new and unusual ways to reach a variety of desired social and economic goals, economists and social scientists face the difficult task of examining and theorizing about multi-actor collaboration. In other words, as collaboration changes, the grand challenges of the economic and social sciences are changing too.

To illustrate the changing nature of collaboration and to anticipate some of the important theoretical questions that ensue in light of this change, this PhD research begins with a brief description of three cases: Elemental, the Patient Room of the Future (P.R.O.F.) and ScotRail. As Chapters 1 and 2 unfold, these cases will be continuously used to illustrate concepts surrounding research on ecosystems as new forms of collaboration (I define ecosystems in section 1.3.1). More specifically, Elemental will be primarily used to illustrate the dynamics of ecosystems (how ecosystems develop/ evolve), ScotRail will be primarily used to illustrate the rules and norms of collaboration that influence the relationships among ecosystem actors, whereas P.R.O.F. will be primarily used to show the capabilities ecosystem actors must nurture to successfully cooperate and coordinate with their peers.

1.1.1 Elemental

On February 27, 2010, at 3:34AM local time, the Earth's crust in south-central Chile began to violently move. The tremble, an otherwise familiar event to those inhabiting the Pacific Ring of Fire, was far from "ordinary" though. This magnitute-8.8 earthquake was the second strongest ever recorded in Chile. Its effects, it was later reported, had reached as far as neighboring São Paolo (Brazil) and Buenos Aires (Argentina)[1].

In the weeks that followed, hundreds of aftershocks rocked the coastline, adding to the damage caused by the initial tremor. While most of the structures remained intact (stringent building codes had been in place since the '60s), many dwellings and dwellers were left without basic amenities such as: water, electricity, gas and even roads. The authorities had estimated that 2 million people were directly affected by the earthquake and massive rescue and rebuilding operations followed.

In the small Chilean town of Constitución, uniquely affected by 15-meter waves alongside the tremor, the works began too. Albeit somewhat differently. As part of the relief effort, architecture firm Elemental was coopted by local authorities to create a new master plan. The earthquake had, after all, killed 500 inhabitants and destroyed nearly 80% of the buildings. Giving residents their amenities and their hopes back was a priority.

Guided by its founders' philosophy[2] on public interest projects and following consultation with local stakeholders, Elemental took an innovative and somewhat controversial approach to providing a fresh start: they made the earthquake survivors part of it. Instead of building entire houses for the future residents, the

[1] https://www.britannica.com/event/Chile-earthquake-of-2010

[2] Founded in 2001, Elemental is a self- proclaimed "Do Tank", specializing in public interest projects such as housing, public space, infrastructure and transportation. The firm believes that collaboration is the key to social impact creation. So much so that its design process is entirely participatory.

architecture firm proposed, and eventually executed, simple, two-story *half*-houses[3]. One side of the house was ready to move into, while the other waited to be built and customized by the dwellers. All at their own pace. Once reconstruction was complete, the (finished) house was theirs to keep.

The half-houses initially caused outrage but were later seen as unique intervention instruments meant not just for disaster areas, but also for housing deficits around the world. By involving the dweller in the building process and by providing tools, materials, instructions, as well as adding connections to services such as sewage, garbage disposal, healthcare, and even education, a unique form of collaboration had emerged. A **self-sustaining** form that could provide both **immediate relief** and **long-term benefits** to its members (dwellers, small for-profit companies, NGOs, decision-makers) through discipline and **trust** (collaboration between the different parties was based on special rules and norms) as well as the setting of joint goals. A form that **contained itself** with minimal orchestration and no rigid contracts. A form that was **flexible** enough to accommodate changing circumstances and limited resources in disaster prone areas, but **stable** enough to help survivors engage in mutual value creation (value co-creation) for themselves, for the community and for the country as a whole.

1.1.2 ScotRail

The Jacobite (steam train) still takes riders along what is described as the greatest railway journey in the world. Inaugurated in 1901, the 84-mile (135Km) track provides stunning views of Britain's highest mountain, its most westerly mainland railway station, Arisaig, as well as of mystical freshwater and seawater lochs.

While traditionally serving as an important tourist attraction, the railway network in Scotland has also served as the main infrastructure for commercial exchanges between the country's major cities. The first important railway connection in Scotland (the Edinburgh-Glasgow link) dates back to 1831. Today, however, the number of connections has risen beyond any 19th century railway company's

[3] https://99percentinvisible.org/episode/half-a-house/

wildest dreams. In 2017, Scotland's main rail service provider, ScotRail, operated 359 stations and made 94.2 million passenger journeys possible (TransportScotland 2017, p. 107).

Such an impressive spike in activity[4], while desired, also brought abrupt change. For ScotRail, the rising number of passengers over the years coupled with aging infrastructure/ aging facilities called for a refreshed strategy. A strategy in which the company leveraged collaboration (and collaborators) to improve journey times and connections, reduce emissions, and improve the quality, accessibility and affordability of the transport network it served. For example, by letting stakeholders "adopt" parts of its assets for their own use as well as that of others.

Launched in 2005, the "Adopt a Station"[5] engagement program did exactly that: engage the community in creative and productive ways in order to preserve the rail network. Initiated by ScotRail, the program invited citizens (and the broader community) to occupy unused areas at stations for the provision of services (setting up bookshops, community centre, and cafés), but also for small facility improvements (gardening, signalling necessary repairs). In return for the "adopters'" efforts and for their trust, ScotRail provided the necessary tools, guidance, and even additional perks such as reduced travel fees and quarterly prize draws.

While initially considered a risky attempt to engage and collaborate (especially in the long-term), the "Adopt a Station Program" proved immensely popular. Between 2005 and 2018, more than 260 stations of the 359 were "adopted" to the delight of the passengers (commuting became more pleasant, passengers "owned" their stations), the funding and regulatory bodies (less vandalism at the adopted stations meant lower maintenance costs as adopters signaled repair works), and, naturally, of the organization itself (increased reputation, community building, cost savings).

[4] https://www.transport.gov.scot/media/10320/ts-rail-rail-infrastructure-strategy-consultation-november-2016.pdf

[5] https://www.scotrail.co.uk/about-scotrail/volunteering/adopt-station

By encouraging stakeholders with different interests and varying bargaining power (e.g., individual passengers, fellow firms/ suppliers, and even regulators) to take part in "Adopt a Station", ScotRail had unknowingly helped create a new form of collaboration. A form of collaboration that encouraged **mutual value creation** between stakeholders on **multiple levels** and having **multiple stakes**, that created a sense of community and trust among participants, and, most importantly, that ensured the **long-term preservation** of the rail network. This form of collaboration also **blurred the line between the roles**/ **hierarchies** of the various actors (Jaakkola and Alexander, 2014) and in doing so, helped build a self-organized community. In short, learning to overcome tensions and understand the various levels of complexity between the actors was key to creating cohesion and success.

1.1.3 The Patient Room of the Future (P.R.O.F.)

Poperinge, Belgium, is a place rich in history and tradition. Known for its production of hops (flowers used as a flavoring and stability agent in beer, to which they impart bitter, zesty, or citric flavors) as well as for its well-preserved military cemeteries from WWI, the town quietly attracts nostalgic visitors to its battlefield tours and fine dining options.

Since 2009/2010, however, Poperinge has also started attracting visitors (although of a very different kind) to a less conventional site: an immense show-room exhibiting technologies that are set to revolutionize the future delivery of healthcare. More specifically, a showroom with full-size patient (recovery) rooms, patient care rooms, private care rooms as well as personalized residence rooms of the future[6].

[6] http://www.prof-projects.com/concepts.html

The history of the showroom is both intricate and straight-forward[7] and can be traced back to one entrepreneur: Jan van Hecke. As early as the 1980s, this entrepreneur was contemplating the future of his furniture company, Boone International, and of the industry in general. An aging population in Europe together with an increasing quality of life demanded better healthcare solutions, including upscale patient rooms and retirement homes. While this entrepreneurial vision eventually led the company to become the 2nd largest company in the furniture retail market in Europe and the 3rd largest in hospitals and retirement homes in Belgium (Vanhaverbeke and Verhoeve, 2016), the implementation of this vision was by no means conventional.

At the start of 2009, Van Hecke began materializing his ambitions through consultation and collaboration. Initially, he coopted 12 experts he knew well to discuss possible projects. The experts were mainly academics or professionals who published in highly ranked journals or trade magazines and were interested in revolutionizing the healthcare industry.

Soon, however, it became clear that the initial number of perspectives was limited and that the number of members could grow further, perhaps even take the form of a consortium. Consequently, nurses, midwives, companies that offered healthcare products (e.g., medical devices, supplies) or services (e.g., transportation, cleaning), directors of hospitals and retirement homes were all asked to contribute their time and expertise.

Orchestrating the interactions within such a diverse and fast-growing group (in 2018, P.R.O.F. included 300+ members) was a challenge. To keep the discussion going among the participants, the entrepreneur began to standardize the brainstorming sessions (so-called "brainwave" sessions were developed, each producing up to 700-1000 ideas at a time), to change the participant recruitment criteria (participants' personalities were as important as their professional expertise) as well as to divide the group to balance commercial and non-

[7] The (his)story of the showroom and projects are also available as a case study. See Vanhaverbeke and Verhoeve (2016).

commercial interests (the "large" consortium included non-profit members working on ideation, while the "small" consortium included commercial partners working in manufacturing/ execution).

By 2010, the (organized) consultation effort appeared to have been successful. On July 1st that year, the first "Patient Room of the Future" (P.R.O.F. 1.0) project was launched, with many more to follow. Creating mutual value in a sector that was over-regulated and non-innovative was therefore possible. All thanks to collaboration.

The approach taken by van Hecke to address an important societal challenge, as the entrepreneur himself realized, led to far more than a consortium. P.R.O.F. was nothing short of a new form of collaboration. Within this form, **the commercial and non-commercial interests** of the participants (the actors), their **types** and **levels of expertise**, as well their **varying strategic intents** were successfully **combined** to create an impressive outcome. Each year P.R.O.F. produced a prototype to revolutionize healthcare and improve the lives of the elderly. Uniquely, P.R.O.F. members also shared what appeared to be a **distinct culture** within the context of its projects; a culture based on **trust, respect and mutual sharing**. To be part of P.R.O.F., members (whose power positions often varied considerably) were expected to continuously interact with one another – sometimes collaboratively *and* competitively – and to **nurture a set of common capabilities**. These capabilities/ behaviors included but were not limited to: **acting as ambassadors** of the P.R.O.F. projects, showing **willingness to collaborate** and holding a **positive attitude towards new ideas**.

1.1.4 What the three tales have in common

While Elemental, ScotRail and P.R.O.F. might come through as isolated cases, the three tales of collaboration have, in fact, much in common. For example, all three cases describe how people and resources can be creatively combined to serve a higher purpose: ensuring that a community can thrive even in the aftermath of a serious disaster (Elemental), ensuring the viability of important infrastructure as well as better travel conditions for the commuters and community (ScotRail) or

ensuring that elderly care is up to standards using the latest technologies (P.R.O.F.).

Most importantly, however, all three tales describe what various scholars and practitioners call "ecosystems". Ecosystems represent a new stage in the evolution of collaboration as well as a new form of collaboration (Leroi-Werelds, Pop and Roijakkers, 2017) and are currently receiving attention from a variety of fields including strategy and innovation management (strategy/IM), entrepreneurship and service marketing.

The following sections will elaborate further on the importance of studying new forms of collaboration such as ecosystems as well as on how these forms of collaboration became possible. Next, I provide a definition of ecosystems and outline some important research preoccupations surrounding them.

1.2 The importance of studying new forms of collaboration

> Our future is uncertain, shaped by a multitude of powerful, complex and interconnected forces, eventually altered by improbable, unpredictable and highly disruptive events (OECD, 2016, p. 22).

While the idea of using collaboration (in a variety of forms) to move societies forward (Bason, 2018), to democratize innovation and governance in firms (Mars, Bronstein and Lusch, 2012) as well as to improve the wellbeing of individuals (Kramer and Pfitzer, 2016) is, in itself, nothing new (see Axelrod, 1984), the *increasingly complex* patterns of collaboration are.

Below, I summarize some of the trends that have influenced collaboration patterns from the 1980s onward. Subsequently, I focus on *ecosystems as new forms of collaboration* and put forward the theoretical and practical imperative to study them.

1.2.1 The global trends shaping collaboration and firms' response

It is roughly since the 1980s that the world has witnessed a dramatic increase in the frequency with which companies enter into collaborative relationships (Reuer, 2004). And for good reason.

Pressured by increasing competition, shorter product life cycles and increased risk (OECD, 2016), companies have begun to recognize the advantages of connecting to a variety of collaborators and collaborator types for resources and survival (Mars, Bronstein and Lusch, 2012; Bogaert, 2017). At the same time, the falling costs of Internet services, software and other technologies for collaboration (Rosoff, 2015), have made collaboration more accessible than ever. By leveraging the new ICT infrastructure and the increasing number and diversity of innomediaries – i.e., the consultancies, and agencies helping their clients to accelerate an (open) innovation project (Piller and Diener, 2013) (I discuss innomediaries at length in Chapter 5), firms could suddenly access more potential partners, but also organize their collaborative activities better. Last but not least, additional trends like increased globalization (Pinkus, Manyika and Ramaswamy, 2017) and the growing complexity of challenges that firms needed to solve (Kramer and Pfitzer, 2016) have dramatically altered the number and difficulty of collaborative relationships that firms engage in.

Generally speaking, it appears that firms have responded to new pressures in their environment in a very specific way. That is, firms have begun to shrink their core and expand their periphery (Visscher et al., 2017) and in doing so, have experienced a profound shift in how they perceive collaboration as well as the types of collaborations they engage in.

In terms of the change in perception, **firms' attitude towards collaboration has been noticeably shifting** (Moore 1993, 2006; Kramer and Pfitzer, 2016; Adner, 2017) from a product-oriented mindset to a "service" mindset. The product mindset, also known as the goods-dominant logic (Vargo and Lusch, 2004), starts from the assumption that what a firm produces is the focal point of value creation. The central premise of this logic is that *firms create and deliver value* to their

customers. Customers, on the other hand, are mere targets for the firm and passively receive value when buying the product or service. By contrast, the service mindset, also known as the service-dominant logic (Vargo and Lusch 2004; 2008; 2016), states that the customer is the creator of his/ her own value. The central premise of this logic is that a firm cannot create value for, nor deliver value to, the customer, but that the customer is the only one who can determine and effectively create this value. I elaborate further on the differences between the goods-dominant and the service-dominant logic in Chapter 2. As this change of attitude set in, firms became engaged less in simple transactions and migrated towards becoming value co-creating entities intertwined in "systems, constellations or networks of resources" (Smith and Ng, 2012).

In terms of preferred types or forms of collaboration, firms have been complementing (and even replacing) traditional alliances and portfolios with **more open forms** (Gulati, Puranam and Tushman, 2012; Chesbrough, Vanhaverbeke and West, 2014; Hagedoorn and Zobel, 2015) such as networks and ecosystems (I define ecosystems briefly in Section 1.3 and discuss the elements of this definition extensively in Section 2.4).

While the adoption of these new and more open forms of collaboration presented organizations with clear challenges (for example, the challenge of developing new capabilities such as absorptive capacity; I discuss capabilities at length in Chapter 5), they also provided unique opportunities. Unlike the forms of collaboration preceding them, ecosystems provided more flexibility, focused on longer time horizons, promoted unique strategizing and governance models (they were better suited for addressing societal challenges), and showed a unique focus on the end customer (Leroi-Werelds, Pop and Roijakkers, 2017) (I discuss the most important forms of collaboration in Section 2.3). Moreover, ecosystems also showcased how trust could emerge between a broad range of actors whose (bargaining) power varies considerably. At P.R.O.F., for example, power-dependencies could have easily set in were it not for clear rules and careful orchestration. By acknowledging the rules and norms of collaboration upfront, however, the non-profit members and commercial partners could safely collaborate (see also Molina-Morales,

Martínez-Fernández and Torlò (2011) for a discussion on optimal levels of trust for innovation and collaboration).

1.2.2 Ecosystems as means to a (strategic) end

All in all, a growing number of organizations today recognize the opportunity of engaging in new and more open forms of collaboration in order to reach their strategic goals. In this way ecosystems become powerful means to a variety of strategic ends.

In the pharmaceutical industry, for example, increased transparency and accountability, stricter regulations and empowered patients as well as the advent of digitization have helped ecosystems take shape over time. Today, firms like Danish multinational Novo Nordisk[8] are teaming up with other actors (sometimes competitors) in creative ways to accelerate the pace of innovation, reduce their products' carbon footprint and provide better health outcomes to their patients. All of this using the ecosystem as an infrastructure as well as a way of thinking (Chapter 4 explores the case of the pharmaceutical industry deeper).

In fashion, established brands such as Burberry are engineering ecosystems to stay relevant and profitable, but also to help cool an overheated fashion system. Driven by its core values (protect, explore and inspire), the British label has recently developed an approach to help create more engagement between itself and its customers as well as other stakeholders. The approach is called "Buy Now Wear Now" and involves the complete re-organizing of the company's supply chains as well as the creation of new feedback loops between the company, its end-customers and shops to help deliver products faster. While traditionally end-customers were unable to order and wear collections directly from the runway, "Buy Now Wear Now" has helped changed this and has also helped create new synergies between all actors involved in creating and delivering fashion items.

[8] In 2013, Novo Nordisk partnered with AstraZeneca, Baxter, GlaxoSmithKline, Johnson & Johnson, Pfizer and The National Health Service Sustainable Development Unit to publish the first international guidelines for calculating the carbon footprint of pharmaceuticals and medical devices.

Today, the "Buy Now Wear Now" approach is receiving heavy support from designers, retailers and fashion firms too due to its potential to reform a stagnating industry (Hoang, 2016). As such "Buy Now Wear Now" lies at the heart of a new form of collaboration which Burberry is orchestrating.

The cases of Novo Nordisk or Burberry are not singular, however. Firms in other industries and inhabiting various other geographies are also using new forms of collaboration such as ecosystems to address challenges and facilitate the creation of mutual value with their stakeholders. Elemental in architecture (see earlier section), ScotRail in transportation (Jaakkola and Alexander, 2014), P.R.O.F. in elderly care, (Vanhaverbeke and Verhoeve, 2016), IMEC in nano-electronics (Leten et al., 2013), or Chez Panisse in restaurants and hospitality (Chesbrough, Kim and Agogino, 2014) all illustrate how ecosystems as new forms of collaboration can be used to adjust to new trends in the economy as well as facilitate value co-creation for individuals, firms and society than any one actor could create on its own (Kramer and Pfitzer, 2016).

1.2.3 Towards a more unified understanding of ecosystems

> Clearly, we are moving from a business world dominated by hierarchies, in which assets are controlled by a company, to a world of markets, in which assets can be accessed when needed. The conventional relationship between buyers and suppliers then shifts to more complex configurations in multisided markets and ecosystems. (McGrath, 2016, p. 14)

As outlined above, there are a number of trends affecting how today's firms perceive collaboration (shift from a goods-dominant to a service dominant logic) as well as how they organize for it (by using more open forms of collaboration such as ecosystems).

With such complexity and uncertainty looming (OECD, 2016), firms experience what some management scholars have referred to as "the end of the strategy world as they know it" (Bell, 2013, p. 37). In other words, as the global challenges amplify (Kramer and Pfitzer, 2016), firms are increasingly required to abandon

traditional (conventional) ways of collaborating in favor of new (unconventional) ones.

To be able to and sustain unconventional collaborative relationships needed to reach their own goals as well as those of their stakeholders, however, firms must focus less on hierarchies and more on exchanges (McGrath, 2016). Because ecosystems, as new forms of collaboration, are less hierarchical and offer the necessary infrastructure for complex exchanges to occur (as will be shown, in an ecosystem people and assets can be combined in new and complex ways), understanding their characteristics becomes **increasingly important in both theory and practice**.

As early as 1993, scholars have mentioned that **a theory of ecosystems** could help firms "anticipate the managerial challenges of nurturing the complex business communities that bring innovations to market" (Moore 1993, p. 75). For example, the types of challenges P.R.O.F. encountered as it struggled to bring one innovation per year onto the market. Equally, a theory of ecosystems could help policy-makers understand how to replicate complex forms of collaboration that help deliver "transformative services" – i.e., services aimed at improving the lives of individuals (customers and/or employees), families, communities, cities, society or the natural environment (Anderson et al., 2013; Anderson and Ostrom, 2015). For example, to replicate the impact architecture firm Elemental has had while rebuilding the small town of Constitución after the earthquake. Finally, a theory of ecosystems could help individuals, firms and policy-makers understand the conditions which need to be met for collaboration between them to be fruitful (and sustained), thus building on the pioneering work of Robert Axelrod (Axelrod, 1984).

In summary, **having a deeper understanding of ecosystems** by means of a unified theory, practitioners and policy makers alike **could allocate resources better** and eventually create "value nets" (Brandenburger and Nalebuff, 1996) or

collaborative "constellations"[9] (Gordijn, Petit and Wieringa, 2006) as ecosystems are sometimes known[10] (see Vanhaverbeke and Cloodt, 2006), that serve a very specific purpose (Zahra and Nambisan, 2012; Rabelo and Bernus, 2015). In this way, ecosystems could serve as vehicles for mutual value creation for people, organizations, and even society as a whole.

1.2.4 The importance of providing an integrated perspective

While the utility of establishing a unified theory of ecosystems is clear, the practicalities of this task are less so. This is mainly due to the variety of fields that have contributed to the field of ecosystems and to the variety of viewpoints that appear to coexist both inside and outside academia. Moreover, as the term "ecosystem" nears the status of the "next business buzzword"[11], defining the term accurately and clarifying the elements of the definition becomes an even more difficult task.

"Ecosystem" is a term that has originated from biology and has been generally defined as "all the living things in an area and the way they affect each other and the environment" (Cambridge Dictionary), thus stressing the "actors". Over time, however, it was adopted by various disciplines, including entrepreneurship, service marketing, strategy, innovation management, engineering and even information technology. The notion of an "innovation ecosystem" (Adner, 2006), for example, was introduced to describe the new rules and norms of collaboration

[9] The notion of a "constellation" has its roots in the (service) marketing literature, where it refers to a combination of multiple interdependent services that offer consumers complementary value and synergetic benefits (Van Riel et. al., 2013). Whereas service constellations will have a center (the customer), ecosystems will not necessarily have one too. According to Van Riel et al. (2013), ecosystems can be seen as arrangements that *produce* service constellations.

[10] „Constellations" or „value constellations" are used inter-changeably by some strategic management scholars to describe groups of organizations (enterprises) that work together towards a joint goal. Gordijn, Petit and Wieringa (2006), for example, define IT-enabled value constellations as „collections of enterprises that jointly satisfy a consumer need using information technology".

[11] https://www.forbes.com/sites/victorhwang/2014/04/16/the-next-big-business-buzzword-ecosystem/#6c0691f5456a

among innovating firms. Similarly, "business ecosystem" (Moore, 1993), "entrepreneurial ecosystem" (Ucbasaran, Westhead and Wright, 2001), "product ecosystem" (Zhou, Xu and Jiao, 2011), "organizational ecosystem" (Mars, Bronstein and Lusch, 2012), and "service ecosystem" (Ostrom et al., 2015) too were introduced to serve a variety of research purposes and to describe a variety of phenomena over the years.

Among the aforementioned fields, strategy/ innovation management (IM), entrepreneurship and service marketing have theorized considerably about how ecosystems, as new forms of collaboration, can support people, firms and even societies to reach complex goals (Kramer and Pfitzer, 2016). The latter, as well as the fact that the fields are highly combinable – e.g., all three fields are concerned with the notions of value and value co-creation[12] in ecosystems (Kraus and Kauranen, 2009; Bettencourt, Lusch and Vargo, 2014) (see section 2.4.4) makes **inter-disciplinary research[13]** (Cronin, 2008) an exciting opportunity.

In as follows, I outline briefly how each field has contributed to a better understanding of ecosystems. These contributions are summarized in Table 1-1 (the list is not meant to be exhaustive) and discussed at length in Chapter 2.

Strategy/IM has made parallels to the natural world (man-made business ecosystems imitate natural ecosystems) (Moore, 1993; Oh et al., 2016; Ritala and Almpanopoulou, 2017), has explored how collaboration in ecosystems emerges, progresses and eventually ends (the evolution of collaboration) (Moore, 1993) and has explored the various forms of collaboration that exist (alliances, portfolios,

[12] Co-creation of value or mutual value creation is an important concept in both strategic and innovation management (strategy/IM) as well as service marketing/ S-D logic. Whereas in strategic management this concept refers to the process of developing products and services jointly with other actors in the ecosystem (Ramaswamy and Gouillart, 2010; Clarysse et al., 2014), in S-D logic it refers to the process whereby a supplier/ manufacturer/ service organization provides a good or service to a customer who, though use, and involvement in the process, gains value (Vargo & Lusch, 2004). In this PhD thesis, I follow the prescriptions of S-D logic when discussing value co-creation in ecosystems.

[13] According to Cronin (2008, p. 3) interdisciplinarity generally refers to "the appropriate combination of knowledge from many different specialties, especially to shed new light on an actual problem".

networks) (Hamel, 1991; Hagedoorn, 1996; Das and Teng, 2002; Reuer 2004; Lavie 2007; Ozcan and Eisenhardt, 2009; Leroi-Werelds, Pop and Roijakkers, 2017).

Table 1-1: Key concepts from strategy/IM, entrepreneurship and service marketing that enrich ecosystem research

Perspectives from strategy/IM (main)	Perspectives from entrepreneurship	Perspectives from service marketing
Analogy to natural ecosystems (Moore 1993; Oh et al., 2016; Ritala and Almpanopoulou, 2017) Evolutionary stages (Moore, 1993) Forms of collaboration preceding ecosystems (Hamel, 1991; Hagedoorn, 1996; Das and Teng, 2002; Reuer 2004; Lavie 2007; Ozcan and Eisenhardt, 2009; Leroi-Werelds, Pop and Roijakkers, 2017) Ecosystems as sources of competitive advantage (Iansiti and Levien, 2004; Williamson and De Meyer, 2012; Rohrbeck, Hölzle and Gemünden, 2009). Ecosystems as a form of (coupled) Open Innovation (Chesbrough, Vanhaverbeke and West, 2014) Value co-creation (Ramaswamy and Gouillart, 2010; Ritala et al., 2013; Clarysse et al., 2014) Trust and reciprocity (Molina-Morales, Martínez-Fernández and Torlò, 2011) Engineered versus emergent nature of ecosystems (Oh et al., 2016) Types of ecosystem risks (Adner, 2006; Adner and Kapoor 2010)	Analogy to networks (Nambisan and Baron, 2012; Autio and Thomas, 2013) Ecosystem domains (Isenberg, 2010) Ecosystem strategies/ opportunity identification (Zahra and Nambisan, 2012; Nambisan and Baron, 2013; Autio and Thomas, 2013; Acs et al. 2017) Actor capabilities, actor profiles (Busenitz and Barney, 1997; Nambisan and Baron, 2012; Zahra and Nambisan, 2012; Autio et al., 2014)	Ecosystems as vehicles for value co-creation (Ng and Vargo, 2018) S-D Logic (Vargo and Lusch, 2004) Institutions in ecosystem (Vargo and Lusch, 2016) The role of the customer in the ecosystem; customer incentives (Lusch, Vargo and O'Brien, 2007)

Strategy/ IM has also theorized about mutual value creation, or the process of developing products and services jointly with other actors in the ecosystem (Ramaswamy and Gouillart, 2010; Clarysse et al., 2014), has explored how competition and collaboration can uniquely co-exist in ecosystems (Ritala et al., 2013), has explained how ecosystems can become sources of competitive advantage (Iansiti and Levien, 2004; Williamson and De Meyer, 2012) and have laid out the risks of collaboration firms face in complex settings (Adner, 2006; Adner and Kapoor, 2010). Finally, strategy/IM has linked ecosystems to the coupled mode of Open Innovation (Chesbrough, Vanhaverbeke and West, 2014).

Entrepreneurship, on the other hand, has been mainly preoccupied with human and process aspects in ecosystems. In particular, with how entrepreneurial behavior emerges (Isenberg, 2010) and how perpetuating this behavior can help firms and individuals in ecosystems remain self-sustaining over extended periods of time (e.g. see Nambisan and Baron 2012 on the development of the "ecosystem mindset"). Entrepreneurship has also laid out the kinds of strategies, capabilities and thinking that make ecosystem actors resilient and ultimately successful in their collaborative endeavors (Busenitz and Barney, 1997; Zahra and Nambisan, 2012; Nambisan and Baron, 2013; Autio and Thomas, 2013). Finally, entrepreneurship has analyzed ecosystems by exploring the complexity of their various domains (Isenberg, 2010).

Finally, service marketing has theorized about the shift from a goods-dominant to a service-dominant logic (Vargo and Lusch, 2004; 2008; 2016) and its implications (Ng and Vargo, 2018) for firms. For example, the field has helped identify institutions and institutional change patters (Vargo and Lusch, 2016) (here institutions refer to the rules and norms of collaboration) in ecosystems and has contributed significantly to better understanding of mutual value creation (value co-creation) and of the unique role of the customer in this process.

While research in the three aforementioned fields has not always converged, a few notable advancements provide today **an opportunity for a more integrated view**. These advancements, the contributions of each field as well as the three fields' compatibility are discussed in detail in Chapter 2.

1.3 Definition and research objectives

1.3.1 Defining ecosystems

Considering the variety of available perspectives on ecosystems, defining these new forms of collaboration represents an ongoing challenge. A close examination of the definitions supplied by strategy/IM, entrepreneurship and service marketing scholars (see Section 2.5.1) over time supports this remark. To date, there appears to be **no unified definition** of ecosystems across these research fields and hence no clear consensus on the main features of an ecosystem. By main features I mean those aspects that differentiate ecosystems from other forms of collaboration – e.g., alliances, portfolios and networks.

To overcome this limitation, **I put forward a preferred definition** (to be used throughout the remainder of the PhD thesis) and discuss its features briefly.

In this PhD thesis, I follow service marketing scholars in defining ecosystems as:

> Relatively self-contained, self-adjusting systems of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange. (Vargo and Lusch, 2016, p.10)

This definition spells out a few important features of ecosystems[14]. These features are highlighted below and exemplified using the three tales of collaboration in Section 1.1.

I have chosen the definition put forward by Vargo and Lusch (2016) because it is more comprehensive than other definitions put forward by strategy/IM, entrepreneurship and service marketing scholars. Whereas alternative definitions

[14] This definition refers equally to product *and* service exchanges. While the strategy/IM literature distinguishes between product and service exchanges, service marketing suggests that all firms are service providers, either directly (e.g., tax preparation services) or indirectly through a good/ product (e.g., tax preparation software) (Bettencourt, Lusch and Vargo, 2014; Leroi-Werelds, Pop and Roijakkers, 2017). A good/ product can therefore be considered as a distribution mechanism for indirect service provision. Thus, in ecosystems, all actors engage in service-for-service exchanges. The latter represents the locus of value creation.

diverge in terms of focus and emphasize only selected aspects (e.g., the nature of the actors) (see Section 2.4), Vargo and Lusch (2016) account explicitly for: the nature and development of ecosystems (they are self-contained and self-adjusting; they continuously evolve), the nature of the actors in an ecosystem (actors are resource-integrators; that is, they use existing resources such as goods, services and information available to them, integrate them with additional resources and skills and ultimately transform the potential value of these resources into real value), and the locus of value creation (value is created through continuous service exchange among actors; this service exchange is governed by institutions/ institutional arrangements).

A more elaborate discussion of each feature as well as the rationale used to select the preferred definition are deferred to Chapter 2.

Actors and resource integration. Actors and their capacity to integrate resources effectively represent the fundamental building blocks of ecosystems. In simple terms, resource integration refers to actors' ability to combine the goods, services and information available to them with additional resources in order to transform the potential value of these resources into real value (or value in use) (Leroi-Werelds, Pop and Roijakkers, 2017). At P.R.O.F., non-commercial actors (patients, their families, nurses, caregivers, hospital directors) working on ideation integrated their own ideas and experiences with the experiences and commercial expertise of for-profit actors in order to create viable prototypes. Similarly, in the aftermath of the Chilean earthquake, the dwellers (earthquake survivors) combined their own skills and time with the technical support (instructions on how to rebuild their houses) provided by architecture firm Elemental, the building materials provided by small for-profit companies, as well as the additional supplies (food, tools) provided by local and international NGOs to rebuild their community.

Mutual value creation (value co-creation). As actors in an ecosystem interact, they engage in mutual value creation (value co-creation). This value refers to any kind of co-created value (insights, knowledge, processes, products, services, etc.) that actors actually use in order to reach individual and joint goals. At ScotRail,

mutual value is created by means of the "Adopt a Station" program, which encourages commuters to create a better travel experience for themselves and others. Similarly, at P.R.O.F, value is jointly created in the context of providing better care for the elderly.

Institutions. In ecosystems, the interactions between actors are uniquely influenced by shared rules and norms of collaboration called "institutions". These rules and norms typically evolve (are formed and reformed based on the experiences of the actors) and help the ecosystem remain stable over prolonged periods of time. At ScotRail, the creation of a common language and of an effective communication scheme between the actors facilitates effective innovation. In the case of Elemental, the existence of a favorable legal context helps individual survivors and firms work effectively and speed up reconstruction of Constitución. At P.R.O.F., having a common structure/ hierarchy for innovation and collaboration (the existence of two consortia – with commercial and a non-commercial interest respectively) also represents a favorable institution.

Self-contained, self-adjusting systems. In contrast to simpler forms of collaboration, ecosystems are self-contained and self-adjusting. This means that while their boundaries can change (boundaries expand/ contract as actors repeatedly enter and exit the ecosystem), the ecosystem itself and its underlying institutions remain fairly stable over time. At Elemental, while some smaller contractors or foreign aid organizations might support the reconstruction efforts in Constitución only on a temporary basis, the ecosystem itself remains in place throughout the entire duration of the works and even beyond (the community strengthens even after the half-houses are complete). At P.R.O.F., while some commercial and non-commercial partners might enter/leave the ecosystem (contributions are voluntary), the structure of the ecosystem itself as well as its strategy to produce a yearly prototype remain unchanged.

Service exchange. Last but not least, actors in ecosystems engage in continuous service exchange. In other words, actors provide a service to another actor in order to obtain reciprocal service. This aspect makes "service-for-service" exchanges the locus of mutual value creation in ecosystems. At Elemental, the

architecture firm provides its design skills to the local authorities, in exchange for recognition and help with implementing the project. At ScotRail, the transportation company makes unused space and assets available to commuters, whereby commuters provide their gardening skills to improve the look and feel of the train stations. At P.R.O.F., the non-profit actors in the "large" consortium provide their ideas and skills in exchange for commercial actors' manufacturing and execution expertise and vice-versa.

1.3.2 Establishing research objectives

Considering the practical importance of ecosystems as new forms of collaboration as well as the need for a more unified view of ecosystems (Iansiti and Levien, 2004; den Hartigh, Tol and Visscher, 2006; Adner and Kapoor, 2010; Nambisan and Baron, 2013; Lusch and Vargo, 2016) this PhD thesis uses an **inter-disciplinary approach to advance existing ecosystem research** in several ways.

In light of the above, the general research aim of this PhD thesis can be summarized as follows:

> The aim of the thesis is to advance the current understanding of ecosystems as new forms of collaboration by using an inter-disciplinary approach.

Specifically, the research objectives of the thesis are:

- to improve the current theoretical understanding of ecosystems by combining perspectives from strategy/IM, entrepreneurship and service marketing (Chapter 2);
- to evidence ecosystems' evolution and internal dynamics (Chapter 3);
- to identify and categorize (provide a typology of) institutions and institutional change patterns in ecosystems (Chapter 4);
- to provide a capability framework for actors in ecosystems (Chapter 5).

As Chapter 2 will make clear, these aims are in line with current preoccupations in ecosystem research across the three research fields examined.

In the following paragraphs, I describe each of these objectives/aims and indicate where and how these aims are addressed. The sub-aims of the thesis are also summarized in Table 1-2 at the end of this chapter.

1.3.3 Research philosophy and approach to theory building

While **inter-disciplinary research** is inherently challenging (Kaplan, Milde and Cowan, 2017) – e.g., differing knowledge bases in each discipline, the cognitive challenge of connecting various fields, variety of research methods etc., – it also offers the possibility of generating more impactful[15], meaningful results by reconciling several paradigms (Baum and Dobbin, 2000) to better understand complex phenomena. In light of this observation, in this PhD thesis I utilize inter-disciplinarity not only to unify the existing understanding of ecosystems but also to take this understanding further. By noting how key concepts related to ecosystems converge and diverge across disciplines, I come one step closer to providing a more solid (unified) knowledge base for future ecosystem research.

Because ecosystems are the products of continuous social interaction (Gulati, Puranam and Tushman, 2012; Nambisan and Baron, 2013; Sharma and Conduit 2016; Adner, 2017) and are therefore in a constant state of flux – i.e., they are self-contained/ self-adjusting (Vargo and Lusch, 2016; Visscher et al. 2017), represent complex structures in which value is mutually created on various levels of aggregation (Lusch and Vargo, 2016) and are typically used to reach a particular strategic goal (Iansiti and Levien, 2004; Leten et al., 2013, Chesbrough, Kim and Agogino, 2014) or to solve a broader societal problem (Kramer and Pfitzer, 2016), the disciplines of strategy, entrepreneurship and service marketing (alongside psychology, organizational science, sociology and more) can all collectively contribute to their better understanding (see Table 1-1 for an overview). For example, strategic management can offer insights on how organizations in ecosystems can gain competitive advantage/ stay profitable (Williamson and De Meyer, 2012). Similarly, entrepreneurship can offer insights

[15] https://www.socialsciencespace.com/2018/03/academy-management-report-measuring-scholarly-impact/

on how ecosystem actors can identify opportunities in ecosystems (Acs et al., 2017) and nurture the right capabilities to exploit these opportunities (Autio et al., 2014). Finally, service marketing can help understand the mutual value creation process, the role of the end-customer and the institutions that can either positively or negatively influence interactions between actors (Vargo and Lusch, 2016). These perspectives, and more, are discussed at length in Section 2.4.

In this PhD thesis, I leverage insights from strategic management and innovation (strategy/IM), entrepreneurship and service marketing to better define ecosystems, as well as to examine their self-contained, self-adjusting nature, their complex institutions and their actors and their capabilities.

In terms of elected **research perspective**[16] taken, my PhD thesis leans towards **interpretivism**. Because ecosystems are complex, context-dependent phenomena (Ritala and Almpanopoulou, 2017), these forms of collaboration "reflect a particular set of circumstances and interactions involving individuals coming together at a specific time" (Saunders et al., 2015, p. 141). The latter makes interpretivism and its specific methods (interviews, direct observation, archival search) appropriate for the study of ecosystems. In Chapter 3, I utilize a single case study-approach to understand how ecosystems develop and the dynamics of their development. In Chapter 4, I utilize a multiple case study approach to understand institutions in ecosystems. Finally, in Chapter 5, I utilize a multi-method approach (multiple case study and questionnaire) to better understand actors and their capabilities.

The main approach towards theory building used in this PhD thesis is **inductive reasoning**. In an attempt to provide a more unified view of ecosystems, I explore the existing literature and collect additional data on various ecosystem characteristics - i.e., their self-contained, self-adjusting nature/ how they evolve, mutual value creation and the institutions that contribute to it as well as actors

[16] A research philosophy refers to a "system of beliefs and assumptions about the development of knowledge" (Saunders et al., 2015, p. 124)

and the capabilities that enable them to successfully integrate resources. Subsequently, I use these insights to generate or build theory – i.e., I offer conceptual frameworks (typologies of institutions/ maturity profiles). Following Suddaby (2006), I do not believe that there are pre-existing or universal explanations of social behavior in ecosystems. Instead, I believe in a continuous interpretation of meaning.

In the following sections I detail each of the four separate research objectives of my PhD thesis, and elaborate on how the objectives collectively contribute to a deeper understanding of ecosystems as new forms of collaboration.

1.3.4 Objective 1: Improving the current theoretical understanding of ecosystems

In Chapter 2, I combine perspectives from strategy/IM, entrepreneurship and service marketing (and, more marginally, game theory and organizational science) to provide a better theoretical understanding of ecosystems. To this end, and by means of an extensive literature review, I provide separate sections on: the two facets of inter-firm collaboration (cooperation and coordination) and success within each, the main forms of collaboration that have emerged over time (including ecosystems), the main research streams that have studied ecosystems (the research perspectives used in the thesis) and the importance of integrating them, and a discussion of available ecosystem definitions. Additionally, I provide separate sections on each element of this definition while putting additional emphasis on actors in ecosystems, mutual value creation and ecosystems' development. All in all, Chapter 2 elaborates on some of the notions introduced in the current chapter (Chapter 1) and is meant to serve as groundwork for the remainder of the thesis.

The need for this extensive literature review to address the first research objective of the thesis is explained below.

Several authors have pointed out that ecosystems can be considered as the next phase in the evolution of forms of collaboration (Gomes et al., 2016; Leroi-

Werelds, Pop and Roijakkers, 2017). For a graphical representation of this evolution please see Figure 2-1 in Section 2.3. While ecosystems have many elements in common with networks (networks are forms of collaboration preceding ecosystems), there seems to be a set of distinguishing factors such as the long-term strategic nature (Iansiti and Levien, 2004) of these collaborative structures, their potential for self-organization and self-development (Visscher et al., 2017), and the shared (decentralized) governance models (Nambisan and Baron, 2013). Furthermore, it is important to note that – more than any other form of collaboration – ecosystems seem to focus on the end-customer (Piller and West, 2014; Zhou, Xu and Jiao, 2011). More specifically, ecosystems focus on building unique customer-centric value propositions (Nambisan and Baron, 2013), on creating value with the customer (Ritala et al., 2013), and actively involve the customer in mutual value creation processes to ensure customer-facing solutions (Adner, 2006; Adner and Kapoor, 2010; 2016).

By addressing the specific evolution of collaborative forms as well as the more general evolution of collaboration (here I leverage the work of Axelrod (1984) and also provide an overview of more recent work on collaboration), in Chapter 2 I clarify the conditions that have led to the development of ecosystems as well as what sets ecosystems apart from existing forms of collaboration.

1.3.5 Objective 2: Understanding how ecosystems develop and self-adjust

In Chapter 3, I combine perspectives from strategy/IM with insights from entrepreneurship to understand how an ecosystem develops and what dynamics/ mechanisms influence this evolution, thus addressing the second research objective. More specifically, I use a single case study approach to illustrate the complex interplay between strategy and implementation in a Dutch ecosystem of small and medium-sized firms (SMEs) over a period of time. In studying this interplay, I evidence how an ecosystem self-adjusts in response to changing internal and external circumstances (Nambisan and Baron, 2013; Vargo and Akaka 2012) and across three distinct phases: initiation, growth and maturity. Additionally, I examine the capabilities (personality traits) of the ecosystem

orchestrator and show how these capabilities influence ecosystem outcomes at each stage.

The development of ecosystems represents an important theme in the broader context of ecosystem research for several reasons. First, understanding development and evolution helps both practitioners and policy-makers allocate resources better and even replicate successful models (e.g., successful ecosystems) in the face of growing uncertainty (OECD, 2016) (see Section 1.2.1 for an overview of trends calling for ecosystems as new forms of collaboration). Second, understanding development patterns can help uncover complex change/ self-adjustment patterns within ecosystems. In strategy/IM in particular, researchers (Rabelo and Bernus, 2015) have called for more studies on ecosystems' evolution as these studies can help shed light on how ecosystem actors (individuals and firms) adjust their relationships and their mindsets as the environment around them changes. Third, and perhaps most importantly, understanding the evolution leads to a better understanding of how ecosystem actors strategize as they seek to manage the growing number of relations forming around them (Brunswicker and van de Vrande, 2014; Vanhaverbeke, 2017).

By examining the evolution and internal dynamics of an ecosystem in a specific context (here, a Dutch ecosystem of SMEs active in the human resource services industry), Chapter 3 answers calls for research on how ecosystem actors organize for increasingly complex strategic challenges – i.e., they leverage ecosystems to address these challenges (Gardet and Fraiha, 2012; Autio et al. 2014; Brunswicker and van de Vrande, 2014) as well as calls for insights on how ecosystem actors combine deliberate and emergent strategies to "optimize" the outcomes for all actors involved (Rabelo and Bernus, 2015; Oh et al., 2017). Last but not least, this research helps provide more evidence on the distinct stages of development in an ecosystem: initiation, growth, maturity and eventually self-renewal. In doing so, I follow similar efforts by Moore (2006), Autio and Thomas (2013) and Rabelo and Bernus (2015).

1.3.6 Objective 3: Understanding institutions and institutional change in ecosystems

In Chapter 4, I combine perspectives from strategy/IM with perspectives from service marketing to understand institutions and institutional change patterns in ecosystems. In this way, I address the third research objective. More specifically, I use a multiple case study approach to put forward a typology of institutions in healthcare. In total, I identify and illustrate nine types of institutions (culture, structure, processes, metrics, language, practices, IP, legislation and general beliefs) grouped by three levels of analysis (micro, meso and macro). Additionally, I provide evidence of how actors react to or induce institutional change by either making, breaking and maintaining the existing rules and norms for collaboration and value co-creation.

As noted earlier, the interactions between ecosystem actors are guided by specific rules and norms of collaboration or what service marketing has referred to as "institutions" (Vargo and Lusch, 2016). While institutions do not, in themselves, help or hinder collaboration between actors, the context will determine whether an institution is positive or negative (Vargo, Wieland and Akaka, 2015). The latter makes the study of institutions an important research exercise. By observing institutions in context, scholars can note how various tensions between actors are overcome (Visscher et al., 2017) at various levels of aggregation – e.g., micro, meso and macro. For practitioners, the study of institutions can translate into better decision-making and decision-making tools (e.g., useful typologies).

By examining institutions and institutional change patterns in ecosystems, I contribute to bridging the gap between abstract general theories and empirical findings (Brodie and Gustafsson, 2016; Vargo and Lusch, 2016), and thus between theory formulation and verification (Brodie et al., 2011). Additionally, I answer calls for evidence on how institutions manifest in practice (Barile et al., 2016). More broadly, our study also adds to prior work by Iansiti and Levien (2004), Peltoniemi (2006), Chesbrough, Kim and Agogino (2014) and Frow and McColl-Kennedy (2014) on the factors that influence (either positively or negatively) interactions and relationship building among ecosystem actors, the

levels at which interactions in ecosystems occur, as well as how actors deal with institutional change.

1.3.7 Objective 4: Understanding ecosystem actors and their capabilities

In Chapter 5, I once again combine perspectives from strategy/ IM with perspectives from service marketing to understand the capabilities ecosystem actors need to successfully engage with non-traditional partners. In doing so, I tackle the fourth and final research objective. More specifically, I use a mixed-method approach to classify the capabilities ecosystem actors need to collaborate with innomediaries and integrate the resources provided by them. Innomediaries are defined as intermediaries, consultancies, and agencies that can help accelerate an (open) innovation project (Piller and Diener, 2013). In other words, the chapter puts forward an open innovation maturity framework for innomediary-customer relations and illustrates this framework using examples from practice. Here customers refer to the innovating firms soliciting the innomediary services.

Studying ecosystem actors and their capabilities is important for two main reasons. First, since actors play a fundamental role in the process of mutual value creation (they are sometimes referred to as the foundational element in ecosystems; see Tronvoll, 2017), establishing which capabilities help them relate and collaborate in better, more innovative ways (Edvardsson, Tronvoll and Gruber, 2011) can help design special frameworks or interventions (e.g., education/training). Second, and related to the first, because the wellbeing of an ecosystem rests on the wellbeing of its individual constituents (Clarysse et al., 2014; Han, Lowik and de Weerd-Nederhof, 2017), understanding what capabilities help the individual actor better integrate resources and create value can help guide efforts to support the longevity of the ecosystem overall.

