



UNIVERSITY OF GOTHENBURG

Platform Thinking

Strategic principles for orchestrating innovation ecosystems in the digital economy

Plattformstänkande

Strategiska principer för att orkestrera innovationsekosystem i den digitala ekonomin

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Abstract

In the digital economy incumbent firms act in increasingly networked environments referred to in this study as innovation ecosystems. To thrive in this new business landscape incumbent firms must employ new innovation strategies and we suggest that incumbents should adopt ‘platform thinking’ to orchestrate their innovation ecosystem. Platform thinking refers to the strategies of incumbent firms that entails exposing their core product or service to external innovators in the innovation ecosystem thereby viewing their core product or service as a platform for innovation. Following this logic, participants in the innovation ecosystem can jointly create a larger value than either of the actors could have on their own. We employed a comparative case study to investigate what capabilities incumbent firms need to develop to leverage a platform in an innovation ecosystem. Our findings indicate that incumbent firms must develop four capabilities; the capability to share resources without specifying the innovation outcome; the capability to capture value from multiple revenue streams; the capability to protect the created value through interdependent relations; and the capability to create generative structures. The theoretical conceptualization of platform thinking constitutes this study’s novel contribution to the platform and ecosystem literature. Furthermore, the study contributes to practice by providing deeper insights into the capabilities that incumbent firms must develop to leverage an innovation ecosystem and thrive in the digital economy.

Abstrakt

I den digitala ekonomin agerar bolag i en allt mer sammankopplad miljö, något som vi i den här studien kallar för ett innovationsekosystem. För att bli framgångsrik i detta nya affärslandskap måste väletablerade bolag anamma nya innovationsstrategier. Vi föreslår här att dessa bolag bör anta ett plattformstänkande för att orkestrera sitt innovationsekosystem. Till plattformstänkande räknas de strategier som används utav väletablerade bolag för att exponera sin kärntjänst eller kärnprodukt för externa innovatörer i innovationsekosystemet. Vid en sådan exponering ser bolaget sin produkt eller tjänst som en plattform för innovation och deltagare i innovationsekosystemet kan gemensamt skapa ett större värde än det värde som någon av deltagarna skulle kunna skapa enskilt. Vi har använt oss av en jämförande fallstudie för att undersöka vilka förmågor som väletablerade företag behöver utveckla för att kunna använda sig av en plattform i ett innovationsekosystem. Våra resultat indikerar att väletablerade företag måste utveckla fyra förmågor: förmågan att dela resurser utan att specificera innovationen på förhand; förmågan att fånga värde ifrån flera olika intäktströmmar; förmågan att skydda värdet som skapats genom att skapa goda relationer; och förmågan att skapa generativa strukturer. Den teoretiska conceptualiseringen av plattformstänkande är denna studies originella bidrag till plattforms- och ekosystemslitteraturen. Denna studie bidrar även med ett praktiskt värde i form av djupare insikter kring de förmågor som väletablerade företag måste utveckla för att unyttja ett innovationsekosystem och lyckas i den digitala ekonomin.

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1. Introduction

In the ever-changing economic environment that currently face firms many have recognized that no firm can act independent of their surroundings (Adner et al. 2013; Jacobides, 2013). No organization can afford to ignore the shift towards a digital economy that fundamentally transforms the business logic and basic assumptions of organizations. Today, technological innovations and new competitors cause sudden, major disruptions that force business leaders to react instantly and re-think their entire structure and identity (Teece, 2012; Utesheva et al. 2015). Disruptions occur with greater intensity in the digital economy than they have ever done in the industrial economy. Consider the rapidness at which the new transportation service Uber established themselves on a global market, causing severe damage to traditional taxi operators, or the speed at which Airbnb acquired a large part of the hotel industry's market share (Weill & Woerner, 2013). Sheffi (2015) argues that the faster it takes for a disruption to occur, the greater harm it will cause established firms. If companies can ensure a quick detection of disruptive technologies or events and have prepared a timely and effective response they will have a greater chance of survival. Chesbrough (2010) points out that this particularly applies to incumbent firms in traditional industries with well-established business models. As these companies were not born in the digital economy they significantly need to innovate their business models in order to stay competitive.

In this study we suggest (in line with previous research) that one way for incumbent firms to protect themselves from disruptions and obsolescence is to collaborate with potential disruptors through what is referred to as *innovation ecosystems* (Adner and Kapoor, 2010; Autio & Llewellyn, 2014; Gawer, 2014; Nambisan & Sawhney, 2011). In the literature, such collaborations have also been referred to as innovation networks (Yoo et al. 2010), business ecosystems (Iansiti & Levien, 2004; Moore, 1993), digital ecosystems (Selander et al. 2013) or bazaars (Demil and Lecoq, 2006). An innovation ecosystem is often governed through a platform and orchestrated by a platform leader who act as a focal actor in the ecosystem (Adner, 2012; Gawer, 2014; Selander et al. 2013).