By studying the capabilities of actors in a specific context (here, in the context of innomediary-customer relations) I contribute to the growing literature on open innovation capability frameworks and framework building (Enkel, Bell and Hogenkamp, 2011; Habicht, Möslein and Reichwald, 2012; Hosseini et al., 2017). Furthermore, I shed light on what constitutes the right mix of skills for mutual

value creation (maturity) in ecosystems and how these skills can be developed for fruitful and satisfying relationships with other ecosystem actors. Finally, I enrich existing studies on the relationship between innomediaries and innovating firms (Mortara and Roijakkers, 2014; Randhawa, Wilden and Gudergan, 2018), by uniquely providing the perspective of the firm (customer).

Summarizing the above, Table 1-2 offers a more condensed view of the research objectives in this PhD thesis. For Chapters 2-5, I list the focus area(s), questions addressed, methods employed, research perspectives taken, and research objectives proposed. Additionally, I note the contribution of each chapter and note the various outlets in which prior versions of the chapters have been published. In the next chapter (Chapter 2) I offer an extensive literature review on ecosystems to serve as groundwork for the empirical chapters.

Table 1-2: Overview of thesis chapters

Chapter title	Chapter 2: A literature review on ecosystems	Chapter 3: How ecosystems develop and the dynamics of their development: A case study from the Dutch HR-services industry	Chapter 4: Institutions in ecosystems: Case studies from the pharmaceutical industry	Chapter 5: Actors in ecosystems: Insights from a mixed-method study of innomediary-customer relations
Focus	Theoretical understanding of ecosystems	Ecosystem evolution and self-adjustment	Institutions and institutional change in ecosystems	Actors and actors' capabilities in ecosystems
Questions addressed	What makes for successful collaboration? (cooperation and coordination combined). How has collaboration evolved? How have strategy/IM, entrepreneurship and service marketing contributed to ecosystem research? How are ecosystems defined? Where do definitions converge/ diverge?	How do ecosystems develop and what dynamics underlie this development?	Which types of institutions influence collaboration and mutual value creation in ecosystems and how do firms deal with them?	Which capabilities must ecosystems actors nurture for effective and lasting collaboration in their ecosystems?
Design/ Methodology (n brief)	Literature review	Single case study	Multiple case study	Mixed-method research
Research perspective(s) taken	Strategy/IM + entrepreneurship + service marketing	Strategy/IM + entrepreneurship	Strategy/IM + service marketing	Strategy/IM + service marketing
Aim/ Research objective	To improve the current theoretical understanding of ecosystems.	To provide a detailed account of an ecosystem's	To identify and categorize (provide a typology of) institutions and institutional	To provide a capability framework (typology of

		evolution and internal dynamics.	change patterns in ecosystems.	capabilities) for actors in an ecosystem.
Contribution (in brief)	The chapter describes: two facets of collaboration and three important perspectives in ecosystem research. The chapter also addresses the definition of ecosystems, summarizes the key areas of consensus and/ or divergence and addresses separately actors, mutual value creation and ecosystem development.	The chapter outlines the complex interplay between strategy and implementation in a Dutch ecosystem of small and medium-sized firms (SMEs). Additionally, the chapter examines the capabilities of the orchestrator in relation to the ecosystem.	The chapter examines institutions (rules and norms of collaboration) in ecosystems and provides a typology; this typology is illustrated with examples from two healthcare companies. Additionally, the chapter outlines the patterns of institutional change that are observed in ecosystems – i.e., making, breaking and maintaining.	The chapter examines the capabilities of ecosystem actors in context and puts forward a capability framework. Here, the context is provided by the relationships between innomediaries and innovating firms. Additionally, the chapter demonstrates how the capability framework can be used to describe actors' proficiency with collaboration.
Publishing outlet and title in print	Outlet: Das, T.K. (ed.) ***Managing Alliance Portfolios and Networks*** (MAPN), Charlotte: Information Age Publishing*, pp.1-31. Title in print: 'Value creation in alliance ecosystems: insights from marketing'. Authors: Leroi-Werelds, S., Pop, O.M. and Roijakkers, N. *only parts of Chapter 2 were published in this outlet	Outlet: Vanhaverbeke, W., Frattini, F., Roijakkers, N., Usman, M. (eds.), ***Researching Open Innovation in SMEs***, World Scientific Publishing, pp.347-375. Title in print: 'The link between entrepreneurial attributes and SME ecosystem orchestration: a case from the Dutch HR services industry' Authors: Pop, O.M., Roijakkers, N., Rus, D., and Hins, M.	Outlet*:* Ng, I.C. and Vargo, S.L. (eds.) ***Journal of Service Management –*** *Special issue on Service-Dominant Logic, Service Ecosystems and Institutions: Bridging Theory and Practice, 29*(4), pp.593-614. Title in print: 'Institutional types and institutional change in healthcare ecosystems' Authors: Pop, O.M., Leroi-Werelds, S., Roijakkers, N., and Andreassen, T.W.	Outlet: ***No designated outlet*** ***Proposed outlet***: R&D Management Journal/ Journal of Product Innovation Management Working title: 'An open innovation maturity framework for innomediary-customer collaborations' Authors: Pop, O.M., Natalicchio, A., Rus, D. and Zynga, A.
Publication year	2017	2017	2018	Expected: 2019/2020

Chapter 2: A literature review on ecosystems

2.1 Introduction and structured abstract

Having a number of available perspectives on ecosystems (e.g., strategy/IM, entrepreneurship and service marketing) to choose from is both encouraging as well as concerning for scholars. The source of encouragement lies in having multiple lenses through which to study new forms of collaboration, while the source of concern lies in the difficulty of joining these perspectives/ lenses to create a coherent theory. As Ritala and Almpanopoulou (2017) have recently remarked, the ecosystem literature in strategy/IM, for example, pays insufficient attention to other disciplines and by doing so **fragments** the available insights instead of helping insights converge into a more unified view.

The "inconvenience" of having many literature streams contributing to ecosystem research is especially apparent when searching for a (unified) definition of ecosystems across disciplines and/or to clarify the elements of this definition – i.e., which features set ecosystems apart from other forms of collaboration? Ng, Maull and Smith (2011), for example, see service ecosystems (systems) as complex systems in which specific arrangements of people and technologies take actions that provide value for others. In the strategy/IM literature, however, ecosystems are collaborative arrangements through which firms combine their individual offerings into a coherent, customer-centric solution (Adner, 2006). Similarly, while strategy/IM scholars view the firm as the creator of value in an ecosystem, service marketing scholars suggest that the customer is the sole creator of value.

To address these concerns and provide a better understanding of ecosystems as new form of collaboration, I have organized this chapter as follows. First, I discuss inter-firm collaboration (broadly) and its two important facets: cooperation and coordination. Second, I introduce a section on the evolution of collaboration to

understand the origins of ecosystems. Third, I elaborate on three important literature streams that can effectively contribute to ecosystem research and note the main perspectives from each that can further inform the conversation around ecosystems. These streams include: strategy/IM, entrepreneurship and service marketing. Having the aforementioned insights in mind, I move on to the challenge of proposing a unified definition of ecosystems. Here, I compare and contrast a representative sample of definitions of ecosystems from strategy/IM, entrepreneurship and strategic marketing and note the areas of consensus as well as points of divergence before making a choice. Finally, I zoom in on three key elements of ecosystems – actors, mutual value creation and development – to provide additional groundwork for the empirical chapters. All in all, the chapter illustrates the state of the art in ecosystem research and in doing so, provides a more complete view on an increasingly important phenomenon.

In Table 2-1, and for ease of reference, I summarize some essential information about the chapter. This information includes the chapter's: aim, design and methodology, data sources, research perspective taken, findings, strengths, limitations, practical implications as well as publishing outlet.

Table 2-1: Chapter 2 at-a-glance

Aim/ Research objective	The aim of this chapter is to improve the current theoretical understanding of ecosystems. In doing so, the chapter addresses the first research objective of the thesis.
Design/ Methodology and data sources	First, the chapter describes inter-firm collaboration and its two facets: cooperation and coordination. Second, the chapter describes the evolution of collaboration. Third, the chapter discusses (jointly) three important perspectives in ecosystem research: strategy/IM, entrepreneurship and service marketing. Fourth, the chapter addresses the definition of ecosystems, summarizes the key areas of consensus and/ or divergence and addresses separately actors, mutual value creation and ecosystem development. The chapter represents a comprehensive literature review on ecosystems and draws upon a variety of scientific publications in the fields of strategy//IM, entrepreneurship, service marketing as well as connected fields (organizational science, game theory, economic geography etc.)
Research perspective(s) taken	Strategy/IM + entrepreneurship + service marketing
Findings	Strategy/IM, entrepreneurship and service marketing provide important perspectives for ecosystem research. Depending on the topic (defining

	ecosystems, ecosystem actors, mutual value creation in ecosystems and ecosystem development), these perspectives can converge and/or diverge. Service marketing offers the more comprehensive definition of ecosystems. There are four important forms of collaboration that have emerged over time: alliances, portfolios, networks and ecosystems.
Strengths/ Originality	The chapter leverages several important literature streams to improve the current understanding of ecosystems. In doing so, it lays a solid foundation for the remainder of the PhD thesis.
Limitations	The review mainly leverages the strategy/IM literature and infuses it with insights from entrepreneurship and service marketing, potentially leaving out other notable contributions.
Practical implications	An improved theoretical understanding of ecosystems can help inform future research as well as future policy-making – i.e., decision-makers can use the lessons from theory to design policies that support the creation of ecosystems
Publishing outlet and title in print	Outlet: Das, T.K. (ed.) ***Managing Alliance Portfolios and Networks*** (MAPN), Charlotte: Information Age Publishing*, pp.1-31. Title in print: 'Value creation in alliance ecosystems: insights from marketing'. Authors: Leroi-Werelds, S., Pop, O.M. and Roijakkers, N. *only parts of Chapter 2 were published in this outlet
Publication year	2017

2.2 Successful collaboration: a matter of cooperation and coordination

> Every organized human activity – from making pots to placing a man on the moon – gives rise to two fundamental and opposing requirements: the division of labor into various tasks, and the coordination of these tasks to accomplish the activity. (Mintzberg, 1979, p. 2)

Studying the patterns of (and prerequisites for) successful collaboration between firms is at the heart of strategy/IM research as well as of related fields such as organizational science or organizational behavior. The latter is reflected by the multitude of publications that have emerged over the years on the topic. From studies linking collaboration to the efficient utilization of knowledge (Grant and Baden-Fuller, 1995) to those linking collaboration to successful innovation (Chesbrough, 2006; Chesbrough, Vanhaverbeke and West, 2014), and from

studies on collaboration between private firms (and even intermediaries) (Mortara and Roijakkers, 2014) to studies on successful collaboration in the public sector (Bason, 2018), insights abound.

A lesser acknowledged fact, however, is that many contemporary (2006-2016) studies on collaboration were inspired by much earlier work such as that of Henry Mintzberg[17] and Robert Axelrod[18]. In "The Structuring of Organizations: A Synthesis of the Research", Mintzberg (1979) was preoccupied with how firms are structured as well as with how structure was connected to the successful pursuit of certain strategies. As part of this work, Mintzberg elaborated on two facets of activity/collaboration *within* the firm – cooperation (agreement on the necessity to collaborate) and coordination (the alignment of actions in light of collaboration). These insights proved invaluable for the subsequent research on complex, *inter*-firm collaboration. While Mintzberg addressed cooperation and coordination simultaneously, Axelrod's (1984) work focused exclusively on inter-firm cooperation in the context of social dilemmas[19]. More specifically, Axelrod was interested in how firms decide when and if it is a good time to cooperate, which cooperation strategies firms use given their specific goals, what makes firms cooperate rather than compete and what affects cooperation in the long run (how does cooperation evolve?).

All in all, these early works on intra and inter-firm collaboration anticipated many of the important questions strategic management scholars still contemplate today.

In as follows, I summarize some a few key insights connected to successful inter-firm collaboration and its two facets: cooperation and coordination. These insights draw both on early work on the topic as well as on more recent developments. Having touched upon collaboration and inter-firm relationships in general, I move

[17] Henry Mintzberg is a Canadian academic and leading thinker in the field of management. He is best known for his work in the realm of organizational structures and organizational design.

[18] Robert Axelrod is an American political scientist that has used interdisciplinary work to explain the evolution of cooperation between individuals, firms (organizations) and even nations.

[19] Social dilemmas refer to situations of interdependence characterized by a conflict between immediate self-interest and longer-term collective interest.

on to discuss four main *forms* of collaboration that have emerged in the literature as well as in practice. These forms are discussed at length in Sections 2.3.2–2.3.5 and will help introduce the concept of ecosystems.

2.2.1 Cooperation versus coordination

While success in inter-firm collaboration has been generally attributed to actors' commitment (Autio and Thomas, 2013), alignment of interests (Smith and Ng, 2012; Nambisan and Baron, 2013) and trust (Molina-Morales, Martínez-Fernández and Torlò, 2011; Ritala et al., 2013), complementary studies on inter-firm cooperation are revealing an additional facet.

In their work on collaboration in strategic alliances, Gulati, Wohlgezogen and Zhelyazkov (2012) argue that successful **collaboration requires not only cooperation** – i.e., the joint pursuit of agreed-on goals, **but also** adequate **coordination** – i.e., the deliberate and orderly alignment or adjustment of actions that are necessary to reach joint goals. Hence, while cooperation is more concerned with alignment of interests, coordination is concerned with information sharing, decision-making and feedback mechanisms to ensure that collaboration efforts "click" and yield the desired outcomes.

Leveraging Gulati, Wohlgezogen and Zhelyazkov's (2012) work as well as that of other scholars investigating the antecedents of effective collaboration, I elaborate on successful collaboration and cooperation practices prescribed in the literature.

2.2.2 Successful cooperation

While each inter-firm collaboration is situationally unique, game theory[20] in general and game models in particular have long been used to represent a wide variety of problems as well as to prescribe how (rational) leaders (in the case of firms) or countries (in the case of a national context) should act in given situations. One well-known game model that continues to be used is the Iterated

[20] Game theory is a branch of mathematics developed in the 1940s and 1950s which has since been used to rationally examine the strategic behavior of nations (especially super-powers).

Prisoner's Dilemma. This game model was described in Axelrod's early work as: "an abstract formulation of some very common situations in which what is best for each person individually leads to mutual defections, whereas everyone would have been better off with mutual cooperation" (Axelrod, 1984, p. 9).

To better understand when persons (actors) should cooperate, and when they should be selfish in an ongoing cooperation, Axelrod (1984) invited experts in game theory to submit programs for a computerized Prisoner's Dilemma Tournament. This tournament was similar to a chess tournament, while entries came from a variety of profiles including: game theorists, economists, experts in psychology, sociology, political science and more. The result of the tournament (run in two rounds) was surprising: the winning strategy (called "Tit-For-Tat") was the simplest: the program started with cooperation and thereafter did what the other player did on the previous move. The implications for practice began to be clear.

Factors that promote cooperation: a game theory perspective. After a careful analysis of all entries in the tournament, Axelrod concluded that what distinguished high scoring entries (or games) such as Tit-For-Tat from low scoring entries was the unique property of being "nice"[21]. That is, the property of not defecting but rather cooperating on the first move. The winning game ("Tit-for-tat") appeared to make a deliberate attempt to understand the other player (actor in the cooperation) and then to "make a choice that will yield the best long-term score based upon this understanding" (Axelrod 1984, p.34)

But cooperation, Axelrod acknowledged, was often the product of a long, complex, even bureaucratic journey. Along this journey, players (actors) could come and go and the rules of the game (the institutions) could change. In light of these uncertainties, Axelrod observed that having a number of conditions in place could, in fact, support cooperation and prevent actors from repeatedly defecting. Thus, players could be encouraged to cooperate rather than compete in a number of ways.

[21] Alongside niceness, not retaliating (never immediately defecting after a defection), being forgiving (forgives an isolated defection) and being clear (promoting clear patterns of mutually understood behavior) proved extremely important.

First, by **making the probability of meeting again sufficiently high.** If players knew that they could meet again, they would be less inclined to defect. While factors like average lifespan, relative mobility, and the wellbeing of the individuals (firms) could all affect this probability, the lesson was nevertheless powerful. Co-locating (clustering) individuals or firms or providing prolonged exposure to each other (such as in the case of war) could help cooperation get started. In the words of Axelrod himself: "When the probability of two individuals meeting each other again is sufficiently high, cooperation based on reciprocity can thrive and be evolutionarily stable in a population with no relatedness at all" (Axelrod, 1984, p. 97).

Second, cooperation could be promoted by helping players **remember past interactions.** In other words, if players considered the history of the interaction, they could better estimate its future outcomes. Remembering past interactions was also linked to players' ability to discriminate among a variety of actors in their environment. In a sense, modern alliances and portfolio management practices did exactly that: they helped provide ways for firms to segmented collaborators and then devise separate strategies to interact with each (I discuss alliances and portfolios further in the next sections). All in all, remembering past interactions could help players reward cooperation from some individuals and punish the defection of others, thus leading to better outcomes. Last but not least, remembering past interactions could also lead to end-gaming – or an extreme form of punishment if the other player(s) repeatedly defected.

Third, raising **the value of future interactions or** the value of future **payoffs,** could support collaboration rather than competition. Making the future more important rather than the present, for example, could help players come together in new ways. Thus, having a common stake or a stake in each-others' success made physical clustering less necessary and could help interactions take place over prolonged periods of time. Additionally, by cumulating the payoffs of cooperation in such a way that the next move was worth some fraction of the current move, players could be discouraged from defecting. Finally, cultivating foresight in the payers was an additional way of helping them value the future more.

Fourth, by **spreading the adoption of cooperation** (cultivating niceness in the collective sense by teaching the players values, facts, and skills that promote cooperation) players could sustain collaboration in the long run. Once cooperation was established, Axelrod remarked, it acted as a protection mechanism against "intrusions" (strategies or players that undermined cooperation). The widespread adoption of cooperation could also have additional benefits. Once cooperation was there to stay, individuals could afford to experiment ("be generous") in dealing with each other as well as with new players. Furthermore, the common culture of cooperation could also be passed on to future generations of players, thus yielding added benefits. In Axelrod's words: "An individual able to achieve a beneficial response from another is more likely to have offspring that survive and that continue the pattern of behavior which elicited beneficial responses from others" (Axelrod, 1984, p. 22).

Finally, some other aspects that promoted successful cooperation according to Axelrod included: practicing reciprocity (players should spend time understanding each other and should reciprocate each-others' moves) and understanding that cooperation is not a zero-sum game (the echo/ripple effects, both of defection and cooperation, are powerful and unpredictable).

Main limitation of the work. While Axelrod's contribution to the understanding of cooperation between firms was significant, it also came with one important limitation. Specifically, Axelrod's work examined interactions between just two players (actors) at a time. While a single player (actor) may have been interacting with many others, the player (actor) was assumed to be interacting with them one at the time. In real contexts, however, cooperation often takes place simultaneously between many players at a time. Thus, while the work of Robert Axelrod is still highly relevant for ecosystem research (it helps clarify the conditions under which complex cooperation emerges and thrives), a number of additional insights are worth acknowledging as well.

More recent insights on successful cooperation. As noted above, the cooperation facet (dimension) of collaboration is preoccupied with designing interventions and/or promoting behavior that limits opportunism among actors.

In other words, it is preoccupied with **limiting relational risk** (Gulati, Wohlgezogen and Zhelyazkov, 2012). For interventions to be effective, however, they must consider the **particularities** of the cooperation (the extent of the inter-dependence). According to Gulati, Wohlgezogen and Zhelyazkov (2012), cooperation is an activity that can be arranged along a **continuum**. That is, actors can range from highly cooperative to highly uncooperative, while the scope of the cooperation can range from narrowly defined and clearly budgeted initiatives (e.g., a one-off cooperation in light of a new manufacturing process) to broad, open-ended ones (e.g., IP sharing partnerships). The larger the extent of the cooperation, the higher the inter-dependence and hence the risk. When addressing cooperation issues, actors must take the former specificities into account.

Successful cooperation also hinges on **incentives**[22]. In a recent meta-analysis on reward, punishment and cooperation, Balliet, Mulder and Van Lange (2011) put forward a number of interesting findings. First, rewards and punishment have similar effects in promoting cooperation and are more effective after several trials – i.e., as actors learn, they develop a more cooperative behavior. Second, the cost of incentives can magnify the effectiveness of the interventions meant to promote cooperation. Costly incentives fair better than free incentives because "when individuals receive incentives involving cost to the provider, they are more likely to perceive that the provider is relatively more concerned about the collective, relative to when incentives are free" (Balliet, Mulder and Van Lange, 2011, p. 18). For example, authorities often provide public recognition for heroic deeds. This type of incentive will be perceived as "costly" by members of society and therefore promote more cooperation. Finally, the source of the incentives is of little importance: centralized and decentralized sanctioning systems have similar effects on cooperation – i.e., it does not matter whether. For example, whether a firm is sanctioned by an external party (e.g. the government) or an industry peer not does appear make a difference.

In a related meta-analysis, Balliet (2010) discusses the importance of **communication** in promoting cooperation. Some interesting findings of this

[22] This concept is similar to the concept of payoffs.

analysis include: as group size increases, spoken as opposed to written communication is more effective in enhancing cooperation and the impact of communication before the dilemma is not significantly different from communication during the game. In Chapter 3, I provide a deeper discussion on communication and cooperation in the analysis of the Q-Search ecosystem.

2.2.3 Successful coordination

Whereas successful cooperation is a matter of preventing the potentially opportunistic behavior of actors, coordination is concerned with improving the **mechanics of the collaboration**. Similar to the relational risk actors face during cooperation, in coordination actors are confronted with **operational risk** (Gulati, Wohlgezogen and Zhelyazkov, 2012). Operational risk here refers to a potential inability to create the right information sharing, decision making and feedback mechanisms necessary for the collaboration to take place.

Because coordination reflects a preoccupation with aligning and adjusting actions, its success lies in avoiding what scholars have called **coordination neglect** (Heath and Staudenmayer, 2000). In pursuit of their goals, actors may organize themselves in a way that slows them down. Hence, while actors might be highly motivated to succeed in their task, their actions may lead to undesired outcomes. To the latter, Gulati, Wohlgezogen and Zhelyazkov (2012) suggest that actors can **reduce operational risk** by careful planning, adjusting to each other's practices and structures, adopting flexible roles, procedures and interfaces, and preventing ad-hoc responses to emerging problems.

In this PhD research, I discuss the coordination facet of collaboration at length throughout Chapters 3-5. Hence, additional information regarding the type of culture (individual or collective) that promotes effective coordination, the types of structures that support coordination and the processes by which coordination can best be achieved can be found in the respective chapters.

Summing up, recent research shows that actors' agreement to collaborate/ commit to each other (cooperation) is just as important as how they collaborate/ commit to each other (coordination) (Gulati, Wohlgezogen and Zhelyazkov,

2012). As stated throughout this section, collaboration challenges are typically not resolved merely because actors' interests align. To succeed with collaboration, actors must continuously invest in making their relationships work and in doing so avoid so-called coordination neglect (Heath and Staudenmayer, 2000).

All in all, the acknowledgement of cooperation and coordination as two separate (but equally important) facets of collaboration can add more nuance to the discussion of what drives the wellbeing and vitality of inter-firm relationships (Van Lange and Joireman, 2008) – especially in highly complex settings. In the paragraphs that follow, I discuss four important forms of collaboration and outline briefly how cooperation and coordination unfold in each.

2.3 The evolution of collaboration and the main collaborative forms[23]

> In the same way you can never go backward to a slower computer, you can never go backward to a lessened state of connectedness[24]. (Douglas Coupland)

As a number of important trends make their way into the economy (see Section 1.2.1), collaboration between individuals and firms takes new and exciting forms. Pressured by increased competition, shortened product life cycles and heightened risk, firms today recognize the benefit of connecting to a variety of other firms (economic actors) and firm (actor) types for innovation and survival. In other words, the entire logic of collaboration seems to be shifting and with it, firms' outlook, protection mechanisms, and missions seem to be shifting too. The result is more long-term focus, less rigid IP policies, and more joint strategizing. (Leroi-Werelds, Pop and Roijakkers, 2017). From the rigid, contract-based strategic alliances which became popular in the 1970s and 1980s, to the "loose" ecosystems surfacing in industries today, collaboration is becoming less of a solo endeavor and more of a group performance (see Figure 2-1).

[23] An earlier version of this section has been published in Das, T.K. (ed.), Managing Alliance Portfolios and Networks (MAPN), Charlotte: Information Age Publishing, pp.1-31. The section was part of Chapter 1: "Value creation in alliance ecosystems: insights from marketing" and was co-authored by Sara Leroi-Werelds, Oana-Maria Pop and Nadine Roijakkers. The publication year was 2017.

[24] https://www.theglobeandmail.com/news/national/a-radical-pessimists-guide-to-the-next-10-years/article1321040/

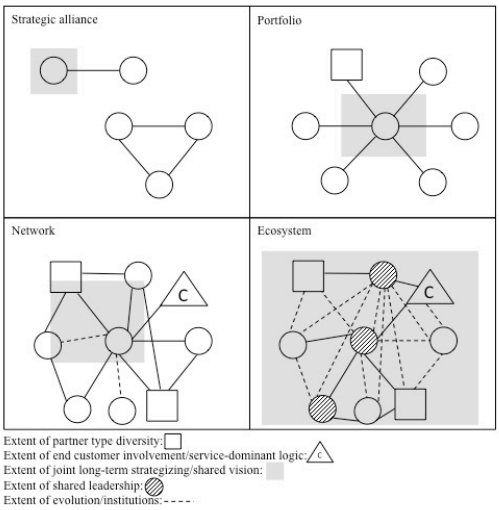

Figure 2-1: Forms of collaboration: from strategic alliances to ecosystems (Leroi-Werelds, Pop and Roijakkers, 2017)

In management research, strategy/IM scholars have documented the changing nature of collaboration in detail (Gulati, Puranam and Tushman, 2012; Kramer and Pfitzer, 2017). By surveying their important work, as well as work from connected fields such as organizational science, it appears that collaboration can take place in a number of fundamental ways (it follows certain patterns). These fundamental ways or forms of collaboration (also called "collaborative arrangements" or "collaborative constellations") are: alliances, portfolios, networks and ecosystems.

In Figure 2-1 I illustrate these forms in their order of complexity and summarize some of their key features. These features will be explained in more detail in the sections below. Studies in strategy/IM have also shown that collaboration and its forms are not static. In fact, collaboration continuously evolves depending on a variety of factors both inside and outside firms and it does so according to certain identifyable principles.

2.3.1 Early work on the evolution of collaboration

According to Axelrod (1984) collaboration[25] between two firms (actors) is a process that unfolds gradually. Therefore, collaboration has a beginning, middle and "end".

In the beginning, collaboration can emerge anywhere, even in situations when the environment prevents it (the environment is "conductive to defection") such as war zones. Typically, collaboration first evolves in very small clusters of individuals who base their activities on reciprocity and trust. If the first phase succeeds, collaboration expands (this represents the "middle" of the process) among players (actors) that share a common collaborative strategy despite other available strategies in their environment. If this second phase succeeds as well, the players arrive at "full collaboration" or the maturity of this process. In the third phase, collaboration is established and can protect itself from the invasion of less collaborative strategies. The cases of Elemental, ScotRail and P.R.O.F. all represent instances in which actors have arrived at "full" collaborations. While these actors may repeatedly enter and exit the ecosystem, the rules of collaboration will be passed on to future "generations". In this way, collaboration (or the forms of collaboration) never truly arrive at an "end". Rather, collaboration continues in new ways. Following French nobleman and chemist Antoine Lavoisier's quote, "Dans la nature rien ne se crée, rien ne se perd, tout change." [In nature, nothing is created, nothing is lost, everything changes.], in ecosystems – and other forms of collaboration too, the foundational elements of collaboration can endure, serving as seeds for new initiation and growth.

In as follows, I move on to discuss various forms of cooperation and coordination combined (I call them forms of collaboration) and how advancements in each have led to the development of next generation of inter-firm relations.

2.3.2 Alliances: the basic building blocks of collaboration

The most basic forms of inter-firm collaboration known to scholars are the strategic alliances ("alliances" from here on) between two or more independent

[25] In his work, Axelrod (1984) focused on the cooperation facet of collaboration. Nevertheless, his findings have important implications for collaboration in general.

firms. In alliances, the firms temporarily combine resources and efforts to reach their strategic goals (Hagedoorn, 1996).

Alliances involving two (dyadic alliances) or more firms (multi-partner alliances or alliance constellations) (Das, 2015; Das and Teng, 2002) were first witnessed in the 1970s in high-tech sectors such as IT and pharmaceutical biotechnology (Hagedoorn, 1996). In these sectors, firms were experiencing the limitations of their own internal resources. Consequently, they began tapping into externally available ones. External resources were then internalized and integrated with internal (existing) resources to increase competitiveness and meet strategic goals.

A defining feature of early alliances was the self-interested behavior of the partners involved. Large pharmaceutical companies, for example, were interested in internalizing biotechnological knowledge from small firms, while the small firms were interested in accessing both financial resources and competencies to produce and market new drugs from the larger entities (Powell, Koput and Smith-Doerr, 1996). Additionally, both types of actors aimed to strengthen their individual competitive positions in end markets by securing ownership/ access to crucial resources. Ultimately, the goal of large pharmaceutical firms was to become skilled at biotechnological drug development whereas most small biotechnological firms aimed to become fully integrated drug developers. Combining resources (cooperating) through early alliances in pharmaceutical biotechnology was therefore a means of enhancing the other partner's ability – that is, the ability to independently develop and produce more valuable drugs than the competition.

While alliances emphasized cooperation and showcased how actors could effectively coordinate their efforts, joint strategizing was not typically the case. Instead, firms drew up their own strategies to follow. Effectively, alliances helped firms join forces on a temporary basis because their strategic goals matched and their resources were complementary. Hence, a source of synergy (Hamel, 1991). As for formal control, in the early days of alliances, actors tried to retain as much of it as possible.

In summary, collaboration in the alliance phase was, for most firms, a new (and little understood) strategic tool. Generally speaking, many firms tried to

compensate for their lack of experience by designing formal, all encompassing, legal arrangements that enabled them to have a strong influence on their collaboration partners' actions. In the 1970s and 1980s the world therefore saw the proliferation of equity collaboration, whereby companies would take a stake in their partners so as to have a strong say in the joint project. It was only in the 1990s that the share of equity partnerships in the total number of alliances started to drop in favor of more flexible, loosely organized contractual agreements (Narula and Hagedoorn, 1999).

2.3.3 Portfolios: collections of alliances

The second form of collaboration (one that emerges from alliances) is represented by portfolios and by the act of portfolio management. In other words, by the attempt to manage synergies across an increasing number of stable (lasting) partnerships and partner types.

Unlike basic alliances, portfolio management practices require firms wishing to get more out of their collaboration efforts to extract best practices from their alliance experiences and to then spread them throughout their organization. In portfolio management the focal firm (the ego) optimizes its direct relations to effectively reach its own strategic goals (Lavie, 2007). Also, and once again in contrast with alliance practice, portfolios showcase the changing attitude towards partners and the important establishment of alliance functions. That is, self-centeredness and individual strategizing are becoming less the norm and more the exception.

From managing alliances to managing portfolios of relations, many firms therefore viewed partnerships as a more structural element of doing business. This change of view also changed their attitudes towards the actors they considered crucial for reaching long-term strategic goals. As a result, portfolio management models came to distinguish between strategic partners and transactional partners. Informal design elements such as trust building, joint learning, and shared norms became increasingly important in the management of the longer-term relations that are usually established with strategic partners.

Philips Electronics, for example, has traditionally classified its partners into strategic alliance partners, regular partners, and contractual relations. With its strategic partners, the company developed longer-term, mutually beneficial, trustful relations where both the wellbeing of Philips and the wellbeing of the partners were equally important. To partnerships that were not considered to be strategically important, the company applied a different approach by not devoting as much management attention and trying to serve its own needs in the most efficient and effective manner (Roijakkers, Zynga and Bishop, 2014).

Alongside a changing attitude towards crucial partners, portfolio management also came with the establishment of alliance departments in many firms engaged in an increasing number of alliances (Kale and Singh, 2007). With only two or three alliances unfolding at a time, these relations could be managed as separate structures. As their numbers grew, however, it became necessary to manage the connections between these alliances, the synergies between different types of actors, and the link between the entire portfolio of alliances and the corporate strategy. As such, the element of learning based on experience became a crucial one.

With increasing alliance experience, firms accumulated knowledge on managing their portfolio of alliances too.

In summary, the transition from the first to the second form of collaboration brought significant changes. As firms matured, they started adopting a more long-term view on alliances and started building more trustful relationships with strategic partners as a consequence. In these relationships, the wellbeing of every partner was equally important. This shift in attitude was grounded in the notion that such relationships would be more successful and would thus more effectively serve firm interests.

2.3.4 Networks: inter-connected portfolios

A third important form of collaboration that emerged over time was the network.

While alliances and portfolios were initially limited to high-tech sectors, new collaboration practices and with them, new forms of collaboration, gradually spread to other industries, too. These industries included the low- and medium-tech sectors as well as service-based industries (late 1980s and 1990s). One of the earliest examples of an alliance in the service industry was the long-standing partnership between KLM and Northwest Airlines (now Delta) initiated in 1989.

Generally speaking, it was the proliferation of alliances and of alliance portfolios in many industries that led to the formation of dense network structures. While portfolios were characterized by direct links between actors and an ego firm that managed synergies within the portfolio, networks comprised not only direct links between many actors and an orchestrator but also interconnections among the actors themselves (Powell, Koput and Smith-Doerr, 1996).

With growing portfolios of diverse partners such as suppliers, complementors (firms that sell or offer goods or services that are compatible with one another), competitors, and even end customers, many firms began to understand that the boundaries of their portfolios were not clearly defined and that information could potentially travel further than their direct connections. Through their partners' partners firms were therefore connected to resource and information flows that existed beyond their portfolios. Consequently, many firms with more mature approaches to collaboration began to actively manage their position in such networks. This move was necessary for better access to critical resources and information. Researchers thus began to relate the position of firms in networks to their performance (Gulati, 1995). Additionally, researchers began to examine the role of trust in networks, especially from the perspective of the orchestrator (ego firm) and the rest of the actors (Skardon, 2011). Dhanaraj and Parkhe (2006) for example note that trust, alongside procedural justice and joint asset ownership, represents an important way to ensure the equitable distribution of value in networks.

In the strategy/IM literature, some authors have viewed networks as constellations of alliances ("alliance constellations") and have remarked the shift from competition between firms, to competition between entire networks (Gomes-Casseres, 2003). While firms still entered networks to access external resources

and strengthen their internal resource base, resources were increasingly being created at the level of the network thus benefiting all actors involved.

In addition to pooling their resources, firms in networks also experimented with joint strategy formulation. This new practice encouraged interaction for the wellbeing of the network, rather than of the individual actor. As time went by, network actors also became more specialized and therefore more dependent on others for complementary functions. In other words, networks actors began to provide each other with crucial input for mutual value creation. Interestingly, while network orchestrators actively designed network management models, networks also evolved, to some extent, on their own. This evolution was helped by mutual adjustment among actors that rippled through the network. Collaboration was thus becoming, bit-by-bit, self-sustained.

Well-documented examples of networks from the pharmaceutical biotechnology industry are the networks led by Millennium Pharmaceuticals in the 1990s (Stuart, Ozdemir and Ding, 2007). In the field of respiratory disease, Millennium shared its technological knowledge with the large pharmaceutical firm Astra AB, which provided access to its complementary resources necessary to bring new drugs to the market. Within the same network, Millennium also integrated the resources of Harvard, Anhui Medical University, and the National Institute of Allergy to ensure access to the latest scientific developments. In the field of type II diabetes Millennium actively brought together the Whitehead Institute, Washington University, Joslin Diabetes Center, and pharmaceutical firm Hoffman La Roche to strategically align their joint efforts. In these networks, Millennium specialized in its core competence and relied on its partners to provide their unique, complementary resources on a longer-term basis.

In summary, networks were a form of collaboration more firmly grounded in collective wellbeing. As network actors connected both to the ego firm (orchestrator) and to each other, the benefits generated for the collective started to prevail.

2.3.5 Ecosystems: elevated networks

The fourth and most recent potential form of collaboration is the ecosystem. As noted in the introduction (Chapter 1), ecosystems are increasingly common in various sectors of industry where they play a significant role in improving the individual and collective wellbeing of people and firms (Kramer and Pfitzer, 2016). Some recent examples include the well-documented cases of IMEC (Leten et al., 2013), Chez Panisse (Chesbrough, Kim and Agogino, 2014), ScotRail (Jaakkola and Alexander, 2014), P.R.O.F. (Vanhaverbeke and Verhoeve, 2016), but also the lesser known cases of Elemental[26], The New York Times[27], HitRecord[28], and the Copenhagen Food Cooperative (Leroi-Werelds, Pop and Roijakkers, 2017). All of these cases represent instances in which formal orchestration models and structures are replaced by less formal alternatives largely based on trust and reciprocity. The latter makes constant communication an important activity of the ecosystem actors (Kramer and Pfitzer, 2016).

As noted in Section 2.4.1, ecosystems in strategy/IM are often contrasted to their biological counterparts (Gulati, Puranam, and Tushman, 2012; Iansiti and Levien, 2004; Lusch and Vargo, 2014). This is because strategy/IM has posited that ecosystem actors can tune into their environment, search for the best resource combinations, and create joint value based on collaboration and structured competition (Ritala et al., 2013). Actors can also use feedback from the ecosystem to adapt even more effectively in the future (Barile et al., 2016). Thus, the performance of ecosystem's individual partners is closely linked to the survival of the ecosystem as a whole (Clarysse et al., 2014; Han, Lowik and de Weerd-Nederhof, 2017). In addition to this evolutionary component, a shared vision on the basis of which joint strategizing occurs (Kramer and Pfitzer, 2016), ties ecosystem actors together in the long run. Such a vision enables ecosystem actors to feel they are part of a shared enterprise, serving each other, helping each other

[26] http://www.elementalchile.cl

[27] https://mashable.com/2014/05/16/full-new-york-times-innovation-report/?europe=true

[28] https://hitrecord.org

create value, committing to each other, and pursuing jointly formulated strategies and goals (Thomas and Autio, 2013; Vargo and Lusch, 2016).

Given these considerations, strategy/IM scholars see ecosystems as largely evolutionary or grounded in shared norms and shared leadership (Adner, 2017), but also managed structures, or grounded in joint strategizing based on a shared vision (Gulati, Puranam, and Tushman, 2012; Mars, Bronstein and Lusch, 2012; Vargo and Lusch, 2016). Additionally, scholars view ecosystems as forms of collaboration

With respect to governance, an ecosystem's development is grounded in certain formal and informal norms (Nambisan and Baron, 2013). A well-grounded set of rules decreases the need for the stringent design and an active orchestrator, stimulating evolution and self-renewal. What is more, ecosystems can function on the basis of *shared* leadership; that is, they can be shaped by different partners over time. In Chapter 3, the example of Q-Search, an HR-services ecosystem, shows how different partners can take the lead in different projects within the ecosystem depending on their specific knowledge and expertise, thus facilitating the evolutionary course (Gulati, Puranam, and Tushman, 2012).

While the unique strategizing and governance models in ecosystems are worth noting, the single most important factor that distinguishes ecosystems from alliances, portfolios, and networks, is this increased **focus on the end customer** (see also Section 2.6 for more on this perspective). In collaborative arrangements preceding ecosystems, end customers are considered passive recipients of value embedded in output (goods or services) while their contribution to mutual value creation processes is largely neglected.

Having understood the origins of ecosystems as well as the most common forms of inter-firm collaboration, I move on to discuss some of the important perspectives that fuel ecosystem research. These perspective stem from various literature streams, are highly combinable and therefore represent an excellent opportunity for inter-disciplinary research.

2.4 Using multiple disciplines and perspectives to study ecosystems

> The innovation ecosystem literature pays insufficient attention to the "dialog with multiple constituents" (Ritala and Almpanopoulou, 2017, p. 39)

From architecture to healthcare, and from restaurants and hospitality to nano-electronics, firms from a variety of industries and inhabiting various geographies are becoming increasingly skilled at collaboration. More specifically, they are becoming increasingly skilled at collaborating with other actors in ever more complex ways, including, but not limited to ecosystems (see Section 1.1 for three illustrative tales of collaboration).

As they migrate from traditional forms of collaboration such as alliances and portfolios to more complex forms such as networks and ecosystems (see Section 2.3 for a discussion of the evolution of collaboration), however, firms embark on a complex journey. This journey entails a series of transformations (shifts) including, but not limited to: a shift from a short-term focus to a long-term view of the business, a move from uni-directional relationships to relationships grounded in trust and mutuality, and a change from strict IP policies to looser, more generic IP regimes (see Leten et al., 2013 for an example in nano-electronics). As the following sections will illustrate, ecosystems, more than any other form of collaboration, evidence all of these transitions. More importantly, ecosystems exhibit a series of important characteristics that contribute to better collaboration and more mutual value creation for the actors involved.

For example, in ecosystems the individual self-interests of the various actors are of lesser importance than the overall wellbeing of the ecosystem. At ScotRail, the self-interest of the transportation company is of lesser importance than the overall wellbeing of the actors that contribute to the success of "Adopt a Station" – e.g., passengers, policy makers, suppliers etc. Additionally, ecosystems have an explicit end-customer focus making these forms of collaboration suitable for creating truly customer-centric solutions (Leroi-Werelds, Pop and Roijakkers, 2017). This was the case at Elemental and P.R.O.F. At Elemental, the dwellers are at the center of the reconstruction efforts, whereas at P.R.O.F. the elderly are at the heart of innovation and collaboration efforts between the actors.

In the academic literature, not all of the aforementioned characteristics of ecosystems have been addressed by one single literature stream. In fact, it appears that various **literature streams have contributed differently** to the current understanding of ecosystems and their defining features. For example, while the entrepreneurship literature has offered some evidence on the motivations of the individual actor in an ecosystem, the strategy/ innovation management field has extensively described the rules of coopetition (collaboration and competition combined) and strategy-making (including possible bottlenecks). Another important stream, service marketing, has, by contrast, focused on the explicit role of the customer as well as on the general processes of value co-creation.

To overcome this limitation, this PhD thesis leverages insights from strategy/IM and infuses them with concepts from entrepreneurship and service marketing. In other words, the PhD thesis takes an inter-disciplinary approach to help provide a more integrated and more nuanced understanding of ecosystems as new forms of collaboration.

Below, I discuss how strategy/IM, entrepreneurship and service marketing have enriched the current understanding of ecosystems as well as how these fields combine.

2.4.1 Perspectives from strategy and innovation management (IM)

In strategy/IM the notion of an ecosystem was first introduced in 1993 through pioneering work of James F. Moore. In his discourse on the new ecology of competition, Moore (1993, p. 76) wrote that ecosystems "condense out of the original swirl of capital, customer interest, and talent generated by a new innovation, just as successful species spring from the natural resources of sunlight, water, and soil nutrients". As this viewpoint gained popularity, so did the parallel between man-made ecosystems and their natural counterparts. For example, it was believed that just like in nature, business communities also evolve from a random collection of elements to structured forms. Similarly, dominant firms, just like species, could lose their dominance as environmental factors changed.

While the fitness of the parallel to the natural world has eventually questioned in the academic world (Oh et al., 2016; Ritala and Almpanopoulou, 2017), strategy/IM continued to use the **analogy to natural ecosystems** to explain the new rules of competition and strategy making in increasingly complex business environments. In particular, strategy IM theorized about how organizations in ecosystems can gain competitive advantage/ stay profitable (Williamson and De Meyer, 2012). In a recent contribution, Adner (2017, p. 39) reinforced this point by noting that "[the rising interest in ecosystems] has mirrored an increasing interest and concern (…) with interdependence across organizations and activities".

The analogy to natural ecosystems, however, was not the only important perspective strategy/IM has lent to the study of ecosystems. Drawing on the rich existing literature on alliances and portfolios, strategy/IM scholars have also theorized about how **open innovation** was **taking place in more complex settings** and how firms were collaborating with more partner types, including the end-customer. Open innovation is a management paradigm which originally grew out of the practices and research of the high technology industry in the U.S. and Japan (Chesbrough, Vanhaverbeke and West, 2014) and which can be defined as "a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model" (Chesbrough, Vanhaverbeke and West, 2014, p. 17). In plain terms, open innovation involves the utilization of knowledge, both inside and outside a firm, to innovate something new.

An important development in open innovation that has also contributed to a better understanding of ecosystems was the introduction of **coupled open innovation** as a third way of combining knowledge from within as well as outside firms' boundaries. In highly complex collaborative environments such as ecosystems, strategy/IM scholars observed, some firms appeared to **couple** traditional outside-in (inbound) or inside-out (outbound) modes of open innovation[29] to

[29] Inbound processes can include scouting, in-licensing IP, attending events, university research programs etc., while outbound processes can refer to donating IP, spin-offs, corporate incubators and more.

produce innovative products, services and business models (Gassmann and Enkel, 2004; Chesbrough, Vanhaverbeke and West, 2014). In other words, firms used coupled open innovation processes to accelerate and improve collaboration among each other and ultimately reach joint goals. This observation helped provide a deeper understanding of the complex processes taking place at the heart of ecosystems.

In a related narrative, strategy/IM scholars also highlighted the unique **value co-creation processes** in ecosystems. That is, the "the practices of developing systems, products, or services through collaboration with customers, managers, employees, and other company stakeholders" (Ramaswamy and Gouillart, 2010, p. 5). The act of co-creation, it was argued, was fundamental to the creation of valuable synergies among actors and thus to the longevity of the ecosystem overall. According to Clarysse et al. (2014), actors in ecosystems create joint processes and worked in tandem in order to effectively pool their resources. This view is also reflected by (Ritala et al., 2013, p. 246) who state that: '[In ecosystems] Value is more often co-created (…) [through] collaboration and competition in different or even same market".

Co-creation processes in ecosystems, however, are impossible without the existence of **trust and reciprocity** among the actors. Indeed, as a number of scholars have remarked, an optimal level of trust[30] (Molina-Morales, Martínez-Fernández and Torlò, 2011) is essential to successful knowledge exchanges in an ecosystem. Inter-personal and inter-firm trust in particular (Ritala et al., 2013), can be viewed seen as intangible, complementary governance mechanisms to contracts. To play the collaboration game right (Blomqvist, Hurmelinna and Seppänen, 2005), scholars have argued, ecosystem actors must consider the inherent challenges of collaboration and address them accordingly. Some of these challenges include the existence of asymmetric partners (for example, start-ups and large, established firms) as well as the existence of agency problems in

[30] Insufficient trust as well as excessive trust can be damaging to the performance of the actors in an ecosystem. Investing in relationships that provide little value to the firm's activity, for example, can lead to a misallocation of resources or even taking unnecessary risks (Molina-Morales, Martínez-Fernández and Torlò, 2011).

general. As noted in the seminal work of Jensen and Meckling (1976), such agency problems are inherent to any collaborative context – especially in highly inter-connected settings in which larger actors (or principals according to principal-agent theory) frequently outsource tasks or functions to smaller, more specialized actors around them (agents) expecting that the latter act in their best interest.

On a separate note, strategy/IM research has also contributed to a deeper understanding of ecosystems by providing insights on **collaboration** in general and its various **forms**. Specifically, strategy/IM has helped describe the fundamental ways in which actors can exchange resources, connect, learn, and innovate to successfully navigate an increasingly complex business environment (McGrath, 2016). In this respect, strategy/IM has studied strategic alliances (Hamel, 1991; Hagedoorn, 1996; Das and Teng, 2002), portfolios (Lavie 2007; Ozcan and Eisenhardt, 2009; Roijakkers et al., 2014) and networks for collaboration (Powell, Koput and Smith-Doerr, 1996; Gomes-Casseres, 2003; von Hippel, 2007) extensively. While these forms of collaboration all preceded ecosystems, they offered important lessons for ecosystem research. For example, in the shift from alliances to ecosystems, governance models changed from strict orchestration to looser arrangements. In Section 2.3 I describe this important evolution in more detail and also provide complementary insights from the work of Robert Axelrod (Axelrod, 1984).

In connection to how collaboration develops and forms of collaboration emerge, strategy/IM has theorized about the circumstances under which ecosystems are created. To this end, strategy/IM scholars have also argued that ecosystems can be **both engineered** (built deliberately, using planning) **and emergent** (formed organically, without direct intervention) (Oh et al., 2016). Moreover, ecosystems have been shown to mature in specific **evolutionary stages**. For example, Moore (1993) and his followers, have indicated that ecosystems develop from birth, throughout expansion and leadership, and eventually reach self-renewal – or, alternatively, death (the form dissolves and actors move on to establish other forms of collaboration, perhaps less complex). During birth, ecosystem actors focus on defining what customers want. During expansion, the ecosystem becomes enlarged thorough the development of innovative concepts (based on customer needs) and through scaling up. During the leadership stage the

ecosystem actors become preoccupied with standards and there is a focus on profitability and remaining stable. Finally, the ecosystem becomes threatened by other ecosystems and innovations and even policy changes. If it is strong enough it will renew itself by identifying new needs and starting over. Alternatively, the ecosystem will dissolve/ die.

A final important perspective from strategy/IM refers to the **risk(s)** ecosystem actors face as they collaborate in increasingly complex ways. According to the widely referenced works of Adner (2006) and Adner and Kapoor (2010), the success of an actor's growth strategy in an ecosystem greatly depends on whether he/she **assesses risk in a structured way**. Specifically: initiative risks (the familiar uncertainties of managing a project), interdependence risks (the uncertainties of coordinating with complementary actors) and integration risks (the uncertainties presented by the adoption process across the value chain).

While this list of perspectives from strategy/IM is not meant to be exhaustive, it provides an important overview of the contributions strategy/IM has brought to current ecosystem research.

2.4.2 Perspectives from entrepreneurship

In entrepreneurship, the introduction of ecosystems as a research concept can also be linked the work of Moore (1993; 1996) on the ecology of competition but also to developments in regional studies and economic geography, two fields closely connected to entrepreneurship. Regional studies refer to the study of different geographical regions and their relationships to the larger world whereas economic geography studies the broader location, distribution and spatial organization of economic activities globally.

In economic geography in particular, researchers have advanced general frameworks to help understand how entrepreneurship develops in certain regions. If the development and evolution of entrepreneurial activities in key regions was understood, they argued, policy makers could learn how to create more entrepreneurship in those same locations and potentially elsewhere. One such framework was that put forward by Isenberg (2011). This framework divides

ecosystems into **six domains** – human capital, markets, policy, finance, culture and supports – that interact in complex ways to **make the ecosystem self-sustaining** (able to renew itself). The human domain includes labor and educational institutions; markets refer to the networks of the entrepreneurs as well as to their early customers (early adopters of technologies); policy includes support for entrepreneurship from both the government as well as other sources (e.g., social legitimacy of entrepreneurship); finance includes financial capital (e.g., micro-loans); culture refers to having adequate social norms as well as to promoting entrepreneurship through success stories; and supports includes support professions for entrepreneurs (e.g., legal and accounting, technical experts etc.). In other words: actors, institutions and infrastructure all needed to be carefully coordinated for an ecosystem to be successful.

Much like strategy/IM, entrepreneurship has also aimed to distinguish ecosystems from other forms of collaboration. To this end, ecosystems in entrepreneurship have been represented as a type of **"elevated network"** (the parallel to networks is frequent). Nambisan and Baron (2012), for example, see ecosystems as "loosely interconnected networks of companies and other entities", whereas Autio and Thomas (2013) define them as "a network of interconnected organizations". In Section 2.5 I discuss in more detail how the available definitions of ecosystems converge and diverge.

In terms of its main contribution to ecosystem research, entrepreneurship has focused on putting forward the building blocks (domains) of ecosystems and the **ecosystem strategies** (strategic thinking) used by actors to achieve **success** (Acs et al., 2017). Here success refers to actors' ability to continue their economic activity (survive). Additionally, the field of entrepreneurship has contributed to ecosystem theory by **profiling actors** in ecosystems. That is, by identifying the **capabilities** that allowed actors (individuals/ entrepreneurs or firms/ ventures) to thrive in such complex forms of collaboration.

In terms of exploring strategies for success, entrepreneurship scholars (Zahra and Nambisan, 2012; Nambisan and Baron, 2013; Autio and Thomas, 2013) have carried out studies on successful collaboration among entrepreneurs as well as on incentives to collaborate. With global competition on the rise, shorter product life

cycles and increased risk, these studies revealed how entrepreneurs increasingly **co-evolved their capabilities** for innovation, instead of nurturing them individually. At the same time, there appeared to be a shift from working competitively to working **cooperatively *and* competitively** (Mione, 2009; Ritala et al., 2013; Bengtsson and Johansson, 2014) to develop new products and services. This was not possible in highly hierarchical collaborative arrangements such as alliances or portfolios. Finally, researchers remarked a trend whereby actors from ***both* the production** (manufacturers) **and use side** (end customers) (Autio and Thomas, 2013) of the innovation process worked together for their mutual benefit and survival. These findings reinforced prior insights from strategy/IM.

In terms of actors' capabilities, entrepreneurship research showed that actors in ecosystems typically possessed **insight** and nurtured **strategic thinking**. In the words of Zahra and Nambisan (2012, p. 219): "Creating, shaping, navigating, and exploiting (…) ecosystems requires entrepreneurial insight, coupled with strategic thinking". Insight refers to having sufficient knowledge and skill to create the future, whereas foresight involves shadowing the future (anticipating it).

Some other important capabilities mentioned by entrepreneurship scholars include actors' **overconfidence** (generalizing beyond facts), **optimism** (seeing positive trends) and **rigidity** (failing to alter their views) (Busenitz and Barney, 1997). These traits help entrepreneurs sustain their ambitions and contribute the success of the ecosystem. At the same time ecosystem actors have been shown to possess a so-called **"ecosystem mindset"** (Nambisan and Baron, 2012). This mindset is a culture-related aspect and refers to the ecosystem actors' *cognitive* ability to adapt to conflicting demands from their environments. To succeed, actors must therefore **exercise self-control** (resisting powerful impulses), **grit** (being focused and persistent in pursuit of **long-term goals**), and **metacognition** (control over their own cognitive processes).

While some of these traits might appear as contradictory (rigidity versus adaptability), these characteristics can work both to the entrepreneur's advantage as well as against the entrepreneur depending on the time horizon and the corresponding challenges of this horizon. In Chapter 3 I elaborate on the

versatility of these traits and how they might best be combined to sustain an ecosystem's evolution.

Summing up, entrepreneurship has shared insights on how entrepreneurs address limitations in their environments, how they deal with complexity and constraints (e.g., through coopetition) and how they turn challenges into actions that create value (see also Paquin and Howard-Grenville (2013) on the paradoxes entrepreneurs must manage in ecosystems).

2.4.3 Perspectives from service marketing

In service marketing the initial introduction and eventual uptake of the "(service) ecosystem" as a research concept coincides with **a change of perspective regarding the source of value** and markets in general. For example, economic activity was no longer viewed as taking place in linear value chains in which physical products are offered to end-customers, but rather in "dynamic and processual value-creating constellations" (Ng and Vargo, 2018, p. 518). This line of thinking was similar to the one expressed by strategy/IM. At the same time, value itself was no longer seen as something created in isolation by a single actor such as an individual or a firm, but rather as "a co-creative endeavor (…) with context playing an essential role" (Ng and Vargo, 2018, p. 518). Finally, service marketing scholars observed how in the context of advancing economies, service was once again becoming an important concept. Specifically, firms were "transitioning away from a traditional manufacturing identity to a service orientation" (Ng and Vargo, 2018, p. 518).

In time, this change of perspective around value creation condensed into a new lexicon (new terms were introduced) and also theory. This theory came to be known as **service-dominant logic (S-D).** Because of the importance of S-D logic to ecosystem research (ecosystems or "service ecosystems" in service marketing and underlaid by the principles of S-D logic), I elaborate on it in more detail below.

S-D logic (Vargo and Lusch, 2004) represents a pattern of thought that challenges long and firmly held assumptions about the source of value, the role of customers and firms as well as how firms should approach marketing and innovation

activities. This pattern of thought is also known as the "service mindset" and is best understood by contrast to the traditional "product mindset".

The product mindset, also known as the goods-dominant (G-D) logic (Vargo and Lusch, 2004), states that what a firm produces is the focal point of value creation. As noted in Chapter 1, the central premise of this logic is that firms create and deliver value to their customers. Customers, on the other hand, are mere targets for the firm and passively receive value when buying the product or service. The service mindset, however, states that **the customer is the creator of his/ her own value**. The central premise of this latter is that a firm cannot create value for, nor deliver value to, the customer, but that the customer is the sole creator of his value through a process called **resource integration**. Thus, firms cannot create value for the customer, but can only support their end-customers' value creation process. When buying a car, for example, a customer needs several resources such as car maintenance, a license plate, insurance, loans, fuel, etc. which he/she integrates from various service providers (car dealership, bank, insurance company, registration office, fuel stations) in order to make the car usable and therefore valuable (Leroi-Werelds, Pop and Roijakkers, 2017).

Observing these developments, service marketing researchers have concluded that:

> Value is not completely individually, or even dyadically, created but, rather it is created through the integration of resources, provided by many sources, including a full range of market-facing, private and public actors (Vargo and Lusch, 2016, p. 9).

The **main distinctions** between G-D and S-D logic can be summarized as follows. While under G-D logic the purpose of the firm is to produce and distribute of units of output (which were embedded with value), in S-D logic firms' purpose is to assist their end-customers in their value creation process. Furthermore, while in G-D logic, actors exchange money for goods and services, in S-D logic service becomes the sole basis of exchange. The end-customer, under G-D logic is portrayed as recipient of goods and therefore a destroyer of value. In contrast, S-D logic notes that the customer is the creator of value and that the goods and services provided by a firm are mere inputs for this process. In terms of the customer-firm interaction, G-D logic notes that firms do things to customers (they

segment them, distribute and communicate to them). S-D logic however states that firms do things with customers; thus, customers are not passive recipients or targets but rather active resource integrators (for a complete list of distinctions between G-D and S-D logic see Leroi-Werelds, Pop and Roijakkers (2017, p. 19)).

The important transition from neglecting the role of the end-customer to acknowledging the contribution of the end-customer in the value creation process (value becomes co-created) is similar to the transition from a firm-centric or ego-orientation to a customer-centric or partner-centric orientation in strategy/IM. This similarity helps create an important bridge between the field of strategy/IM and that of service marketing.

All in all, having a different understanding on the collaboration patterns/ relationships between end-customers and firms, especially in highly complex environments (Chandler and Vargo 2011) has eventually led to a systems orientation in service marketing. Consequently, researchers began using the term "**ecosystem**" to identify systems in which customers interacted not only with firms but with their broader environment (Lusch and Vargo, 2014). Ecosystems as forms of collaboration were therefore defined as "relatively self-contained, self-adjusting systems of resource integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" (Vargo and Lusch, 2016, p.10)

Through the elements of this definition, which I discuss in more detail in Section 2.6, service marketing scholars made additional contributions to ecosystem research. For example, by noting the importance of **institutions** – i.e., the rules, norms, meanings, symbols, practices, and similar aides to collaboration (Vargo and Lusch, 2016) in ecosystems. Following the prescriptions of S-D logic, these institutions could be aggregated at three levels of context (Lusch and Vargo, 2014) including: the micro level (e.g., rules and norms of collaboration at the dyadic, B2B, or B2C level), the meso level (e.g., rules and norms of collaboration at the industry level), and the macro-level (rules and norms of collaboration at the national/ country level). Adding such granularity to the study of relationships between ecosystem actors was critical to a better understanding of new collaborative arrangements.

A final, important contribution service marketing has made to ecosystem research is linked to actors' incentives to contribute to the ecosystem (incentives is also a topic addressed by entrepreneurship scholars). Specifically, service marketing has noted that **customers contribute voluntarily** to the ecosystem, while the extent to which they are willing to engage is influenced by a number of factors. Lusch, Vargo and O'Brien (2007) summarize these six key factors as: *expertise* (a customer is more likely to contribute if he has the required knowledge and skills); *control* (a customer is more willing to engage in the ecosystem when he/she wants to exercise control over either the process or the outcome of mutual value creation); *physical capital* (a customer is more likely to engage if he has the required tools and equipment to do so; see Elemental, ScotRail and P.R.O.F.); *risk taking* (engaging in the ecosystem may involve physical, psychological, and/or social risks; the lower the risks, the more likely customers are to engage); psychological benefits (e.g., pure enjoyment like at ScotRail, new product development such as at LEGO etc.) and *economic benefits* (e.g., lower purchase costs (or a discount), incentives).

2.4.4 How strategy/IM, entrepreneurship and service marketing combine

As shown above, strategic management and innovation (strategy/IM), entrepreneurship and service marketing have each contributed differently (but altogether significantly) to the understanding of ecosystems as new forms of collaboration. Furthermore, these fields have often provided complementary rather than opposing insights. For example, whereas strategy/IM has helped describe the fundamental ways in which actors engaged in collaboration (whether simple or complex) exchange resources, connect, learn, and innovate, entrepreneurship has helped describe key strategies used by actors to achieve their goals as well as the profile of these actors. Similarly, both strategy/IM and service marketing have been preoccupied with a firm's dominant logic[31] especially in complex settings (Bettis and Prahalad, 1995; Vargo and Lusch, 2008). While

[31] In strategic management, the dominant logic of a firm refers to an organizational filter that helps assimilate data that is in line with their strategy: "the dominant logic puts constraints on the ability of an organization to learn" (Bettis and Prahalad, 1995, p. 8).

the goods-dominant versus service-dominant (S-D) logic divide persists, new research increasingly combines both views. Skålén and Edvardsson (2016), for example, have offered a framework to help organizations migrate from one logic to another.

Generally speaking, strategy/IM, entrepreneurship and service marketing combine well in explaining the multiple facets of inter-firm collaboration. The latter makes inter-disciplinary research within these fields a relatively easy task.

According to Kraus and Kauranen (2009), strategy/IM and entrepreneurship combine especially well[32] because "both academic fields are focused on the process of adapting to change and exploiting opportunities" (Kraus and Kauranen, 2009, p. 38). As environmental dynamics change and global competition intensifies (see section 1.2.1), companies adopt increasingly entrepreneurial strategies to survive. In fact, complex collaborative settings enable companies to gradually abandon individual strategies and the traditional search for competitive advantage in favor of ecosystem strategies and a non-traditional search for alignment between partners (Adner, 2017). Consequently, scholars are increasingly calling for the integration of the two (McGrath and MacMillan, 2000).

The same Kraus and Kauranen (2009) note that both strategy/IM and entrepreneurship are concerned with value creation and acknowledge it as a major organizational goal. The same can be said for service marketing (Ng and Vargo, 2008). All three disciplines, in fact, acknowledge that value creation is central to the activity of the organization and offer theories regarding how this value might best be created/ its creation might be best facilitated.

In light of the above joining strategy/IM, entrepreneurship and service marketing for the purpose of inter-disciplinary research on inter-firm collaboration represents an exciting endeavor.

[32] Kraus and Kauranen (2009) also note that, generally speaking, strategy/IM and entrepreneurship intersect in six key areas or domains. These domains include: innovations, networks, internationalization, organizational learning, top management teams and governance, and growth.

Having discussed how strategy/IM, entrepreneurship and service marketing enrich the current understanding of ecosystems (separately as well as jointly), I continue by focusing on more specific topics in ecosystem research. In the next section (Section 2.5), I leverage perspectives from strategy/IM, entrepreneurship and service marketing to clarify the definition of ecosystems.

2.5 Clarifying the definition

2.5.1 Illustrative definitions by research field

Strategy/IM, entrepreneurship and service marketing as disciplines have leveraged the term "ecosystem" considerably – and also differently – in the past years. As illustration, I provide a sample of representative definitions from these fields.

Strategy/IM:

> An economic community supported by a foundation of interacting organizations and individuals — the organisms of the business world (Moore, 1996, p. 6)

> A value network (…) or a group of companies, which simultaneously create value by combining their skills and assets. (Clarysse et al., 2014, p. 1164)

> The alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize. (Adner, 2017, p. 40)

Entrepreneurship:

> [A] loosely interconnected network of companies and other entities that coevolve capabilities around a shared set of technologies, knowledge, or skills, and work cooperatively and competitively to develop new products and services. (Nambisan and Baron, 2012, p. 1071)

> [Organizational ecosystems] are comprised of diverse actors and organizations, which often enter into relationships and participate in exchanges based on a wide range of intentions. (Mars, Bronstein and Lusch, 2012, p. 274)

> A network of interconnected organizations, organized around a focal firm or a platform, which incorporates both production and use side participants, and focuses on the co-creation of new value through innovation. (Autio and Thomas, 2013, p. 205)

Service marketing:

> Relatively self-contained self-adjusting systems of resource-integrating actors connected by shared institutional logics and mutual value creation through service exchange. (Vargo and Lusch, 2016, p. 10)

> An ecosystem is a useful term for describing the interdependence between actors, their adaptation and evolution. If changes are too great and actors cannot adapt in line with the new conditions, then the ecosystem may collapse. (Frow and McColl-Kennedy, 2014, p. 11)

2.5.2 Where definitions converge and diverge

Some areas of consensus. There are several respects in which the definitions proposed by strategy/IM, entrepreneurship and service marketing align. For example, all three research streams agree that ecosystems represent complex forms of collaboration/ interaction between individuals and firms. They also agree that the purpose of the collaboration is always to create some type of benefit for those involved – whether concrete (e.g. new products and services, value propositions materialize) or more general (innovation, value). Furthermore, all definitions appear to center around the ecosystem actors, sometimes even noting their nature ("production and use side").

Where the definitions diverge. While on the surface the available definitions of ecosystems seem to converge, delving deeper into the specifics of each definition reveals the opposite. The first important difference lies in how the definitions are constructed. More specifically, the definitions seem to emphasize a variety of other terms: economic community, (value) network, (alignment) structure, system. This makes definitions inherently difficult to compare. This lack of consistency prompts a series of questions. For example, is a value community the same as a value network? And are alignment structures more potent that systems?

The definitions also diverge in terms of focus. While strategy/IM scholars emphasize the process aspects (the collaboration itself as well as the purpose of the collaboration – e.g., for a value proposition to materialize) (Adner, 2017) in an ecosystem, entrepreneurship scholars focus on the ecosystem actor – e.g., an ecosystem brings together production and use side participants (Autio and Thomas, 2013), as well as on the roles actors in ecosystems might take – e.g., focal firm, and their capabilities (sometimes co-evolved) (Nambisan and Baron, 2012). Additionally, the level of analysis can also differ all the way from the individual in the ecosystem (often the entrepreneur) (Isenberg, 2011; Grant, 2012), the organization in the ecosystem (Jaakkola and Alexander, 2014; Clarysse, 2014), the inter-organizational level (Leten et al., 2013) and even the national level – e.g., some scholars have looked at countries as ecosystems via the notion of "national systems of innovation" (Lundvall, 2010).

Finally, the definitions diverge in terms of how they refer to the rules and norms of collaboration among actors. While some scholars call such rules "shared intentions" (Mars, Bronstein and Lusch, 2012), others leverage the more established concept of "institutions" (Vargo and Lusch, 2016). Entrepreneurship scholars have also addressed the rules and norms of collaboration more indirectly by indicating that actors can work both collaboratively *and* competitively in ecosystems (Nambisan and Baron, 2012).

All in all, there appears to be no general agreement across research fields in terms of how ecosystems should be defined. On the flipside, however, exploring the differences – whether subtle or major – between definitions may lead to a deeper understanding of ecosystems as a research term. As Aarikka-Stenroos and Ritala (2017) remark, scholars are increasingly using "ecosystems" as an approach to describe inter-dependence and co-evolution of contemporary business and innovation activities. To *adequately* describe these activities, however, clarity, complementarity and rigor are necessary.

In as follows, and in an attempt to add more clarity to the discussion, I select our preferred definition and sketch out its most important elements.

2.5.3 A unified definition of ecosystems

Having the three research perspectives – strategy/IM, entrepreneurship and service marketing – in mind, I observe that service scholars Vargo and Lusch (2016) have so far offered the most comprehensive view on ecosystems[33].

Vargo and Lusch (2016) define an ecosystem as:

> A relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutions and mutual value creation (through service exchange). (Vargo and Lusch, 2016, p. 10)

In as follows, and for additional clarity, I describe[34] in more detail each element suggested by this definition. In doing so, **I pay special attention** to elaborating on **actors** (and their capabilities) in ecosystems, on **mutual value creation** and institutions, as well as on the **development** (patterns) of ecosystems in order to provide the necessary grounding for the empirical chapters (Chapters 3-5 each address one of these elements in detail). The focus on the latter elements is also consistent with the prescriptions of Axelrod (1984), whom suggests that the amount of cooperation attained in a specific context depends uniquely on the attributes of the individual players (actor capabilities), the relationships between the players (institutions, service exchange) and the nature of the context of the game (conditions for development). Therefore, the understanding of these elements in particular is important for the understanding of ecosystems as forms of collaboration in general.

2.6 The defining elements of an ecosystem

2.6.1 Actors and resource integration

[33] Järvi, Almpanopoulou and Ritala (2018) also cover the three important themes in their definition but their work condenses that of service scholars.

[34] While the selected definition of an ecosystem has been provided by service marketing scholars, in describing the elements of this definition I aggregate complementary perspectives from strategy/IM, entrepreneurship and service marketing.

According to the definition of Vargo and Lusch (2016), ecosystems form around resource-integrating actors such as end customers, intermediaries, suppliers, non-profit firms, commercial firms, and even local authorities. As one of the fundamental premises of S-D logic notes, all actors in an ecosystem (including the end-customer) are resource integrators. Resource integration implies that actors use existing resources (such as goods, services and information available to them), integrate them with additional resources and skills and ultimately transform the potential value of these resources into real value (or value in use) (Leroi-Werelds, Pop and Roijakkers, 2017). The cases of Elemental, ScotRail and P.R.O.F. illustrate this well[35] (see Section 1.1).

The view that all actors are resource integrators is especially important because it contrasts long and firmly held assumptions (especially in the strategy/IM literature) about the source of value in ecosystems – i.e., that value is embedded into products or services during the production process (G-D logic perspective). Through this, the definition of Vargo and Lusch (2016), captures the change of mentality/ thinking that firms experience in an increasingly interconnected economy.

Actor types and actor roles. As they integrate resources, ecosystem actors can also take on different roles. That is, actors can be both customers/receivers of input from other ecosystem actors and/or suppliers/producers of output for the benefit of other actors (Lusch and Vargo, 2006, 2008; Autio and Thomas, 2013). The fields of strategy/IM, entrepreneurship and service marketing have discussed the roles of actors in ecosystems as follows.

In strategy/IM, a frequently used typology of actors refers to **dominators, keystones** and **niche players**. In their widely referenced book "The Keystone Advantage" as well as in an article suggestively titled "Strategy as ecology", Iansiti and Levien (2004) used the term "dominators" to describe the ecosystem actors that overtook others, and the term "niche players" to describe actors with specialized roles that helped the ecosystem function adequately. Furthermore, the

[35] The unique resource integration mechanisms in an ecosystem often give this form of collaboration the feel of a close-knit "community"; see Adner (2017) for a discussion of ecosystems as affiliation/ community versus ecosystems as structures that help value propositions materialize.

authors introduced a special term, the "keystone", to describe actors whose function it was to regulate the ecosystem's wellbeing by providing a fundamental set of assets (the act of regulating the ecosystem's wellbeing has been called "orchestration"). While keystones represented only a small part of the total actors, they exerted tremendous influence on everyone else. Because niche players and dominators relied on the keystone(s) for guidance on how to deal with uncertain conditions, for help with connection among actors, and for innovation, a relationship of dependency was created.

Given the (often stark) differences between the aforementioned roles (and the roles described henceforth) and the complexity of the collaborative environment (which might be dominated by bureaucracy, a rigid IP regime etc.), tensions among ecosystem actors are inevitable (Axelrod, 1984; Ritala et al., 2013; Visscher et al., 2017). To promote long-term collaboration, the literature suggests that actors must practice reciprocity, understand the echo/ripple effects of their actions, and interact continuously (see Section 2.3.1). Actors will also need to practice a blend of collaboration and competition, identified in the literature as "coopetition".

While Iansiti and Levien's (2004) typology of ecosystem actors still endures, other authors have begun to add more granularity to the discussion. For example, Mars, Bronstein and Lusch (2012) suggest that another category of actors, the **ecosystem engineers**, could be just as important to the functioning of an ecosystem. Placed between the keystones and the niche players/ other actors, ecosystem engineers help create, shape, and modify the conditions under which actors operate. A government, for example, can easily take on this role by ensuring the necessary legal framework for a certain activity to take place.

In entrepreneurship, Autio and Thomas (2013) have distinguished between the **production side** and **use side** actors in an ecosystem. Consequently, an ecosystem, unlike less sophisticated forms of collaboration, can include suppliers, complementors and research institutions, *as well as* customers, competitors, regulators, judiciary and standard setting bodies. In service marketing research, Frow and McColl-Kennedy (2014, p. 14) reinforce this point by noting that "an ecosystem differs from a stakeholder system in that it includes entities not

generally viewed as stakeholder groups, such as "**anti-clients**". That is, competitors, or actors whose interests are generally viewed as conflicting with other actors who supply or complement each other in their interactions. Finally, in a more recent view, Visscher et al. (2017), note that in ecosystems where the activity is arranged around the products or technologies the companies develop, the categories of actors will include: **customers and suppliers** as well as competitors, complementors, or universities, which contribute to mutual value creation.

Actor capabilities. In close connection to actor types and roles, scholars have also provided insights on the capabilities that ecosystem actors must nurture in order to effectively perform resource integration.

Because each ecosystem is unique (Autio and Thomas, 2013; Rabelo and Bernus, 2015), however, the capabilities of the actors across these ecosystems likely differ too. While some capabilities can be general – e.g., the ability to network effectively with other actors, other capabilities are highly context-specific. For example, the actors in an ecosystem designed to create a yearly prototype for elderly care (such as P.R.O.F.), will nurture different capabilities than those in an ecosystem designed to rebuild a community immediately after a natural disaster (Elemental). This is due to the difference in the urgency in the two cases.

Below, I provide a sample of general capabilities from the literature and add a short commentary for each.

> Timing, resource allocation and partner due diligence are important capabilities actors must nurture. (Adner, 2006)

> A key capability is having an ecosystem mindset. (Nambisan and Baron, 2012)

> An organization's ability to facilitate and enhance mutually beneficial interaction is critical. (Karpen et al., 2015)

> Network building capability: Actors coevolve their capabilities and roles and tend to align themselves with the direction set by one or more central parties. (Adner, 2017)

> Actors must nurture a variety of capabilities – captured in an Open Innovation Maturity Framework. (Enkel, Bell and Hogenkamp, 2011)

According to the widely referenced work of Adner (2006), one of the most important (general) capabilities an actor must nurture in an ecosystem, is the **ability to assess various risks in a structured way**. In an ecosystem, the most common types of risks include: initiative risks (the familiar uncertainties of managing a project), interdependence risks (the uncertainties of coordinating with complementary actors) and integration risks (the uncertainties presented by the adoption process across). Understanding how to spot risks and learning how to manage them helps ecosystem actors adapt quickly to changes as well as plan for delays, compromises, and disappointments that are, almost exclusively, outside of their control.

On a related note, Ritala, Heiman and Hurmenlinna-Laukkanen (2016) suggest that ecosystem actors must develop capabilities to help them effectively **plan for the unfamiliar as well as the unknown**. Leveraging the well-known concept of "dynamic capabilities" (Teece, 2007; Winter, 2003) – i.e., the capabilities that secure competitive advantage in changing environments by helping actors solve *familiar* problems, the authors argue that in highly disruptive settings such as ecosystems, dynamic capabilities can actually become "rigidities". To effectively cope with the unfamiliar and the unknown, actors must focus less on dynamics capabilities and more on **mastering ad-hoc processes** (the ability to adapt) as well as on using **detachment** (or a collective and open state of mind to new ideas) to survive and thrive.

While Adner (2006) and Ritala, Heiman and Hurmenlinna-Laukkanen (2016) have focused on risk and managing the unknown, other scholars have focused on the ecosystem actors' abilities to **manage** the **paradoxes** inherent to ecosystems and their development. The work of Paquin and Howard-Grenville (2013), while referring originally to networks, is a case in point. In their study, the authors have identified three broad types of dilemmas actors (keystones/ dominating actors in particular) must manage to ensure the viability of their networks. Because ecosystems represent "networks of networks" (Frow and McColl-Kennedy, 2014) these lessons can also be applied to ecosystems (ecosystems represent "networks

of networks"). The first dilemma is a balance between broad and pragmatic legitimacy and refers to creating broad interest in the ecosystem's activities as well as prove the worth of these activities. Here, the dominant actors must be able to **engage** adequately with various other actor types and create productive dialogue so that a balance can be achieved and the ecosystem can develop. The second dilemma refers to enabling serendipity versus directing ties and refers to allowing actors to connect both in an organized fashion as well as by chance. To do this, dominating actors must possess an **ability to connect** as well as **brokering expertise**; these two capabilities help them create matches between other actors. The third dilemma is replication versus invigoration and is connected to focus on familiar projects or seeking novel ones. In this instance, the dominating actor must have an ability to balance the existing portfolio of projects as well as to effectively **seek new projects.**

In a recent address at the R&D Management Conference in Milan[36], scholars to the likes of Gianvito Lanzolla and Annabelle Gawer have also noted the **paradoxes** ecosystem entrepreneurs (both within and outside organizations) must keep in mind in an increasingly digitized economy. Some of these paradoxes include, for example, openness vs. control (sharing know-how openly versus withholding knowledge), flexibility vs. stability (allowing frequent changes versus maintaining the status-quo), collaboration vs. focus (engaging with multiple actors versus concentrating on own needs) and digital skills vs. legacy experience (combining old and new ways of working).

In entrepreneurship, Nambisan and Baron (2012) have put forward another important capability of the ecosystem actors: the ability to nurture an **ecosystem mindset**. This mindset is a culture-related aspect and refers to the ecosystem actors' ability to adapt to conflicting demands. More specifically, to the "cognitive processes through which individuals monitor, evaluate, direct, and adjust their own behavior so as to progress toward desired goals" (Nambisan and Baron, p. 1073). According to the authors, the existence of **self-regulation** is beneficial to ecosystem actors because being part of an ecosystem restricts their autonomy or independence. To continuously make good use of their skills, actors must

[36] http://www.rnd2018.polimi.it/academic-keynote-speakers/

therefore **exercise self-control** (resisting powerful impulses), **grit** (being focused and persistent in pursuit of long-term goals), and **metacognition** (control over their own cognitive processes). Such collections of capabilities help actors recognize promising innovation in and outside the ecosystem, manage performance and technology development goals, adapt to new circumstances (various bundles of capabilities are used at various times) as well as manage relationships. Actors that adopt the ecosystem mindset understand that indulging in impulsive (self-serving) behavior will lead to instability and a break-up of relations whereas self-control (resisting impulses) and the ability to value the long-term nature of the relation will enhance longevity of relations/ecosystems. I evidence this observation further in Chapter 3 in our study of the Q-Search ecosystem.

In service marketing, the ability to engage in **co-creation** is frequently referred to as a fundamental capability of the actors. In other words, the success of an actor is contingent on his/her ability to **co-create valuable experiences with other actors**. Building on earlier research in the field, Karpen et al. (2015) have put forward a number of capabilities that help actors co-create value through service exchanges. The capabilities include individuated, relational, ethical, empowered, developmental and concerted interaction. Individuated interaction refers to an actor's ability to understand the resource integration process, contexts and desired outcomes of other actors. Relational interaction is the ability to enhance social and emotional links with other actors. Ethical interaction relates to the ability to act in a fair and non-opportunistic way towards other actors. Empowered interaction means enabling other actors to shape the nature and content of the exchange. Developmental interaction refers to an actor's ability to assist other actors in developing their own knowledge and competences. Finally, concerted interaction is linked to an actor's ability to synchronize processes in the ecosystem. These six aforementioned capabilities are known collectively as an actor's "**service-dominant orientation**" and represent: "an organization's ability to facilitate and enhance mutually beneficial interaction and resource integration processes with individual actors within the service system" (Karpen et al., 2015, p. 91).

In the discussion of actors and actors' capabilities, especially in the strategy/IM literature, I also observe a subtle but nevertheless important **distinction** between the operational capabilities, or those capabilities that can ensure an "**operational fit**" in an ecosystem (production skills and technological knowledge, similar decision-making approaches, similar awareness of regulatory affairs, similar incentive schemes used to assess performance etc.), and the capabilities that ensure "**chemistry fit**"[37] (compatible work ethics, long-term commitment to the community (having a joint mindset), flexibility and innovation (co-creating experiences), planning jointly for the unfamiliar). While operational aspects are clearly important for mutual value creation in an ecosystem, cohesion and long-term stability can only be achieved by focusing on (the less easy to measure) chemistry aspects. In other words, **operational skills alone do not result in success** for the actors.

On a final note, in recent work, Adner (2017) puts forward another important capability for ecosystem actors. As ecosystem actors have joint value creation effort as a general goal, they must work towards building sustainable relationships. In doing so, they must possess the ability to **co-evolve their capabilities** and roles, and to align themselves with the direction set by one or more central parties. In summary, they must nurture a **network building capability**.

While studying each of the aforementioned capabilities – e.g., ecosystem mindset, service-dominant orientation, network building capability etc., in isolation is valuable, studying the ecosystem actors' capabilities collectively has emerged as an exciting new research avenue especially in strategy/IM.

In their widely referenced work, Enkel, Bell and Hogenkamp (2011) have tried to *collectively assess* actors' capabilities by putting forward a so-called **open innovation maturity framework**. Here, maturity represented "the extent to

[37] Operational, strategic and chemistry fit between organizations are three concepts coined by Robert Porter Lynch, the Director of the Association of Strategic Alliance Professionals in the US. These concepts have formed Lynch's widely referenced "three-dimensional relationship model". Initially applied only to relationships along the value chain, operational, strategic and chemistry fit are also relevant in the context of ecosystems whereby actors must assess the adequacy of the relationships between them.

which a specific process [was] explicitly defined, managed, measured, controlled and effective" (Enkel, Bell and Hogenkamp, 2011, p. 1164). By using this framework, the authors hoped to not only benchmark actors' open innovation capabilities[38] but also design management interventions based on the results. By understanding the maturity level of each actor, it was argued, the performance of each actor could be eventually improved. The three broad elements of maturity included in the framework were: climate for innovation, partnership capacity and internal processes, while the five maturity levels on which actors could find themselves included: initial/ arbitrary, repeatable, defined, managed, optimizing.

In a follow-up study, Hosseini et al. (2017) leveraged the work of Enkel, Bell and Hogenkamp (2011), as well as that of others to propose an even more comprehensive framework. This new framework included a collection of **23 capability areas** grouped in six categories: strategic alignment, governance, methods, information technology, people, and culture.

Summing up, resource integrating actors are the fundamental building blocks of ecosystems. Depending on the theoretical perspective taken, these actors can take on a variety of roles and perform a variety of functions. Ultimately, it is the actors' capabilities that will determine how well they integrate the resources available to them with resources in their collaborative environment.

In Chapter 5, I explore the topic of actors in ecosystems more deeply by proposing a capability framework (typology of capabilities) for actors in an ecosystem.

2.6.2 Mutual value creation (value co-creation) through service exchange

According to service marketing scholars, actors in an ecosystem engage in an act of mutual value creation (value co-creation) through service exchange. This value refers to any kind of co-created value (insights, knowledge, processes, products, services, etc.) that actors actually use in order to reach individual and joint goals (Autio and Thomas, 2013; Grönroos and Voima, 2013; Prahalad and Ramaswamy, 2004). I detail the important notion of service exchange below, together with the

[38] In strategy/IM, ecosystems are viewed as forms of collaboration that nurture open innovation; therefore, the ecosystem actors' capabilities in general become "open innovation" capabilities.

related notion of "institutions" (the rules and norms of collaboration that support and/or constrain mutual value creation in an ecosystem).

Service exchange. According to S-D logic, all firms are service providers, either directly (e.g., tax preparation services) or indirectly through a good (e.g., tax preparation software). A good or product can thus be considered as a distribution mechanism for indirect service provision. Service can be defined as the application of resources, primarily knowledge and skills, for the benefit of another party or oneself (Bettencourt, Lusch and Vargo, 2014). By this token, an ecosystem can be viewed as an aggregation of several actors (including the end customer) that interact and exchange service for service. In other words, an actor will provide a service to another actor in order to obtain reciprocal service. This fact makes "service-for-service" exchanges the locus of mutual value creation (Vargo and Lusch, 2016) in ecosystems. At ScotRail for example, the transportation company offers its unused space and assets to commuters, whereby commuters offer their time and skills to the "Adopt a Station" program.

Determinants of mutual value creation. For the service exchanges between actors to be fruitful (value generating), however, a number of elements must be in place. For example, having the right balance of actor types (Iansiti and Levien, 2004) or having the actors share a common mindset (Nambisan and Baron, 2012) can greatly influence the outcomes of the collaboration. Additionally, the "institutions", or the rules and norms of collaboration in the ecosystem, invariably influence the relationships between actors.

In strategy/IM, authors have distinguished between **intra-firm** (related to individual actors in ecosystems) and **inter-firm** (related to the strategy and governance of ecosystems) **determinants** of mutual value creation.

Concerning intra-firm determinants, several authors (Gulati, 1995; Lavie, 2007; Adner and Kapoor, 2010) have looked at **actor capabilities as indicators of value creating potential**. For example, scholars have found that actors that engaged in collaboration based on a **clear objective** – i.e., to contribute to the common good/ wellbeing of the ecosystem as a whole, had a higher chance of creating value than actors whose activities were driven by self-interest. Other

scholars have looked at actors' **experience with collaboration** and the extent to which this experience has translated into strong partnering capabilities formally organized within alliance departments. Actors lacking partnering experience, it was concluded, were less likely to successfully interact within ecosystems.

Other intra-firm determinants that that are mentioned in the strategy/IM literature were: a clear partnering strategy (Mortara et al., 2009) that was supported by other actors, strong knowledge management capabilities and a learning orientation (Calantone, Cavusgil and Zhao, 2002), the ability to absorb external resources and integrate them with internal resources (Nätti, Hurmelinna-Laukkanen and Johnston, 2014) and, generally speaking, a reputation as a flexible, reliable partner. All in all, most of these capabilities were related to the collaborative maturity of actors. Actors that had prepared themselves well for collaboration and made the necessary internal arrangements were generally thought to be able to create value through collaboration (Enkel, Bell and Hogenkamp, 2011).

Concerning inter-firm determinants, strategy/IM scholars have linked the value creation potential of actors to elements such as **strategy** as well as to the formal and informal **governance mechanisms** actors help put in place for the entire ecosystem (Das and Teng, 1998; Gulati, 1995; Lavie, 2007). Specifically, scholars have pointed out that ecosystems for which clear areas of value creation have been identified in advance (so-called "engineered" ecosystems – see Oh et al., 2016) are more likely to generate the expected value than ecosystems for which no such preparation was undertaken. Additionally, ecosystems whose actors possessed complementary resources (Iansiti and Levien, 2004) and common strategic goals (Nambisan and Baron, 2012) were more likely to create mutual value than ecosystems consisting of actors with similar types of resources and divergent strategic goals.

In terms of formal governance mechanisms, strategy/IM scholars found that having clearly defined roles for the actors (see Section 2.6.1) (Iansiti and Levien, 2004; Mars, Bronstein and Lusch, 2012), having clear conflict management procedures (Ritala et al., 2013), communication and shared decision-making

structures (Dhanaraj and Parkhe, 2006), and knowledge transfer routines (Calantone, Cavusgil and Zhao, 2002) were important for value creation.

With respect to informal governance, scholars have pointed out that inter-actor relationships characterized by mutual attachment and interdependence (see the case of P.R.O.F.) were better suited for mutual value creation than relationships where one actor was clearly less powerful, and therefore dependent, on other actors. In fact, relationships in which actors behaved both collaboratively and competitively (Möller and Rajala, 2007; Ritala et al., 2013) were more likely to help generate value for all actor involved.

Institutions and their role. Generally speaking, mutual value creation in ecosystems is influenced by context-specific institutions. Institutions can be defined as "humanly devised rules, norms, and beliefs that enable and constrain action and make social life predictable and meaningful" (Vargo and Lusch, 2016, p.11). Thus, if actors are the players in the collaborative game, institutions represent the rules.

In the academic literature, institutions are described in "institutional theory" (North, 1991; Scott, 2001) which focuses on the relationships between actors and the fields in which they are active (Lawrence and Suddaby, 2006). Institutional theory has served as a guiding theory in organizational research since the nineteenth century and has especially flourished since the 1970s to become one of the dominant frames guiding organization studies (Thornton, Ocasio and Lounsbury, 2012).

According to institutional theory, the basic function of institutions is to effectively reduce thinking by providing information and acting as signposts (Edquist and Johnson, 1997). Specifically, institutions are employed to create order and reduce uncertainty (North, 1991), while their durability stems from the fact that they can create stable expectations of others' behavior.

Generally speaking, institutions provide cognitive schema, normative guidance and rules that guide behavior (Scott, 2008). Institutions are also instrumental in the cooperation and coordination (that jointly constitute collaboration) activities

of actors in the ecosystem. Additionally, institutions (such as property rights and contracts) can help manage conflicts between these actors (Vargo and Lusch, 2016).

At the organizational level, so-called **micro-level institutions** determine how an actor collaborates and interacts with ecosystem partners. Micro-level institutions include, broadly, culture, structure, process and metric-related aspects. From a cultural standpoint, some values that facilitate value co-creation include: mutual respect, empowerment, and mutual trust (Sharma and Conduit, 2016). Structure-wise, the existence of special functions, activities and departments can create synergies and better interaction between ecosystem partners (including the end customer) (Hosseini et al., 2016). Having flexible functional and cross-functional structures also allows for the simultaneous tackling of incremental and radical innovation projects (de Visser et al., 2010), which creates more partnering possibilities for innovating firms. With regard to processes, ecosystem actors must orchestrate their actions in a way that facilitates value creation. A strategy process that includes collaboration with end customers (Bettencourt, Lusch and Vargo, 2014) or an information management process that does not passively collect information, but actively engages with partners (including customers) (Shah et al., 2006) and learns from them are both examples of effective processes. Finally, metrics refer to how partners measure their performance in ecosystems. Today, organizations often develop dashboards with Key Performance Indicators (KPIs) based on their organizational objectives. Collaboration and co-creation proficiency can be measured, for example, by number of collaborative projects and co-created ideas, number of employees involved in collaborative projects, revenues generated by the collaboration (Cravens, Piercy and Cravens, 2000; Michelino et al., 2015) as well as an ecosystem partner's satisfaction with the collaboration, the level of trust developed among actors, and the actor's intention to collaborate again in the future (Tamoschus, Hienerth and Lessl, 2015).

At the **meso- and macro levels of context**, the rules and norms of collaboration are heavily context-dependent.

At the **meso-level**, the rules and norms of collaboration in an ecosystem can facilitate a fruitful interaction with different categories of actors – including

suppliers, complementors, competitors and end customers. Hence, the first important step is to create a language all actors understand, especially in a highly technical context. In addition to language, the effective management of the main practices (routinized activities) can greatly facilitate knowledge exchange. Third, intellectual property (IP) rights can also greatly help or hinder collaboration in an ecosystem and are of critical importance when pharmaceutical companies collaborate with other organizations (Leten et al., 2013).

At the **macro-level**, legislation can frequently alter interactions and collaborations between various partners (see Clarysse at al., 2014). For example, pharmaceutical companies cannot advertise in the same way as manufacturers of regular consumer products do. As a result, most countries have a clause in their law to regulate this issue (Fefer, 2012). General beliefs about any given industry/ activity are another category of aspects that can influence actors' collaboration. To establish valuable interactions and relationships, actors must therefore build trustful relationships and abstain from opportunistic practices (Kessel, 2014).

When effective, institutions will help an ecosystem successfully self-adjust and therefore survive. At P.R.O.F., in particular, having a common structure/ hierarchy for innovation and collaboration represents an institution that promotes mutual value creation. In the case of Elemental, the existence of a favorable legal context helps individuals and firms work effectively and speed up reconstruction. At ScotRail, the creation of a common language and of an effective communication scheme between the actors is also an institution that facilitates effective collaboration.

When ineffective, however, institutions can subtract from the self-adjusting power of ecosystems (Vargo and Lusch, 2016). For example, the introduction of a new law could make the provision of certain services illegal and therefore jeopardize the activity of actors in an ecosystem. Generally speaking, a well-functioning set of institutions decreases the need for hierarchies and tight orchestration (coordination of activities). With the help of institutions, actors can effectively coordinate themselves.

Summing up, actors in ecosystems create mutual value by engaging in continuous service exchange. The quality of this service exchange is influenced by a number of factors (determinants) either related to the individual actor - e.g., the actors' experience with collaboration, or to the ecosystem overall - e.g., existing governance mechanisms. Generally speaking, the success or failure of mutual value creation efforts will rest heavily on the institutions (or rules of the game) that are specific to the collaborative context in question.

In Chapter 4, I explore the topic of mutual value creation and institutions by identifying and categorizing (by means of a typology) the institutions and institutional change patterns in a healthcare context.

2.6.3 The self-contained, self-adjusting nature of ecosystems

Finally, the definition proposed by Vargo and Lusch (2016), remarks the self-contained self-adjusting nature of ecosystems.

Ecosystems are self-contained and self-adjusting in that they can exist over extended periods of time as actors adapt to changing internal and external circumstances (Nambisan and Baron, 2013; Vargo and Akaka, 2012). While actors may repeatedly enter and exit the ecosystem, the ecosystem itself remains a fairly stable collaborative structure that nurtures entrepreneurship (Isenberg, 2010) and that helps actors pursue a variety of important goals (Kramer and Pfitzer, 2016).

The continuous self-adjustment of ecosystems happens in response to changes in the surrounding competitive environment. If the process of self-adjustment is successful, it will lead ecosystem actors to create a shared vision (ecosystem partners will feel they are part of a shared enterprise), to "serve" each other, to commit to each other, and ultimately, to pursue jointly formulated strategies and goals (Leroi-Werelds, Pop and Roijakkers, 2017). The case of Elemental in particular, but also those of P.R.O.F. and ScotRail, demonstrate the self-contained, self-adjusting nature of ecosystems. While some actors may enter or exit the ecosystem (at Elemental, for example, some partners might contribute to

the reconstruction only on a limited/temporary basis), the general goals of the ecosystem remain unchanged.

The stages of development. As ecosystems adjust to changing circumstances in their environment, they do so in a number of clearly distinguishable stages. According to the widely referenced work of Moore (1993) and his followers, ecosystems develop in four distinct stages: **birth**, **expansion**, **leadership**, and **self-renewal** – or, **alternatively, death** (Moore, 1993). In each of these phases, ecosystem actors employ a variety of strategies to manage the ecosystem and prevent it from dismantling. During birth, the ecosystem's community of actors is focused on jointly defining customer-oriented value propositions and, consequently, on creating cohesion. As the community expands and the actors work more closely with suppliers and partners, ecosystems begin to "conquer new territory" (Moore, 1993, p. 83). Next, the leadership phase helps actors jointly develop a long-term vision for their activity and continue improving their joint offer. The fourth and final stage sets in when the ecosystem is threatened by rival ecosystems and innovations and can result in either self-renewal or death.

Leveraging Moore's (1993) work and enriching it with perspectives from entrepreneurship, Autio and Thomas (2013) have divided the birth stage (called "emergence") further into **three more sub-stages: initiation**, **momentum** and **optimization**. Here, initiation, consists of the initial idea of an ecosystem and the related digital service development, resource gathering and early operation. During momentum, the ecosystem begins to grow rapidly, driven by investments, increasing numbers of participants, aggressive marketing and competitor activity. Finally, during optimization, there is less focus on growth/expansion and more on value creation and streamlining of activities.

While the existence of such evolutionary/ development phases is straightforward, a common debate in strategy/IM related to whether these phases are deliberately created or if, on the contrary they emerge (**creation versus emergence debate**) (Rabelo and Bernus, 2015; Oh et al., 2017). This debate can be traced to Henry Mintzberg's seminal work on deliberate and emergent strategies which he called "two ends of a continuum along which real-world strategies lie" (Mintzberg and Waters, 1985, p. 257).

To the left (emergence) end of the continuum, scholars like Autio and Thomas (2013) note that ecosystems **emerge in their own manner** (their evolution is context-specific)[39] and through the combination of four activities: resource procurement and management activities, including financial resources, coalition forming and skill acquisition; design and provision of the underlying technology (the core platform); institutional activities, or rule-making and enforcement, discourse, and identity construction; and context activities or actions related to actors external to the ecosystem, including dialogue with regulators and government, discourse in the press and wider society, and the actions of competitors.

To the right (planned) end of the continuum, other scholars (see Rabelo and Bernus (2015) for a review) argue that irrespective of how they were conceived, ecosystems are **constructed** through a number of **carefully planned phases**: analysis (about which kind of ecosystem is desired); project (focus on design and partners); deployment (the theoretical ecosystem is transformed into real infrastructures and populated with real actors); execution (innovation initiatives start to materialize); sustenance (the ecosystem and its evolution can be managed) and conclusion (the ecosystem either ends its activities, or radically changes its mission). As Rabelo and Bernus (2015, p. 2250) note: "no matter how a given innovation ecosystem was established, a set of people took actions at certain moments ("stages") following some logical sequence, either towards building a whole ecosystem or possibly only related to some specific issue. As such, this can be observed and explicitly represented". This "representation" aspect is today among the least researched aspects of ecosystem evolution due to insufficient data to substantiate findings. Last but not least, Oh et al. (2016) follow Papaioannou, Wield and Chataway (2009) in noting that ecosystems are evolved entities characterized by the presence of intention and governance.

How actors and institutions influence development. Because actors represent the foundational elements of ecosystems (Tronvoll, 2017), neither the study of institutions, nor that of the evolution of an ecosystem can be

[39] Uniquely, Autio and Thomas (2013) take a cross-disciplinary approach and integrate insights from dominant design theory, institutional entrepreneurship theory, and social movement theory.

disconnected from them. In fact, these three themes often appear inter-twined in the literature. In recent work on the evolution of ecosystems, for example, scholars have focused on describing actors' shared intentions[40] (Taillard et al., 2016) and their role in an ecosystem's initial development (initiation). More specifically, as ecosystem actors **move from individuality to shared goals** – i.e., the "we" emphasized by service researchers (Vargo and Akaka, 2012; Vargo and Lusch, 2016), their interactions gradually stabilize, become more normative, and lead to even more cohesion. Hence, an ecosystem is born. In time, continuous feedback loops ensure that there is a balance between the independence and the interdependence of actors, as well as that institutions can continuously formed and reformed (Vargo and Akaka, 2012). In other words, as they face systematic changes, actors negotiate and renegotiate the institutional arrangements between them (Lusch and Nambisan, 2015; Vargo et al., 2015) and therefore lead the ecosystem down a unique development path.

Another study on how actors and institutions are linked to ecosystem development is provided by the work of Banoun, Dufour and Andiappan (2016). In this work, which is similar to that of Taillard et al. (2016), the authors link the development and evolution of the ecosystem to the evolution its actors' intentions. Specifically, the study argues that actors' gradual move from a product to a service-dominant logic can be divided into six unique evolutionary phases. In this way, actors move from an initial phase of poorly controlled G-D logic (Phase 1), to a phase where G-D logic is under control (phase 2). Next, actors move onto a Transitional logic (Phase 3) and later to a phase in which transitional logic is under control (transitional logic is an intermediary step between G-D and S-D). Finally, the actors reach the phase in which S-D Logic is present, but still poorly implemented (Phase 5) and eventually a phase in which S-D is brought under control (Phase 6). I discuss the differences between S-D and G-D Logic in Section 2.4.3.

A final interesting study linking actors and actor roles to ecosystem development by Dedehayir, Mäkinen and Ortt (2016) identifies the various roles that form during ecosystem emergence (initiation) These roles refer to: leadership roles

[40] In recent work, Visscher et al. (2017, p. 3) have stressed that actors do not adapt to the ecosystem in order to be successful; instead, actors actively shape the constant "loosening and tightening, expanding and contracting, merging and splitting".

("ecosystem leader" and "dominator"), direct value creation roles ("supplier", "assembler", "complementor" and "user"), value creation support roles ("expert" and "champion"), and finally, entrepreneurial ecosystem roles ("entrepreneur", "sponsor", and "regulator"). Furthermore, the emergence or genesis of an ecosystem can also be dissected into: preparation, formation and operation.

Summing up, ecosystems represent self-contained forms of collaboration that self-adjust in response to changes in the surrounding collaborative environment. Whether emergent or planned, ecosystems develop in clearly observable stages - e.g., birth, expansion, leadership and renewal/death and do so in close relation to the actors. Thus, studying the development of ecosystems cannot be disconnected from the "development" of its actors.

In Chapter 3, I explore the topic of ecosystem development by documenting the initiation, growth, maturity, and eventual rebirth of a Dutch ecosystem of small and medium-sized organizations (SMEs) active in the HR-services industry.

2.7 Summarizing the review on ecosystems

As illustrated throughout this chapter, the "ecosystem" as a research term is, no doubt, coming of age and its growing use by various fields points to a profound shift in how society thinks about collaboration and economic value.

As organizations move beyond traditional silos and merge into new forms of collaboration, ecosystems become a means to create powerful and lasting competitive advantage (Kramer and Pfitzer, 2016; Williamson and De Meyer 2012). More importantly, they have become a means for firms and individuals to address challenges no single actor could address on their own (Kramer and Pfitzer, 2016). In the light of these aspects, the continued study of ecosystems remains an imperative for both industry (Adner and Kapoor, 2010; Rohrbeck, Hölzle and Gemünden, 2009) and academia (Ng, Maull and Smith, 2011).

Because the study of ecosystems is not restricted to any single research field, finding a unified definition of ecosystems as well as understanding actors, value creation and ecosystem development in general proves a challenging but also

important task. To address this task as effectively as possible, in Sections 2.4–2.5 I have elaborated on each of the aforementioned aspects by leveraging key insights from strategy/IM, entrepreneurship and service marketing. In doing so I have offered a primer ecosystem research past and present and also proposed research avenues for further inquiry.

This chapter started by describing the two facets of inter-firm collaboration: cooperation and coordination, as well as success within each (Section 2.2). Next, the chapter has described the evolution of collaboration as well as the main collaborative forms observable from the 1970s onward (Section 2.3). In Section 2.4, the chapter has elaborated on three important lenses used to study ecosystems and has noted their potential to be joined through inter-disciplinary research. Subsequently (Section 2.5), the chapter has compared and contrasted insights from the three selected research streams – strategy/IM, entrepreneurship and service marketing – to propose a unifying definition for ecosystems. While both strategy/IM and entrepreneurship scholars have contributed significantly to the development of the term, service research has offered the most comprehensive view of ecosystems as new collaborative arrangements. Therefore, I follow Vargo and Lusch (2016, p. 10) in defining an ecosystem as: a "relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutions and mutual value creation (through service exchange)". Having clarified the definition, the chapter has concluded (Section 2.6) by elaborating on key elements of this this definition. In this way, actors and resource integration, mutual value creation (value co-creation), service exchange, as well as the self-contained and self-adjusting nature of ecosystems were all explained separately as well as together to create a more nuanced picture of existing ecosystem research.

In summary, the nature and capabilities of the ecosystem actors, the rules and norms of collaboration that bind them as well as the gradual, self-adjusting development of ecosystems, are deeply inter-twined notions. As Mars, Bronstein and Lusch (2012, p. 274) note: "The hierarchical emergence and structure of organizational ecosystems vary according to the types and diversity of actors and functions that are nested and embedded within them". Therefore, throughout the remainder of the PhD thesis, I will continuously show how a change in one of these

areas – for example, a change in a macro-level institution (a policy) – affects not only how the ecosystem develops (it might flourish or dissolve) but also the ecosystem actors themselves (actors might need to acquire new skills/ capabilities as a result of the new policy).

Chapter 3: How ecosystems develop and the dynamics of their development: A case study from the Dutch HR-services industry

3.1 Structured abstract

The aim of this chapter is to evidence how ecosystems (can potentially) develop and self-adjust. As such, the chapter addresses the second research objective of the thesis.

To reach this aim, the chapter provides a detailed account of the complex development of Q-Search, a Dutch ecosystem of small and medium-sized enterprises (SMEs) active in the HR-services industry. In the process of analyzing the ecosystem's developmental journey, the chapter also discusses how the personality of the ecosystem's orchestrator (an entrepreneur) reflects upon the new form of collaboration forming around her.

In Table 3-1, I provide additional information about the chapter, including the design and methodology used, data sources, research perspective taken, findings, strengths, limitations, practical implications as well as publishing outlet.

Table 3-1: Chapter 3 at-a-glance

Aim/ Research objective	The aim of this chapter is to evidence how ecosystems develop and self-adjust. In doing so, the chapter addresses the second research objective of the thesis.
Design/ Methodology and data sources	First, the various stages of the Q-Search ecosystem's evolution are identified. Next, each stage is characterized in terms of: specific goals, key

	attributes (capabilities) of the entrepreneurial orchestrator, key orchestration actions, means of value creation and outcomes. The chapter is a single case study that draws upon: interviews, archival search, and direct observation.
Research perspective(s) taken	Strategy/IM + entrepreneurship
Findings	At Q-Search, the entrepreneurial orchestrator's vision, authenticity/honesty, passion for a cause, personal initiative, social skill, persistence/grit, ability to conduct self-reflection, and self-efficacy and willingness to change are essential for the ecosystem's success self-renewal/ survival as it passes through various developmental phases.
Strengths/ Originality	The chapter examines the complex interplay between the ecosystem's orchestrator (her personal attributes and roles assumed), the goals the orchestrator helps set for the ecosystem, the actions taken by the orchestrator to reach the goals, and the value created for the ecosystem partners as well as society.
Limitations	The study is limited to one case. The study is based mainly on archival data and the personal recollections of current and former ecosystem members.
Practical implications	It takes a specific type of entrepreneur to orchestrate the complex relations in an ecosystem and eventually make these relations self-sustaining. Not all traits weigh equally across the ecosystem's development, however.
Publishing outlet and title in print	Outlet: Vanhaverbeke, W., Frattini, F., Roijakkers, N., Usman, M. (eds.), ***Researching Open Innovation in SMEs***, World Scientific Publishing, pp.347-375 Title in print: 'The link between entrepreneurial attributes and SME ecosystem orchestration: a case from the Dutch HR services industry' Authors: Pop, O.M., Roijakkers, N., Rus, D., and Hins, M.
Publication year	2017

3.2 Introduction

The importance of small and medium-sized organizations (SMEs) for economic growth (World Bank, 2016) as well as their recent tendency to aggregate into new forms of collaboration (Eurostat, 2016) including alliances (Lee et al., 2012),

networks (Gardet and Fraiha, 2012), and ecosystems (Gulati, Puranam, and Tushman, 2012; Leroi-Werelds, Pop and Roijakkers, 2017) continues to be emphasized. To date, however, relatively little is known about how SMEs build and evolve such complex relations and how they secure the strength of their collaborations in the long run (a notable exception is Vanhaverbeke et al., 2017).

In recent years, several strategy/IM scholars have put forward calls for research on forms of collaboration that reduce uncertainty and opportunistic thinking (Dhanaraj and Parkhe, 2006; Gardet and Fraiha, 2012), and are therefore conducive to effective and lasting knowledge exchange (value creation) between SMEs. Other scholars have called for a better understanding of how SMEs implement open innovation in general (Brunswicker and van de Vrande, 2014; Vanhaverbeke, 2017), and therefore, how they engage in forms of collaboration that support open innovation (including networks and ecosystems). Most importantly, however, researchers have signaled a need to better understand how SMEs, as important actors in the economy, coordinate their relationships with other SMEs given the prominence of the so-called "human element" (Salampasis and Mention, 2017). The human element (or factor) refers to the fact that in SMEs, it is the individual (founder/entrepreneur) who contributes to the creation of the right environment for innovation and development. Therefore, understanding the individual and his/ her motivations will lead to a better understanding of his/her actions overall.

To shed more light on this topic as well as advance current research on the evolution of ecosystems in general, this chapter explores how an entrepreneurial actor (an entrepreneur) orchestrates the ecosystem of SMEs forming around her. Specifically, I study the case of Q-Search, a Dutch human resources (HR) services ecosystem whose aim is to increase "workers' joy" (job satisfaction), and through this, to provide better societal outcomes.

3.3 Theoretical background

In the strategy/IM as well as in the entrepreneurship literature, managing relationships between SMEs has recently taken center stage. Brunswicker and van

de Vrande (2014), in particular, have underlined that the open innovation (OI) relationships of SMEs (both formal and informal) are crucial for their survival, their ability to change their strategic direction, and their overall (innovative) performance (Brunswicker, 2011; Drechsler and Natter, 2012; Van de Vrande et al., 2009)[41]. SMEs also create relations to enrich their knowledge capital (Laperche and Liu, 2013); that is, the information and knowledge produced, acquired, and used in the value creation process. In addition, being embedded in a network or ecosystem of OI relations enable SMEs to compensate for the lack of complementary resources and skills they typically need for innovation. Being part of a shared enterprise with an explicit customer focus (a typical feature of ecosystems) leads to a so-called "ecosystem advantage" (Williamson and De Meyer, 2012) in the face of changing customer demands and volatile markets. All in all, as Ceci and Iubatti (2012, p. 565) note: "the presence of multiple types of relationships [in collaboration] modifies inter-firm dynamics, creating a space where traditional innovation activities take place in an unusual way".

While SMEs can potentially use and integrate the resources available to them (Leroi-Werelds, Pop and Roijakkers, 2017) to create value – e.g., become more effective at product/service innovation, realizing this potential requires the development of specific capabilities (Vanhaverbeke et al., 2017). Uniquely, SMEs and their founders (the entrepreneurs) must build up the ability to coordinate or orchestrate their relationships effectively – i.e., "create symbiotic relationships[42] that overcome the tendency of long-lived relationships toward inertia" (Davis and Eisenhardt, 2011, p. 159)

To effectively coordinate their relationships and manage their knowledge flows in increasingly complex forms of collaboration, entrepreneurs must consider a

[41] As noted in Chapters 1 and 2, some studies consider ecosystems as forms of collaboration that enable open innovation (West and Wood, 2008; Chesbrough, Kim and Agogino, 2014; Chesbrough, Vanhaverbeke and West, 2014). Open Innovation can be defined as the utilization of knowledge, both inside and outside of the firm, to innovate something new (Chesbrough and Bogers, 2014).

[42] Davis and Eisenhardt (2011) describe "symbiotic relationships" as relationships whereby partners mutually adapt to changing circumstances.

variety of orchestration issues including: coordination modes (Gardet and Fraiha, 2012), trust (Cobben and Roijakkers, 2018; Balliet, Mulder and Van Lange, 2011), division of roles (Dedehayir, Mäkinen and Ortt, 2016) and even conflict resolution and guarantees against potential loss (Balliet, 2010). At the same time, entrepreneurs must understand orchestration processes such as managing innovation leverage (Nambisan and Sawhney, 2011). Managing leverage refers to offering a common set of technologies, tools, and other assets that ecosystem actors can deploy to assure consistent quality of their output. Finally, entrepreneurs must recognize the link between personal attributes and orchestration actions and understand this link's potential/ power (Ucbasaran, Westhead and Wright, 2001). That is, using a series of key attributes – e.g., strong vision, authenticity, leading by example (Conger, Kanungo and Menon, 2000; Shamir, House and Arthur, 1993), orchestrators can discretely influence outcomes for ecosystem actors, and even society at large (Nambisan and Sawhney, 2011; Ritala et al., 2013). In fact, entrepreneurs appear to create personal visions whereby each SME partner/actor in the ecosystem: plays a distinctive role, markets the ecosystem to outside parties, helps set up partner/actor selection mechanisms reflecting their personal values, and creates a resource pool from which partners/actors can draw resources for their activity (see also Dhanaraj and Parkhe, 2006).

With regard to the evolution of relationships between SMEs, it is also important to note that although there may be one single actor initiating and orchestrating the ecosystem, this form of collaboration typically evolves over time to a state of shared or rotating leadership (Davis and Eisenhardt, 2011) and a sustainable social community, functioning largely on the basis of shared norms and values (i.e., institutions), whereby several actors can take the lead on initiatives pursued by the ecosystem (Kramer and Pfitzer, 2016). While other forms of collaboration such as alliances and portfolios are usually associated with superior performance and enhanced competitive positions only for the individual firms (Leroi-Werelds, Pop and Roijakkers, 2017), the SME ecosystems witnessed today seem to be more about collective benefit and creating societal value (Ritala et al., 2013). The examples of Elemental and P.R.O.F. in Chapter 1 support his point well.

In as follows, I introduce the research design and describe the journey of an entrepreneur that has sought to build and eventually strengthen the SME ecosystem forming around her. When referring to the actors in the aforementioned ecosystem, I use the term "partner" to better reflect the way in which the entrepreneur addressed her collaborators.

3.4 Research design

3.4.1 Research context

Founded in the year 2000 by finance and HR expert, independent policy advisor, and entrepreneur, Marjolein Hins, Q-Search is an ecosystem specialized in HR and development as well as transformational services consulting.

Q-Search became operational in an environment that was a relatively hostile to collaboration and growth. When asked to describe the HR services industry in the Netherlands at the turn of the millennium (2000-2002), Hins pointed to a conservative, divided market, undergoing slow and uneven change. Additionally, the entrepreneur recalls a deep divide between industry actors large (corporations) and small (individual SMEs) – a divide that had created value misalignment as well as inefficiencies. To remedy this situation Hins and her partners created a form of collaboration capable of both "penetrating" the reactive, old-fashioned HR services industry/ market ("to compete with the McKinseys and the Ebigners") as well as instilling much needed change.

The Q-Search ecosystem's original goal was twofold: leverage experienced individuals and SMEs to improve the existing recruitment practices in The Netherlands and create greater societal impact. To reach this goal, Q-Search attracted and connected SME partners that were both specialized (their complementary types of expertise could effectively combine into projects) and whose interests gravitated more towards shared gains and collective impact generation (as opposed to individual gains and fixed targets as was the norm). By adopting a novel approach to business collaboration, Q-Search contrasted starkly with other individual HR service organizations.

According to partners' accounts, Q-Search served as a vehicle for mutual value creation within Q-Search as well as outside it (in the larger community of practice). Effectively, Q-Search created adhesion among partners (the ecosystem actors) by "instilling the Q-feeling" (a set of principles/ code of conduct to which partners could voluntarily adhere). Additionally, and perhaps just as importantly, at a time when collaboration/ Information and Communication Technologies (ICT) platforms for recruiting and management were unknown in the Netherlands, Q-Search was also pioneering ways to educate and bring together specialized SMEs by digital means[43]. By combining online and offline collaboration, Q-Search sought to create an arena where people operated on the basis of trust, cooperation, and sharing.

All in all, choosing to build a form of collaboration beyond a typical organization or recruitment network set Hins and her followers (partners) apart. Instead of locking her partners in, Hins envisioned an arrangement by which her partners (individual HR professionals and SMEs) could, in time, function *independently* from her guidance and intervention. As such, Hins was laying the groundwork for a form of collaboration much larger than herself and her immediate sphere of influence. A form that could not only become self-contained and self-adjusting (thus, self-perpetuating), but also more effective at understanding end-customers and delivering better, more innovative value propositions to them.

Between 2000 and 2016, Q-Search passed through a number of important evolutionary phases. These phases were: initiation, growth, and maturity (see Figure 3-1).

The initiation phase unfolded between 2000 and 2001 and was characterized by Hins' (the orchestrator's) drive to bring about change. Triggered by her disappointing experience as a manager for a large Dutch auto lease company, Hins began to contemplate a different type of organization. For one year, she searched for like-minded people and SMEs willing to join her and ultimately

[43] Q-Search was founded in the year 2000 while its underlying ICT platform was commissioned in 2002. For reference, this was a time when popular platforms and tools for business such as LinkedIn (2002), Skype (2003) or Facebook (2004) were either not yet in existence or just being launched.

started new activities with a core group of around 10 SME partners. During this first phase, the ecosystem (still in its infancy) was not driven by profit.

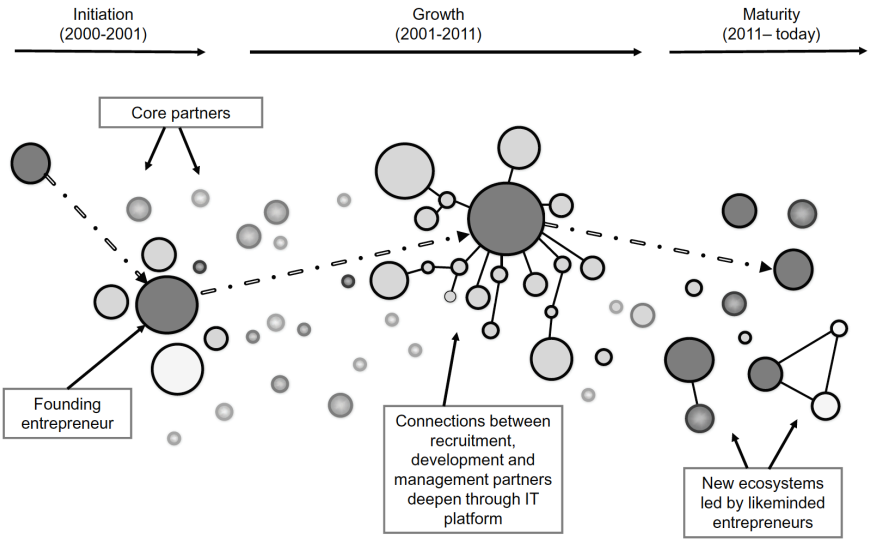

Figure 3-1: The evolution of Q-Search

As more (non-core) partners began to join, the ecosystem shifted into its second phase: growth. This phase spanned the 2001–2011 period and was characterized by the temporary formalization and centralization of relationships and activities. To this end, Hins (as the orchestrator) introduced a fee-based system and virtual (ICT) platform to connect all partners. To facilitate this connection and potentially create symbiotic relationships, Hins also provided services - e.g., marketing collateral, newsletters, guest lectures and meetings, leads etc., in exchange for partners' yearly financial contribution. Furthermore, Hins committed the jointly developed values and ways of working to paper.

As time passed, however, some partners began to show more and more signs of dependence. Misunderstanding Hins' role in the ecosystem and triggered by the dawn of the international financial crisis in 2008/2009, partners increasingly expected Hins to take the lead (orchestrate their activities) and initiate projects. Realizing that Q-Search was progressively mistaken for a formal structure, the

entrepreneur decided to abandon all formal administration (eliminate the yearly fee) and to collaborate solely based on demand. This action enabled the ecosystem to evolve to its third phase[44]: maturity (2011–2016). This phase was characterized by several spin-offs, which maintained the spirit of Q-Search and worked towards the orchestrator's initial purpose – i.e., improve the existing recruitment practices in The Netherlands and create greater societal impact. One such spin-off was the "The Future of Work" project – a project whose philosophy was to lay a new foundation for the way people work and then actively communicate this vision to the Dutch government for further implementation.

3.4.2 Research method

The case of Q-Search represents a rare opportunity to document how ecosystems in general (and entrepreneurial ecosystems in particular) develop and self-adjust as well as of the complex processes and culture-related aspects that support this development for several reasons. First, Q-Search provides evidence on how complex, decentralized forms of collaboration (here, ecosystems) can emerge as alternatives[45] to the centralized, hierarchical, profit-driven practices of large firms. Second, Q-Search represents an example of the pioneering use of ICT technologies by small businesses for the purpose of collaboration and collective impact creation at the turn of the millennium. Q-Search was founded in the year 2000, at a time when ICT platforms for small HR service professionals were uncommon and social media platforms were not yet popularized. Third, Q-Search's longevity[46] and the rich available data on its orchestrator's activity offers a chance to understand how the psychology (her personal attributes/ capabilities) and actions of the entrepreneurial orchestrator can reflect, both directly and indirectly, on the ecosystem's development (2000–2016). All in all, the case of Q-

[44] After 2016, the ecosystem entered its fourth phase: renewal.

[45] This alternative means of harnessing the power of partners in a collaboration is known today as the "ecosystem advantage" (Williamson and De Meyer, 2012).

[46] I have documented the evolution of Q-Search between 2000 and 2016. In 2018, however, projects continue to be executed under the Q-Search umbrella.

Search appears representative an important collaboration-related trend in the economy – i.e., a trend by which actors increasingly reject formal, contract-based collaboration in favor of less formal, highly symbiotic relationships (Davis and Eisenhardt, 2011) that facilitate collective impact creation (Kramer and Pfitzer, 2016). Hence, it makes for an interesting research case.

The research method adopted in this work is an inductive single case study while the purpose of the work was to expand existing theories on entrepreneurial firms (SMEs) embedded in ecosystems. Despite the widely acknowledged limitations of single case studies, especially in terms of their reliability and validity (Yin, 2013), this method represents a powerful means of acquiring a rich understanding of complex phenomena (Eisenhardt and Graebner, 2007) that is critical and unusual (Yin, 2013). Following similar efforts by Petruzzelli and Savino (2014) (the case of Rene Redzepi and Noma), Manzini, Lazzarotti and Pellegrini (2016) (the case of Lindt & Sprüngli) and Cattani 2006 (the case of Corning), Q-Search was strategically selected (Flyvbjerg, 2006) for the current investigation. Information-oriented selection (as opposed to random selection) is appropriate when having high expectations about the information content of the case, as well as when the goal is to maximize the utility of this content (Flyvbjerg, 2006).

In the case of Q-Search, a single case study makes it possible to understand each of the ecosystem's evolutionary stages as well as the complex processes that enabled each transition (from initiation, to growth and eventually to maturity). Furthermore, the study of Q-Search is retrospective and thus enables researchers to grasp the "big picture" (Cattani, 2006); that is, Q-Search's full development path as well as the outcomes at each stage (see Chesbrough, Kim and Agogino (2014) for a study of Chez Panisse using a similar technique).

Following the prescriptions of Gibbert, Ruigrok and Wicki (2008), I have ensured the quality of the research by taking several measures. To increase the **internal validity** of the work, I have created a clear research framework and have performed pattern matching – or a comparison with patterns observed by other researchers – e.g., typical stages of an ecosystem's evolution. In terms of the research framework, I have analyzed the evolution of Q-Search by noting the

ecosystem's goals, the key attributes of the entrepreneurial orchestrator, the key orchestration actions, the mutual value that was created, and the outcomes of the collaboration at each evolutionary stage as well as the links between them.

To increase the **construct validity,** I have provided a chain of evidence of the ecosystem's evolution and have triangulated this evidence using multiple sources of data (see Table 3-2). The two sources of primary data included interviews and direct observation. All interviews were recorded between July 2015 and June 2016[47]. Four out of seven conversations were in-depth, semi-structured interviews with the Q-Search orchestrator, a core partner and long-term collaborator, as well as two non-core/ordinary partners in Stages II and III of the ecosystem's development. These conversations were mainly used to: plot Q-Search's evolution on a timeline, establish the ecosystem's goals at each stage, establish outcomes at each stage, and identify the key attributes of the orchestrator. Interviewees were asked to describe their reason for joining Q-Search and their relationship to its orchestrator, the ecosystem dynamics they observed while at Q-Search, the main outcomes of working collaboratively and the key attributes of the entrepreneurial orchestrator (positive and negative) in relation to Q-Search's development. The additional three conversations were shorter semi-structured interviews with non-core project partners. The supplementary interviews were commissioned to understand how Q-Search helped create value (collective impact) beyond its boundaries as well as how the personality of the orchestrator influenced the value creation. The direct observation involved participation in a typical Q-Search Intervision Group Meeting. Observing the meeting helped shed light on the symbiotic relationships between partners and the elements that enabled these relationships to continue over time. Additionally, the meeting was used to verify whether Q-Search's timeline was correctly drawn. The secondary sources of data included public and privately available information on Q-Search — e.g., press releases about Q-Search

[47] The interviews were not recorded at different stages of the ecosystem's development (as would have been ideal) but within a narrow time-frame in Stage III (2015/2016). Potential weaknesses of this data collection method may therefore include incomplete recollection of the interviewees as well as reflexivity (Tellis, 1997). Nevertheless, the interviews provided useful and detailed depiction of the ecosystem's general evolution and the traits of the entrepreneurial orchestrator.

and documents available on the back end of Q-search's ICT platform (access into the archives was granted by the founder) and brochures describing the Q-Search projects, collaboration philosophies and services.

Table 3-2: Data sources for the research

Data type	Description
Interviews	1 in-depth, semi-structured personal interview with Q-Search founder and orchestrator (and written follow-up)
	1 in-depth, semi-structured personal interview with core partner in Stage I (personal and organizational development coach) and long-term collaborator (+ written follow-up)
	1 in-depth, semi-structured personal interview with non-core partner (transformation consultant) in Stage II (+ written follow-up)
	1 in-depth, semi-structured telephone interview with non-core partner (member of The Future of Work project - a Q-Search spin-off) in Stage III
	3 short semi-structured, supplementary telephone interviews non-core partners in Stage III. The profiles of the interviewees included: president of an association of labor experts, a career expert and an expert in coaching individuals with disabilities
Documents	Document outlining rules and attitudes prospective Q-Search partners adhered to prior to being granted membership Sample statements: "I am aware that working successfully in a networked organization means that I take other people's business as seriously as my own"; "I firmly believe that by working together within Q-Search I can serve more customers than I could on my own (I can also generate more revenue with the group than by working alone)"
	Document outlining values Q-Search members shared and/or developed while in the ecosystem. Sample statements: Q-Searchers are "interested in others, informal, communicative, empathetic, respectful, have a sense of humor, helpful, and provide pleasant company"; Professionally, "Q-Searchers know what they're talking about, know their trade (via experience and skills), and are professional (you are in good hands with them)" The document also includes partner testimonials.

	Document outlining benefits received in exchange for Q-Search membership fee in Stage II – e.g. network book, marketing collateral (Q-Search logos, banners, personalized signature in e-mails), OTYS user manual (the IT infrastructure), newsletters, direct weekly info, list of leads, access to shared meeting rooms, etc.
	Document outlining input for new tax plan in The Netherlands.
	PowerPoint presentation for the Ministry of Internal Affairs in The Netherlands on achieving societal impact through new leadership and flexible forms of organization (networks).
	Document outlining The Future of Work project's philosophy
Direct observation	Attending a typical intervision group (MIG) meeting with Q-Search founder/ orchestrator and 5 SME partners (3 previously interviewed and 2 not previously interviewed); in this meeting the preliminary findings of the chapter were discussed. Feedback was incorporated into the final version of the chapter

Two additional measures taken to ensure the quality of the research involved external validity and reliability (Gibbert, Ruigrok and Wicki, 2008). To ensure **external validity**, I have provided a clear rationale for case selection as well as details regarding the case study context – i.e., the state of the HR services consulting industry at the time Q-Search was founded. To ensure **reliability**, I have used a case study protocol and database and have made these sources available to all researchers involved in the study[48]. Once data collection was complete[49], and by using the research framework drawn from the strategy/IM and entrepreneurship literature, my co-authors and I performed independent analyses of the complex interplay between the Q-Search ecosystem's goals, value creation mechanisms, and outcomes and the personal attributes of Q-

[48] In exchange for her support of the ecosystem research presented in this chapter (sharing the contact details of potential key informants, granting access to files and databases etc.) Ms Hins, the entrepreneurial orchestrator, was listed as a co-author. Ms Hins was not granted access to the case study protocol and database, and did not perform any of the data collection and/ or analyses. Ms Hins, however, helped disseminate the findings of the research.

[49] All collected data were stored and analyzed (coded) using MS Excel and/or NVivo10.

Search's orchestrator as well as her actions. These analyses were eventually compared and contrasted until consensus regarding results was reached.

While Q-Search offers a rich account of an SME ecosystem's development and internal dynamics, I follow Gehman et al. (2017) in acknowledging that this data is only a static photograph of an otherwise dynamic phenomenon (the ecosystem continuously evolves). Consequently, in this chapter I explicate the evolution of Q-Search by using process thinking (Langley et al., 2013). As part of this approach, I have interviewed core and non-core partners at Q-Search about specific factual events (initiation, financial crisis, implementation of the ICT platform etc.), rather than being interested in their interpretations and cognitions of the latter. The exception was the founding entrepreneur, whom I inquired about her attitude toward the evolution in order to grasp her capabilities and leadership style. Additionally, I have employed visual mapping (see Figure 3-1) to plot each evolutionary phase and have then examined, in-depth, their particularities. This exercise helped me grasp the bigger picture (Cattani, 2006) of Q-Search's evolution. In the next section, I provide a thorough analysis of Q-Search's evolution by examining the ecosystem's goals, key attributes of the entrepreneurial orchestrator, key orchestration actions, the value created within the SME ecosystem, and outcomes of the collaboration.

3.5 Findings

3.5.1 Initiation (2000-2001)

The first phase of the ecosystem's development took place between 2000 and 2001 and was marked by the orchestrator's decision to abandon her position as manager at a large, hierarchical organization in favor of a more meaningful pursuit: to alter existing HR practices, increase job satisfaction, and boost the quality of work-life in the Netherlands. This period (Table 3-3) was synonymous with laying the groundwork for sustained value creation and included three goals: establishing ecosystem legitimacy fostering a knowledge-sharing culture and creating space for continued development.

Table 3-3: Phase I of the Q-Search Ecosystem's development: Initiation (2000-2001)

Core aspects		Evidence from data
Ecosystem goals	Establish ecosystem legitimacy	"So first we were a recruitment network but I was also talking about […] the ultimate advisory, consultancy bureau but not in the old form but the new network form" (Source: Orchestrator)
	Foster knowledge sharing culture	"Q-Search is nothing more than a little society for me" (Source: Orchestrator)
	Create space for continued development	"Making business in a more humane way on the basis of equality, respect, warm-heartedness, and sincerity" (Source: Core partner)
Key attributes of the entrepreneurial orchestrator	Vision	"I was an entrepreneur and I started talking about the concept of… well, the consultancy firm in the network organization form" (Source: Orchestrator) "She said: I want to change [workplace] politics without going into politics. I want to increase [workers' joy]" (Source: Core partner)
	Authenticity/honesty	"She is a reference point for a lot of people. And a reference point not solely in terms of business" (Source: Core partner) "A person in her authenticity, in her genuine being. Being herself" (Source: Non-core partner) Other sources: Doc1 Partner selection criteria
	Entrepreneurial passion	"I worked in companies and I saw that we were not cooperating easily or not even cooperating with each other [at all] although we were working on the same products or services. And I thought: This is strange, but you know, I am not going to change them" (Source: Orchestrator)

	Personal initiative	"She initiates a lot" (Source: Non-core partner) "She facilitates. She is always there. If [she] is not there, there is no group" (Source: Core partner)
Key orchestration actions	Non-systematized communication	"The first model was: Everything for free, just being happy that people were even interested in me and came there" (Source: Orchestrator)
	Member self-selection	"She picked out the persons she liked to join in the first stage. And she had, of course, her own reasons and her own assessment, for that" (Source: Core partner) "[The selections] I made them myself" (Source: Orchestrator)
	Singlehandedly supporting the ecosystem	"At the beginning I paid everything myself but then I earned my money with recruitment" (Source: Orchestrator)
	Coordination mechanisms creation	"We had a starting meeting with, I think around 10-15 people" (Source: Core partner)
Means of creating ecosystem value	Connecting likeminded HR service professionals	"So yes, we were all, you can say in a major part in alignment with the values, ideas, philosophies that [the entrepreneur] exhibited" (Source: Core partner)
Outcomes	Ecosystem takes shape with help from core partners in recruitment.	"It all started up with I think, maybe, 10 people who were active in recruitment" (Source: Core partner) "Everyone was enthusiastic and I started with recruitment professionals" (Source: Orchestrator) "I realized that I think I have to write down all the rules we made up already with each other" (Source: Orchestrator)

The driving force across this phase was the orchestrator's vision (disseminated through careful communication), an image of the future that represented the shared values to which the ecosystem's SMEs should aspire (Shamir, House and Arthur, 1993).

To begin with, the orchestrator spent much of her time broadcasting her desire to build a strong HR services community. To do so, she took part in individual and group conversations, held speeches, and prepared presentations, inspiring and attracting SMEs whose values were aligned with her vision. Within a short period of time, a core group of 10 partners forms around Hins, establishing a type of informal steering committee whose job would be to agree on the direction Q-Search should take further.

Next, the orchestrator moved on to foster a knowledge-sharing culture (second key orchestration action) following her conviction that taking a humane approach to business will help create a community based on trust and collaboration, responsibility, openness, and experimentation. To realize this goal, she spent time deepening (as opposed to multiplying) the conversations around better HR practices and increasing job satisfaction in the Netherlands, consolidated prospective SME partners' points of view, and performed a careful selection of core partners based on a fit with her own personal values and vision.

In this stage, partners were therefore selected based on their agreement with statements such as:

> I/we believe that we can be more customer-oriented (service-minded) by working within Q-Search than we can by working separately[50].

This pursuit of creating the right environment for sharing, collaborating, establishing mutual trust, and shared responsibility reflected the orchestrator's personal belief system and behaviors.

[50] In Chapter 4 I examine the notion of customer-centricity more deeply by drawing on the experience of healthcare organizations.

The final goal related to creating space for continued development or an environment that could help partners coevolve, withstand environmental contingencies, and safeguard exchanges. Taking a long-term perspective, the orchestrator supported the formation of Q-Search with her own resources, thereby communicating that she believed in the long-term viability of the collaborative arrangement as well as in the symbiotic relationships that could help support it.

At the same time, Hins promoted open innovation (OI) principles and relations as well as the type group-oriented behavior necessary for the ecosystem to remain viable. By the end of 2001, the orchestrator had created a space where HR service professionals and SMEs sharing the same principles, ideas, and philosophies could be connected. As the communication efforts (including word-of-mouth) regarding Q-Search's raison d'être began to attract many new partners, the orchestrator initiated additional (deliberate) steps to facilitate growth and accommodate the deepening of connections among partners paving the way for innovative services creation.

3.5.2 Growth (2001-2011)

Growth at Q-Search took place between 2001 and 2011 and was marked by the formalization of relationships between the orchestrator and her SME partners (Table 3-4).

Having laid the groundwork for sustained value creation in the initiation phase, the orchestrator's focus now shifts toward: deepening the connection among partners, changing and aligning their behavior and creating a values community that transcends a singular focus on monetary benefits. These interconnected goals were reached through a series of synchronized actions and reveal new orchestrator attributes.

The first goal, deepening the connection among partners, was realized by means of two nearly simultaneous actions.

Table 3-4: Phase II of the Q-Search Ecosystem's development: Growth (2001-2011)

Core aspects		Evidence from data
Ecosystem goals	Deepening connection among partners (via IT platform)	"What is also very interesting is that you can use ICT to change behavior" (Source: Orchestrator) "She was asking: What can I do for the whole group to create a better community?" (Source: Non-core partner) "We were always pushing towards cooperation. Find each other without me" (Source: Non-core partner)
	Changing/aligning partner behavior	"She was more like: OK, if you go in that direction, what do you need to go in that direction? How can I help you with that?" (Source: Non-core partner) "The formal issue was more necessary when the personal connection was not there" (Source: Orchestrator)
	Creation of a values community	"I think she was trying more to build, develop the values community more than the business community. And that's what a lot of partners did not understand" (Source: Core partner) "All the selections, I made them myself. And after 3 years or so I also asked partners to look for new partners because I thought otherwise it's not a really democratic process" (Source: Orchestrator)
Key attributes of the entrepreneurial orchestrator	Vision	"And 10 years ago, there was a partner in my network that said: You really have to change the website because nobody understands it. Well, I see that because I am talking about what will happen in the future, in 10-15 years from now" (Source: Orchestrator)
	Social skill	"She is a trust builder" (Source: Core partner) "She is a 'bridger', she is a strong networker, and she knows quite a lot of people, and she is also a peacemaker, a world-changer, she is very strong and very quick and she is taking care" (Source: Non-core partner) "I am good at attracting new people, building a concept, testing new partners, writing a newsletter. But if someone else wants to take over some of these steps it's OK with me" (Source: Orchestrator)
	Entrepreneurial passion (strong group-orientation)	"She was asking: What can I do for the whole group to create a better community?" (Source: Non-core partner)

		"We have to be patient and take everyone with us" (Source: Orchestrator) Other sources: Doc2 Q-Search values
	Persistence/grit	"She is very strong at that [drive, persistence]. She really believes there is a better world" (Source: Non-core partner) Other sources: MIG meeting: Partners present at meeting unanimously confirmed this trait.
	Self-reflection	"I was constantly working on my inner self. I was so anxious to create this that I was constantly working on myself. It was a lot of hard work" (Source: Orchestrator) Other sources: MIG meeting: Some partners confirmed this trait.
Key orchestration actions	Vision and mission document drafted	"The contract was this intention, the vision, 1½-page, and then a 1½-page simple [outline of] rules; I delivered a few services, I organized meetings for the partners every month and I wrote a newspaper/ newsletter every month in which I told them about each other because they were not always at the meetings" (Source: Orchestrator) Other sources: Doc2 Q-Search values
	IT platform commissioned and implemented	"All the partners were connected to the IT system, which OTYS built with me for recruitment" (Source: Orchestrator) Other sources: Doc3 Services provided by orchestrator
	Full ecosystem facilitation for yearly fee (subscription model)	"At the beginning I paid everything myself but then I earned my money with recruitment. After 3 years they paid 750 euros a year and therefore I did all the work but I quit recruitment" (Source: Orchestrator)
Means of creating ecosystem value	Ongoing triage/self-organizing system	"The network kind of organized itself also because the partners that did not share your vision, they leave. And the contract is not necessary. It's like a true biological ecosystem" (Source: Orchestrator)
	Connectedness, resource diversity	"I really let people connect their brains in a different way" (Source: Orchestrator) "The main value is the diversity and the sharing in that diversity" (Source: Non-core partner)

Outcomes	Orchestration is formalized and partners polarize in the wake of a depending financial crisis. Entrepreneur formally quits Q-Search.	"It was kind of a culture split between the recruitment partners and some of the consulting business, counseling business, and trainers. (…) The values that [the entrepreneur] embraced were more in the consulting, counseling side. The recruiters were the moneymakers and they were real goal getters" (Source: Non-core partner) "The crisis came and what you see is that everybody started acting like a human" (Source: Non-core partner) "What people do a lot is to think that Q-Search is the ship [they] can go on, and they will help me survive. No, you have to survive yourself" (Source: Orchestrator) "So, I quit after 11 years with the forms" (Source: Orchestrator)

First, the orchestrator and core recruitment partners drafted and distributed a three-page vision and legal document (collaboration contract). Next, the orchestrator commissioned a custom-built ICT platform.

This joint vision and legal document was made available as soon as 2001 and was designed to reinforce the ecosystem's vision, to clarify the engagement rules between the orchestrator and partners, to outline the resources and facilities available to partners, and to highlight legal provisions – e.g., how profits from joint project would be split. The decision to create a hybrid collaboration contract stemmed from the orchestrator's belief that successful collaboration could only happen if partners adhered to a set of common principles and values. At the same time, the orchestrator believed that successful collaboration hinged on partner's ability to understand, apply and continuously rehearse the commonly agreed upon "principles"[51] of collaboration. Originally confusing — i.e., some partners felt vision and legal aspects cannot mix — the document eventually became the keystone of collaboration, enabling high-quality exchanges and transparency within Q-Search.

Shortly after, in 2002, the orchestrator commissioned an external company (OTYS) to develop and implement an ICT platform to support the growing number and intensity of relationships between various partners and partner types. The ICT platform was also designed to facilitate knowledge creation and sharing, develop the basis for learning processes, and strengthen the ties between all categories of partners – recruitment, management, and development partners combined. The creation of an ICT platform to strengthen the ties between partners[52] (management and development partners could now share vacancies with recruiters), blend routines (old and new), and accumulate a pool of complementary skills was a pioneering initiative for HR services consulting professionals in the Netherlands. To the forward-thinking orchestrator, the

[51] These principles or rules and norms of collaboration are described in Chapter 4 as institutions.

[52] The importance of the IT component in an ecosystem (the existence of IT/ ICT platforms as a distinguishing feature) represents an ongoing debate in the literature. As mentioned in Chapter 2, some scholars have defined ecosystems as "uniquely digital", whereas other scholars note that ecosystems are built on digital platforms (Evans and Gawer, 2016; Jacobides, Cennamo and Gawer, 2018).

platform was a natural action taken to realize her initial vision of the future: a "networked" organization (an ecosystem) that could sustain long-term, innovative services creation and generate value for society at large.

The second and third goals, changing and aligning partners' behavior and creating a values community that transcended monetary benefits, were also partly realized by the introduction of the ICT platform. An important decision at this point in time was the orchestrator's decision to assume full ecosystem facilitation for a yearly fee by 2003. The fee was designed to be an "all-inclusive" package for partners and included services such as group communications (OTYS user manual/guide to the ICT platform, monthly newsletters about partners, coworking tips, guest lectures, facilitated meetings), marketing collateral (website, logos, banners, brochures, badges, personalized email signatures), access to facilities (shared meeting rooms), and personal coaching/feedback.

To iron out the increasingly obvious disparities between different types of partners, the orchestrator continued the original group meetings. To these meetings she invited, depending on her perceived necessity, only members of a certain partner category, or members across all these categories. During these meetings, the orchestrating entrepreneur's social skills, especially her ability to perceive others' interests and needs (Baron and Tang, 2008) accurately, her propensity to express her own reactions and feelings openly, and her skill in adapting her behaviors to the situation at hand, enabled her to build trust ("she is a trust-builder") (Balliet, Mulder and Van Lange, 2011), to bridge various points of views ("she is a bridger"), and to make peace ("she is a peacemaker") (Balliet, 2010; Ritala et al., 2013) as tensions inevitably arose. Her passion (Cardon et al. 2013) for keeping the ecosystem and its members active and interested, for sharing and helping even those beyond her immediate web of connections, and her persistence/grit and dedication to her SME partners have helped create a climate of psychological safety, trust, and cooperation and a sense of shared purpose, mutual support, and voice – all prerequisites of shared leadership creation (Carson, Tesluk and Marrone, 2007).

The deliberate transition from loose to coordinated orchestration (in order to create a values community) during the growth phase occurs naturally and reveals the orchestrator's systematic approach to generating win–win situations. This attitude is consistent with the vision of a self-sustaining community (Vargo and Lusch, 2016) that can engineer behaviors (e.g., service attitudes and exchanges) and services for the greater good. The orchestrator also gravitates toward relinquishing ownership and control by letting more skilled partners take over tasks, democratizing partner selection criteria, and encouraging partners to collaborate without her direct involvement.

All in all, the outcomes of the second phase were a slightly more formalized orchestration process and a more diversified and visibly strengthened partner community, albeit one of intensified tensions between the idea-oriented (management and development) and business-oriented (recruitment) SME partners. Despite the orchestrator's effort to reconcile expectations and iron out disparities, the global financial crisis, whose effects were first felt in the Netherlands in 2008/2009, takes its toll and triggers the shift toward maturity. In the light of financial pressures, many partners had become dependent on the orchestrator's assistance, noncollaborative and unwilling to assume responsibility for their survival.

3.5.3 Maturity (2011-2016)

The final observed phase of the Q-Search ecosystem's development began in late 2011 and continued throughout 2016 (Table 3-5). The transition brought another round of structural changes, much like the previous transition had previously done through the establishment of the collaboration contract, the IT platform, and the subscription fee. The misalignment between the orchestrator's personal aspirations and her role within the ecosystem at the end of growth in conjunction with the growing divide between profit and inspiration-seeking SME partners, prompted her to dismantle the formal structure that had sustained the ecosystem's functioning from 2003 throughout 2011.

Table 3-5: Phase III of the Q-Search Ecosystem's development: Maturity (2011-2016)

Core aspects		Evidence from data
Ecosystem goals	Pursue vision and continue support	"The only thing that we have to do is to interact on a deeper lever with each other and then we do not need all the rules" (Source: Orchestrator)
Key attributes of the entrepreneurial orchestrator	Re-alignment between vision decisions	"The development of Q-Search is nothing other than the mirror of her personal development. What she is doing now with and in Q-Search is very much more aligned with her deeper soul and attitudes" (Source: Core partner) "She was more and more interested in issues of transformation, transition, culture change" (Source: Non-core partner)
	Self-efficacy and persistence	"My enthusiasm [remained constant] because I discovered that [what I had started was working] and I was more convinced that I have to continue with it" (Source: Orchestrator) "It takes time and effort and resilience to continue in doing [what you do]. Sometimes you take two steps forward and three back" (Source: Orchestrator)
	Self-reflection/personal development	"During those 15 years the hardest work I had to do was on myself" (Source: Orchestrator) "All the phases were necessary for my development and for my partners and for our surroundings" (Source: Orchestrator) "I have an ego myself. I have had to let go a lot of it and I still have it. […] But it is a functional ego" (Source: Orchestrator) "Now she is very much more relaxed. She initiates and looks what happens" (Source: Core partner)

Key orchestration actions	Quitting network as formal orchestrator	"I think 70-80 per cent of her time she was busy, busy, busy with operational issues. So the [Phase] III was, in fact, her liberating act" (Source: Core partner) "What we are doing now with the intervention group is that we have a case, on which we share our wisdom so that [everybody] can go home with much more information and work on that" (Source: Orchestrator) Doc5 Sample vision document (The Art of Impact) Doc6 The Future of Work project
	Collaboration with policy–makers	"My focus now is policies, the Hague, ministries, institutions" (Source: Orchestrator) Doc4 Sample vision document (Input for new tax plan for self-employed)
Means of creating ecosystem value	Freedom in pursuit of vision, inspiration, connectedness	"We [serve more] as inspiration to each other than we [focus] on getting assignments with companies" (Source: Orchestrator) MIG Meeting
Outcomes	Boundaries disappear	"The idea of Q-Search being an organization, an organized organization is really gone" (Source: Orchestrator) "With me there are no more boundaries anymore. (…) I do not have official partners anymore" (Source: Orchestrator) "I left at the same time as the entrepreneur said: I will change the system of Q-Search. I though OK, that is for me also a good time to change now" (Source: Non-core partner)
	New ecosystems take shape	"Q-Search now, it [includes] the entrepreneur, [whom] is a good networker, but also partners, and the network around [them]. So, we are building a whole new ecosystem" (Source: Orchestrator)

What remained is a borderless, self-adjusting community whose members represented new seeds for growth. The main goal (pursuing the ecosystem's initial vision and continuing interpersonal support) was born from the orchestrator's personal development and renewed need to align her vision with actions. During this phase, the orchestrator's role could be best described as an enabler and sustainer of transformation (Gastaldi et al., 2015) for partners that had embraced the original vision for collaboration and who were prepared to take it forward in their professional environments.

In the final phase, the ecosystem retained a subset of partners acquired throughout the first phases. These partners included individuals and SMEs whose level of independence and responsibility matched that of the orchestrator and who were now free to choose various forms for collaboration which best suited their individual pursuits. In this phase, a subset of partners also came closer to achieving societal impact. Evidence for the latter was provided by the types of projects they engaged in – i.e., projects aiming to provide general guidelines for effective collaboration (the Art of Impact) as well as projects aimed to help policy-makers understand issues in recruitment, workforce development and other societally relevant issues.

While the ICT platform no longer served its original purpose in Phase III, the communication among partners continued via so-called "Maatschappelijke Intervisie Groep" (MIG) (intervision group) meetings. As alternatives to the orchestration service package (meetings with facilitation, concept-building, newsletters, partner selection, personal coaching) delivered by the orchestrator during growth, MIG meetings took interaction to a new level by enabling participants (partners and experts keen on broadening their professional horizons) to reflect more deeply on their ideas, limitations, and concerns, and even perform role-play in order to solve conflicts. The fluid membership of these meetings reflected the orchestrator's and SME partners' belief that issues were best solved by bringing the right combination of people together, namely individuals with complementary skills that were passionate about the issue and open to new ideas. Trust was once again of fundamental importance in sustaining the new means of

collaboration and, more broadly, to the building of an effective knowledge-sharing network at the core of the ecosystem (Dyer and Nobeoka, 2000; Skardon, 2011).

Examples of on-demand projects – mainly in collaboration with policymakers – in this phase included: The Future of Work, a project whose aim was to lay the foundations for the workplace and work practices of the future and the Development Vouchers project. The Development Vouchers project represented a collaborative initiative involving a broad array of stakeholders, i.e., local policymakers, union representatives, career counselors and life management coaches (among them, Q-Search partners), and representatives of an industry-specific employer association for continuous learning), whose goal was to create a national platform for lifelong vocational development that would enable all members of society to fully participate in the workforce.

During the ecosystem's maturity, Q-Search partners also worked closely with the Ministry of Social Affairs and Employment as well as the Ministry of Education, Culture and Science in the Netherlands to promote impact creation via new forms of collaboration – i.e., lessons from the building of Q-Search were taken forward. As for the orchestrator herself, her new joint projects — The Art of Impact and The Art of Letting Go training — were the result of her found self-efficacy and the fit between her vision and the preferred way of working with others. That is, in an exploratory, collaborative, open manner.

All in all, during maturity the alignment between the orchestrator's attributes and those of the ecosystem (whom she no longer orchestrated directly) appeared to be a strong predictor of success. This finding is in line with previous entrepreneurship research (Rauch and Frese, 2007). In effect, the most important change occurs internally as the orchestrator successfully aligned her values and beliefs with those of the ecosystem. Maturity was therefore a time of renewal for everyone involved in the ecosystem – i.e., entrepreneurial orchestrator, SME partners, emergent stakeholders. Maturity also elicited the reintroduction of some of the successful practices undertaken during initiation. As such, informal conversations re-emerge in a new format:

> What we are doing now with the intervision [MIG] group is that we have a case, on which we share our wisdom so that [everybody] can go home with much more information and work on that. (Source: The Orchestrator)

Last but not least, during maturity mutual sharing and responsibility for partners' learning were once again decentralized, as was the orchestrator's role in creating connections. During maturity partners connected independently, with or without her participation. These new dynamics placed the emphasis back on realizing the initial vision (changing existing HR practices and increasing job satisfaction and quality of work life in the Netherlands) within a community of dedicated SME partners, who had now fully embraced the Q-Search vision and who choose to collaborate and support each other unencumbered by any formal agreements.

3.6 Discussion and conclusion

Using an inductive, single case study approach, the chapter has examined the development of a Dutch ecosystem of SMEs active in the HR services industry. Because ecosystems "reflect a particular set of circumstances and interactions involving individuals coming together at a specific time" (Saunders et al., 2015, p. 141), the research perspective taken in this chapter is interpretivism.

In the context of this gradual development (from initiation, throughout growth and eventually maturity) the chapter has provided evidence on the complex interplay between the ecosystem's goals, the attributes of the entrepreneurial orchestrator, the orchestrator's actions, as well as ecosystem outcomes and innovative value creation. In as follows, I describe the theoretical and managerial implications of my research.

3.6.1 Theoretical implications

By documenting the interplay between ecosystem goals, orchestrator attributes and actions as well as value creation, I have added to previous work by Brunswicker and van de Vrande (2014) and Vanhaverbeke (2017), whom have repeatedly called for more knowledge on how SMEs coordinate ever more complex

webs of relationships. Furthermore, I have built on existing work by Gardet and Fraiha (2012) and Autio et al. (2014) on relations and coordination in a networked setting. Uniquely, however, the framework used for the analysis is inter-disciplinary and combines different literature streams – i.e., strategy/IM, entrepreneurship as well as a few elements from psychology (the entrepreneurial attributes) to showcase the profound influence the attributes of the orchestrator can cast on the ecosystem forming around her and vice-versa[53]. The study has also elevated existing studies on the development of ecosystems by providing evidence of how ecosystem actors (including the orchestrator) combine deliberate and emergent strategies (Mintzberg and Waters, 1985) to create value and therefore "optimize" the outcomes for all partners involved (Rabelo and Bernus, 2015; Oh et al., 2017). Last but not least, the precise phases of an ecosystem's evolution – initiation, growth, maturity – were also delineated and explained in detail and it was pointed out that these stages are not linear and predictable, but rather a consequence of the continuous expansion and contraction of the ecosystem as it undergoes its developmental journey.

In studying the psychological profile of the ecosystem's entrepreneurial orchestrator and how it affects ecosystem development and evolution, I also build on the important work by Ahn, Mortara and Minshall (2013) who also find that in an SME context the founder and his/her traits have a profound influence on the way OI relations unfold. In addition, and leveraging studies by Salampasis and Mention (2017), I also shed light on the human element in OI ecosystems. As our findings show, personal relationships play a crucial role in supporting OI in each of the evolutionary phases (Ceci and Iubatti, 2012; Vanhaverbeke, 2017). During initiation, the regular meetings held by the entrepreneurial orchestrator with core partners help create familiarity and also attract new, complementary SMEs to Q-Search. This, in turn, leads to establishing ecosystem trust and legitimacy, to knowledge-sharing, to continued development, and to innovative service creation. During growth, personal relationships contribute to the creation of the IT platform

[53] As Visscher et al. (2017, p. 3) note, orchestrators "do not only adapt to innovation ecosystems, but also have opportunities to shape them, and that these opportunities alter in the course of time". At Q-Search too, each stage brings new challenges which require the orchestrator to both adapt and support her initial vision.

for closer activity coordination, better communication, and aligned expectations. Finally, during maturity, personal relationships (feedback from partners) and the understanding that trust has arrived at a tipping point (Molina-Morales, Martínez-Fernández and Torlò, 2011) enable the orchestrator to "free" herself from the formal orchestration role and let Q-Search become a truly self-sustaining (ecosystem) collaborative arrangement. Ultimately, Q-Search partners move on to create new OI relationships in HR consulting, drawing upon the experience from Q-Search.

Surprisingly, however, the study finds that the constant nurturing of personal relationships and the introduction of the ICT platform are necessary but not sufficient for the successful orchestration of an SME ecosystem. While the entrepreneurial orchestrator carries out much self-reflection and continuously deepens discussions among partners, her approach to orchestration is not always effective in light of the challenges at each stage. For example, the orchestrator often prefers a consensus leadership approach (Castle and Decker, 2011), as opposed to a rotating leadership process which might result in more innovation and hence better outcomes for the members. As Davis and Eisenhardt (2011, p. 159) note: "while dominating and consensus leadership processes are associated with less innovation, a rotating leadership process is associated with more innovation".

3.6.2 Managerial implications

This research presented in this chapter also provides important implications for practitioners. First, by understanding the particularities of each evolutionary phase, practitioners may design better instruments and interventions to stimulate SME ecosystems' initiation, growth and/ or maturity. In it is important to note, however, that these evolutionary phases or stages are not "clear-cut" and certainly not always "linear". Instead, the ecosystem's development consists of a "constant transformation, loosening and tightening, expanding and contracting, merging and splitting" (Visscher et al., 2017, p. 3). The latter is what Lusch and Vargo (2016) refer to as 'the self-contained, self-adjusting nature' of ecosystems.

At Q-Search, this dynamic is primarily evidenced by the introduction of the ICT platform and of the vision and legal document during growth and their eventual abandonment in phase three to help ecosystem partners function independently of the orchestrator's coordination.

Another important managerial implication of the research is linked to the profile of the orchestrating entrepreneur. While it is tempting to put forward an "ideal" set of capabilities that the orchestrating entrepreneur must possess, this chapter's findings have shown that successful orchestration requires the exercising different capabilities depending on the challenge ahead. During initiation, the orchestrator struggles to establish her ecosystem's legitimacy both internally and externally (what Paquin and Howard-Grenville (2013) have referred to as the "broad versus pragmatic legitimacy" dilemma). This challenge requires her to show passion (Cardon et al., 2013) and authenticity so as to establish fellowship and help the ecosystem grow beyond the core recruitment partners. During growth, the challenge becomes creating cohesion among partners and ironing out disparities between them (these disparities are nearly fatal to the ecosystem due to the financial crisis). As such the orchestrator must continue to show passion and grit (Syed and Mueller, 2014) as well as persevere in supporting her original vision for the ecosystem. Finally, during maturity, the challenge becomes a continued pursuit of the vision of the ecosystem, albeit using different means - e.g., influencing policy. In this final stage, which coincides with the ecosystem's renewal, the orchestrator must exercise deep self-reflection (Dhanaraj and Parkhe, 2006) so as to successfully realign her values with that of the ecosystem in its latter form. All in all, this chapter suggests that there are a number of entrepreneurial attributes that are essential to healthy relationship building and activity coordination - e.g., overconfidence, optimism and rigidity (Busenitz and Barney, 1997), grit, passion and perseverance (Syed and Mueller, 2014), ability to self-reflect (Dhanaraj and Parkhe, 2006) etc. – but that these attributes are most useful if adapted to the challenge/ situation at hand. Thus, practitioners could use these observations to stimulate capability building.

A third and final managerial implication of the research is linked to the engine of an ecosystem's development. While the orchestrating entrepreneur's facilitating

role is clear in this process, this chapter finds that the ecosystem's longevity, is in fact, influenced not so much by the entrepreneur herself but by a small core group of partners who come to share the orchestrator's philosophy. This observation suggests that building forms of collaboration that are resistant to shocks and that are able to provide collective impact (Kramer and Pfitzer, 2016) is not a matter of appointing a strong leader or orchestrator, but rather a matter of aggregating a small community whose members develop symbiotic relationships (Davis and Eisenhardt, 2011). Additionally, the findings suggest that the introduction of a fee during the growth phase of the ecosystem has both positive and negative consequences. For the partners – individuals and SMEs – who fail to share the orchestrator's philosophy, the fee represents a means to distance themselves from the core mission of the ecosystem and cause an over-reliance on the orchestrator. For the core partners, however, the fee does not affect their independence.

3.6.3 Limitations

While this chapter presents one of the first attempts to visualize and analyze an SME ecosystem's evolution over a prolonged period of time, its main weakness lies in that I draw up this view based on archival data and retrospective accounts of Q-Search's development. Despite this limitation, the research has found consensus among interviewees as to when initiation, growth, and maturity had occurred at Q-Search.

A further important limitation is given by the limited study of the ecosystem partners. While this research has mainly focused on the entrepreneurial orchestrator, one can speculate that Q-Search's development is effectively influenced by the maturity of its partners too. Future research on SME ecosystems should therefore address this limitation by analyzing the traits and maturity of the orchestrator as well as of the various categories of partners to note possible causal mechanisms. The latter could provide a more nuanced study of the dynamics that underlie an ecosystem's development. Furthermore, future studies could leverage inter-disciplinary research to understand the implications of ICT on the building of inter-firm relationships. At Q-Search, the pioneering introduction of a customized

ICT platform facilitates communication but fails to establish full cohesion among all partner types. The latter might be linked to the fact that communication (especially in social dilemmas) is most effective when delivered face-to-face as opposed to written format (Balliet, 2010). All in all, I encourage researchers to continue exploring the human element in inter-firm relationships.

3.7 Acknowledgements

Prior to its final publication, the study of Q-Search (in its various versions) was reviewed by several editors, presented at several internal research seminars at UHasselt, shared with students via guest lectures, and discussed at one important academic conference: The Academy of Management Meeting (AOM) in Anaheim, USA in August, 2016. The feedback received on those occasions as well as throughout the publishing process with World Scientific Publishing (via the editors and reviewers "Researching Open Innovation in SMEs") has significantly elevated the quality of the manuscript. Therefore, I are deeply indebted to: the editors of the Strategic Entrepreneurship Journal and those at the California Management Review (despite the eventual rejections), the organizers of the TIM Doctoral Consortium at AOM, the panelists and attendees of the session on "Entrepreneurial Ecosystems: Emerging Research Directions" at the AOM (among them: Professors: Llewellyn Thomas, Erkko Autio, Mike Wright and Satish Nambisan) as well as the attendees of our Ecosystems session at the AOM (I took great pleasure in discussing how to raise the level of (female) entrepreneurship in ecosystems!). I would also like to extend a warm thank you to my fellow co-author Prof. Nadine Roijakkers for introducing me to Marjolein Hins at Q-Search, and to Marjolein Hins (Q-Search founder) herself and to her partners for their kindness, openness and support with executing this research. Last, but certainly not least, I would like to thank Prof. Diana Rus at the University of Groningen for her full faith in the research project and for her insights regarding the psychology of the entrepreneur.

Chapter 4: Institutions in ecosystems: Case studies from the pharmaceutical industry

4.1 Structured abstract

The aim of this chapter is to identify and categorize (by means of a typology) institutions and institutional change patterns in ecosystems. In doing so, the chapter addresses the third research objective of the thesis.

Specifically, the chapter proposes a typology of institutions enabling or constraining customer centricity and value co-creation in ecosystems, illustrates the various types of institutions with examples from healthcare and provide case study evidence on how pharmaceutical companies react to and induce institutional change.

In Table 4-1, I provide additional information about the chapter, including the design and methodology used, data sources, research perspective taken, findings, strengths, limitations, practical implications as well as publishing outlet.

Table 4-1: Chapter 4 at-a-glance

Aim/ Research objective	The aim of this chapter is to identify and categorize (by means of a typology) institutions and institutional change patterns in ecosystems. In doing so, the chapter addresses the third research objective of the thesis.
Design/ Methodology and data sources	First, a typology of institutions enabling or constraining customer centricity and value co-creation is proposed and illustrated with examples from healthcare. Next, to clarify how companies deal with these institutions by reacting to or inducing institutional change, two case companies from the pharmaceutical industry are described.

	The chapter is a multiple case study that draws upon: interviews, workshops and archival search (companies' websites, annual reports, reports from independent organizations).
Research perspective(s) taken	Strategy/IM + service marketing
Findings	In the cases one can identify nine types of institutions (culture, structure, processes, metrics, language, practices, IP, legislation and general beliefs) grouped by three levels of analysis (micro, meso and macro). Furthermore, the findings indicate that companies can react to, but also proactively induce, institutional change.
Strengths/ Originality	This research develops a deeper understanding of institutions by developing a typology. This typology is then empirically examined in a healthcare context.
Limitations	The investigation is limited to two case studies.
Practical implications	Organizations need to understand the micro-, meso- and macro-level institutions of their capabilities; react to institutional changes imposed by other actors; and proactively change institutions by breaking, making or maintaining them
Publishing outlet and title in print	Outlet*:* Ng, I.C. and Vargo, S.L. (eds.) ***Journal of Service Management –*** *Special issue on Service-Dominant Logic, Service Ecosystems and Institutions: Bridging Theory and Practice, 29*(4), pp.593-614. Title in print: 'Institutional types and institutional change in healthcare ecosystems'. Authors: Pop, O.M., Leroi-Werelds, S., Roijakkers, N., and Andreassen, T.W.
Publication year	2018

4.2 Introduction

Researching the rules and norms of collaboration in ecosystems has been addressed by both strategy/IM as well as service marketing scholars (Iansiti and Levien, 2004; Peltoniemi, 2006; Chesbrough, Kim and Agogino, 2014; Frow and McColl-Kennedy, 2014; Vargo and Lusch, 2016). In these contributions, the authors have urged for a deeper exploration of several elements such as: the factors that influence (either positively or negatively) the relationships between

ecosystem actors, the levels at which the interactions can occur (micro, meso and macro), as well as how organizations deal with institutions and institutional change (essentially, a change in the rules and norms of collaboration in the ecosystem in practice).

To address these concerns, and in answer to specific calls for research on ecosystems in the healthcare industry – e.g., how can actors in healthcare collaborate to create better patient well-being (see, for example, Kramer and Pfitzer, 2016 or Sharma and Conduit, 2016), as well as calls for mid-range theories to bridge the gap between abstract general theories and empirical findings (Brodie and Gustafsson, 2016; Vargo and Lusch, 2016), I have put forward an investigation of institutions and institutional change in the healthcare sector. Below, I describe our research endeavor in more detail.

4.2.1 The importance of developing mid-range theories

Prior research in service-dominant (S-D) logic has emphasized the need to develop mid-range theories in order to bridge the gap between abstract general theories and empirical findings (Brodie and Gustafsson, 2016; Vargo and Lusch, 2016), and thus between theory formulation and verification (Brodie et al., 2011). While the purpose of general theories, such as S-D logic, is to explain everything about a general topic, mid-range theories focus on a particular phenomenon or construct in a particular context (Brodie et al., 2011).

Mid-range theories can take different forms (Brodie and Gustafsson, 2016). For instance, recent mid-range theories advanced by S-D logic include the delineation of the conceptual domain of customer engagement (Brodie et al., 2011), the development of a conceptual model of customer engagement marketing (Harmeling et al., 2017) and the development of a typology of customer participation (Dong and Sivakumar, 2017).

4.2.2 Proposing a typology

This chapter focuses on the developing the groundwork for a mid-range theory of institutions in ecosystems by proposing a typology. This typology aims to offer much needed insights into the domain of institutions as well as a refinement of S-D logic as a meta-theory. According to S-D logic (and as put forward in Chapter 2), an ecosystem is: "a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" (Vargo and Lusch, 2016, p. 10).

This S-D logic perspective on ecosystems supports customer centricity (i.e., the focus of the ecosystem is on creating value for the customer which ultimately results in value for other ecosystem actors; Shah et al., 2006) as well as value co-creation (i.e., the customer has an active role in the ecosystem; Sharma and Conduit, 2016). These two notions are crucial when investigating institutions in ecosystems since institutions can enable or constrain interactions and collaborations with customers, which ultimately affects customer centricity and value co-creation within the ecosystem (Vargo and Lusch, 2016).

Although ecosystems and the role of institutions in these ecosystems have been described in recent S-D logic studies (Vargo et al., 2015; Vargo and Lusch, 2016) and are deemed important for business practice (Ostrom et al., 2015), there is little documented evidence on which types of institutions exist, how they manifest themselves in practice and how organizations deal with them (Barile et al., 2016).

In light of this research gap, this chapter proposes a typology of institutions enabling or constraining customer centricity and value co-creation in ecosystems, illustrates the various types of institutions with examples from healthcare, and provides case study evidence on how two pharmaceutical companies react to and induce institutional change in order to facilitate interactions and collaborations with customers. Overall, this study contributes to filling a theoretical and empirical gap in this emerging field and helps organizations to recognize and address ecosystem challenges.

Healthcare represents a relevant context to study ecosystems since it involves a broad range of actors that can collaborate to create better patient well-being

(McColl-Kennedy et al., 2012). Potential ecosystem actors include pharmaceutical companies, universities, patients, caregivers (physicians, pharmacists, nurses, family and friends of patients), patient associations, policymakers, external research organizations and supra-national bodies such as the World Health Organization (Kramer and Pfitzer, 2016; Lowe et al., 2016). Previous studies indicate that an ecosystem perspective on healthcare can help create better patient experiences (Joiner and Lusch, 2016) and better health outcomes (Frow, McColl-Kennedy and Payne, 2016). Although healthcare ecosystems are receiving increased attention in the service literature (McColl-Kennedy et al., 2012; Sharma and Conduit, 2016), empirical research on their institutions is scarce. This is surprising, since institutions can enable or constrain interactions and collaborations with patients, which influence patient centricity and value co-creation, and ultimately patient well-being.

4.3 Theoretical background

4.3.1 Institutions

Institutions have been defined as "humanly devised rules, norms, and beliefs that enable and constrain action and make social life predictable and meaningful" (Vargo and Lusch, 2016, p. 11). Institutions can come in various forms, including, but not limited to: laws, informal social norms, conventions, symbols, practices or other guidelines for thinking, evaluating or behaving.

The basic function of institutions is to effectively reduce thinking by providing information (Edquist and Johnson, 1997) as well as to create order and reduce uncertainty (North, 1991). In inter-firm collaborations, for example, institutions are employed by actors to help create stable expectations of each other's behavior. The latter makes institutions role instrumental and their study mandatory. Because institutions simplify rational thinking, however, there is a potential risk that actors "act without thinking[54]" which can result in ineffective

[54] In Chapter 3 I illustrate the benefit of "acting without thinking" (actors' autonomy in thinking and acting). At Q-Search the orchestrator repeatedly emphasizes that actors must learn to function without her direct supervision/coordination. Eventually, this practice leads to the ecosystem's sustainability/ self-renewal.

dogmas, principles, beliefs or dominant logics (Vargo and Lusch, 2016). This implies that the appropriateness of institutions should be reevaluated and even challenged based on the context, but also over time (Barile et al., 2016). For instance, when Vargo and Lusch (2004) proposed S-D logic, they actually challenged the institutionalized logic of marketing, referred to as goods-dominant logic (Vargo and Lusch, 2016).

4.3.2 Institutional change

Although some initial studies on institutions (e.g., Meyer and Rowan, 1977) consider them as taken-for-granted, the notions of institutional entrepreneurship and institutional work suggest that actors can (pro)actively influence and build institutions (Frow, McColl-Kennedy and Payne, 2016; Vargo and Lusch, 2016). Specifically, actors can induce institutional change by transforming existing institutions or creating new ones (Vargo and Lusch, 2016). DiMaggio (1988) called these actors "institutional entrepreneurs" whereas Lawrence and Suddaby (2006, p. 215) described their activity as "institutional work"—i.e., "the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions". In Chapter 3 I also provide evidence of such institutional work, albeit in a different industry setting.

In a similar vein, Koskela-Huotari et al. (2016) described three patterns of institutional change: breaking, making and maintaining. To change institutions, some of them need to be challenged and broken to make new ones. For instance, if a company wants to collaborate with customers, it has to redefine the roles of customers in the organizational processes (i.e., breaking existing institutions and making new ones) and it can create platforms to interact with them (i.e., making institutions). On the other hand, some institutions have to be maintained. For instance, the company has to adhere to laws that guide company-customer interactions.

4.4 A typology of institutions

As noted in the introduction, this chapter proposes a typology of institutions enabling or constraining interactions and collaborations between firms and their end-customers in ecosystems. By typology I refer to "a conceptually derived interrelated set of types representing forms that may exist, without necessarily having rules for their classification, including types that may be partly overlapping" (Frow, McColl-Kennedy and Payne, 2016, p. 25).

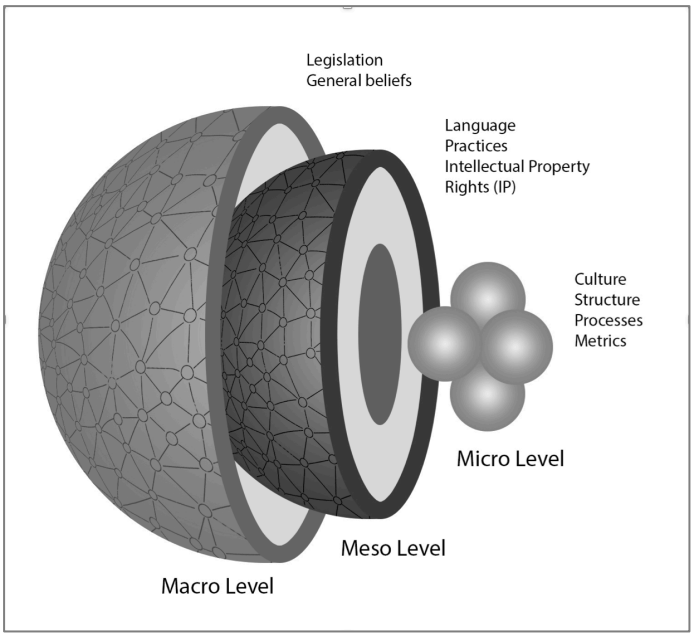

Figure 4-1: Institutions and levels of context

The proposed typology (presented in Figure 4-1 above) starts from three nested levels of context (Chandler and Vargo, 2011; Vargo et al., 2015): the micro-level (e.g., organization), the meso-level (e.g., industry), and the macro-level (e.g., society). These levels – albeit with some variation[55] – are recognized and widely employed by both the service marketing literature as well as scholars in strategy/IM to analyze a firm's strategy. Barney and Hesterly (2011), for example,

[55] In their study of the healthcare industry, Frow, McColl-Kennedy and Payne (2016), for example, note the micro-, meso-, macro and mega-levels of context. For simplicity reasons, and also for better alignment with strategy/IM, I use the micro-, meso-, and macro-levels of context.

make a distinction between the firm's internal capabilities and environment (corresponding to the micro-level of context), the industry environment (corresponding to the meso-level of context), as well as the macro environment (corresponding to the macro-level of context) whereby various political, economic, social, and technological forces interact. The existence of these levels of context or environments has also led to the development of special tools to assess opportunities and threats within each. The VRIO (Value, Rareness, Imitability, Organization) framework (Barney and Hesterly, 2011), for example, is frequently used to help firms uncover and protect the resources and capabilities that give them a long-term competitive advantage. At the meso-level, an industry's profitability might be assessed using Porter's Five Forces model[56] (Porter and Millar, 1985), whereas potential macro-economic forces or trends might be identified using the PEST[57] analysis (McGee, 2006). Thus, in analyzing ecosystems (which are complex forms of collaboration involving many firms), the same levels of context apply.

The micro-, meso- and macro-levels of context in an ecosystem are, not surprisingly, strongly intertwined. Going from micro to macro: a micro-level institution such as organizational culture (e.g. Tesla's culture) will influence meso-level institutions such as industry practices (e.g., Tesla's competitors might adopt part of this culture to stay competitive), but also macro-level institutions such as general beliefs about a particular type of technology (e.g., the utility of electric cars). Going from macro to micro, a new national law that helps create a more skilled workforce will influence meso-level institutions such as intellectual property (a more skilled workforce might generate more valuable IP) as well as create more effective processes for the firms that hire this innovative/ skilled workforce. As a result, the actual and potential activities of an actor in an ecosystem are influenced by its unique context, which includes micro-, meso- and macro-levels

[56] According to Porter and Millar (1985), these forces include the power of buyers, the power of suppliers, the threat of new entrants, the threat of substitute products, and the rivalry among existing competitors.

[57] PEST is an acronym for Political, Economic, Social and Technological.

(Chandler and Vargo, 2011). A further discussion of this theme can be found in Section 2.6.2.

It is also important to note that the various levels can further be divided into institutions (see Figure 4-1). The micro-level institutions exist at the firm level and are therefore broadly applicable to all companies. Meso- and macro-level institutions, however, are industry specific (Koskela-Huotari et al., 2016) and need to be determined based on the firm's unique context.

In this chapter, the chosen context is healthcare – i.e., I investigate two organizations active in the pharmaceutical industry. This industry represents an interesting research context because pharmaceutical companies are currently transforming from product-centric drug manufacturers to patient-centric healthcare providers. As part of this transition, these companies are engaging patients to co-create value (Champagne, Hung and Declerc, 2015; Donahue and Simms, 2016). Hence, understand the various levels of complexity that influence their transition is important to understanding the obstacles they incur and eventual solutions they adopt to overcome these obstacles.

In as follows, I elaborate on each type of institution and in doing so provide further groundwork for the research proposed in this chapter.

4.4.1 Micro-level institutions

Micro-level institutions exist at the organizational level and determine how an organization collaborates and interacts with customers and other actors. In the academic literature (see Shah et al., 2006), culture, structure, processes and metrics[58] frequently emerge as key enablers or deterrents of customer centricity and value co-creation at the organizational level. Interviews with experts in academia, consulting, life sciences, beauty, IT, telecommunications and logistics

[58] These same general enablers or deterrents of customer-centricity and value co-creation will determine the specific capabilities ecosystem actors need in order to maintain quality relationships with each other. This fact is evidenced in Chapter 5.

support this classification[59]. Organizational culture represents "the pattern of shared values and beliefs that help individuals understand organizational functioning and thus provides them with norms for behavior in the firm" (Deshpandé and Webster, 1989, p. 4).

Shah et al. (2006) identified three values and beliefs of a customer-centric culture: every decision begins with the customer; employees are customer advocates; marketing is an investment, not a cost. Going one step further, Sharma and Conduit (2016) proposed a set of values that facilitate value co-creation: mutual respect, empowerment and mutual trust. Mutual respect encompasses the belief that the other actor has valuable resources as well as the demonstrated appreciation for these resources. Empowerment relates to the organization's ability to engage customers to contribute and take responsibility for the value outcome. Mutual trust can be defined as having confidence in the other actor's reliability and integrity.

Structure refers to the anatomy of an organization (Dalton et al., 1980) and consists of all formal reporting relationships, including the number of hierarchical levels, managers' span of control and cross-departmental communication patterns (Daft, 1989). According to Shah et al. (2006), a customer-centric organization integrates and aligns its functional activities and departments to effectively serve its customers. Such entities are not built around functional silos but rather around cross-departmental collaboration. Moreover, customer-centric organizations have function titles like chief customer officers and customer relationship managers instead of product managers and sales teams. Additionally, innovation management scholars emphasize the relevance of "structural ambidexterity"—i.e., having flexible functional and cross-functional structures that allow for the simultaneous tackling of incremental and radical innovation projects (De Visser et al., 2010). When initiating and managing ecosystems, a rigid structure will not support collaboration and co-creation (Hosseini et al., 2017). On the other hand, organizations should have specific functions or departments for collaborating and

[59] In addition to documenting the case studies, I have also interviewed industry experts for the chapter.

interacting with other actors, including customers (Dyer, Kale and Singh, 2001; Leroi-Werelds, Pop and Roijakkers, 2017).

Processes represent actions intended to accomplish a pre-established business objective (Ray, Barney and Muhanna, 2004; Porter, 1991). Five generic processes are essential for a customer-centric organization (Shah et al., 2006): a strategy development process that focuses on the organization's business strategy as well as its customer strategy; a value creation process that creates value for the organization and for its customers; a multichannel integration process that manages customer relationships via different (but integrated) channels in order to create an outstanding customer experience and present a consistent image to the customer; an information management process to collect, collate and use customer data; and a performance assessment process to ensure the organization's strategic aims are reached (Payne and Frow, 2005).

To allow for value co-creation, the aforementioned processes should account for collaboration and interaction with other actors (Mortara et al., 2009), including the customer. This implies that: the strategy process should include collaboration with customers as part of the business and customer strategy; the value creation process should emphasize value co-creation; the multichannel integration process should allow for and encourage two-way communications with customers; the information management process should not passively collect information, but actively engage with customers and learn from them; and the performance assessment process should include not only customer-centric performance measures, but also collaborative measures (Shah et al., 2006).

Finally, metrics refer to measures organizations use to assess their performance. Organizations often develop dashboards with key performance indicators (KPIs) based on their organizational objectives. If an organization strives for customer centricity, it should use customer-centric KPIs since this encourages employees to focus on creating customer value and serving customers instead of on selling products to customers even when they do not need them. Furthermore, it helps managers determine the financial implications of customer-centric decisions (Shah et al., 2006) and track the impact of their investments. The latter is

consistent with the perspective that marketing is not a cost but an investment (Strandvik, Holmlund and Grönroos, 2014) and the notion of return on marketing (Rust, Lemon and Zeithaml, 2004).

Customer centricity can be measured by means of hard metrics, such as customer lifetime value and customer equity (both expressed in financial terms) or soft metrics, such as customer satisfaction and product quality (based on customer perceptions). A frequently used KPI is the Net Promoter Score (NPS). Although there is some criticism regarding the relationship between NPS and organizational growth (Keiningham et al., 2007), it remains a popular and valuable metric for evaluating customer centricity. The NPS is especially treasured by practitioners since it is simple to understand, well suited to integrate in a marketing dashboard, straightforward to track in real-time and easy to benchmark.

To encourage collaboration and value co-creation, additional KPIs should be used. Potential hard metrics include the number of collaborative projects and co-created ideas, the number of employees involved in collaborative projects, as well as the revenues generated by the collaboration (Cravens, Piercy and Cravens, 2000; Michelino et al., 2015). Potential soft metrics include the partner's satisfaction with the collaboration, the level of trust developed among actors, and the actor's intention to collaborate again in the future (Tamoschus, Hienerth and Lessl, 2015).

4.4.2 Meso- and macro-level institutions: an industry perspective

While micro-level institutions reside within the organization, meso- and macro-level institutions exist at the industry level and the global/societal level, respectively. Understanding which meso- and macro-level institutions are relevant requires a focus on the specific industry (Koskela-Huotari et al., 2016).

In the pharmaceutical industry, language, practices and IP rights are relevant meso-level institutions, whereas legislation and general beliefs are relevant macro-level institutions. I elaborate on each of them by combining insights from

the academic literature with industry reports and expert interviews. The industry reports were drawn from international organizations, communities for pharmaceutical executives, rating agencies, patient associations and platforms, and healthcare consultancy firms, whereas the expert interviews included discussions with experts in life sciences.

When interacting and collaborating in a ecosystem, it is important to use a language all actors understand, especially in a rather technical context such as the pharmaceutical industry. To date, several language-related initiatives have been initiated to increase patient participation in the ecosystem. For instance, the European Patients' Academy on Therapeutic Innovation (EUPATI) is a consortium comprising patient organizations, universities, non-profit organizations and pharmaceutical companies. EUPATI's mission is twofold. First, it aims to educate patients so they can contribute to the development of new drugs. Second, it aims to improve the user (patient) friendliness of publicly available healthcare information.

Practices can be defined as "routinized activities" (Vargo and Lusch, 2016) and can influence interactions and collaborations with patients. In a recent interview with McKinsey (McKinsey&Company, 2017), David Epstein, former CEO of Novartis Pharmaceuticals and now an executive partner at Flagship Pioneering, summarizes ongoing practices in healthcare as follows:

> [T]here's enormous waste in the way we do things. You go to a doctor, he or she makes a diagnosis and sends you home, and there's little follow-up until you next return. There has to be a more effective way to monitor people over time. Digital allows that possibility.

Epstein calls for changing industry practices (i.e., institutional change) and states that healthcare efficiency and effectiveness will benefit from customized treatments combined with digital solutions. The latter can take many forms, including digital (video) instead of physical meetings, apps and wearable devices (Champagne, Hung and Declerc et al., 2015). Wearable devices offer physicians the opportunity to continuously monitor patients' health situation, whereas apps

can be used to offer information to patients, and also to support interactions between physicians and patients. Furthermore, apps allow patients to send information to physicians, including pictures or videos, which can facilitate diagnosis and monitoring.

Overall, digital solutions can be used by pharmaceutical companies to supplement or support their pharmacological therapies. For example, pharmaceutical giant Novartis works together with Google to build a smart eye lens that can help patients with diabetes by continuously monitoring their glucose and insulin levels.

The digital evolution not only provides digital solutions to support monitoring practices, but it also affects communication practices. A recent study by McKinsey (Champagne, Hung and Declerc, 2015) indicates that pharmaceutical companies are starting to use digital channels (including apps, communities, social media) to interact with patients, depending on the target audience.

As the pharmaceutical industry relies heavily on research and development (R&D), intellectual property (IP) rights are a crucial meso-level institution. Although IP rights are often debated in healthcare (because of its implications for access to medicines), the protection of IP rights remains important for spurring R&D (McKinseyandCompany, 2017). IP management is thus of critical importance when pharmaceutical companies collaborate with other organizations (Leten et al., 2013).

When companies collaborate with customers, however, the situation is slightly different. This relates to the notion of user innovation (von Hippel, 2010), which is based on three key principles: users have unique knowledge about their own needs; they create solutions to those needs; and they (often) freely share their results with others. The benefit for these users does not lie in IP rights and selling the innovation, but in using a product or service that meets their needs. In the early stages of user innovation research, the focus was on lead users who innovate autonomously to solve their own needs. Later research, however, focused on knowledge sharing and co-development in user communities (Piller and West, 2014; Oliveira, Habicht and Shcherbatiuk, 2012). Within such communities, users

frequently share their ideas, knowledge and inventions freely with other users and also with companies. Hence, they share their knowledge without request or even expectation of compensation (Piller and West, 2014).

Piller and West (2014) discerned between different types of customer-organization collaborative innovation. First, organizations seeking collaboration with customers to enhance products or services do so in a context of privately controlled IP and the motivation of private monetary returns (i.e., to sell the innovation and make a profit). Organizations can foster such innovations by setting up idea contests or building online platforms. Furthermore, companies can provide monetary incentives to customers. The EUPATI project discussed earlier supports patient involvement in the R&D process and stipulates the following about this collaboration: "Interaction may only proceed on the basis of a written agreement that, at a minimum, spells out the basic elements of the collaboration (e.g., rules of engagement, compliance, IP, financial payments)". Second, users can start from their own personal needs (rather than monetary gains) and seek to share their ideas and inventions to meet those needs, and also to help other people with similar needs. This is fostered by user communities. An example of such a community is www.patient-innovation.com where patients and family members can freely post and share their solutions to specific problems.

At the macro-level, legislation is a critical institution affecting interactions and collaborations with patients. According to the World Health Organization (Fefer, 2012), legislation in the healthcare sector is necessary because healthcare concerns the whole population; multiple actors are involved; abuse can lead to serious consequences such as injury or even death; informal controls are insufficient; and patients cannot easily evaluate the safety or quality of drugs. Two examples of legislation that especially impact pharmaceutical companies' interactions and collaborations with patients relate to direct-to-consumer advertising and the processing of health data.

Pharmaceutical companies cannot advertise in the same way as manufacturers of regular consumer products do. Although some exaggeration in advertising can be tolerated for consumer products, this is not the case for medicines. As a result,

most countries have a clause in their law to regulate this issue (Fefer, 2012). For instance, most European countries forbid advertising prescription medicines directly to patients, whereas it is allowed in the USA since 1985. Although there are some pros and cons for direct-to-consumer pharmaceutical advertising (Ventola, 2011), the problem is that it is almost impossible to control since a lot of advertising happens via the Internet. Hence, the need to reevaluate institutions and their appropriateness at regular intervals becomes an imperative.

In terms of protecting health data, the EU Parliament changed the legislation (i.e., institutional change) by approving the General Data Protection Regulation (GDPR). The GDPR (enforceable from May 25, 2018) unifies and strengthens data protection for individuals within the EU. For pharmaceutical companies, this institutional change has several implications. First, the GDPR forms a single, pan-European law for data protection. Second, the GDPR applies to all companies offering goods or services to EU citizens or processing personal data of EU citizens regardless of the company's location. Third, large organizations need a data protection officer. Fourth, not only the conditions for consent have been strengthened, which impact pharmaceutical companies' clinical trials, but also their interactions with patients. Overall, pharmaceutical organizations needed to review their existing policies, procedures and practices to guarantee compliance with this new legislation.

General beliefs about the pharma industry affect interactions and collaborations with patients. To establish valuable interactions and relationships, trust is a key factor. Since the reputation of the pharmaceutical industry has been damaged by its business focus (i.e., moneymaking instead of healthcare), dubious marketing practices, pricing issues and numerous regulatory investigations (Kessel, 2014), trust is a challenging factor for pharma. The 2016 Edelman trust barometer, which is based on an online survey in 28 countries and a total of more than 33,000 respondents, indicates that only 53 percent of the population trust pharmaceutical companies.

This lack of trust can constrain collaborations and interactions with patients. Hence, the pharmaceutical industry is taking action to build trust[60]. The key word for building trust is "transparency" (Champagne, Hung and Declerc, 2015). Specifically, there is a general consensus that pharmaceutical companies should disclose details about clinical trials as well as funding[61]. Although a few years ago, disclosing this information was voluntary and thus a sign of goodwill, information disclosure is slowly becoming mandatory for pharmaceutical companies, and hence, a legal institution. For instance, since 2016 the EMA provides open access to clinical trial data for medicines authorized in the EU. To further support the sharing of clinical trial data, the European Federation of Pharmaceutical Industries and Associations (EFPIA) implemented principles for responsible sharing of clinical trial studies, going beyond the legislative requirements. Additionally, in 2017 EFPIA has committed to disclose information about annual transfers of value to health professionals and healthcare organizations. This relates to activities such as research and educational grants as well as transfers of value to individuals for activities such as speaking at meetings, consultancy and attending advisory boards. Under these EFPIA principles, pharmaceutical companies have dramatically increased the amount of publicly available information, which is in the best interests of patients, healthcare professionals, researchers and pharmaceutical companies.

The typology described insofar (see Figure 4-1 and Table 4-2 below) provides important insights into the main types of institutions that can exist in ecosystems as well as examples of how these institutions manifest in practice. In the next paragraphs I investigate how pharmaceutical companies can potentially deal with these institutions not only by reacting to them but also by actively inducing institutional change – e.g., breaking, making and maintaining these institutions (see Koskela-Huotari et al., 2016).

[60] www.efpia.eu/news-events/the-efpia-view/statements-press-releases/20-june-2017-pharmaceutical-companies-continue-to-drive-transparency-and-underline-industry-investment-in-europe-s-healthcare/

[61] www.efpia.eu/about-medicines/development-of-medicines/clinical-trials/sharing-clinical-trial-information/

Table 4-2: A typology of institutions

Level of institutional context	Institution	Description and source
Micro-level	Culture	Pattern of shared values and beliefs that help understand how an organization functions (Deshpandé and Webster, 1989; see also Shah et al., 2006; Sharma and Conduit, 2016)
	Structure	Anatomy of an organization; contains all functions, departments and links between them (Dalton et al., 1980; see also Shah et al., 2006; Hosseini et al., 2017)
	Processes	Actions whose purpose is to accomplish a pre-established business purpose or objective (Ray, Barney and Muhanna, 2004; Porter 1991; see also Payne and Frow, 2005; Shah et al., 2006)
	Metrics	Measures to assess organizational performance (Shah et al., 2006; Strandvik, Holmlund and Grönroos, 2014)
Meso-level	Language	Pattern of communication and interaction between parties (Frow, McColl-Kennedy and Payne 2016)
	Practices	Routinized activities (Vargo and Lusch, 2016)
	Intellectual property	The legal right to ideas, inventions and creations in the industrial, scientific, literary and artistic fields (Leten et al., 2013)
Macro-level	Legislation	Formal laws (Fefer, 2012)
	General beliefs	Long-held, informal assumptions (Vargo and Lusch, 2016)

4.5 Research design

4.5.1 Research context and case companies

To explore how companies in healthcare deal with various types of institutions, and given the limited prior research on this topic, I employed an inductive,

multiple case-study approach. In contrast to single cases, theory that emerges from multiple case-study research is typically more generalizable, better grounded and hence more likely to be extended and validated through other methods (Davis and Eisenhardt, 2011). Additionally, case study research is especially useful when asking "how" or "why" questions (Gummesson, 2017) and allows researchers to follow an open approach to get an in-depth understanding of complex phenomena such as institutions (Koskela-Huotari et al., 2016).

The case selection was purposive (Gentles et al., 2015; Yin, 2014), ensuring that information-rich cases yielding in-depth insights were used. In other words, I selected cases that best illustrated the phenomenon of interest (Patton, 2002). More specifically, the two case studies described in this chapter represent two broad means of approaching institutional change and patient-centricity in ecosystems: reactive/ top-down and proactive/ bottom-up[62]. The chosen cases were therefore contrasting cases meant to illustrate two paths to enacting institutional change in a healthcare context. Furthermore, the case selection was also based on a further three criteria. First, the case companies should be active in the pharmaceutical industry. Second, the case companies should have invested significant resources in developing their ecosystems. Third, the case companies should be specialized in chronic diseases, implying the necessity of developing trustful, lasting relationships with patients (their end-customers).

Based on the aforementioned criteria, I gained approval to study two case companies. Throughout the remainder of the chapter, I will refer to them as Company Yellow and Company Red. Toward the end of the research process, Company Yellow asked me to conceal its name. I was still permitted, however, to describe the company's activities and programs.

Company Yellow is a mid-sized multinational pharmaceutical company. Its focus is on creating value for patients living with severe chronic diseases. The

[62] A third company, which my research team and I speculated represented a third category (proactive and reactive or top-down and bottom-up), was initially coopted for the study but later decided to withdraw its participation.

company's slogan signals a patient-centric mission. This mission was introduced by the CEO in 2015.

Company Red is a large multinational pharmaceutical company. Addressing diabetes is the company's primary focus. This is complemented by research on hemophilia, growth hormone disorders, obesity and hormone replacement. Patient centricity and value co-creation are central values to the company and stem from the company's history and operations.

4.5.2 Data sources and data analysis

I began collecting data for the research in July 2016. I first conducted six semi-structured exploratory interviews experts in academia, consulting, life sciences, beauty, IT, telecommunications and logistics to understand institutions and institutional change in the pharmaceutical industry. These interviews helped refine the original research framework (the typology of institutions based on the literature). Next, I conducted a total of 11 semi-structured with key informants at the two case companies in order to understand the respective companies' approach to managing institutions and institutional change. The profiles of these informants were diverse (see Table 4-3) and covered various functional areas – i.e., marketing, communications, sales, R&D, HR, strategy, operations, compliance etc., various responsibility levels, as well as various seniority levels within the firm (see Davis and Eisenhardt, 2011 on the importance of having such diversity during data collection). Variety in profiles was extremely important as it helped provide a multitude of angles on institutions and institutional change in ecosystems. The interviewees were asked to describe: their responsibilities within the firm, the firm itself and its ecosystem and the firm's approach to patient centricity. To the latter, the informants were asked to describe the company's attitude and/or approach to managing a variety of micro-, meso-, and macro-level institutions (reactive or proactive) that either enabled or constrained collaboration within their ecosystem.

In addition to the interviews I participated in workshops about patient centricity and patient collaboration at both companies. These workshops provided an

opportunity to ask clarifying questions and understand the companies' short and long-term strategies in terms of achieving patient centricity. The visit also helped me understand whether the organization supported a mainly proactive or reactive approach. Finally, I examined the companies' websites and annual reports as well as independent sources – e.g., reports/ classifications by international rating agencies to establish companies' proficiency with enacting institutional change.

Data collection from primary and secondary sources continued until I achieved category saturation – i.e., no new evidence appeared (Suddaby, 2006) and eventually ended in April 2017.

Table 4-3: Data sources used in the case study analyses

Data Source	Description/ Code	Area of expertise
Company Yellow	Interviewee Y1	Multichannel Operations
	Interviewee Y2	Marketing
	Interviewee Y3	Multichannel Marketing
	Interviewee Y4	Compliance, Awareness and Prevention
	Interviewee Y5	Immunology
	Interviewee Y6	Talent Solutions
	Interviewee Y7	Patient Value Solutions
	Workshop	Various profiles
	Annual reports Company website	- -
Company Red	Interviewee R1	Communications

Interviewee R2	Business Assurance
Interviewee R3	Patient Relations
Interviewee R4	Corporate Sustainability
Workshop	Various profiles
Annual reports Company website	- -

The interview transcripts and other written materials were analyzed using an open coding approach (Strauss and Corbin, 1998) in NVivo 10. The codes included the types of institutions included in the theoretical framework (Table 4-2) and the approach taken to change them (making/breaking or maintaining represent the institutional change patterns in our study). For example, I first looked for evidence on how "culture" (a micro-level institution) manifests within the two companies; next, I added granularity by coding for how (and if) the existing culture is made/broken or maintained. Additionally, I coded for general information about the case companies and about the pharmaceutical industry and carried out a word-for-word content analysis of all information obtained. As the coding required sensitivity to both detail and context, two researchers (myself and the second author) independently carried out this task and discussed overlaps or inconsistencies. Disputes of codes among researchers were solved by requesting the help of a third researcher; in this way, I was better able to categorize certain approaches to institutional change – e.g., whether Company Yellow's practice of creating programs as well as digital platforms for patients and physicians to build knowledge that goes beyond the disease but focuses on the patient's overall wellbeing was a matter of making or breaking an institution or, in fact, a matter of both (which proved to be the case)[63].

[63] It is important to note that this process is subjective and can therefore be prone to error (a limitation which I acknowledge in the discussion section).

4.6 Findings

Having described the research design, in this next section I illustrate the typology of institutions (see Table 4-2) with relevant examples from Company Yellow and Company Red. Following the prescriptions of Siggelkow (2007), I used citations for increased transparency and depth. I would like to note that the list of illustrations is not intended to be exhaustive. Rather, the objective is to illustrate how institutions can affect customer centricity and value co-creation in a specific setting and how organizations deal with institutions or even induce institutional change to facilitate interactions and collaborations with customers/patients (see Table 4-4 for key patterns).

4.6.1 Managing micro-level institutions

Managing culture. At Company Yellow, the transformation to a (more) patient-centric culture was initiated through a top-management initiated patient-centric strategy (the strategy was introduced by the new CEO in 2015). This strategy comprised four elements: employees should distinguish signals among the noise (abundance of data, for example); employees must acknowledge how their tasks create patient value; employees should strive for an organization that gives space for development, execution, failure and idea generation; and employees should support teamwork, build empathy and exhibit generosity.

Consistent with the theoretical work of Shah et al. (2006), I found that leadership commitment was critical for the cultural shift at Company Yellow. In fact, the close involvement of the CEO appears to be the engine of change:

> I think with the change where [The CEO] came in and took over [...], I had a big culture shift from more the numbers, the facts, the processes, to a truly patient focused organization. (Source: Y6)

Table 4-4: Case study findings

Case company	Institution	Institutional change	Key pattern
Company Yellow	Culture	Cultural and strategic transformation initiative in 2015	Breaking/making
	Structure	The structure of the company has completely been redrawn and special units and functions were created to maximize creation of stakeholder value	Breaking/making
	Processes	Investments in multichannel integration processes to encourage two-way information streams between the company and healthcare providers/patients	Making
	Metrics	In line with the new strategy, the value for stakeholders such as patients is included as a new metric	Making
	Language	EUPATI membership to develop a common vocabulary between patients, caregivers, policymakers, pharmaceutical companies and other actors	Making
	Practices	Creating programs as well as digital platforms for patients and physicians to build knowledge that goes beyond the disease but focuses on the patient's overall wellbeing	Breaking/Making
	Intellectual property	Transformation from a closed company (creating IP internally or acquiring it from other companies) to a more open and collaborative company (whereby IP is jointly created and used)	Breaking/Making
	Legislation	Adhere to GDPR	Maintaining
		Change legislation via research initiatives to create better stakeholder value, e.g., for patients	Breaking/Making

	General beliefs	EFPIA membership	Maintaining
		Enhance reputation	Breaking/Making
Company Red	Culture	Patient centricity and value co-creation are supported by the company's way of management	Maintaining
	Structure	The existing structure is kept but improved to facilitate patient interactions and collaborations	Maintaining
	Processes	Creation of disease panels to promote two-way communications	Making
	Metrics	Performance is evaluated against the way of management	Maintaining
	Language	EUPATI membership to develop a common vocabulary between patients, caregivers, policymakers, pharmaceutical companies and other actors	Making
	Practices	Creating programs as well as digital platforms for patients and physicians to build knowledge that goes beyond the disease/ focuses on the patient's overall wellbeing	Breaking/Making
		Change industry-wide practices regarding the industry's effect on climate change	Breaking/Making
	Intellectual property	IP management - and sometimes lack of formal IP - paves the way for collaboration. While patents are still deemed important for R&D, the way of management and its Triple Bottom Line resulted in an open and collaborative approach for R&D	Maintaining
	Legislation	Adhere to GDPR	Maintaining
		Work with local actors to implement adequate measures to prevent chronic diseases.	Breaking/Making
	General beliefs	EFPIA membership	Maintaining
		Promote responsible and ethical business practices and provide funding to independent, non-profit organizations such as the World Diabetes Foundation (WDF)	Breaking/making

Alongside the four patient centricity guidelines, Company Yellow nurtures a set of cultural values fostering patient centricity and value co-creation. Specifically, Company Yellow emphasized the importance of listening to patients and engaging them in order to deliver the right care for the right individual.

Finally, Company Yellow's strategy explicitly showed appreciation for "patient groups who provide valuable services to patient communities and understand what matters to people living with severe diseases". For example, Company Yellow invested in engaging patients through events such as hackathons, where multiple actors including developers, designers, digital experts and patients thought about new ways for applying digital technologies to improve the lives of the patient community.

Company Yellow also emphasized mutual trust in relationships with patients, by valuing the right solutions more than market share or a dominant position

> I do not aspire to gain a huge market share or to take the market or to have a dominant position, but to provide the right solution to the right patient and [to] be recognized as a true partner and a value-generating partner. (Source: Y5)

At Company Red, patient centricity and value co-creation were supported by special guidelines. Formerly known (before 2011) as the company's way of management—i.e., the way in which Company Red managers were expected to act, the special guidelines today steer all employees' behavior in two ways. First, it describes Company Red's ambition to strengthen its leadership in diabetes, the focus on developing medicines and making them accessible to patients, the aspiration to make a difference, the focus on quality and business ethics, and the company's business philosophy balancing financial, social and environmental responsibilities (the so-called Triple Bottom Line). Second, it offers ten essentials for daily employee behavior including: "We create value by having a patient-centered business approach" and "We build and maintain good relationships with our stakeholders."

The co-creative nature of Company Red's culture was indicated by the following statements about collaborating with patients based on respect, empowerment and trust:

> To be able to address the needs of the patient we have to have very big ears; being very aware and having a higher purpose. (Source: R2)

> The core thing is that there is trust and that they understand that we are completely transparent in everything we do. You cannot work with a patient organization with a one-sided agenda. (Source: R3)

Managing structure. The two companies changed their organizational structure to support patient centricity and collaborations with patients. At Company Yellow, this change was radical and involved a complete makeover (the classic organizational chart became circular), while at Company Red, the existing structure was improved to accommodate changing collaboration patterns.

Company Yellow's approach to upgrading the organizational structure involved redrawing it completely. This favored the creation of specific structures intended to effectively collaborate with patients and other actors (e.g., patient units). The act of breaking down old barriers and silos in which "marketing was doing marketing, sales and commercial were doing sales, and medical was doing medical" (Source: Y5), however, was not an easy task. In fact, a reorganization of this scope requires a substantial time of adjustment of internal teams:

> In a way we could work a lot more on sharing individuals' capabilities, building on the strengths of the people, and then compensating each other where we know that we may have, I would not say a weakness, but where we are not that strong. (Source: Y6)

In terms of structure, Company Red supported value co-creation by having specific departments and functions in place. Today, the Corporate Stakeholder Engagement Department is responsible for engaging with various actors, such as NGOs, the National Health Service, healthcare professionals and patients. Furthermore, the Patient Relations Department focused on involving patients' key

opinion leaders and patient associations in the R&D process. Finally, Company Red championed cross-departmental collaboration and concentrated on the exploitation of existing assets and knowledge:

> We also work very much with other functions. I would argue that one of our finest qualities is [the ability] to tap into existing structures, whether it's management teams or communication lines. (Source: R4)

Managing processes. Redesigning processes to support patient centricity and value co-creation received significant attention within both companies. Guided by its patient-centric culture, Company Yellow recognized the strategy development and value creation processes as products of collaboration. Patients' input was treated as a key insight, one that benefitted not only patients but also the organization. Additionally, Company Yellow invested in improving its multichannel integration processes to encourage two-way information streams and also designed an information management process that facilitates learning. However, these processes were mainly directed at healthcare professionals and not directly at patients.

Alongside initiatives directed at healthcare professionals, Company Yellow also invested in facilitating two-way communications with patients. For instance, Company Yellow launched a 24/7 helpline for both healthcare professionals and patients to address their questions or concerns about the company's products. Furthermore, the feedback received during these interactions was used to improve products and treatments.

At Company Red, the strategy development and value creation process were also rooted in the organizational culture. To enact value co-creation, Company Red created disease expert panels within certain therapy areas and continuously promoted two-way communication. The latter reveals the company's approach to multichannel integration, as described by one of the respondents:

> Trying to target stakeholders who we find very important to have good relations with and trying to identify either their information needs or some tools that can provide

> them some utility. One of those groups is patients. I primarily engage with them via digital channels: social media accounts, web-based accounts. (Source: R1)

Company Red also developed a study meant to reduce the burden of diabetes by interviewing patients and family members, nurses, dieticians and specialists about the psychosocial challenges of the disease. The study also provided dialogue tools that have helped healthcare professionals educate and treat people with diabetes. Finally, Company Red refined its multichannel and information management processes via a recent collaboration with IBM Watson Health. The agreement combined Company Red's understanding of diabetes with IBM's expertise in cognitive computing:

> Working with ambitious partners like IBM Watson Health helps us explore the opportunities presented by an increasingly digitalized healthcare system. We aim to leverage our combined capabilities to improve the lives of people with diabetes by making the management of the condition more simple, effective and measurable. (Source: Annual report 2015)

Managing metrics. Metrics represented the final type of micro-level institutions. In both companies, the changes have been incremental and were designed to highlight the returns on investing in patient centricity and value co-creation.

Company Yellow developed several metrics intended to reflect the success (or failure) of collaboration. Hard measures include the results of profit-sharing agreements and the intensity and duration of collaborations. In terms of soft metrics, the company reported the results of sentiment analysis and several engagement metrics. Uniquely, Company Yellow also created performance metrics in collaboration with patients:

> We had to pioneer how to set up a dashboard, which measures value for patients. [...] What we actually did was that we worked with patients to discern what they see as valuable. (Source: Y2)

In a similar vein, Company Red used both hard and soft measures to evaluate its performance. The hard metrics included the number of patients that reach out to

and rely on Company Red's products. Soft measures captured patients' attitudes toward the organization, and company reputation was measured annually using the RepTrak® methodology. However, Company Red also evaluated performance by means of their values:

> We have a group of extremely senior people called the Facilitators. Once every 2 years they go out to each unit and they measure how the unit has performed against the [company guidelines]. (Source: R2)

Due to its size, a unique performance measure used by Company Red was the Access to Medicine Index, which evaluated research-based pharmaceutical companies on how they make their medicines and diagnostics accessible in low- and middle-income countries.

4.6.2 Managing meso-level institutions

Managing language. Developing a common language represented an important aspect of collaborating with patients. To this end, both case companies were members of the aforementioned EUPATI consortium, where developing a common vocabulary between patients, caregivers, policymakers, pharmaceutical companies and other actors was a key priority:

> The project [EUPATI] is about getting the patients' voice into medicine development. [...] There are a lot of constituents there. One is that we have an encyclopedia that is possible to understand by the layman. [...] It is not product specific, therapy specific, or disease specific at all. (Source: R3)

Managing practices. Both companies supported changing healthcare practices and are also tried to induce institutional change to better support patient centricity and value co-creation. Company Yellow tried to communicate with patients through various channels and continuously improves it social listening skills. It tried to bring "the voice of the patient into its teams" (Source: Y3) by tapping into insights from telephone calls, newsletters, webinars, social media and online platforms. The insights obtained via these channels enabled Company Yellow to draw patient disease journeys, which facilitated further discussions and

interactions between actors. To date, a number of programs have been created to facilitate communication and better health outcomes:

> You can create really nice programs linking patients with physicians and starting from communication aspects, from fears and beliefs, building an education that goes beyond disease. [That is] more into the qualitative component of the interaction. (Source: Y5)

Company Yellow also used digital solutions to better support healthcare practices. For instance, creating online communities of people living with specific conditions, their family members as well as their caregivers. Company Yellow created such communities to inform, support as well as engage patients and other actors. Additionally, Company Yellow tried to support physician's practices by offering not only webinars, workshops, but also tools.

In a similar vein, Company Red supported physicians' practices via a website that provided physicians information and resources to support discussions about unmet needs and the daily challenges of living with diabetes. Company Red also established and sponsors the Hemophilia Academy, an annual educational event run by international experts in hematology—i.e., a branch of medicine focusing on blood disorders. The aim is to educate and support young hematologists. Given the scarcity of hemophilia specialists in developing countries, the initiative was paving the way for improved patient outcomes.

Company Red furthermore wanted to change industry-wide practices regarding the industry's effect on climate change. To this end, Company Red partnered with five other companies (AstraZeneca, Baxter, GlaxoSmithKline, Johnson & Johnson and Pfizer) as well as with the National Health Service Sustainable Development Unit (a unit supporting the national healthcare system in England). In 2012, the group published the first international guidelines for calculating the carbon footprint of pharmaceuticals and medical devices.

Managing IP. At Company Yellow, changes in IP management were in line with its transformation from a closed company (creating IP internally or acquiring it

from other companies) to a more open and collaborative company (whereby IP is jointly created and used). Company Yellow gradually embraced open innovation to find new and improved medicines and treatments; for example, though a technology access platform, which allowed partners to access Company Yellow's state-of-the-art technology and collaborate with the R&D department to discover new drugs. Finally, Company Yellow encouraged user innovation through hackathons, a time-constrained gathering where various actors (designers, IT specialists, patients, healthcare professionals, etc.) collaborate to come up with new healthcare solutions.

At Company Red, IP management skills — and sometimes lack of formal IP — have paved the way for collaboration. While patents were still deemed important for R&D, the company guidelines and its Triple Bottom Line created new perspectives. For example, the company neither engaged in patenting activities in least developed low-income countries, nor enforced patents in these countries. Furthermore, Company Red recognized that healthcare emergencies can require exceptions to IP rights. In other words, the company pursued an open and collaborative approach for their R&D. Additionally, Company Red was actively looking for research collaborations with academia and biotech companies, licensing opportunities, co-development as well as global commercialization partnerships. Finally, Company Red collaborated with various partners to improve society as a whole. One project founded by Company Red, involved University College London and the Steno Diabetes Center, and built on private-public partnerships between business, policymakers, architects, healthcare professionals, academics and other actors. Within this arrangement, all actors working together to create the urban spaces that help people live more healthy lives.

Company Red also celebrated patient-entrepreneurs though initiatives and awards. According to a Senior Vice President for Company Red: "The growing prevalence of diabetes makes the need for disruptive innovation in the way we manage diabetes more relevant than ever. By engaging with patient-entrepreneurs, in the role of innovators; we hope to advance breakthroughs in patient-centered innovation that may impact millions of patients".

4.6.3 Managing macro-level institutions

Legislation. While micro- and meso-level institutions are, by their nature, closer to companies' daily realities and hence easier to manage or change, dealing with macro-level institutions in healthcare requires a different skillset. To comply with the aforementioned GDPR, Company Yellow adopted a new set of privacy compliance standards called Binding Corporate Rules. These provide guidelines to ensure legal obligations and public expectations are met. At Company Red, whose centralized systems track and audit interactions with patients, the GDPR required a system update:

> And then certainly, when we do engage with patients, for example what I do in my work with user testing, there are also very strict rules around can we keep any data or personal information related to that patient? Can the agency, if we need to use one, can they keep that information? How long can we keep that information for? Where can we store it? etc. (Source: R1)

While both companies adhered to existing regulations, changing regulations was also an option. Company Yellow, for example, not only complied with legal institutions, but also tried to change them via research initiatives meant to create a better patient value as well as a better policy. An example was a project drawn in response to the high hospitalizations of epilepsy patients and the fact that 30 percent of these patients were not in control of their seizures. The project's implementation not only led to the reduction of hospitalization rates for epilepsy patients but also provided policymakers with insights into the states where legislative change was needed most.

In a similar vein, Company Red addressed the direct advertising issue—i.e., direct advertising of chronic disease medication to patients is permitted in the USA – but illegal in Europe, by adapting its global activities to local regulations:

> In some countries the affiliate works very closely with diabetes educators, [to help patients] manage a chronic disease. In other countries, we are not able to get that

> close and then the work might be through the patient organization in that market. (Source: R1)

Company Red also designed country-level interventions and worked with local actors to implement adequate measures—including policy change:

> When you look at the targets for reducing mortality rates due to chronic diseases we are trying to find out what would it take on a country basis to make interventions that would prevent people from dying prematurely. (Source: R4)

General beliefs. Both Company Yellow and Company Red were an EFPIA-member and thus disclosed information based on their principles (which is more than legally required). Company Yellow even provided clinical trial data on their company website, including summaries in lay terms and definitions of concepts, so that patients (or other individuals) could better understand what happened. Furthermore, Company Yellow tried to enhance their reputation by living and breathing its patient strategy by creating interactive material with patient stories, creating a non-stop helpline, and stimulating open innovation (e.g., via hackathons). However, Company Yellow still struggled with the reputation of the industry. In the words of one respondent:

> Our industry is not known as a very trustworthy industry. We are overcoming obstacles that were not necessarily created by us. (Source: Y3)

Company Red also addressed general beliefs in different ways and the company was often included in international rankings such as the RepTrak listing. The RepTrak listing identifies the most reputable pharma companies among the UK general public and offers an overview of these companies' contribution to society. To change general beliefs, Company Red actively promoted responsible and ethical business practices (see previous example on the carbon footprint) and provided funding to independent, non-profit organizations. These organizations support prevention and treatment of diabetes in low- and middle-income countries through funding of sustainable projects. Similar to Company Yellow, however, Company Red still struggled with the industry's image:

> Another aspect would be the sentiment of the patients towards pharma which is: they have mixed feelings because patients think large pharma organizations are there to keep them unhealthy and restrict their access to medicine and then of course there is the other feeling where patients trust the organization to deliver the best possible solution and to give them better health outcomes. (Source R1)

4.7 Discussion and conclusion

The aim of this chapter was threefold: to provide a typology of institutions enabling or constraining customer centricity and value co-creation in ecosystems by surveying various streams of literature; to illustrate the various types of institutions with examples from healthcare; and to provide case study evidence on how pharmaceutical companies react to and induce institutional change. In as follows, I discuss and describe the theoretical and managerial implications of my research.

4.7.1 Theoretical implications

The aim of this chapter was to identify and classify institutions and institutional change in ecosystems as advanced by strategy/IM and S-D logic (service marketing). Specifically, the study has proposed a typology of institutions with a potential to either enable or constrain customer centricity and value co-creation (see Figure 4-1 and Table 4-1) in an ecosystem. Given the scarce empirical evidence on this topic as well as the topic's sheer complexity (institutions, irrespective of firm/industry are organized by various levels, come in various forms and are strongly inter-connected), the chapter has helped researchers come one step closer to understanding institutional change and institutional change patterns employed by organizations in general and healthcare organizations (pharmaceutical firms) in particular. By means of a multiple case-study approach, the research can enable scholars to compare and contrast[64] two concrete paths towards achieving patient centricity be enacting institutional change.

[64] It is important to note that no particular approach (proactive or reactive) is more effective than the other.

This chapter has also added to existing knowledge on the nested levels in an ecosystem. Specifically, the typology and case study descriptions illustrate institutions at three levels: within a company (micro-level), within an industry (meso-level) or at a global/societal level (macro-level). Furthermore, the findings of the case study research clearly demonstrate how these levels are intertwined and how institutional change at one level can induce institutional change at other levels. For instance, the digital evolution of healthcare practices (i.e., meso-level) implies that pharmaceutical companies can use digital channels to communicate to and interact with patients (i.e., micro-level) while considering data protection legislation (i.e., macro-level).

By proposing a typology of institutions, this chapter contributes to filling a theoretical gap in this emerging field. Specifically, ecosystems and institutions have been conceptualized and described in recent S-D logic studies (Vargo and Lusch, 2016), but there is little documented evidence on which types of institutions exist and how they manifest themselves in practice (Barile et al., 2016).

Additionally, this chapter adds to existing knowledge on institutional change by investigating how companies deal with micro-, meso- and macro-level institutions. The findings indicate that ecosystem actors can deal with institutional change in a reactive as well as a proactive way (the two case companies utilize these approaches in a variety of ways). The former refers to the fact that institutional change can be induced, on the one hand, by external actors such as the government. In this situation companies have to conform (e.g., the GDPR). On the other, companies can proactively induce institutional change through a variety of activities and initiatives – e.g., Company Red's partnership to develop guidelines that measure the industry's carbon footprint. At the same time, companies can direct their change efforts either top-down (guided by the CEO) or bottom-up (through further implication of all layers in the organization).

All in all, this study shows how companies can break, make or maintain institutions in order to facilitate interactions and collaborations with customers. By illustrating how Company Yellow and Company Red deal with micro-, meso- and macro-level

institutions, the findings of this chapter support previous research (e.g., Barile et al., 2016; Vargo and Lusch, 2016) suggesting that institutions should not be taken-for-granted and ecosystem actors can induce institutional change and consequently shape interactions and collaborations in the ecosystem.

4.7.2 Managerial implications

The findings of this research yield relevant insights for practitioners. Specifically, the findings of the two case studies illustrate the relevance of understanding institutions, reacting to institutional change and proactively inducing institutional change.

First, if companies want to interact and collaborate with end-customers in their ecosystem, they have to understand the institutions that enable or hamper these interactions and collaborations. Specifically, organizations need to consider these institutions at three nested but interrelated levels: micro, meso and macro. For instance, our findings show that general beliefs (i.e., a macro-level institution) hamper interactions with patients because they do not trust pharmaceutical companies. For these companies, it is crucial to understand the sources of this distrust and take this into account when interacting with patients.

Second, besides understanding institutions, companies should also conform or adjust to institutional changes imposed by other actors in the ecosystem. The introduction of the GDPR, which is imposed by the government, is an excellent example. Companies react to this macro-level institutional change, resulting in institutional changes at the micro-level, such as changing processes (e.g., changing information management processes) and a changing structure (e.g., appointing a Data Protection Officer).

Third, companies should not only react to institutional change imposed by other actors, but they should also induce institutional change themselves in order to facilitate interactions and collaborations with customers. Interestingly, there appears to be a link between the case companies' maturity level and their propensity to deliberately induce change into their ecosystems. For example, as

patient centricity is more embedded into the culture of the organization, the more the various areas of an organization are empowered to induce change in this direction (such as is the case at Company Red). Additionally, a less experienced organization might have these efforts initially directed top-down, whereas a more experienced organization will see patient-centricity efforts appearing more frequently in a bottom-up fashion. Further studies are necessary, however, to establish more exact patterns.

With regard to the specific ways of enacting institutional change utilized by the case companies, our case studies emphasize breaking, making and maintaining institutions. For instance, while Company Red has built on its existing guidelines (i.e., maintaining a micro-level institution), Company Yellow has transformed its organizational culture (i.e., breaking and making a micro-level institution) to facilitate interactions and collaborations with patients. Specifically, it introduced a strategy which emphasized patient centricity and patient collaborations. Furthermore, both companies created digital platforms to facilitate company-patient interactions (i.e., making meso-level institutions) and are trying to change legislation via research initiatives meant to create a better patient value as well as a better policy (i.e., breaking/making a macro-level institution). Managers in healthcare or related industries could potentially utilize these findings as benchmarks against which to evaluate their own practice.

4.7.3 Limitations and future research

Several limitations of this study suggest opportunities for further research.

First, our research focused on healthcare (pharmaceutical) companies and has illustrated two approaches to inducing institutional change in an ecosystem. Company Yellow's efforts to becoming more patient centric are mainly directed from top down and generally reactive, whereas Company Red's efforts are mainly bottom up and generally proactive. Both companies, however, make/ break or maintain institutions in their ecosystems. While the two cases offer a unique glace at two complex but different journeys towards patient centricity, inferences and generalizations should be made with caution. For example, there is no evidence

to suggest that any of the two approaches is inherently better than the other, nor that the top down or bottom-up approaches are permanent states. Thus, continuing to monitor the case companies could provide interesting evidence on the possible alternation of the approaches and respective benefits to the actors. Additionally, researching companies that combine a top-down with a bottom-up approach could provide an additional source of valuable evidence. At the same time, and irrespective of where it originates, the concrete way in which institutional change is enacted out will depend heavily on several company-specific characteristics (leadership, culture, strategic outlook etc.). Thus, studying how a selection of these company characteristics can potentially influence the change of one specific institution could bring important insights. For example, a study on how language (the development of a common vocabulary among industry actors), as a meso-level institution, is addressed.

Second, and connected to the first, in this study I faced limitations connected to identifying relevant institutions from healthcare. Although this study included an extensive investigation of several sources, I do not suggest that the listing of institutions is in any way exhaustive but rather indicative.

Third, as this research has focused exclusively on organizations in healthcare, I encourage the study of this phenomenon in other industries as well. In doing so, future studies could refine and possibly extend the typology proposed in this chapter – e.g. identify other context-specific meso- and macro-level forces that potentially influence a company's ability to achieve customer centricity and/or develop more fruitful relations to other partners. Going one step further, future studies could also investigate the specific capabilities ecosystem actors need to acquire in order to effectively manage institutional change. Finally, studies could ultimately use scales and maturity models to enable cross-industry comparison.

Fourth, this study focused on pharmaceutical companies and how they deal with healthcare ecosystem institutions. Future research could investigate other actors in this healthcare ecosystem (e.g., hospitals, patient organizations, research institutes, etc.) to examine how various actors in the same healthcare ecosystem deal with the same institutions.

4.8 Acknowledgements

Prior to its final publication in Journal of Service Management, our study of institutions and institutional change in healthcare ecosystems underwent multiple review rounds, was discussed in several research seminars – e.g. at Radboud University, Nijmegen (April, 2017) and TU Eindhoven (November, 2017) and was presented in modified form at two important academic conferences: DRUID in New York, USA (June, 2017) and the R&D Management Conference in Leuven. Belgium (July, 2017). The feedback received on all these occasions has significantly elevated the quality of the manuscript and has enabled the authors to carefully scrutinize the typology proposed as well as the contribution of the research. Moreover, receiving diverse feedback from various research communities (entrepreneurship, strategy/IM and service marketing) has confirmed that our research is relevant and timely in multiple areas giving us an extra incentive to carry out edits.

As a result, I am deeply indebted to: the editors at the Journal of Service Management (notably guest editors Prof. Irene Ng and Prof. Stephen Vargo for shortlisting our contribution) and the three anonymous reviewers assigned by the journal, those attending and offering feedback at the two academic conferences, as well as the attendees of the research seminars in Nijmegen and Eindhoven (special thanks to Prof. Allard Van Riel for his early support of the project and to Prof. Annelies Bobelyin for seeing the value of qualitative research of the kind I have proposed in the chapter).

Lastly but not least, I would also like to extend a warm thanks to two case companies that have offered to share their journey with patient centricity with us. While their names were concealed in the publishing process, their experience will no doubt help other organizations understand better their ecosystems and the rules and norms of collaboration that sustain them. I am also deeply indebted to fellow co-author Prof. Sara Leroi-Werelds for her focus through the review and publishing process and for her patience in introducing myself and Prof. Nadine Roijakkers to service research. Last but not least, thanks go out to Prof. Tor

Andreassen for his pragmatism regarding this research and his faith that I could eventually put a solid study on ecosystems out into the world.

Chapter 5: Actors in ecosystems: Insights from a mixed-method study of innomediary-customer relations

5.1 Structured abstract

The aim of this chapter is to provide a capability profile for actors in an ecosystem. In doing so, the chapter addresses the fourth and final research objective of the thesis.

More specifically, the chapter puts forward a prospective maturity framework for innovating companies engaged in collaborative relationships with innomediaries. The framework comprises a number of important capabilities companies must consider when engaging with an innomediary.

In Table 5-1, I provide additional information about the chapter, including the design and methodology used, data sources, research perspective taken, findings, strengths, limitations, practical implications as well as publishing outlet.

Table 5-1: Chapter 5 at-a-glance

Aim/ Research objective	The aim of this chapter is to provide a capability framework (typology of capabilities) for actors in an ecosystem. In doing so, the chapter addresses the fourth and final research objective of the thesis.
Design/ Methodology and data sources	First, and using qualitative data, the chapter proposes a theoretical capability "profile" for innovating firms working with innomediaries. Next, the chapter demonstrates this framework using a sample (N=81) of firms; additionally, the chapter illustrates three maturity profiles using examples from practice.

	The chapter uses a mixed-methods approach and combines interviews, workshops and archival search with survey research.
Research perspective taken	Strategy/IM + service marketing
Findings	There are 13 capabilities innovating firms must consider when engaging in innomediary-customer relations: open innovation climate, learning capability, partner focus (innomediaries), partner focus (other partners), sudden adaptation, leadership for open innovation, division of roles, legal/ IP management processes, recognition capacity (external scanning), recognition capacity (strategic assessment), assimilation capacity (coordinating), assimilation capacity (integrating), and network development. These capabilities, alongside recording metrics, collectively form an open innovation maturity framework. The capabilities are closely knit and continuously influence each other.
Strengths/ Originality	The chapter zooms in on the relation between innomediaries and innovating firms (their customers), by uniquely taking the customer perspective. The chapter proposes a maturity framework and illustrates three separate maturity profiles: a mature organization (mapping/ technology company), an above-average organization (TV and broadband company), and a beginner (a heating solutions company).
Limitations	The proposed framework is context-specific (limited to innomediary-customer relations) and is therefore not easily generalizable.
Practical implications	By (simultaneously) recognizing and improving the proposed capability categories, actors can potentially track their development with regard to OI, improve their OI practice and even establish more durable relationships with innomediaries.
Publishing outlet and title in print	Outlet: ***No designated outlet*** ***Proposed outlet***: R&D Management Journal/ Journal of Product Innovation Management Working title: 'An open innovation maturity framework for innomediary-customer collaborations' Authors: Pop, O.M., Natalicchio, A., Rus, D. and Zynga, A.
Publication year	Expected: 2019/2020

5.2 Introduction

Because the wellbeing of an ecosystem is dependent on the wellbeing of its constituents (the actors) (Clarysse et al., 2014; Han, Lowik and de Weerd-Nederhof, 2017), understanding actor types and actor capabilities as well as the types of relationships they engage in is fundamental to understanding the ecosystem's overall survival. In recent years, strategy/IM and service marketing scholars alike have taken interest in this topic by studying how pairs of actors relate in an ecosystem as well as where tensions exist. The relationship between firms and their suppliers (Payne, Storbacka and Frow, 2008; McGrath, 2016) or between policy-makers and all other actors (Clarysse et al., 2014), in particular, have received plenty of attention. Today, one witnesses a growing interest in understanding the relationship between another pair of actors. Specifically, between innomediaries, the intermediaries, consultancies, and agencies helping their customers accelerate an open innovation project (Piller and Diener, 2013), and their clients.

Innomediary-customer relations are of growing importance in the business and academic world. On the business side, globalization as well as the proliferation of ICT technologies has enabled fruitful collaborations between organizations to the likes of NineSigma, HYPE Innovation, BrightIdea and IdeaConnection and their customers. In these relationships, the innomediaries have helped customers improve their open innovation (OI) practice (drive continuous innovation), overcome gaps in knowledge and even discover new sources of innovation[65]. The existence of such best practice[66] has called for the development of frameworks and tools to ensure the repeatability of this success. In academia, strategy/IM researchers have leveraged the examples from practice to classify innomediaries and detail their roles (Dalziel, 2010; Hossain, 2012; Howells, 2006; Roijakkers,

[65] https://www.biw.kuleuven.be/assistenten/documenten/NineSigma.pdf

[66] HYPE Innovation, for example, a leading enterprise innovation software provider, has recently launched Connect and Learn, a platform that allows companies (including customers, partners, and resellers) to share information about their innovation programs, "date" (organize meetings and events), submit ideas to the C-Level radar, and get handy reading material for their practice.

Zynga and Bishop, 2014). In doing so, research has shed light on the managerial barriers to successful collaboration between innomediaries and customers as well as the means to overcome these barriers. Interestingly, however, the majority of this research has been **one sided** – i.e., it has explored only the innomediary side.

While the innomediary provides important input/ resources to their customers' open innovation (OI) initiatives, it is the customer himself that must integrate these resources in order to create value (here, I follow the prescriptions of S-D Logic as detailed in Chapter 2). Hence, in researching the relationships between innomediaries and innovating firms it is not enough to understand how innomediaries alone contribute to the value co-creation process. Instead, research must also focus how customers develop (sometimes matching) capabilities that help create fruitful and lasting relations (thus leading to the longevity of the ecosystem). For example, by replicating the value co-creation capability of the innomediary (Karpen et al., 2015).

To date, the strategy/IM offers limited information on the capabilities of the customer in innomediary-customer relations. By leveraging insights from service marketing, however, the innomediary-customer relationship can be understood better.

To advance research on innomediaries as important actors in the ecosystem (Sieg, Wallin and Von Krogh, 2010; Randhawa, Wilden and Gudergan, 2018) and explore the innomediary-customer relation from the perspective of the customer (Randhawa, Wilden and Gudergan, 2018), I set out to understand the capabilities that help customers benefit from the relationship with the innomediaries (Mortara and Roijakkers, 2014) by means of an open innovation (OI) capability framework.

Whereas existing OI capability frameworks (OICFs) (see Hosseini et al., 2017 for a recent comparison) and studies on open innovation (OI) maturity in general (Enkel, Bell and Hogenkamp, 2011; Habicht, Möslein, and Reichwald, 2012) are useful in identifying capabilities for OI relations, these frameworks are not specific enough to be applicable in specific contexts (such as the innomediary-customer

dyad). In this chapter I therefore refer only to those capabilities that can enable fruitful interactions (value co-creation) for the customer in an innomediary-customer context and illustrate these capabilities with examples from practice.

5.3 Theoretical background

5.3.1 The new dynamics of collaboration

The contemporary innovation landscape is characterized by remarkable dynamics. Today, factors like increased globalization (Greenspan, 2004), the advent of information and communication technologies (Higón, 2012), shortening technology life cycles (Chesbrough, 2006), mature and involved customers (Grabher, Ibert and Flohr, 2008; Greer and Lei, 2012; Leroi-Werelds, Pop and Roijakkers, 2017) and the growing complexity of challenges that need to be solved by organizations (Kramer and Pfitzer, 2016) continually shape the rules and norms of collaboration (Fjeldstad et al., 2012).

In the face of such dramatic shifts in their environments, organizations have adopted a variety of strategies to cope. For example, organizations have begun to scrutinize their competitors, identify their own advantages, and evaluate the conditions that would enable or prevent competitors from coopting these advantages in the future (Wessel and Christensen, 2012). A far more effective strategy, however, has been to shrink their "core" and expand their "periphery"[67]. That is, to recognize "that actors outside the traditional boundaries of the firm possess unique knowledge that may be applicable within [the organization]" (Gulati, Puranam and Tushman, 2012, p. 4).

In pursuit of the latter, organizations have gradually found themselves working more with suppliers, complementors, customers, competitors, research institutions, regulators, the judiciary and even standard setting bodies (Autio and Thomas, 2013) to navigate the new dynamics of competition and innovation. In

[67] In the process of shrinking their core and expanding their web of partners, organizations transition from closed to open and collaborative models of innovation (Chesbrough et al., 2014; Hagedoorn and Zobel, 2015), and from a product to a service-centric mindset (Day, 2014; Vargo and Lusch, 2016) respectively.

other words, they have found themselves engaged in open innovation (Chesbrough, 2006; Chesbrough, Vanhaverbeke, and West, 2014) as well as in the complex collaborative arrangements that foster open innovation – i.e., ecosystems (Iansiti and Levien, 2004; Adner and Kapoor, 2010; Chesbrough, Vanhaverbeke and West, 2014).

Recently, open innovation intermediaries (or "innomediaries") have also been recognized as *key partners* in open innovation (Roijakkers, Zynga and Bishop, 2014) and in open innovation ecosystems (Agogué et al., 2017). Placed between providers and seekers of innovation management products and services, these "knowledge brokers" are tasked with tapping into a range of previously disconnected knowledge sources (e.g., Chesbrough, 2003; Howells, 2006), facilitating knowledge transfer as well as filling structural holes in the market (Sawhney, Prandelli and Verona, 2003). Furthermore, innomediaries frequently educate their customers (the innovating organizations[68]) vis-à-vis best practices in open innovation (Piller and Diener, 2013) and therefore help them navigate complex market dynamics. In their role as "connectors", innomediaries can even create symbiotic relationships with their client organizations. The notion of symbiotic relationships in ecosystems links to the established notion of "industrial symbiosis" (Chertow, 2000). As Kokoulina et al. (2018, p. 1) note: "Industrial symbiosis is an important concept for regional development in which industrial organizations seek to use one another's outputs and inputs, reduce waste and achieve economic benefits". These relationships ultimately result in forms of collaboration whose goal is to stimulate organizational learning on both sides (Mele and Russo-Spena, 2015), thus creating value for the customer and the innomediary.

All in all, innomediaries appear to provide their end-customers with the tools and capabilities that help them integrate resources better and hence create value.

[68] I use the terms "(innomediary) customers" and "innovating organizations" interchangeably throughout the chapter.

In as follows, I explore innomediaries in more detail and lay out the (open innovation) capabilities that are relevant for the end-customer (the innovating firm) in an innomediary-customer context.

5.3.2 Innomediaries

As organizations navigate increasingly complex environments (see Alcatel[69], Tesla[70] and Beiersdorf[71] for some recent examples) their need to collaborate effectively grows. In particular, organizations increasingly seek to engage with partners that specialize in "match-making" or in linking them to valuable solution providers (Lichtenthaler and Ernst, 2008; Roijakkers, Zynga and Bishop, 2014). The process of facilitating this knowledge exchange (which is done by a third party) is sometimes referred to as "innomediation" (an intermediation of OI), while the orchestrators of this process are known as "innomediaries".

Piller and Diener (2013) have defined innomediaries as intermediaries, consultancies, and agencies helping their clients to accelerate an (open) innovation project; such entities can typically offer: dedicated software, platforms, tools, methods, access to an established community of solvers/ participants, and even education and process consulting. Certain branches of organizations can also act as intermediaries; according to Alexander and Martin (2013), today very few organizations engage directly in OI without using their technology transfer offices. To this end, the intermediaries become the forward arm of organizations and institutions of all types. For the purpose of my study, however, I focus on intermediaries as external entities (I do not consider the relationship between an organization and its own technology transfer office).

[69] https://www.prnewswire.com/news-releases/embracing-open-innovation-alcatel-onetouch-announces-their-innovation-accelerator-for-north-america-300015173.html

[70] https://www.telefonica.com/en/web/public-policy/-/tesla-opens-all-its-patents-to-speed-up-innovation

[71] https://www.beiersdorf.com/newsroom/press-news/all-news/2017/01/09-beiersdorf-raised-open-innovation-to-a-new-level

Generally speaking, organizations may rely on intermediaries for open innovation (innomediaries) for a number of reasons.

First, as some early investigations (Sawhney et al., 2003) have shown, innomediaries can help companies innovate more effectively and help them *overcome gaps in knowledge* by favoring the retrieval of useful external knowledge. To this end, innomediaries can act as the "visible hand" (Katzy et al., 2013) that connects/ links organizations to the actors around them. As they do this, innomediaries act as brokers in a two-sided market (Lopez-Vega and Vanhaverbeke, 2009). For example, innomediaries can act as a force that renders external innovation accessible to every company and even help organizations outperform their competitors (Abbate, Coppolino and Schiavone, 2013).

Second, innomediaries can help *drive continuous innovation* in organizations (Bank and Raza, 2014) by supporting collaborative idea management or idea campaigns. By offering organizations the necessary tools and training to reach their potential, innomediaries help create an environment where strategy, leadership and culture for innovation are aligned. For example, Continental, a leading German automotive manufacturing company, has worked with innomediaries to establish Contivation[72], a platform that allows early and extensive sharing of innovative product ideas. By helping the company put an innovation management process and digital platform in place, the innomediary has helped the systematic promotion of innovation thought the various layers of the organization thus leading to more value creation for the organization and all its stakeholders.

Third, since innomediaries can act at various levels (international, national and regional), they help mobilize a variety of resources and even help disseminate important policies (Landry et al., 2013). Finally, as Abbate and Coppolino (2011) note, an innomediary's role can often go beyond pure intermediation to include: (innovation) network creation, knowledge transfer across various domains, as well

[72] https://www.continental-corporation.com/en/sustainability/employees/knowledge-management-63530

as searching and transforming ideas to provide solutions that fit to individual clients (Hossain, 2012). The latter aspect is also linked to innomediaries' abilities to form communities and even ecosystems of partners – a trend that is increasingly evident in practice. As some recent studies have shown (Agogué et al., 2017), innomediaries have, in fact, developed core functions that include creating and maintaining a network of multilateral exchange (van Lente et al., 2003), mobilizing resources, creating a common agenda for actors and supporting the learning process. Innomediaries have also developed their own unique capabilities to help their customers overcome internal barriers to OI; these capabilities include: technological, marketing, and co-creation capabilities (Randhawa, Wilden, and Gudergan, 2018). Technological capabilities are the capabilities intermediaries use to develop, maintain and customize online innovation platform and projects for their customers. Marketing capabilities are used, for example, to help customers get buy-in from senior executives on OI projects. Finally, co-creation capabilities are used by innomediaries to support and enhance technological and marketing capabilities and in doing so, deploy customer-centric services.

In as follows, I examine the literature for relevant customer capabilities in an innomediary-customer context and provide more granularity as to how these capabilities can affect the innomediary-customer relation.

5.3.3 Open innovation maturity in innomediary-customer relations

There are several factors that can influence an organizations' ability to develop fruitful collaborations with its non-traditional partners (such as innomediaries). For example, having the right culture for innovation – e.g., the absence of the not-invented-here syndrome (Antons and Piller, 2015), can signal a positive attitude towards knowledge from external sources. Similarly, the existence of a dedicated R&D unit (Bianchi et al., 2011) or an ability to identify and absorb external knowledge (Arora and Gambardella, 2010; Cohen and Levinthal, 1989) can lead to beneficial outcomes. These factors, and more like them, collectively form the maturity of an organization's OI practice (Enkel, Bell and Hogenkamp, 2011; Hosseini et al., 2017).

In strategy/IM, OI maturity is a wide-ranging concept that has been linked to a variety of notions, including, but not limited to: culture aspects (Tidd and Bessant, 2009; Enkel, Bell and Hogenkamp, 2011), special structures and hierarchies (Bianchi et al., 2011; Cottam, Ensor and Band, 2001), tailored processes (Arora and Gambardella, 2010; Cohen and Levinthal, 1989) and even metrics or reward schemes (Chesbrough and Brunswicker, 2014).

As the OI capability spectrum is broad, to date there is little clarity as to which of its dimensions are relevant for particular contexts such as innomediary-customer relations. While some studies have made an explicit reference to the not-invented-here syndrome and absorptive capacity (Roijakkers, Zynga and Bishop, 2014) as well as to trust and legal readiness issues (Mortara and Roijakkers, 2014) in innomediary-customer relations, a comprehensive OI maturity framework has yet to be defined. Therefore, developing an OI maturity framework, by integrating a variety of existing and potential perspectives, would help shed light on how to render the relationship between innomediaries and innovating firms more fruitful (able to generate value for both parties involved).

Drawing principally on strategy/IM, I identified the most prominent dimensions of OI maturity that help customers create value in the context of innomediary-customer relations. These dimensions include cultural aspects (climate, learning and knowledge sharing, partner focus, sudden adaptation and leadership), structures and hierarchies, process aspects (IP management capabilities, absorptive capacity and network development) and metrics. Additionally, these dimensions and closely linked to the institutions (rules and norms of collaboration in ecosystems) discussed in Chapter 4. This list of dimensions I have indicated below is not intended to be all-encompassing, but rather to serve as a groundwork for further inquiry.

Culture aspects. Having a strong OI culture – a shared pattern of values of beliefs (Deshpandé and Webster, 1989) – is an essential feature of OI maturity because it helps build strong and fruitful relations with partners. To date, several studies have reinforced this link and have elaborated on the various sub-

dimensions. In as follows, I elaborate on five core aspects of culture that have emerged from my review of the literature, namely: climate, learning and knowledge sharing, partner focus, sudden adaptation and leadership.

Remneland-Wikhman and Wikhman (2011, p. 285), for example, note that "measuring certain aspects of **organizational climate** can reveal strengths and weaknesses in the movement towards open and distributed innovation processes". The essential aspects of innovation climate (see also Baer and Frese, 2003) point to whether ideas are readily accepted in the organization (the availability of psychological safety to develop ideas) or whether people can take the time to develop them.

OI maturity is also linked to the existence of well-established **learning and knowledge sharing routines** (Calantone, Cavusgil and Zhao, 2002; Real, Roldán and Leal, 2014). Experience sharing, regular discussions around best innovation practices and mechanisms to disseminate ideas (e.g. newsletters) are all indicators of the existence of such routines. Alongside an adequate climate and learning/ knowledge sharing routines, having a genuine **partner focus –** towards both innomediaries and other partners – is central to successful OI (Zobel 2017; Lambert and Enz, 2012). Here, engaging in open dialogue or even co-creation with partners, or proactively searching for value co-creating opportunities are typical activities, and hence indications of a mature OI culture.

Not surprisingly, OI maturity also comes through in how an organization **adapts to unexpected circumstances** – often beyond its immediate control (Ritala, Heiman and Hurmelinna-Laukkanen, 2016). For example, in how an organization reacts to sudden changes in its environment (caused by an increasing variety of OI partners), how it overcomes managerial biases (e.g. conflicts of interest in OI projects), and how easily it can detach from routines when unfamiliar problems arise (frequently the case in complex ecosystems of partners).

Last but not least, **leadership for OI** is also an important cultural dimension that ties into OI maturity. Rus, Wisse and Rietzschel (2016) describe such leadership in terms of commitment to OI efforts, helping employees get on board with OI

activities and promoting OI capability building in the organization among other aspects.

In summary ensuring a climate for innovation, the existence of knowledge sharing routines, having a partner focus, the ability to adapt to unforeseen circumstances and securing leadership for OI represent core aspects of a mature OI culture.

Structures and hierarchies. A second, and more immediately visible, aspect of OI maturity is the presence (or absence) of structures and hierarchies to implement it. In the context of innomediary-customer relations, organizational design as well as role division are of particular importance and are therefore elaborated on below.

Summarizing earlier inquiries into the topic, Hosseini et al. (2017, p. 93) note that "an appropriate degree of openness that goes along with corresponding internal structures and processes is essential for improving the organization's innovation performance". In a similar vein, Bianchi et al. (2011) emphasize the relevance of **organizational design** in successfully managing inflows and outflows of knowledge (the various modes of OI). For example, in documenting the case of Deutsche Telekom, Rohrbeck, Hölzle and Gemünden (2009) note that providing a separate organizational structure that unites academics and corporate R&D personnel allows the organization to overcome barriers associated with university–industry collaborations.

At the same time, having independent OI teams – or entire **OI departments** – working within the traditional company configuration are a very popular choice for OI implementation (Mortara et al., 2009; Mortara and Minshall, 2011) and hence an indicator of OI maturity. This function can either be **central or decentralized** – i.e., embedded within the business units. As Huston and Sakkab (2006) remark while documenting P&G's Connect and Develop model for innovation, with brick-and-mortar R&D infrastructures becoming outdated, connectivity and flexibility in structures becomes the way forward for a mature OI practice.

Another means of signaling the importance of OI in an organization is to create specialized job **titles** (Dąbrowska and Podmetina, 2018). In the pharmaceutical industry, OI functions are even used to highlight concern for OI partners – including patients (Pop et al., 2017). Finally, having a clear **division of roles** and responsibilities when it comes to integrating external knowledge, employing/ naming gatekeepers and technology scouts, as well as providing the means to adapt external knowledge to internal processes (Zobel, 2017) are further indications of OI maturity from an organizational structure standpoint.

In summary, adequate organizational design, creating special OI departments (either centralized or decentralized), using job titles to signal the importance (and presence) of the OI function as well as ensuring an adequate division of roles appear to be core aspects of OI maturity in terms of structural aspects.

Processes. There is a rich literature on the distinctive processes that support OI activities with a variety of partners. The core process-related capabilities include: IP management capabilities, absorptive capacity and its various dimensions as well as network development processes.

In their broad investigation of OI maturity, Enkel et al. (2011) underline the importance of having legal and intellectual property (IP) management processes in place. Such processes are critical because they help organizations understand the circumstances under which they must own the IP from a partner as opposed to simply licensing. Generally speaking, **legal and IP departments** that constructively collaborate with other departments, that are actively involved in new product development decisions and that establish win-win contracts with innovation partners as well as take a long-term view on managing the IP portfolio are clear indications of a mature OI practice.

A more established notion, however, is organizations' **absorptive capacity** (Cohen and Levinthal, 1990; Zahra and George, 2002) – that is, an organization's ability to identify, assimilate, transform, and exploit external knowledge, research and practice. Acquisition is important as it broadens the scope of an organization's research, helps make new connections and increases the speed and quality of

learning. Assimilation relates to understanding external knowledge (and partners) and it is important because it facilitates interpretation and learning. Transformation refers to the internal conversion of externally acquired know-how and is important because it helps create synergies. Finally, exploitation, or the use and implementation of knowledge, helps build core competencies and harvest resources.

Building on Zahra and George (2002) as well as on work by Lane, Koka and Pathak (2006) and Todorova and Durisin (2007), Zobel (2017) further reinforces the unique importance of capabilities such as **recognition capacity** and **assimilation capacity**. Organizations that nurture recognition capacity, for example, have the means to explore, identify, and value external knowledge resources. Such organizations may frequently participate in professional association activities, establish contacts with researchers at universities and screen the start-up community. In parallel, such organizations typically evaluate whether the externally sourced knowledge fits the organization and assess the potential benefits through various means. Similarly, organizations that possess assimilation capacity can analyze, process, and diffuse external knowledge easily – which makes them proficient at OI. Having reward and incentive systems in place (Huston and Sakkab, 2006), empowering employees to use external knowledge, as well as a well-designed system (Di Minin, Frattini and Piccaluga, 2010) to store and later access knowledge (e.g., idea banks) are all hallmarks of a mature OI practice (see Natalicchio et al. (2017) for a recent review of knowledge management practices grouped by OI process).

Last but not least, organizations with **network development processes** in place (Mortara and Minshall, 2009) can successfully identify and attract a broad and diverse range of partners for OI as well as adequately communicate, negotiate and build collaborations with them. In a study by Zynga et al. (2015), networks and network development (external networks and global networks), together with internal processes and external capabilities at a stage-based level, have been linked to the successful and sustainable implementation of OI.

In summary, the adequacy of legal and IP management processes, absorptive capacity (including recognition and assimilation capacity) as well as network development processes appear to lie at the heart of a mature OI practice.

Metrics. A fourth and final important dimension of OI maturity lies in the existence of measurement systems and incentive schemes. In their study of the Fiat Group Automobiles SpA (Fiat), Di Minin et al. (2010), for example, put forward a set of indicators to measure the effectiveness of an organization's external activity and innovation network.

These indicators refer to both number of offers/ orders in progress, number of external companies contacted, and quantity of offers sent out, as well as to softer aspects such as the reputation built with different classes of customers and external partners. In later studies, Chesbrough and Brunswicker (2014) put forward a more comprehensive list of frequent indicators including: budget invested in OI projects, speed of OI projects versus innovation projects, revenue from results of OI, stakeholders' perspective on OI (brand aspects, trust) etc. Building on earlier work by Adams, Bessant and Phelps (2006) and Battistella (2014), Loh and Mortara (2017) have recently studied OI metrics under the umbrella of "technology intelligence", or the activity that helps support decision-making in organizations by developing an awareness of technological opportunities and threats.

5.4 Research design

To propose and demonstrate an OI maturity framework for organizations collaborating with innomediaries, I have used a (primarily) inductive multi-method approach (Dahlander, O'Mahony and Gann, 2016). First, I have combined insights from a thorough literature review on innomediary-firm relations with learnings from eight semi-structured expert interviews (see Table 5-2) and a one-day regional Innovation Managers' forum to shortlist the elements of a possible framework (see Figure 5-1). Subsequently, I have used a questionnaire to further understand how the capabilities included in this framework (model) combine as well as their role in creating a coherent picture of firms' OI maturity.

Table 5-2: Interviewees and topics addressed

Organization Type	Interviewee Function	Topic 1: OI culture	Topic 2: OI structures	Topic 3: OI processes	Topic 4: OI metrics	Topic 5: innomediaries
Firm 1 - pharmaceuticals	Technology Seeker			X		X
Firm 2 – mobile services	Internal Innovation Director	X	X	X	X	X
Firm 3 – TV and broadband	Innovation Program Manager	X	X	X	X	
Firm 4 – drinking water, waste water services	Asset Data Development Team Manager	X			X	
Firm 5 – aerospace and defense	Corporate Innovation Manager	X		X		X
Firm 6 – mapping technologies	Director of Innovation Enablement	X	X		X	X
Firm 7 – heating solutions	UK Head of Innovation			X	X	
Firm 8 – consulting services	Director of Consulting and Learning	X			X	X

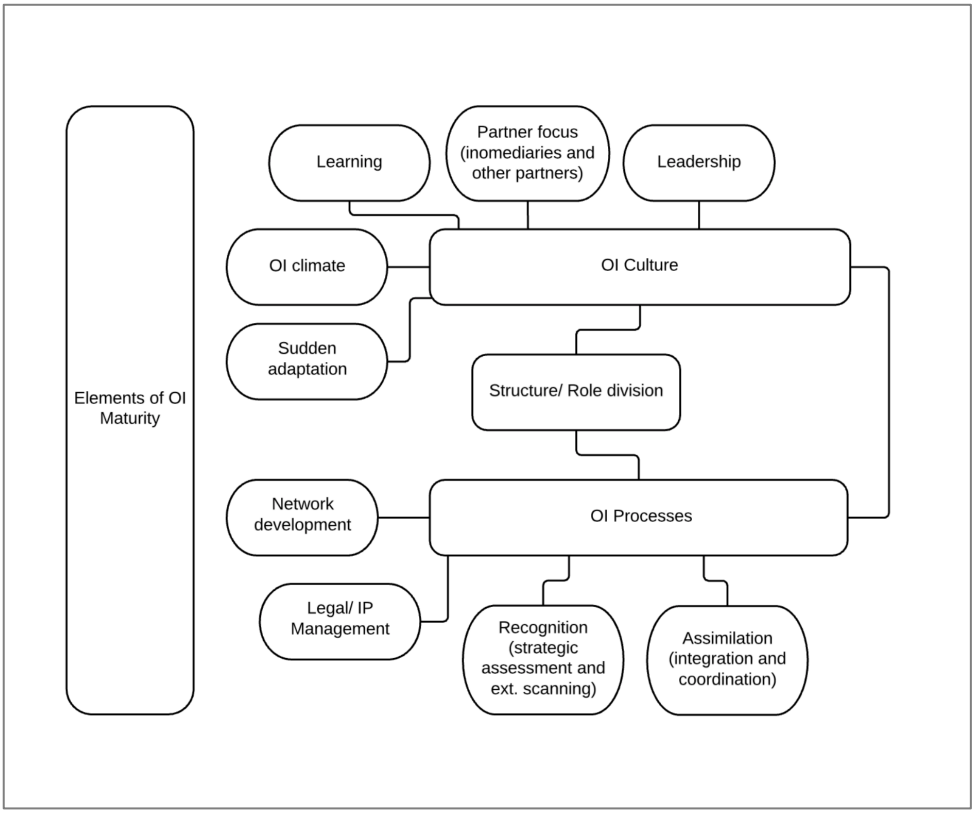

Figure 5-1: The elements of the proposed Open Innovation Maturity Framework for innomediary-innovating firm relations (excludes metrics)

By combining interview data and survey research I was able to better identify potential patterns in the data and also witness (albeit to a very limited extent) how the OI capabilities influence each other and potentially move in sync.

The capabilities included in the framework represent a specific subset of capabilities typically suggested by general OI frameworks such as those proposed by Enkel, Bell and Hogenkamp (2011) or synthesized by Hosseini et al. (2016). In other words, the capability framework in Figure 5-1 does not refer to capabilities that are generally necessary to successfully execute on OI, but rather to capabilities that can potentially influence the development of successful OI relations with a specific type of OI partner – here, the innomediary. For example, the current framework does not touch upon general alignment between the IT and

OI strategy of an innovating firm (Hosseini et al., 2016, p. 92) or the general "transaction currency" (Enkel, Bell and Hogenkamp, p. 1186) used by innovating firms and their employees to make commitments and enter into OI agreements (e.g., trust, simple budget, structural budget etc.). At the same time, it is important to note that the capabilities depicted in Figure 5-1 are not tied to any type of activity the innovating firm might solicit the innomediary for – e.g., driving continuous innovation, overcoming knowledge gaps or network creation (see Section 5.3.2). Instead, the capabilities represent more general firm attributes that can potentially help the innovating firm engage more fruitfully with the innomediary. The links between the various elements of the framework are discussed in more detail in Section 5.5 as well as in Section 5.6 (under theoretical implications).

All in all, the model depicted in Figure 5-1 was demonstrated using sample of 87 innovation managers working with innomediaries. The aforementioned model excludes metrics as metrics were captured using a multiple-choice question as opposed to a 7-item Likert scale (as was the case for the rest of the dimensions). Finally, I have calculated coarse maturity scores for each organization in the survey and have illustrated three maturity profiles using all available data (interviews and survey): a highly mature, an above average and a less mature organization.

The following sections offer additional information about each of these steps.

5.4.1 Interviews and Forum

Between October and November 2017, I interviewed[73] eight innovation management professionals in a variety of industries to better understand the dimensions of OI maturity in the context of innomediary-firm relations as well as to see if and how these dimensions affected (either positively or negatively) the

[73] In addition to the interviews with innovation management professionals, Chapter 5 also leverages insights collected earlier from three innomediaries. Namely, data on innomediary-customer relations with NineSigma (January, 2016) as well as two interviews with HYPE Innovation and IXC UK (February, 2016).

relationship. These interviews were semi-structured, while the OI maturity themes I used in the interview guide were originally sourced from the literature. Specifically, the interviewees were asked to describe their position within the firm, to describe how their organization approached (open) innovation, to elaborate on the most important capabilities in this context as well as to elaborate on their relationships to innomediaries in general. In a later stage, the interviewees were asked to help fill out our survey (ideally with the help of other colleagues in their team so as to avoid bias).

This list of interviewees (experts) as well as the main topics/ OI dimensions discussed with each is provided in Table 5-2. The roles of the experts included, but were not limited to: technology seeking, innovation enablement, consulting and learning. The experts also had various experience levels, from novices to orchestrators of other organizations' OI journeys. In parallel, I moderated and recorded conversations at a regional Innovation Managers' Forum hosted by Fujitsu Services in London, UK. The theme of these conversations was the implementation of OI in general, and the tools/ capabilities organizations need to form fruitful, lasting partnerships in an ecosystem in particular. This primary data collection continued until I achieved category saturation – i.e., no new evidence appeared (Suddaby, 2006).

The interview data and the notes from the Forum were analyzed using an open coding approach (Strauss and Corbin, 1998), and provided a number of insights on the relationship between innomediaries and their customers (innovating organizations) as well as preliminary insights on the important capabilities in light of this relationships. Furthermore, these interviews already provided some indication of how capabilities move in sync.

5.4.2 Survey

Procedure and sample. Using the insights from the literature review as well as the insights from experts and Forum, I constructed a survey to capture the OI maturity of organizations engaging with innomediaries. The survey is available in Appendix A. The survey questions included culture and organizational structure

related aspects as well as questions referring to processes used and metrics employed to capture the results of OI. When completing the survey, participants were asked to keep their latest (most recent) completed OI project in mind. The survey was launched in December 2017. Between December 2017 and April 2018, the survey was distributed electronically to 1.450 innovation management professionals in various industry sectors and inhabiting various geographies (Europe, Asia and North America). During this process, participants were assured of their confidentiality and they participated on a voluntary basis.

Following the prescriptions of Sheehan (2001), I used several techniques to improve the response rates. First, I proposed compensation beyond a typical aggregated report of the findings – i.e., I offered the possibility of creating workshops and presentations around the results. Second, I utilized the university affiliation to spark interest and asked for leading OI scholars to endorse and promote my study. As the survey was business-oriented, my third technique involved keeping the survey length within sensible boundaries and sending pre- as well as several post- notifications (follow-ups) as frequently as possible. Finally, the salience of the topic among my target population helped us achieve satisfactory response rates. In recent years, practitioners have been suggesting that the importance of utilizing innovation maturity models to adequately address innovation strategy[74] has become hard to ignore. Hence, studies on OI maturity have been received well by certain professional groups.

In total, I obtained 87 usable responses, yielding a response rate of 6%.

In as follows I describe the measures used to capture the various aspects of OI maturity. These measures are summarized in Table 5-3.

Measures. The culture and process aspects of OI maturity were measured using 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) and from 1 (*not at all*) to 7 (*to a very great extent*) respectively. The structure related

[74] https://blogs.cisco.com/innovation/the-role-of-assessment-in-an-effective-innovation-maturity-model

aspects were measured on the same 7-point scales as well as by means of polar (*Yes/ No*) questions. The metric aspects were measured via multiple choice and open-ended questions. Finally, the survey captured information about both the OI project and the respondents and their organizations. I also computed coarse scores (averages) for all dimensions of OI maturity captured by the survey - OI climate score, learning capability score etc. - and reliabilities were verified (see Table 5-4 for Cronbach's alpha values).

I captured the various **culture-related aspects** of OI maturity by considering: OI climate, learning capability, partner focus, sudden adaptation and leadership for OI.

OI climate was measured using an 8-item scale which I adapted from Baer and Frese (2003) and Remneland-Wikhman and Wikhman's (2011) work. These authors focused on the flexibility of the organization as it engages in OI, the initiative of its employees, as well as on finding new ways to look at problems. Sample items included: "In our organization, new ideas are readily accepted", "Assistance in developing new ideas is readily available in our organization" and "People in our organization are always searching for new ways of looking at problems". Cronbach's alpha was .912.

Learning capability was measured by means of a 5-item scale which I adapted from Calantone et al. (2002) and Real et al. (2014). These works suggested that commitment to learning, having a shared vision, open minded-ness and knowledge-sharing all represent dimensions of an organization's learning orientation. Sample items include "We put effort into widely sharing lessons and experiences" and "We have specific mechanisms for sharing lessons learned - e.g. unit to unit, team to team". Cronbach's alpha was .892.

Partner focus was measured via a 7-item scale which I constructed based on the works by Lambert and Enz (2012) and Pop et al. (2017) on value co-creation. I captured the focus on the innomediary and the focus on other partners separately by asking participants to first consider partnerships with partners *other* than the innomediary and secondly, partnerships with the *innomediary only*. Sample items

included: "In our innovation partnerships with partners other than innomediaries/ innomediaries we actively work with our innovation partners/ innomediaries to create joint value propositions" and "In our innovation partnerships with partners other than innomediaries/ innomediaries we share resources (e.g., information, tools, processes)". Cronbach's alpha was .895 and .930 respectively.

Sudden adaptation was measured using a short 4-item scale based on Ritala, Heiman and Hurmelinna-Laukkanen (2016)'s work on dealing with unfamiliar problems in organizations. Sample items included: "Our organization can spontaneously react to changes in our environment" and "Our organization is able to discriminate between problems based on their complexity". Cronbach's alpha was .875.

Finally, leadership for OI was measured on a 7-item scale which I constructed based on Rus et al.'s (2016) work on leader behaviors for successful OI implementation. Sample items included: "Our leaders serve as role models for OI activities" and "Our leaders help enable open innovation capability building throughout the organization". Cronbach's alpha was .967.

I measured **structure** by asking respondents to indicate whether their organization has a department that manages OI and, if so, whether this department is a centralized function. Next, I asked respondents to indicate if there were any profiles with "open innovation in their job title" – e.g., VP of OI, OI manager etc. Finally, I measured the existence of adequate role division and hierarchies for OI using a 4-item scale. This scale was adapted from Zobel's (2017) work on coordination mechanisms for OI. Sample items included: "In our organization, there is a clear division of roles and responsibilities to integrate external knowledge" and "In our organization there are technology scouts (or similar roles). Cronbach's alpha was .875.

I captured the various **process-related aspects** of OI maturity by considering: legal/ IP management, recognition capacity (external scanning and strategic assessment), assimilation capacity (coordinating and integrating) as well as network development.

Legal/ IP management capabilities were measured on an 8-item scale which I adapted based on Enkel, Bell and Hogenkamp's (2011) widely referenced work on OI maturity. Sample items included: "Our legal and IP department/ functions/experts tend to constructively collaborate with other departments/functions" and "Our legal and IP department/ functions/experts regularly update their practice to meet changing market demands". Cronbach's alpha was .911.

Recognition capacity (including the ability to perform an external scan of the environment and strategic assessment of external ideas), and assimilation capacity (including the ability to coordinate knowledge flows/ organize knowledge and integrate this knowledge within the organization) were measured based on recent work by Zobel (2017). External scanning was measured on a 6-item scale and sample items included: "Our organization attends trade shows/industry exhibitions" and "Our organization screens the start-up community". Cronbach's alpha was .885.

Strategic assessment was measured on a 4-item scale and sample items included: "We implement processes and mechanisms for verifying the applicability of the external knowledge in market segments" and "We implement processes and mechanisms for assessing unsolicited ideas and knowledge". Cronbach's alpha was .942.

Coordination was measured on a 5-item scale and sample items included: "The usage of external knowledge sources is valued in our organization" and "Our company has standardized rewards and the incentive systems for using external knowledge". Cronbach's alpha was .888.

Integrating was also measured via a 5-item scale, while sample items included: "Our organization has processes to inform employees of stored information and codification tools" and "Our organization has tools to access stored knowledge". Cronbach's alpha was .886.

Network development was measured by means of a 4-item scale developed based on work by Mortara and Mishall (2009). Sample items included "We have processes in place that enable us to successfully communicate with external partners" and "We have processes in place that enable us to successfully build collaboration networks with external partners". Cronbach's alpha was .926.

I measured **metrics** using a multiple-choice question (8 items) adapted from Chesbrough and Brunswicker (2014). Sample choices included: return on investment of OI projects, revenue from results of OI and bonuses and promotions directly tied to OI performance. Participants were also able to indicate what other measures they employed (if any) via an open question.

I captured three types of **demographics in the survey**: company data, project data, and individual data.

Company data. Participants were asked to indicate the name of their organization (open question) as well as the major sector they operate in, their size in terms of revenue, number of employees and years in the business (all using multiple choice questions with one possible answer), listing on the stock exchange (polar question) and the company's experience in working with an innomediary (multiple choice question with one possible answer). The options for the latter included: "Our most recent experience with an innomediary was our first", "We have previously worked with an innomediary" and "We have previously worked with multiple innomediaries".

OI project data – i.e., the OI project the participants considered while filling out the questionnaire. Participants were asked to describe the OI project briefly (open question), to indicate the nature of the project (multiple-choice question; sample options included: staff augmentation, technology acquisition and M&A), duration of the project (in weeks), number of employees included in the project, and, optionally, the number of other individuals involved and the name of the innomediary they worked with (all open questions).

Individual data. Participants were asked to indicate their gender, their age (multiple-choice question; I provided 6 age brackets), current position, years working on innovation projects and functional background (open questions).

Table 5-3: Scales used in the survey

Block	Dimension	Items/ Scales	No. of items
Culture	Open innovation climate	Remneland-Wikhman and Wikhman (2011) Baer and Frese (2003)	8
	Learning capability	Calantone et al. (2002) Real, Roldán and Leal (2014)	5
	Partner focus - other partners	Pop et al. (2017) Lambert and Enz (2012)	7
	Partner focus - innomediaries	Pop et al. (2017) Lambert and Enz (2012)	7
	Sudden adaptation capability	Ritala, Heiman and Hurmelinna-Laukkanen (2016)	4
	Leadership for open innovation	Rus, Wisse and Rietzschel (2016)	7
Structure	Division of roles	Zobel (2017)	4
Process	Legal/ IP Management process	Enkel, Bell and Hogenkamp (2011)	8
	Recognition capacity: External scanning	Zobel (2017)	6
	Recognition capacity: Strategic assessment	Zobel (2017)	4
	Assimilation capacity: Coordinating	Zobel (2017)	5

	Assimilation capacity: Integrating	Zobel (2017)	5
	Network development	Mortara and Minshall (2009)	4
Metrics	Metrics employed	Chesbrough and Brunswicker (2014)	8

In as follows I describe some of the results from the interviews and survey.

5.5 Findings

5.5.1 Sample characteristics (N=81)

In my questionnaire, company and project characteristics were mandatory questions, whereas individual characteristics were not. As 6 out of 87 respondents did not answer the individual questions, I report on the descriptive statistics of a sub-sample of 81 answers.

Company characteristics. Nearly all industry categories were present in the sample, with a slightly higher representation from manufacturers of chemicals and chemical products (12.3%), IT and other information services (11.1%) as well as manufacturers of food products, beverages and tobacco products (9.9%). This indicates that the majority of industries are finding value in engaging with less traditional innovation partners such as innomediaries in order to improve their OI practice.

In terms of size, the majority of organizations to which respondents belong (72.8%) report a revenue above 90 million euros and an employee base of over 5,000 people (67.9%). As for years in operation, over a third of the respondents' organizations had been in business for over 100 years (38.3%), while a quarter (25.9%) for less than 25 years. 54.3% of the companies in the sample were listed on the stock exchange.

The experience in working with innomediaries was also divided. More than half (56.8%) of the respondents work in innovating organizations that had previously worked with multiple innomediaries, 18.5% had previously worked with just one, while 24.7% indicated that their current experience with an innomediary was their first.

Last but not least, the respondents indicated a great variety of innomediaries their organizations had engaged with. Some examples include: NineSigma, Innocentive, Spigit, BrightIdea, Idea Connection, PreScounter and HYPE Innovation.

Project characteristics. The nature of the projects the innovating organizations had jointly set up with innomediaries were, as expected, of various types. While some organizations focused on creating communities and running idea competitions and crowdsourcing, or working in tandem with students/ universities, others were interested in establishing platforms to collect and process ideas for innovation. Some other projects looked at increasing operational excellence, generating new consumer insights, or even performing a "complete overhaul of the innovation engine" (change management). Consequently, the project duration ranged from very short, fixed-duration projects (1-2 weeks) to ongoing/ continuous improvement projects (years) (M = 77 weeks; Md = 12; Mo = 12). In terms of manpower for the projects, 4-16 individuals were typically involved at a given time (M = 38; Md = 10; Mo = 10). Some exceptions include company-wise ideation campaigns, that can incorporate up to 200+ individuals. Last but not least, in 44.3% of the cases, other individuals (externals) were involved alongside innomediaries to facilitate the project's development.

Individual characteristics. The managers participating in the survey were 75.3% male (19.8% female, 4.9% not specified). In terms of age, the most populous group was represented by the 45-54 bracket (29.6%), followed by the 55-64 age group (27.2%) and the 35-44 age group (24.7%) respectively. This division indicates that the OI function typically requires experience. The title of the participants varied greatly as did their functional background.

The titles ranged from functions explicitly oriented towards OI (e.g. OI Leader, Head of OI, OI Manager etc.) and innovation (e.g. Chief Innovation Officer, Innovation Director, Innovation Director) to technology management and/ or R&D (e.g. Technology Analyst, Senior VP R&D, Technology Director etc.). This is consistent with the observation that, recently, organizations are signaling the importance of OI by creating functions explicitly for this purpose. Moreover, the functional background of the managers participating in the survey included strategy (strategy/ new business creation, IP, innovation management), communication (language/ communication), as well as finance and IT. A few profiles were also highly specialized (chemistry, biotech), reflecting a match between the experience of the project leader and the nature of the OI project itself.

In terms of experience on innovation projects, the respondents had worked, on average, 11.45 years (*SD* = 9.03) in this space.

5.5.2 Descriptive statistics and interview insights

To explore the proposed maturity framework (Figure 5-1) more deeply, I have first computed descriptive statistics for each capability captured by the survey. Minimum and maximum values, means, standard deviations, and bivariate correlations were generated using IBM SPSS Statistics 25 and are shown in Table 5-4 and Figure 5-2. I point out that in order to correctly report on these statistics, I only considered capabilities (factors) measured using a homogeneous Likert scale. Therefore, I excluded the questions related to metrics, as they were polar (Yes/ No) questions. The metrics-related questions were used separately to nuance the findings of the three case studies (a beginner profile, a below-average maturity profile and a mature profile).

Next, and to illustrate how the OI capabilities manifest in practice, I have selected three case studies for comparison. The first case (Firm 7 from the interviews) is an organization new to (open) innovation management and innomediaries. The second case (Firm 3) is an organization with some experience with open innovation, whereas the third organization (Firm 6) is seasoned in terms of

collaborating with an innomediary and working on OI projects. All 3 organizations currently run innomediary-facilitated projects (outcomes have yet to be recorded). These projects are described in the text. The data in the case studies was matched with survey data for better between-case comparison. Matching was done based on personalized survey links sent to the interviewees' company.

Table 5-4: Minimum and maximum values, means, standard deviations, and bivariate correlations (N=81)

OI Capabilities	Min.	Max.	Mean	Std. dev	Cronbach's alpha
1. Climate	1.13	7.00	4.54	1.28	.912
2. Learning	1.60	7.00	4.40	1.32	.892
3. Other partner focus	3.00	7.00	5.40	.94	.895
4. Innomediary focus	1.86	7.00	5.22	1.10	.930
5. Sudden adaptation	1.50	7.00	4.28	1.37	.875
6. Leadership	1.00	7.00	4.57	1.58	.967
7. Structure	1.25	7.00	4.07	1.41	.875
8. IP Management	1.50	7.00	4.67	1.19	.911
9. Recognition (ext. scanning)	2.00	7.00	4.90	1.26	.885
10. Recognition (s. Assessment)	1.00	7.00	4.45	1.54	.942
11. Assimilation (coordinating)	1.00	7.00	4.37	1.24	.888
12. Assimilation (integrating)	1.00	6.40	3.88	1.37	.886
13. Network capability	1.00	7.00	4.84	1.41	.926

(table continues on the next page)

Table 5-4: Minimum and maximum values, means, standard deviations, and bivariate correlations (N=81) (continued)

OI Capabilities	1.	2.	3.	4.	5.	6.	7.	8	9.	10.	11.	12.	13.
1. Climate	-												
2. Learning	.715**	-											
3. Other partner focus	.588**	.640**	-										
4. Innomediary focus	.417**	.449**	.603**	-									
5. Sudden adaptation	.818**	.715**	.644**	.416**	-								
6. Leadership	.720**	.698**	.617**	.380**	.673**	-							
7. Structure	.414**	.442**	.329**	.136	.376**	.640**	-						
8. IP Management	.567**	.567**	.496**	.316**	.552**	.609**	.467**	-					
9. Recognition (ext. scanning)	.357**	.265*	.393**	.080	.406**	.408**	.535**	.401**	-				
10. Recognition (s. Assessment)	.500**	.435**	.460**	.254*	.461**	.629**	.665**	.521**	.592**	-			
11. Assimilation (coordinating)	.670**	.615**	.550**	.315**	.627**	.784**	.601**	.571**	.483**	.668**	-		
12. Assimilation (integrating)	.289**	.358**	.321**	.243*	.314**	.472**	.648**	.411**	.429**	.635**	.550**	-	
13. Network capability	.587**	.560**	.588**	.397**	.646**	.686**	.632**	.600**	.528**	.614**	.653**	.499**	-

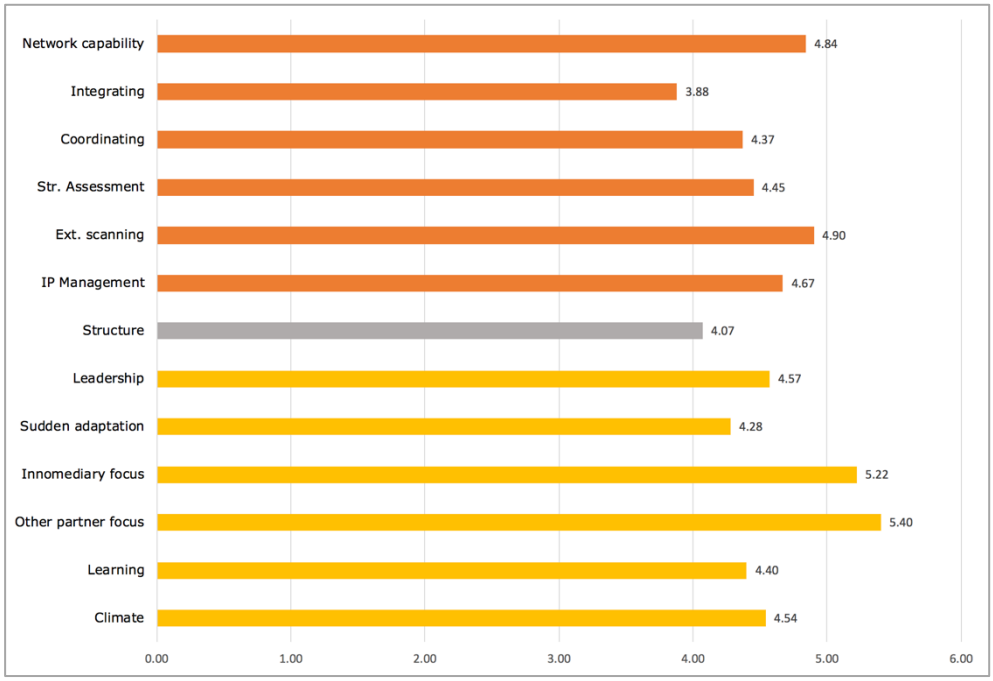

Figure 5-2: Mean maturity scores per capability

To minimize bias, the interviewee was asked to forward to survey link to a member of their team.

I computed coarse scores (averages) to visualize how organizations fared on each aspect of OI maturity and I added means and standard deviations for ease of comparison. For example, if an organization obtained an OI climate score of 3.00 out of a maximum of 7.00 (I used 7-point scales in the survey), the result was shown as follows: "(3.00; M = 4.52; *SD* = 1.27)". In this example, 3.00 represents the score (coarse average) obtained by the company, whereas 4.52 and 1.27 represent the sample mean and standard deviation for OI climate respectively (see Table 5-4). Additionally, I added a number of quotes to illustrate the scores obtained by each of the three selected case companies.

Finally, while OI metrics were not included in the descriptive statistics, I nevertheless added them to the case descriptions because of their importance in practice.

5.5.3 A beginner's profile

To illustrate the OI maturity profile of an organization that is relatively new to OI (see Figure 5-3), I have selected a large, established manufacturing company (founded: 1866; 10–90 million euros in revenue; 500-1,000 employees) that offers heating solutions.

This organization has partnered with an innomediary that is specialized in crowdsourcing in order to explore the possibility of creating online communities. In the words of the company's director:

> The project is to create two online communities: [one for] gas boiler installers, [and one for] consumers who use gas boilers to heat their home. Once established, we want to use the communities to test new ideas for products and services, get feedback, and crowdsource new ideas. The project is underway and therefore does not have any outcomes as yet. (Source: Firm 7)

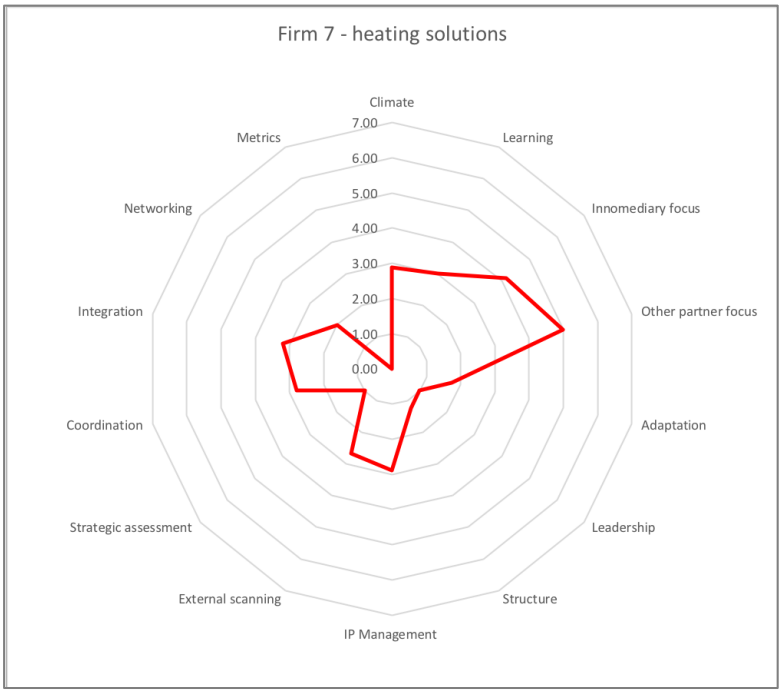

Figure 5-3: Maturity scores for a firm new to open innovation management

The OI project's duration was 26 weeks and involved 5 employees from the company's side as well as 4 externals (e.g., innomediary personnel and other advisors). The organization saw the project as an experiment:

> We are using this kind of hybrid approach. Lean start-up, design thinking (…) running little experiments as quickly, cheaply and effectively as possible to validate our assumptions through that process. (Source: Firm 7)

As it begins its journey into collaboration (Figure 5-3), this organization has a (still) underdeveloped culture for OI. The low to medium climate score (3.00; M = 4.52; *SD* = 1.27), the low ability to adapt to sudden changes in its external environment (1.75; M = 4.28; *SD* = 1.37), and an unsure leadership when it comes to innovation (1.00; M = 4.49; *SD* = 1.57) ("We are also working on the leadership teams' behaviors") collectively confirm this aspect. The company's focus, however, is to improve and eventually embed innovation into the organization's DNA:

> The innovation program is really new. It started only last year. We're not really working on big strategic challenges. Lots of the work we have been doing is about making [the company] a better place to work in. (Source: Firm 7)

While climate, adaptation and leadership scores remain low, the organization scores a bit higher in terms of learning (3.00; M = 4.34; *SD* = 1.37) as well as in terms of relating to innovation partners in general (4.00; M = 5.42; *SD* = 1.04) and to the innomediary in particular (4.14; M = 5.22; *SD* = 1.10). In fact, the relationship with the innomediary is quite unique in that it is based on regular, open communication, trust, and knowledge exchange through recommendations for better OI practice:

> They do not come in and pitch software features to you. They come in and talk about… "help me understand your business", "help me understand your people", "what are the key strategic areas that you need to work on?", "what is the culture like?". Then they adapt and make recommendations on how to engage with your people and I think that is the key. (Source: Firm 7)

Alongside a cultural maturity, the company also begins to create adequate structures for OI. While there are no separate departments to manage OI, neither are there OI functions/ profiles, the innovation team has grown substantially within two years' time, from a single person to 3-4 persons tasked with innovation projects (primarily internal idea management). This change is not yet reflected in the structure score (1.33; M = 4.13; *SD* = 1.45).

Perhaps the biggest challenge of a "beginner" in terms of OI is represented by the processes and metrics aspects. Because OI is primarily seen as a means to address deficiencies in terms on culture ("Is my line manager responsible for ideas improvement? Do we share knowledge with other departments? Do senior managers take the ideas of people like me seriously? The score was poor."), processes have yet to be prioritized. Still, IP management represents an important concern (current and future) (2.40; M = 4.63; *SD* = 1.25) alongside knowledge integration (3.00; M = 3.84; *SD* = 1.39). Due to the lack of adequate OI leaders and leadership, the strategic assessment of opportunities (1.00; M = 4.45; *SD* = 1.55) as well as the coordination processes have yet to be established (2.80; M = 4.37; *SD* = 1.24). Furthermore, network development remains an insufficiently explored avenue (2.00; M = 4.95; *SD* = 1.43), whereas external scanning is still not a regular habit (2.67; M = 4.90; *SD* = 1.26).

Despite these limitations, the organization plans to improve its processes and possibly work on multiple innovation horizons at a time:

> We (…) have this process where we have teams working on two key strategic innovation areas. (…) this is more Horizon 2 work. (…) We also have some training that we roll out but it is focused on how managers can create a better environment that supports creativity. (Source: Firm 7)

Last but not least, the organization does not capture any OI metrics, but plans to do so after promising results from their internal idea management campaigns which the innomediary has helped set up ("We do not have any capabilities to build the platform ourselves").

When asked to describe further developments, the company notes that it is still reluctant to collaborate with more distant partners such as competitors ("It's a very traditional risk-averse business") but that it might consider doing so after the company culture solidifies. At the same time, the company will continue its investment in processes by focusing more on exploration and less on exploitation ("Our business is so heavily focused on exploitation. We need to free up some resources; to invest the time in the exploration of new things").

5.5.4 An above-average OI user's profile

To illustrate the OI maturity profile of an organization that has a limited, but existing experience with OI (Figure 5-4), I have selected a young, large telecommunications and television company (founded: 2005; >90 million euros in revenue; 5,000+ employees) that offers television, broadband Internet and telephony services in 12 countries.

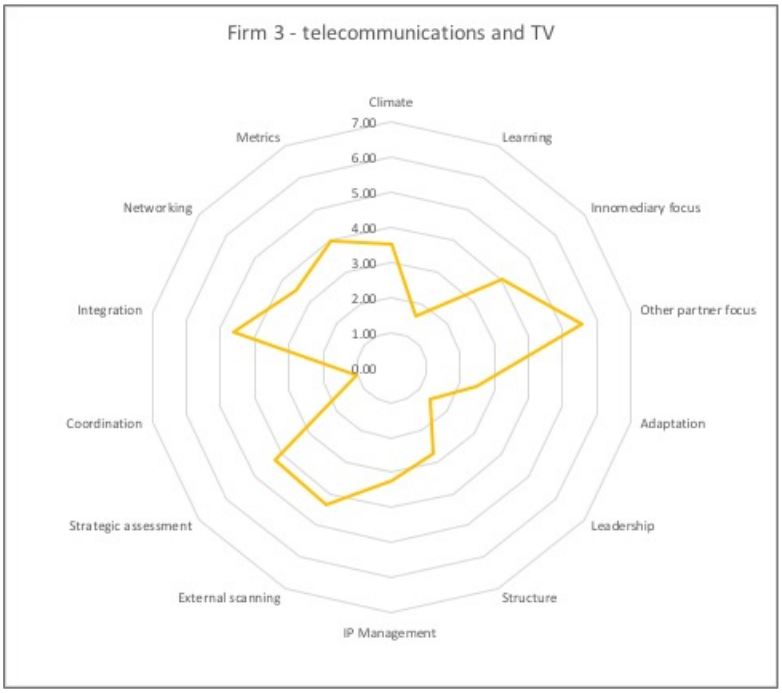

Figure 5-4: Maturity scores for a firm accustomed to open innovation management

The organization has partnered with an innomediary that can assist new product development as well as productivity increase, efforts. In the words of one of the company's Innovation Program Managers:

> The most recent project has been [implemented] to increase productivity in the production business unit (operational excellence). Outcomes are 500 million USD bottom line improvement, of which close to half has been reached by those production sites where the project has been successfully completed already. (Source: Firm 3)

Another promising avenue for innovation with partners for this company is a (now) recurring collaboration with a technical university. This process was also facilitated by the existence of an OI platform which the innomediary had helped establish. The current OI project's duration was 20 weeks and involved 50 of its own employees, as well as 25 externals (e.g., innomediary personnel and other actors).

As its maturity scores indicate (see Figure 5-5 for full scores across dimensions), the company has developed some, but not all of the essential capabilities for fruitful collaboration.

In terms of climate (3.50; M = 4.52: *SD* = 1.27), the employees receive some assistance in developing new ideas as well as the necessary time. As the organization's mantra suggests, innovation is viewed as a long-term process that can produce results only if commitment is shown:

> We always called it "Crawl-Walk-Run. I'm too uncertain to really stand up. Also, not enough data to be able to stand up. That is a pilot; probably failing. Then walk - use the pilot results to really do something and when that works out, start shouting about it. Do more and more and more. [Run] Source: Firm 3)

Despite this healthy attitude towards innovation and its ability to discriminate between problems based on their complexity, the company is slow to react to change – i.e., its adaptation score is low (2.50; M = 4.28: *SD* = 1.37) leaving it vulnerable to internal and external shocks. The company also scores very low on

learning (1.60; M = 4.34; *SD* = 1.37) and leadership ("[The CEO] was more like a figurehead than a sponsor") (1.43; M = 4.57; *SD* = 1.58). Because leaders fail to emphasize the importance of knowledge sharing, the company puts little effort into systematically analyzing successful as well as unsuccessful projects. The consequence is poor feedback and stagnation. After much effort, however, the right people are sometimes found and results start to show:

> Eventually, when we [found] the people that were interested in joining, we invited them for a sort of brainstorming session. Let's call it a co-creation exercise. We invited them for a chat – that is what it was. That actually worked out!
> (Source: Firm 3)

While leaders do little to enable internal OI capability building throughout the organization and do even less in terms of acting as promotors/ role models for innovation (they do not routinely communicate the value of OI to employees), the company fairs quite well in establishing external links and in doing so, acquiring the necessary knowledge for continued progress. In other words, both the innomediary focus (4.00; M = 5.40; *SD* = .94) as well as the additional partner focus dimensions are recognized (5.57; M = 5.22; *SD* = 1.10). The company believes firmly that value is best co-created and proactively searches for value co-creation opportunities with innovation partners. Including its customers:

> Everyone who had an office-only function was obliged – every year – to sit for a day in a call center, for a day in the store, and for a day with a field engineer. (Source: Firm 3)

In terms of structures (2.75; M = 4.13; *SD* = 1.45), there is no clear division of roles and responsibilities to integrate external knowledge. While some special roles exist (e.g., technology scouts), the company has no OI department and no managers e with OI in their job title.

From the process standpoint, the importance of controlled IP sharing is recognized (3.25; M = 6.67; *SD* = 1.19). The overall maturity of the IP department, however, could be further improved. For example, the current IP department does not actively train employees or make them self-aware. Neither does it focus on

establishing win-win contracts with partners or on centralizing know-how ("there is no central repository or database where we can find all that IP"). The latter aspect is also reflected by the very low coordination score (1.00; M = 4.37; *SD* = 1.24). At the organization, management does not communicate the benefits of using external knowledge sources, there are no standardized rewards either and employees not empowered to reach outside. OI efforts are therefore mostly a reactive rather than a proactive activity ("It is only when we have a business need that we run these campaigns. Then we ask employees – those can be all 45,000 people globally or a selection").

Despite these issues, the external scanning processes are much more successful (4.33; M = 4.90; *SD* = 1.26). The company is highly specialized in scanning start-ups but also collaborates with the scientific community. The strategic assessment of opportunities (4.25; M = 4.45; *SD* = 1.54) is also well established although there is no process for assessing unsolicited ideas. As for integration of external knowledge, the existence of a good system to filter ideas makes for an above average score (4.60; M = 3.88; *SD* = 1.37), whereas the success in establishing systematic links with outside stakeholders is reflected in the networking capability (3.50; M = 4.84; *SD* = 1.41). Generally speaking, progress at the organization is slow but steady:

> That is something we eventually did. We just kept on going. And also focused on the simple changes that saved five calls a week. (Source: Firm 3)

Last but not least, metrics represent an important preoccupation at the organization. The organization measures the speed of OI projects versus innovation projects, funding attracted (internally and externally) for OI projects relative to innovation projects as well as the cost of OI projects relative to closed innovation projects.

5.5.5 A mature OI user's profile

To illustrate the OI maturity profile of an organization that is experienced with OI (Figure 5-5), I have selected a young, large technology company (founded: 1985;

>90 million euros in revenue; 5,000+ employees) that offers mapping and location data. This organization is majority-owned by a consortium of German automotive companies.

The organization has partnered with an innomediary that is specialized in enterprise innovation management solutions in order to set up an innovation process as well as develop a tool. As the director of the company's Innovation Enablement Office explains:

> The industry changed so we had to change to keep up. (…) To be able to complete, we needed to change the way we work with the new industry standards. But also new customers, new owners. (Source: Firm 6)

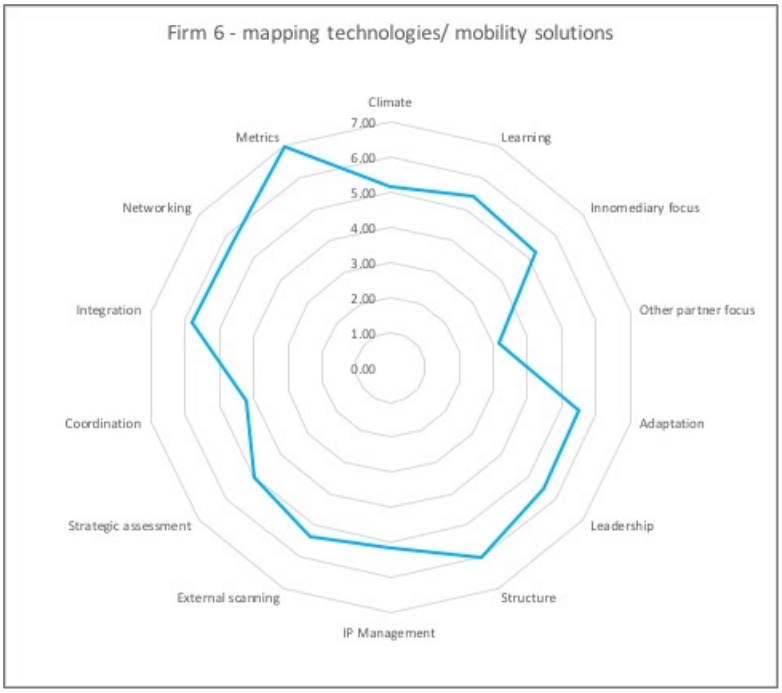

Figure 5-5: Maturity scores for a firm highly accustomed to open innovation management

The current OI project's duration was 12 weeks – a testament to organization's "fail fast" mantra – and involved 4 of its own employees, but no externals (e.g., innomediary personnel and other advisors).

As its maturity scores reveal (see Figure 5-5 for full scores across dimensions), the company has managed to develop a number of essential capabilities for fruitful collaboration. Regarding climate (4.83; M = 4.52: *SD* = 1.27), for example, the company has invested significant resources into educating/ training its employees on innovation and collaboration:

> What we are trying to do first is to educate our internal community. That is why we have set up the training: to educate people on the innovation mindset and also on the platform and the process. (Source: Firm 6)

A related strength includes its high learning capability (5.33; M = 4.34; *SD* = 1.37), while the score related to partnerships with the innomediary (5.29; M = 5.22; *SD* = 1.10) as well as with partners other that the innomediary was high (5.00; M = 5.42; *SD* = 1.04). Partnering in general is important to the company because it helps build expertise and make innovation a predictable process. Moreover, effective partnering coupled with a healthy attitude towards learning can help the organization become recognized as a leader among its stakeholders.

> Our ambition is to align different innovation streams and all the people that enable innovation and foster innovation across the organization. We want [the company] to be a recognized innovation leader both internally and externally. (Source: Firm 6)

Finally, leadership (5.50; M = 4.49; *SD* = 1.57) is an important driver of the organization's open innovation initiatives. As the interviews revealed, the Chief Operating Officer (COO) supports the change management processes in the organization and helps the Innovation Enablement Office receive adequate funding and exposure:

> The COO is my right hand (…) He loves innovation. He hired me personally and I report to someone in between. In principle, I have regular calls with him and he supports everything we do. The strategy, the way we push, the way we enable. (Source: Firm 6)

The latter helps the organization remain flexible and adapt (5.50; M = 4.28; *SD* = 1.37) to changes in its competitive landscape.

Structure-wise, the company has established an OI department ("I was asked to build an innovation enablement team and an innovation enablement (and alignment) office") which is centrally managed innovation "enablement" is the preferred term. The latter underlines the catalyst role (as opposed to a regulatory, commanding role) of staff tasked with OI. All in all, the organization scored very high on the structure scale (6.00; M = 4.13; *SD* = 1.45) indicating a good grip on the infrastructure necessary for collaboration.

In terms of processes, the organization concentrates heavily on knowledge integration and storage (5.75; M = 3.84; *SD* = 1.39) as well as on assessing (5.00; M = 4.45; *SD* = 1.55) the quality of the external knowledge received. The latter helps create more internal as well as external coherence ("We want (us) to be a recognized innovation leader both internally and externally"). To support the increasing number of external collaborations (including that with the innomediary), the organization has also created adequate IP management processes (5.00; M = 4.63; *SD* = 1.25) to fit the various priorities of its stakeholders and has invested in tools to effectively scan its environment (5.33; M = 4.90; *SD* = 1.26). Furthermore, it has focused on coordination mechanisms for OI (4.20; M = 4.37; *SD* = 1.24), albeit with more work to be done in this area ("We are working more with a points system and trying to gamify engagement") Because change is a constant factor at the organization, the network development capability is extremely high (6.00; M = 4.95; *SD* = 1.43).

Finally, metrics are a very important aspect of the organization's activity. For example, showing return on investment on existing initiatives is considered more important that new growth ("At the moment, we do not want to grow. We first want to deliver more return on investment"). In the survey, the organization has indicated that it captures an impressive array of OI metrics including: budget invested in OI and return on revenue on results from OI.

In terms of future prospects, the technology company indicated that it wished to rely less on innomediaries (focus on self-sufficiency). Instead, it planned to invest its resources into adapting to changes and in refining its structures (possibly even creating new structures) instead. According to the members of its Innovation Enablement Office, the integration of processes remains a priority for the organization moving forward.

5.6 Discussion and conclusion

The aim of this chapter was to propose and demonstrate an open innovation maturity framework for actors engaged in collaborative relationships with innomediaries (I call this the innomediary-customer context). As the findings show, there are 13 important capabilities innovating organizations should potentially consider when engaging with innomediaries. They include: open innovation climate, learning capability, partner focus (innomediaries), partner focus (other partners), sudden adaptation, leadership for open innovation, division of roles, legal/ IP Management processes, recognition capacity (external scanning), recognition capacity (strategic assessment), assimilation capacity (coordinating), assimilation capacity (integrating), and network development. In addition, the capability framework has also included a demonstration of how organizations can potentially measure the results of open innovation (metrics). These capabilities are closely knit and continuously influence each other. By recognizing the existence of various capability categories, innovating organizations have a more complete picture of the various facets of OI in innomediary-customer relations. By improving these capabilities, actors can potentially develop more fruitful interactions with innomediaries.

In as follows, some further theoretical and practical implications of my work.

5.6.1 Theoretical implications

First, the approach I have taken to scrutinize the relationship between innomediaries and innovating firms (their customers) represents an important departure from current research practice – notably in strategy/IM. While prior

studies have tended to focus on the capabilities of the innomediary in the innomediary-customer relationship (Mortara and Roijakkers, 2014; Roijakkers, Zynga and Bishop, 2014; Randhawa, Wilden and Gudergan, 2018) the study has focused on the customer, thus helping close an important research gap. More specifically, the chapter has focused on identifying those capabilities that can potentially help customers achieve more benefit in their innomediary-customer relations. I have referred to these capabilities collectively as to an "Open Innovation (OI) Capability Framework".

Second, and related to the first, by proposing a capability framework, my study has built on prior work by Enkel, Bell and Hogenkamp (2011), Habicht, Möslein and Reichwald (2012), Karpen at al. (2015) and Hosseini et al. (2017) – all of whom have examined the maturity of organizations as well as its various components. Uniquely, however, I have not only proposed a framework specific to innomediary-customer relations, but I have also demonstrated this framework using examples from practice. By using case study evidence from various industries, I have illustrated the differences between a beginner's profile, an above average customer as well as a customer that is experienced with open innovation and with collaborating with innomediaries. Furthermore, I have provided a preliminary illustration of how these capabilities might move in sync (see Section 5.6.2).

Third, my work has helped combine existing perspectives on ecosystem actor capabilities from strategy/IM with perspectives from service marketing. By acknowledging the importance of the customer in the innomediary-customer relation, I follow the prescriptions of S-D logic (Lusch and Vargo, 2016) regarding the source of value creation in ecosystems. Reiterating a point made in the introduction of this PhD thesis, while innomediaries can provide important input/ resources to their customers' open innovation (OI) initiatives, it is the customer himself that must ultimately integrate these resources in order to create value. Hence, in researching the relationships between innomediaries and innovating firms it is not enough to understand how innomediaries alone contribute to the value co-creation process.

5.6.2 Managerial implications

For managers, the study presents several implications.

First, case study findings suggest a number of interesting potential links between the capabilities included the framework.

For example, a climate for OI appears to move in sync with two other capabilities: sudden adaptation and leadership. Not surprisingly, a culture of open communication and trust is typically indicative of top management's commitment to OI efforts, including helping employees get on board with OI activities and promoting OI capability building in general. Having this trust established, companies are in a better ability to adapt to changing circumstances in one's environment. In other words, a healthy climate for OI coupled with strong leadership can potentially help organizations address the vulnerabilities in their ecosystems (whether at the micro, meso or macro levels of context – see Chapter 4). Similarly, the preliminary insights from the data seem to suggest that having a strong innomediary focus is linked to having a focus on other OI partners as well (such as universities, suppliers and even end customers). Interestingly, more maturity overall (= high scores on all dimensions of the framework) seems to slightly reduce IP focus. The latter could be explained by the fact that as actors gain experience, they also become more proficient at circumventing the IP conversation in favor of relationship building. At the same time, the more mature an organization, the more it is likely to report on OI metrics. Finally, maturity overall seems to also slightly reduce innomediary focus. The latter is a potential indication of the fact that the relationship between an innovating firm and an innomediary follows a cycle. A relatively inexperienced organization will be inclined to rely more on an innomediary. As it accumulates experiences, reforms culture, creates structures and designs processes, it becomes less and less dependent. A deeper analysis is necessary, however, to understand the potential existence of an inverted u-shape relationship.

Second, and related to the first, as OI capabilities in general and OI capabilities in an innomediary-customer context in particular cannot be studied in isolation,

any change effort must consider this complexity as they plan interventions. For example, managers seeking to improve their climate for (open) innovation must consider the implications for other culture aspects too, such as leadership or partnering capability. By taking a more holistic view of open innovation maturity, managers can thus potentially allocate resources better.

Third, managers in *specific industries* – e.g., healthcare, automotive, food and beverage etc. could deploy indicators such as the coarse factor scores (averages) in my framework – or in some variation of the framework – to generate maturity thresholds (e.g. low, below average, above average and high maturity). To add some more precision to the indicator(s), refined scores (scores calculated using the factor loadings) could be used to generate even more accurate results and rankings. All in all, by repeating the survey at regular intervals, managers could track their organization's progress and even compare themselves with their industry peers.

Fourth, because the dynamics of the innomediary-customer dyad are best understood when considering both actors (the innomediary and the innovating firm), firms engaged in collaborative projects with innomediaries could request input from the innomediaries on how to improve their open innovation practice. For example, the innomediaries could provide external perspectives on each capability category – e.g., structure, culture, processes, thus helping firms become more proficient at managing innovation.

5.6.3 Limitations

The OI maturity framework proposed and tentatively demonstrated in this chapter was obtained by means of a thorough literature review, expert interviews and direct observation. As such, it remains a largely qualitative inquiry into the context-specific capabilities of ecosystem actors and is therefore not easily generalizable beyond its current context (innomediary-customer relations). Despite this setback, the framework represents an exciting starting point for further investigation.

First, future studies could test the relevance of the proposed capabilities by investigating relationships between other pairs of actors in the ecosystem – i.e., suppliers/ complementors/ competitors and the innovating organization or by changing the perspective (emphasizing the innomediary's capabilities as opposed to those of the customer).

Second, and by increasing the sample size, future studies could help augment the original capability framework (13 capabilities) through exploratory factor analysis and/ or a confirmatory factor analysis (CFA). CFA is a type of structural equation modeling technique (SEM) that deals specifically with measurement models (Abbott, 2003; Brown, 2015). Therefore, CFA could be used during the OI maturity scale development to examine the latent structure of the test instrument (Harrington, 2009). More specifically, CFA could be used to verify the number of underlying factors (the OI capabilities) in the OI maturity model as well as the item–factor relationships (factor loadings). Running the CFA on the current sample (N=81) was not possible due to insufficient data and hence possible power issues.

Third, future studies could also examine the innovating firm's satisfaction with innomediaries, as well as the relationships that exist between various capabilities (correlations, interaction effects) leading to more insights for management and practice (some of these avenues were suggested in Section 5.6.2). Going even more granular, future studies could study even more specific capability frameworks depending on the type of innomediary-customer relationship in question. For example, relationships when the innomediary-customer relationship is more transactional (i.e. project based like with NineSigma and InnoCentive) versus relationships when the link is more long-term (i.e. subscription models, long-term contracts such as with HYPE Innovation and Spigit).

A fourth important limitation of the study lies in the fact that existing data does not make clear whether the customer (the innovating firm) can truly benefit from better quality relations with the innomediary due to having certain number of capabilities in place. While the cases offer some indication of this possibility, longitudinal studies could better answer this question and deepen the existing understanding of innomediary-customer relations.

5.7 Acknowledgements

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Chapter 6: Conclusions

> Markets, hierarchies, and ecosystems are the three pillars of modern business thinking (Moore, 2006, p. 31)

As technology marches on (Schwab, 2016), and as more actors connect to the global economy, the rules and norms of collaboration, competition and competitiveness are reshaping at formidable speed. From arm's length relationships to networked structures (Järvi, Almpanopoulou and Ritala, 2018) and self-contained, self-adjusting systems (Vargo and Lusch, 2016), individuals and firms are finding new ways to cope with complexity and uncertainty in their quest to create value (Kapoor and Lee, 2013).

To firms, an important way of coping with environmental complexity has been to shrink their core and expand their periphery (Visscher et al., 2017). That is, to gradually connect to a variety of collaborators and collaborator types for resources and survival (Mars, Bronstein and Lusch, 2012; Bogaert, 2017). This expansion of their horizons has, over time, enabled them to experience a profound shift in how they perceive collaboration, as well as the forms of collaboration they engage in. As a result, the classic alliances and portfolios of the 1970s and 1980s were eventually complemented/ replaced by more open and collaborative architectures for innovation and collaboration (Gulati, Puranam and Tushman, 2012; Chesbrough, Vanhaverbeke and West, 2014; Hagedoorn and Zobel, 2015). These new collaborative arrangements came to be known as ecosystems.

In this thesis I have used an inter-disciplinary approach to advance existing research on ecosystems as new forms of collaboration. Specifically, I have leveraged insights from strategy/IM and have infused them with perspectives from entrepreneurship and service marketing to better understand: how ecosystems develop and the dynamics of their evolution (Chapter 3), institutions in ecosystems (Chapter 4) and ecosystem actors (Chapter 5).

In as follows, I take a high-level view of my findings and outline the theoretical and practical implications of my work.

6.1 Implications for theory

At the onset of this PhD thesis, I put forward the following aim:

> [The aim of the thesis is to] advance the current understanding of ecosystems as new forms of collaboration by using an inter-disciplinary approach.

and formulated four research objectives that I subsequently addressed in Chapters 2-6 as follows:

- to improve the current theoretical understanding of ecosystems by combining perspectives from strategy/IM, entrepreneurship and service marketing (Chapter 2);
- to evidence ecosystems' evolution and internal dynamics (Chapter 3);
- to identify and categorize (provide a typology of) institutions and institutional change patterns in ecosystems (Chapter 4);
- to provide a capability framework for actors in ecosystems (Chapter 5).

In the following paragraphs, I reflect on the overall implications of my work as well as on the value of inter-disciplinary research.

6.1.1 On successful ecosystem collaboration

Ecosystem research falls under the greater umbrella of research on inter-firm collaboration (Mintzberg, 1979; Axelrod, 1984). While each of the chapters in my PhD thesis has (individually) contributed to nuancing the various defining elements of an ecosystem (evolution, institutions, actors), my work has also contributed to the broader understanding of what promotes successful ecosystem (and hence inter-firm) collaboration.

In Chapter 3, for example, I show that successful **collaboration hinges not only on cooperation**, or an agreement on the necessity to collaborate, but also on

the effective coordination of efforts despite a variety of setbacks. At Q-Search, each phase of the ecosystem's development, in fact, requires not only a different type of coordination effort but also a **different skillset** as far as the orchestrator's **personal attributes** are concerned. To "optimize" the outcomes (Rabelo and Bernus, 2015; Oh et al., 2017) for all her partners, the orchestrator initially uses her passion and authenticity to establish the ecosystem's legitimacy as well as to create an atmosphere of inclusion and trust. During growth, the orchestrator leverages her grit to create stricter coordination by means of an IT platform, a payment system as well as new rules and norms for collaboration. During maturity, self-reflection enables the orchestrator to continue the coordination in a less institutionalized manner by focusing on projects that deliver social impact and by enabling partners to interact without her direct intervention.

In Chapter 3 I also touch upon the **importance of communication** (especially spoken) in promoting the cooperation facet of collaboration (Balliet, 2010) in ecosystems. In each of the evolutionary phases of Q-Search, the entrepreneur makes considerable effort to create cohesion among the various types of partners by commissioning meetings as well as doing personal coaching. Additionally, she seeks to help partners find each other without het by leveraging the power of a custom-made ICT platform.

Complementing the aforementioned insights from Chapter 3, in Chapter 4 I show that an additional prerequisite of successful ecosystem collaboration in ecosystems is identifying, classifying and eventually adjusting (to) the **rules and norms of collaboration** (the so-called institutions). In the same way that the entrepreneur in Chapter 3 adapts to her ecosystem (and vice-versa) in pursuit of greater social impact, Company Yellow and Company Red strive for patient centricity by inducing institutional change. More specifically, the case companies make, break and/ or and maintain (Koskela-Huotari et al., 2016) a variety of institutions at the micro, meso and macro levels of context (Lusch and Vargo, 2016) in order to reach their goals and create better outcomes.

In addition to the important role of being better attuned to their environment, firms' success with collaboration is also contingent on **creating the right**

channels/ infrastructure for information sharing. This infrastructure is all the more important as it helps mitigate operational risk (Gulati, Wohlgezogen and Zhelyazkov, 2012) in complex forms of collaboration and may even help avoid so-called "coordination neglect" (Heath and Staudenmayer, 2000) – i.e., actors may organize themselves in a way that actually slows them down. In Chapter 3, this infrastructure is represented by the entrepreneur herself (her ability to connect partners) and later by Q-Search's ICT platform. In Chapters 4 and 5, the infrastructure is represented by the structures and processes used by the case/ surveyed companies organize internally (via special departments, roles, processes) as well externally (website, attending physical events – e.g., hackathons, conferences, to acquire knowledge etc.) for collaboration.

Finally, successful collaboration is dependent on a number of **capabilities** that ecosystems actors must consider as they engage in collaboration. While I touch upon capabilities briefly in Chapter 3 (albeit at an individual level), in Chapter 5 I show that context-specific maturity frameworks (see, for example, Hosseini et al., 2016) can prove extremely useful in helping researchers understand the complex array of competences that ecosystem actors combine in order to mature and thrive. In the case of innomediary-innovating firm relations, maturity depends on the firm's ability to foster a culture for innovation and collaboration, to develop a variety of structures and processes that allow external knowledge to be captured and integrated and to record adequate metrics.

All in all, my PhD thesis has shown that the mechanics of collaboration in ecosystems are a complex and fascinating area of research; an area that can be better understood my leveraging multiple research streams and research methods. In the next section, I move on to discuss the implications of combining strategy/IM, entrepreneurship and service marketing for the purpose of ecosystem research.

6.1.2 On utilizing an inter-disciplinary approach to research ecosystems

In addition to the chapter-specific contributions to theory (see Sections 3.6.1, 4.7.1 and 5.6.1), this PhD thesis has also contributed to ecosystem research in

general by uniquely utilizing an inter-disciplinary approach. Specifically, my PhD thesis has shown how strategic management and innovation (strategy/IM), entrepreneurship and service marketing can contribute differently (but altogether significantly) to the understanding of ecosystems.

Inter-disciplinary research, however, can be challenging (Kaplan, Milde and Cowan, 2017). Part of this challenge lies in the fact that different disciplines consist of different knowledge bases which must be combined in a meaningful way. In Chapter 4, for example, the micro, meso and macro levels of context used to classify institutions in ecosystems can be identified in both strategy/IM as well as in service marketing. This makes the investigation of how companies enact institutional change all the more meaningful as researchers in both fields can relate to, and extrapolate from, the findings. Similarly, the customer focus in ecosystems emphasized by service marketing scholars can give strategy/IM research a new angle. In Chapter 5, the study of innomediary-innovating firm relations uniquely focuses on the innovating firm (the end-customer).

The inconsistent terminology used by the various disciplines can also become problematic in the course of inter-disciplinary research. This challenge was most apparent in Chapter 2, whereby I sought to provide a unifying definition of ecosystems (among other theoretical groundwork). To overcome this challenge, I first proposed a number of illustrative definitions by research field. After noting how these definitions converged as well as diverged, I was finally able to put forward a unifying definition to be used throughout the remainder of the PhD.

Finally, in inter-disciplinarity research (as in monodisciplinary research) an important challenge lies in finding the research angle that provides a meaningful contribution. To find this angle, I have sought inspiration from advancements in strategic management research.

In strategic management, Guerras-Martín, Madhok and Montoro-Sánchez (2014) have observed that the frontiers of the field are shaped by two important sets of tensions ("pendulums"):

- the historical tension between internal success factors (analyzing the internal strengths and weaknesses of a firm) and the external environment (industry structure might predict success) and
- the tension between the macro and the micro level of analysis (context).

Having the above in mind, my PhD thesis has attempted to provide a more complete and nuanced view of ecosystems by analyzing both types of factors as well as considering multiple levels of analysis – all with the help of connected fields such as entrepreneurship and service marketing. The latter is especially evident in Chapter 4 where I analyze two companies' journeys toward patient centricity at three levels of context: micro, meso and macro. In other words, and in contrast to similar works, I analyze the success of a firm by looking at its institutional environment (Guerras-Martín, Madhok and Montoro-Sánchez, 2014) as well as at its internal make-up.

In summary, utilizing inter-disciplinary research has helped me generate more impactful, meaningful results (Baum and Dobbin, 2000) than would have been possible by means of a single research stream. In Chapter 2, for example, inter-disciplinarity has helped me describe the defining elements of an ecosystem in much more detail, potentially bringing the tree disciplines: strategy, entrepreneurship, and service marketing, closer together. In Chapter 3, inter-disciplinarity has helped shed light on the complex mechanics of collaboration in ecosystems; that is, the approach has helped show how the entrepreneurial orchestrator's motivations and attributes have led to a particular set of strategic outcomes in each of the ecosystem's evolutionary stages. In Chapter 4, infusing strategy/IM with insights from service marketing has helped demonstrate how pharmaceutical companies can actively and/or reactively manage institutions at the micro-, meso- and macro-levels of context to become more patient-centric and hence reach their strategic goals. Finally, in chapter 5, the same combination of disciplines has helped shed more light on the capability profiles of actors in ecosystems. Additionally, combining strategy/IM with service marketing has helped understand which capabilities can potentially help customers to create value for themselves – i.e., help innovating firms achieve increased maturity.

6.2 Implications for practice

Today, organizations in various industries and inhabiting various geographies are creating ecosystems to address important challenges and to deliver large scale impact. Elemental in architecture, P.R.O.F. in patient care (Vanhaverbeke and Verhoeve, 2016), ScotRail in transportation (Jaakkola and Alexander, 2014), IMEC in nano electronics (Leten et al., 2013), or Chez Panisse in restaurants and hospitality (Chesbrough, Kim and Agogino, 2014) are just a few examples.

As shown in Chapter 2, ecosystems are structurally different from alliances, portfolios, and networks – all forms of collaboration preceding them. For example, ecosystems can include multiple dominant actors, actors can embrace multiple roles within the same ecosystem and therefore collaboration and competition can coexist, the rules and norms of collaboration (institutions) exist on several, inter-connected levels (micro, meso, macro) etc. Alongside structural differences, however, ecosystems also represent a new way of thinking about value in the economy. That is, ecosystems, more than any other form of collaboration, illustrate a shift from a product-dominant mindset (the firm is the source of value) to service-dominant logic (the customer is the source of value).

In this PhD thesis I have repeatedly stressed the positive effects of embracing the principles of service-dominant logic in an ecosystem. More specifically, I have illustrated how individuals and firms that nurture a so-called "ecosystem mindset" can create more value for themselves and others. This "ecosystem mindset" is therefore a crucial notion for practitioners seeking to engage in more effective collaborations.

The "ecosystem mindset", as distinct approach to collaboration, is related to the defining characteristics of ecosystems and includes some of the following beliefs:

- in ecosystems, value is uniquely determined by the beneficiary (the customer) (Chapters 3, 4 and 5);
- ecosystem actors have an ability to formulate common goals and even establish a common culture based on trust, inclusion, and encouragement (Chapter 3);

- ecosystem institutions are continuously formed and reformed based on changing internal and external circumstances (Chapter 4);
- in ecosystems, joint leadership is possible; actors can also make each other replaceable by understanding each other's roles (Chapter 3);
- ecosystem actors nurture capabilities for mutual value creation (value co-creation) (Chapter 5); these capabilities are context based whereas co-created value can refer to insights, knowledge, processes, products, services, etc.;
- ecosystem actors adapt to the ecosystem and vice-versa (Q-Search/ Chapter 3); the ecosystem evolves in both a planned and an organic manner by a process of "loosening and tightening, expanding and contracting, merging and splitting" (Visscher et al., 2017, p. 3).

In addition to understanding the concept of an "ecosystem mindset" the findings of the thesis also offer additional inspiration to managers. In as follows, I formulate five other managerial recommendations based on my research.

1. Ecosystems are complex forms of collaboration and should be treated as such. While zooming onto one-to-one relationships – e.g., between suppliers and customers; between customers and innomediaries etc., in ecosystems is important (this exercise can help determine important capabilities for mutual value creation; see Chapter 5 for the example of innomediary-customer relations), understanding the ecosystem overall is even more so. In ecosystems, actors form symbiotic relationships to help them survive and thrive (see the cases of Elemental, P.R.O.F. and ScotRail). Therefore, ecosystems represent much more than the sum of their individual parts. To formulate a correct ecosystem strategy (Kramer and Pfitzer, 2016), managers must pay careful attention to these considerations. For example, by carefully mapping out their relationships with various actors in the ecosystem, as well as by considering the ripple effects of collaborating/ not collaborating with them (see also Axelrod (1984) for some general principles of successful cooperation facet of collaboration).

2. In ecosystems, innovation and mutual value creation cannot be directly managed. While firms can provide the necessary input for the mutual value creation process of the end-customers, it is ultimately the role of the end-customers to integrate these resources. Managers must therefore understand that

a firm can only move, nudge, steer or influence mutual value creation by indirect means. In Chapter 4 I illustrate this struggle by showing how two pharmaceutical companies make, break and/or maintain the rules and norms of collaboration in their ecosystems to become more patient-centric and thus help patients create more value. On a related note, managers must be cautious when cultivating relationships with their end-customers as well as other actors. While some level of commitment and trust is productive and can lead to successful collaboration, excessive trust or prioritizing unproductive relationships can lead to wasted resources and diminished performance.

3. Actors build capabilities incrementally. To survive and thrive in their respective ecosystems, actors must possess and/or develop a number of important capabilities and, generally speaking, demonstrate a certain maturity in collaboration. Capability building as a process, however, is demanding in terms of staff, skills and time. As the example in Chapter 3 has shown, capability building can sometimes span decades – e.g., at Q-Search it is only during the maturity phase that the SME partners are able to "police themselves" and "find each other" without the orchestrating entrepreneur. Similarly, in Chapter 5, firms collaborating with innomediaries are presented along a maturity "continuum". Moving along this continuum can take years, depending on the strategic priorities of the firm. Therefore, managers tasked with capability building efforts must not only carefully identify appropriate capabilities for collaboration, but also set expectations right in terms of how these capabilities can be acquired and eventually deployed.

4. Not all actors are equal. While ecosystems as forms of collaboration promote shared governance models, mutual value creation, as well as trust and reciprocity, their constituting members are by no means created equal. Ecosystems, in fact, include actors whose experience levels, bargaining power, strategic goals and resources/ capabilities vary widely. Given this diversity, tensions among actors are inevitable. In Chapter 4 I illustrate this by detailing the large number of institutions, stakeholders and stakes pharmaceutical companies must consider in their activity. To effectively harness these tensions, managers must understand how competition and collaboration can productively co-exist as well as how actors

in ecosystems can learn to manage the paradoxes inherent to complex collaborative environments (see Section 2.5.1). Similarly, managers must be aware of potential agency problems as well as of asymmetries between actors when developing their strategies.

5. Ecosystems are much more than structures for/ forms of collaboration. As previously noted, ecosystem represent both unique forms of collaboration as well as an entirely new way of thinking about the source of value/ mutual value creation. Managers seeking to improve their collaboration practice must therefore keep in mind that building ecosystems should never be, in itself, a desired goal. Instead, a more valuable goal is instilling ecosystem thinking into firms – e.g., creating a culture of mutuality/ reciprocity. In Chapter 3, for example, I find that promoting values is a far more powerful exercise that building the IT platform for collaboration at Q-Search. Additionally, promoting the principles of "ecosystem thinking" requires actors to make collaboration a priority as well as to make a deliberate attempt to understand other actors. In this way cooperation and coordination can be sustained.

6. Assessments and Key Performance Indicators (KPIs) should be used with caution. Capturing the progress made with collaboration represents an ongoing concern for managers, especially in complex collaborative environments. Because ecosystems are inherently complex and are often built having a long-term perspective in mind, formulating KPIs that capture success with collaboration is a delicate task. As Chapter 5 has shown, creating maturity assessments is a complex endeavor; one that might not capture all progress made with collaboration. Managers seeking to assess the success of their collaborative efforts must therefore combine both hard and soft metrics and to do so having their unique context in mind. Hard metrics can include speed of collaborative projects versus regular innovation projects or budget invested in collaborative projects (open innovation projects), whereas soft metrics can include partners' level of trust or whether partners wish to repeat the collaboration.

6.3 Avenues for further research and links to other research streams

By infusing strategy/IM research on ecosystems with insights from entrepreneurship and service marketing, this PhD thesis has made a number of contributions to existing ecosystem research (see Sections 3.6.1., 4.7.1. and 5.6.1). In addition to providing some concrete answers, my work has also laid the groundwork for further inquiries. In this final section of my PhD thesis, I therefore outline a number of potential avenues for future research.

As previously mentioned in Section 6.1.2, strategic management represents a research field whose borders are still being shaped by a number of tensions. In other words, this field has not yet reached its maturity (Cummings and Daellenbach, 2009; Guerras-Martín, Madhok and Montoro-Sánchez, 2014), leaving room for a range of topics still to be addressed and notions to be cemented. In an analysis of the Long Range Planning Journal's[75] archive, for example, Cummings and Daellenbach (2009) had remarked the rise of issues such as culture and CSR (corporate social responsibility), knowledge (learning) as well as networks (and **relationships**). Today, increasing competition, shorter product life cycles and increased risk (OECD, 2016) make the importance of the latter undeniable. Having studied various aspects of inter-firm relationships/ collaboration in its most complex forms (ecosystems), I therefore encourage the further exploration of the factors that promote cooperation as well as the specific coordination mechanisms used by actors in ecosystems. In particular, I encourage the development of case studies that explore these motivations and mechanisms longitudinally and in real time (not retrospectively). The advantage of these types of inquiries is that they can facilitate a much deeper understanding of how actors

[75] Long Range Planning is the world's longest running academic journal devoted to strategic management. According to Cummings and Daellenbach (2009), its archive provides "an excellent guide to the consistent themes, fads and trends in the field's development" (Cummings and Daellenbach, 2009, p. 234)

in ecosystems adapt to potential shocks as well as accurately show how ecosystems transition between evolutionary phases.

The same Cummings and Daellenbach (2009) have also remarked a decline in tools and models in strategic management research and a corresponding rise in frameworks and cases. In line with this new direction in strategic as well as innovation management, future research could develop additional profiles (see profile put forward in Chapter 3), typologies (see typology of institutions in ecosystems put forward in Chapter 4), and/ or capability frameworks (see framework put forward in Chapter 5) for actors in ecosystems. For example, future studies could focus on how groups of actors, as opposed to the single orchestrator, influence the outcomes of an ecosystem (this avenue has also been echoed by Acs et al., 2017 in the narrower context of entrepreneurial ecosystems). Similarly, future research could explore institutions and institutional change patterns in a variety of high, medium and low-tech industries. This exploration could help create industry-specific typologies of institutions and through this, guide collaboration efforts in those industries better. For example, highly regulated industries such as car manufacturing or the oil and gas industry will likely focus more on meso- and macro-level institutions in comparison to less regulated ones such as entertainment where the focus might fall on micro-level institutions such as structures and culture. Furthermore, by collecting data from multiple actors and actor types within the same industry, future research could more accurately identify potential risks in an ecosystem and offer guidance on how to offset these risks.

Remaining in sphere of actors in ecosystems, I stimulate fellow researchers to continue addressing the human element in ecosystems – an area which remains underexplored especially in strategy/IM (Molina-Azorín 2014; Salampasis and Mention, 2017). Inter-disciplinary inquiries – such as those combining strategy/IM with entrepreneurship, organizations studies, psychology and even behavioural economics – could thus help profile ecosystem actors more accurately. By understanding how certain profiles (notably those of the keystones and orchestrators in the ecosystem) influence the evolution of ecosystems,

researchers could theorize about the type of actor that is most likely to support the sustainability of the ecosystem in the long run.

Another interesting avenue for future research could explore how learning and symbiosis take place in ecosystems – e.g., how actors exchange know-how and develop similar capabilities for more effective collaboration. Future research could also develop (computer-based) models that simulate the development of ecosystems based on the presence or absence of certain capabilities or by applying shocks. The latter could have important implications for practitioners and policy-makers alike. While my current research is uses narrow inter-disciplinarity, combining more distant fields such as strategic management/ organization studies and computer science could potentially provide interesting results.

In terms of links to other research domains, the topics addressed by this PhD thesis – e.g., ecosystem evolution, institutions, actor capabilities, relate well to a number of concepts from supply chain management and change management.

For example, to the concepts of "resilience". Building a resilient supply chain (Christopher and Peck, 2004) – i.e., a supply chain that can withstand shocks, just like building resilient ecosystems, requires the flexibility of the actors, transparency in terms of information that is exchanged between them, and generally, a better management and a better control of internal processes. Furthermore, organizational resilience (Denyer, 2017) in general, just like ecosystem resilience, have two core drivers: defensive (stopping things from going wrong) and progressive (making good things happen). All in all, and by leveraging these parallels, future research could apply the frameworks and findings from supply chain management to the study of resilience in ecosystems.

My research also relates to the concept of "industrial symbiosis" (Kokoulina et al., 2018). Industrial symbiosis has emerged as an important concept for regional development. In the process of creating symbiotic relationships, firms seek to use each other's inputs and outputs, reduce waste and achieve economic benefits. In similar vein, actors in ecosystems seek to relate in ways that facilitate mutual

value creation. Once again, strategy/IM could benefit from the insights that have been provided by these studies of industrial firms.

Last but not least, my research relates closely to the well-established concept of "change management" (Todnem By, 2005). In Chapter 4 in particular, I have argued that the successful management of institutions and institutional change is critical to the success and survival of the ecosystem. In ecosystem research too, just like in change management, theories and approaches to change are often contradictory – e.g., there is not enough coherence in terms of capabilities needed, processes to be employs etc. Therefore, future inquiries into the change efforts of the actors in ecosystems could benefit both fields.

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Appendix A – Open Innovation Maturity Framework Questionnaire (Chapter 5)

Start of Block: Intro screen

Hello and welcome to this survey!

As researchers in innovation management, we are committed to understanding the strategies and *capabilities* developed by organizations to become more successful at innovation.

Today we know that innovation success depends on a variety of factors, including - but not limited to - a strong culture, adequate structures, effective internal processes, and reliable metrics, as well as the ability to collaborate with a variety of external partners such as: innomediaries, customers, peers, competitors, or decision-makers.

Through this study, conducted by Hasselt University in Belgium, we aim to:
- unpack organizations' innovation maturity (culture, structure, processes, metrics) and
- identify those aspects of maturity that facilitate a successful and satisfying collaboration with one unique type of partner: the *innomediary.*

The following survey will take approximately 15 minutes to complete, while the information you disclose will be used solely for academic purposes and kept strictly confidential.

Once the data collection is finalized and the input is analyzed, we will provide you with a brief, anonymized, aggregated report of our findings.

Good to know: This survey has been optimized for desktop use. Helpful examples and definitions are unavailable on mobile and tablet devices. Pop-up blockers may interfere with your survey experience. If prompted, please allow pop-ups from this website.

Thank you for your time and we look forward to sharing our results with you soon!

Sincerely,
Oana-Maria Pop
Dr. Angelo Natalicchio
Dr. Diana Rus
Dr. Andreas Zynga

What is a *capability*? Hover over for definition.
What are innomediaries? Hover over for definition.

End of Block: Intro screen

Start of Block: Privacy

A note on confidentiality:

- Your responses will be kept strictly confidential and anonymous
- Only the researchers will be able to see your answers. Even so, they will not be able to connect them to you as an individual
- Participation in this research is voluntary. You can stop your cooperation at any time, and you can ask for your responses to be deleted

May we also ask/ remind you to:

- Please answer all questions honestly and give your own opinion, not that of others
- Read each question carefully as some questions may look similar
- Not use the “Back” button in your browser window - answers are only possible while you are on the page; the survey itself does not have a "<<" ("Back") button either.

On behalf of the research team, we thank you for acknowledging the above and invite you to continue to the survey by clicking “>>” ("Next").

End of Block: Privacy

Start of Block: Exit question

The following question refers to your past or current work with innomediaries.

Innomediaries are intermediaries, consultancies, and agencies helping their clients to accelerate an (Open) Innovation project. Such organizations can typically offer: dedicated tools, methods, access to an established community of solvers/ participants, and even education and process consulting.

Examples include: NineSigma, InnoCentive, HYPE Innovation, eYeka, BrightIdea etc.

E1 Have you worked in the past on a project with an innomediary?

- Yes
- No

E2 Can you refer us to someone that has worked with an innomediary?

- Yes
- No

E3 Please enter the contact details of your colleague or collaborator below:

- Salutation
- Name
- Email
- Organization

E4 Do you have another colleague you can refer us to?

- Yes
- No

E5 Please enter the contact details of your additional colleague or collaborator below:

- Salutation

- Name
- Email
- Organization

End of Block: Exit question

Start of Block: Company information

Excellent. Let's begin. First, we would like to know a few things about your organization.

1. What is your organization's name? (optional)
2. What major industry does your organization operate in?

Please select the one option that applies.
▼ Agriculture, forestry and fishing (1) ... Activities of extra-territorial organizations and bodies. (38)

3. What is the size of your organization in terms of revenue? (in thousands of EUR) - i.e., 0 - 1250 thousand = 0 - 1.25 million

- 0-1250 thousand EUR
- 1251-2500 thousand EUR
- 2501-10000 thousand EUR
- 10001-90000 thousand EUR
- Over 90000 thousand EUR

4. How many employees does your organization have?

- < 50 employees
- 50-99 employees
- 100-499 employees
- 500-999 employees
- 1000-4999 employees
- 5000 employees

5. For how long has your company been in business? (years)

- < 25 years
- 26-75 years
- 76-100 years
- over 101 years

6. Is your company listed on a stock exchange?

- Yes
- No

7. What is your company's experience in working with innomediaries?
Please select the one option that applies.

- Our most recent experience with an innomediary was our first
- We have previously worked with an innomediary
- We have previously worked with multiple innomediaries

End of Block: Company information

Start of Block: Project information

The following questions refer to the latest (most recent) completed project done in collaboration with an innomediary.

What is a project? Hover over for definition.

1. Can you describe the project and its outcomes briefly? (optional)

2. What was the specific nature of the project?

- Staff augmentation
- Internal idea management
- Technology acquisition
- Idea competition/ crowdsourcing
- Technology in-licensing/ patent brokering
- Merger and acquisition
- None of the above (please specify)

3. What was the duration of the project? (in weeks)

4. How many employees from your organization were involved in the project?

5. How many other individuals were involved? (optional)

6. What is the name of the innomediary you worked with?

End of Block: Project information

Start of Block: Maturity - Intro

Onto the next part:

Having the same project (the most recent) in mind, please indicate the extent to which you agree or disagree with the following statements.

The statements refer to the way (open) innovation is managed in your organization and are grouped by four dimensions: culture, structure, processes and metrics.

What is innovation? Hover for definition.
What is open innovation? Hover for definition.

End of Block: Maturity - Intro

Start of Block: Maturity – Culture

Please indicate the extent to which you agree or disagree with them by marking the option that best expresses your opinion.

Note: Read the statements carefully, as some may appear similar.
Climate Please indicate the extent to which you agree or disagree with the following statements.
The following sets of statements refer to your organization's CULTURE.

(Climate)

1. In our organization, new ideas are readily accepted
2. Our organization is quick to respond when changes need to be made
3. Management here is quick to spot the need to do things differently

4. Our organization can quickly change procedures to meet new conditions and solve new problems as they arise
5. Assistance in developing new ideas is readily available in our organization
6. People in our organization are always searching for new ways of looking at problems
7. In our organization we take the time needed to develop new ideas.
8. People in our organization co-operate in order to help develop and apply new ideas

(Learning)

In our organization...

1. Leaders repeatedly emphasize the importance of knowledge sharing
2. We put effort into widely sharing lessons and experiences
3. There is a good deal of organizational conversation around best practices/ lessons learned in the past
4. We generally analyze unsuccessful organizational endeavors and communicate the lessons learned widely
5. We have specific mechanisms for sharing lessons learned from unit to unit or team to team

The following statements refer to cooperation/ collaboration with all your innovation partners and contains two parts:

The first part focuses on innovation partners other than innomediaries.
The second part focuses on innomediaries only.

Please read each statement carefully, keeping the specific partner in mind.

What are innovation partners? Hover over for definition.

(Partner focus)

In our innovation partnerships (with partners other than innomediaries) we...

1. Believe that value is best co-created with partners
2. Actively work with our innovation partners to create joint value propositions
3. Engage in open dialogue with our innovation partners to discover win-win value creation opportunities
4. Proactively search for value co-creation opportunities with our innovation partners
5. Communicate openly with our innovation partners
6. Share resources (e.g., information, tools, processes) with our innovation partners
7. Build trust-based relationships with our innovation partners

(Innomediary focus)

In our innovation partnerships with innomediaries we...

1. Believe that value is best co-created
2. Actively work with the innomediary to create joint value propositions
3. Engage in open dialogue with the innomediary to discover win-win value creation opportunities
4. Proactively search for value co-creation opportunities
5. Communicate openly
6. Share resources (e.g., information, tools, processes) with the innomediary
7. Build trust-based relationships with the innomediary

(Sudden adaptation)

Our organization...

1. Can spontaneously react to changes in our environment
2. Is able to quickly deploy appropriate processes to overcome managerial biases and other possible roadblocks (hover for examples)
3. Is able to discriminate between problems based on their complexity
4. Can easily detach from existing routines when unfamiliar problems arise

(Leadership)

Our leaders...

1. Are committed to open innovation efforts
2. Serve as role models for open innovation activities
3. Communicate the value of open innovation to employees
4. Help employees get on board with open innovation activities
5. Actively support employees with open innovation activities
6. Reassure employees that open innovation is here to stay
7. Help enable open innovation capability building throughout the organization

End of Block: Maturity - Culture

Start of Block: Maturity - Structures

The following sets of statements refer to your organization's STRUCTURE.

Please indicate the extent to which you agree or disagree with them by marking the option that best expresses your opinion.

Note: Read the statements carefully, as some may appear similar.

1. Please indicate whether or not the following practices exist in your organization.

We have a department that manages OI - e.g. stakeholder engagement department

- Yes
- No

This department is a central function - i.e. the opposite would be a decentralized department (embedded in the business units)

- Yes
- No

We have people with "Open Innovation" in their job title.

- Yes
- No

2. Please consider to what extent the following elements are implemented in your organization:

1. A clear division of roles and responsibilities to integrate external knowledge
2. Knowledge gatekeepers (or similar roles)
3. Technology scouts (or similar roles)
4. Processes to adapt external knowledge to development processes

End of Block: Maturity - Structures

Start of Block: Maturity - Processes

The following sets of statements refer to your organization's PROCESSES

Please indicate the extent to which you agree or disagree with them by marking the option that best expresses your opinion.

Note: Read the statements carefully, as some may appear similar.

The following statements refer to your legal and intellectual property management (IP) department or functions.

(IP/ Legal)

Our legal and IP department/ functions/experts...

1. Tend to constructively collaborate with other departments/functions
2. Promote controlled and case dependent IP sharing within and outside the organization
3. Promote trust-based legal and IP attitudes within the organization (hover for example)
4. Tend to be involved in new product development decisions (hover for example)
5. Regularly train people involved in OI activities on IP issues and solutions
6. Focus on establishing win-win contracts with innovation partners (hover for example)
7. Regularly update their practice to meet changing market demands (hover for example)
8. Take a long-term view on managing our IP portfolio, favoring quality over quantity (hover for example)

(Recognition capacity – external scanning)

To what extent does your organization conduct the following activities?

1. Participating in professional association activities (hover for example)
2. Attending scientific or professional conferences
3. Attending trade shows/ industry exhibitions
4. Establishing contacts with researchers at universities
5. Reading specialized journals and magazines
6. Screening the start-up community

(Recognition capacity – Strategic assessment)

In deciding whether to bring external knowledge into the organization, we implement processes and mechanisms for:

1. Evaluating whether the external knowledge fits our internal competencies
2. Verifying the applicability of the external knowledge in market segments
3. Assessing the potential strategic benefits of the external knowledge for our business
4. Assessing unsolicited ideas and knowledge (hover for example)

(Assimilation capacity – Coordinating)

Please indicate to what extent to disagree or agree with the following statements:

1. Our management communicates the benefits of using external knowledge throughout the organization
2. Our employees are encouraged to utilize external knowledge
3. The usage of external knowledge sources is valued in our organization
4. Our company has standardized rewards and the incentive systems for using external knowledge
5. Our employees feel legitimized and empowered to use external knowledge

(Assimilation capacity – Integrating)

Please indicate the degree to which the following elements are implemented in your organization's knowledge management system:

1. A system for the analysis and filtration of solicited ideas/ information (hover for examples)
2. Processes to inform employees of stored information and codification tools (hover for example)
3. Tools to access stored knowledge (hover for example)
4. Fast and easy internal information search tools (hover for examples)
5. Systems for the sharing, dissemination or allocation of external knowledge (hover for examples)

(Network capability)

In our organization we have processes in place that enable us to…

1. Successfully identify and attract a broad range of diverse external partners for collaboration
2. Successfully communicate with external partners.
3. Successfully negotiate with external partners.
4. Successfully build collaboration networks with external partners

End of Block: Maturity - Processes

Start of Block: Maturity - Metrics

The following sets of statements refer to your organization's METRICS.

Please indicate the extent to which you agree or disagree with them by marking the option that best expresses your opinion.

Do you measure OI results?

- Yes
- No

What do you measure? Please mark all answers that apply.

- Budget invested in OI projects
- Speed of OI projects versus innovation projects
- Funding attracted (internally and externally) for OI projects relative to innovation projects
- ROI of OI projects
- Cost of open innovation (OI) projects relative to closed innovation projects
- Revenue from results of OI
- Stakeholders' perspective (branding/ trust) on OI
- Bonuses and promotions directly tied to OI performance
- We measure something else, namely...

End of Block: Maturity - Metrics

Start of Block: Participant information

Finally, we would like to have some information about yourself and your role in the organization. Please note that all personal data will be kept strictly confidential and used solely for research purposes.

1. Please select your gender

- Male
- Female
- Would rather not specify

2. Please select your age category

- < 25 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- >65 years

3. What is your current position? (job title)

4. For how many years have you worked on innovation projects?

5. What is your functional background?

6. May we contact you regarding this survey?

- Yes
- No

Please insert your preferred email address/ phone number

End of Block: Participant information

Start of Block: Exit screen questions

And that concludes our survey.
Thank you once again for participating and we look forward to sharing the results with you soon.

For any questions or comments regarding this survey, please contact Ms Oana-Maria Pop (oanamaria.pop@uhasselt.be) or leave a note in the space below.

Please type in your remarks.
We are grateful for any feedback/ comments you may have on the survey.