However, current research lacks the ability to account for how both innovation ecosystems and platforms are developed or evolve over time. Kapoor (2013) claims that we must shed light on how firms actually engage in innovation ecosystems, what actions they take and what challenges they face. In addition we do not know how platforms

impact a firm's competitiveness or innovation practices (Gawer, 2014; Gawer & Cusumano, 2014). When studying platforms many have turned to Apple, Google, Facebook or other digital natives (e.g. Eaton et al. 2015; Gawer, 2014; Ghazawneh & Henfridsson, 2013). As Ritala et al (2013) point out, this is unfortunate since various types of innovation ecosystems must be explored. This is especially true as an increasing number of industries are going through a digital transformation (Karimi & Walter, 2015) which will foster collaborative efforts also in more traditional industries (Chesbrough & Appleyard, 2007). Adner et al. (2013) stress that future research should focus on what particular capabilities are required to become the leader among collaborating firms. Gawer (2014) and Gawer & Cusumano (2014) request an investigation of how these capabilities are developed. Karimi and Walter (2015) call for further research into what capabilities firms need in order to adapt to an ever-changing environment.

As a consequence of the turbulent shifts in the firm's external environment, many organizations face a capability gap that hinders the transformation towards adopting a platform. This means that there is a distance between the firm's current capabilities and the most valuable combination of capabilities available in the new competitive landscape (Lavie, 2006). Amit and Schoemaker (1993) make a distinction between resources and capabilities which we adopt in this study. Accordingly, resources are a firm's assets and capabilities are a firm's competence to leverage those assets. To avoid this capability gap firms must develop or acquire the capabilities needed to thrive in the new environment (Lavie, 2006). Following this logic we suggest that focal firms must develop new capabilities to successfully utilize platforms to govern an innovation ecosystem.

However, past literature gives little guidance in understanding what these capabilities are and how they are developed. Therefore, we combine the platform literature and the innovation ecosystem literature into the concept of *platform thinking*. In doing so, we draw from Sawhney's (1998) original notion of platform thinking where he argues that firms need "to carefully assess what is "core" and what is "derivative" in the values that it stands for, the offerings that it creates, the technologies that it employs, the customer franchises that it controls, and the customer segments that it targets" (Sawhney, 1998, p. 3). Using this view of a firm's core value proposition we suggest that incumbent firms in any industry could adopt platform thinking. In this study, we define platform thinking as seeing your "core products [or services] as platforms that can be exposed to genuinely

new innovation areas for generating complementary products and eventually new revenue streams” (Svahn, 2014, p. 2). The aim of this research is to explore what capabilities incumbent firms need to successfully adopt platform thinking and thus the following research question set out to guide this study:

What capabilities do incumbent firms need to develop in order to leverage innovation ecosystems through platform thinking?

2. Related Work

In the industrial economy value chains are depicted as linear, starting with physical inputs such as raw materials or intermediate products and resulting in intermediate or finished goods or services (Morabito, 2014, Ng, 2014). The industrial economy is characterized by what Vargo and Lusch (2004) refer to as the goods-dominant logic which focus on the manufacturing and distribution of goods. This logic sees the firm as the producer of value and the customer as the consumer of value. As competitive advantage stems from cost minimization and standardization of goods, services are seen as less important as they are heterogeneous, difficult to standardize, perishable and inseparable from customers (Vargo & Lusch, 2004).

2.1. The Digital Economy

There is an ongoing shift from the industrial economy to the digital economy. Today, firms face the challenge of a long product development processes in an environment that has been, and continues to be, transformed by digital technologies (Tripsas, 2009; Yoo et al. 2012). This new economy fundamentally transforms the way firms in all industries create value and gain competitive advantage (Duhăneanu & Marin, 2014; Morabito, 2014). The digital economy is foremost guided by customer demands and offers are personalized to fit individual buyers. The essential input for value creation is digital information and the resulting products and services are based on high information content. In addition, the economic focus of a business in the digital economy shifts from cost reduction to value maximization (Morabito, 2014, Ng, 2014). The digital economy has strategic impact on all firms, forcing them to react with digital innovation and speed to stay competitive (Weill & Woerner, 2013).

Vargo and Lusch (2004) describes this new paradigm as the service-dominant logic and claim that in this business logic the role of a good is to be a foundation for service provision. In this context various parties use their individual expertise for the benefit of all players as there is a mutually beneficial service exchange between all parties that together contribute to the value of a service (Vargo & Lusch, 2004). Value chains are depicted as complex, multi-layered networks rather than chains (Morabito, 2014, Ng, 2014). This context fundamentally alters the underlying assumptions of businesses, e.g. that costs and demand are known to all players in the field or that technology and

innovation are developed inside of firm-boundaries (Pitelis, 2009). Consequently, in the digital economy firms must innovate the way they do business (Teece, 2012).

In addition to altering the competitive business landscape, the digital economy transforms firms’ innovation practices and processes. Due to the scattered nature of expertise and knowledge and the networked nature of technology development, firms can no longer manage their innovation activities solely through relying on in-house resources (Ritala et al. 2013). There is an ongoing shift away from internal innovation practices towards collaborative innovation and R&D. This new innovation focus requires that firms consider actors outside of their organizational boundaries and recognize how internal innovation practices can influence and be impacted by external innovation initiatives (Chesbrough, 2006). One thing is clear moving forward; to stay competitive in the digital economy, firms can no longer innovate in isolation (Adner, 2012; Adner & Kapoor, 2010; Chesbrough, 2006; Selander et al. 2013). To illustrate the differences between the industrial economy and the digital economy, Teece’s (2012) summary of the characteristics of each logic is presented in Table 1.

The Industrial Economy	The Digital Economy
Static Competition	Dynamic Competition
The West and the Rest	A Semi-Globalized World
Industry-level Analysis	Ecosystem-level Analysis
Vertical Integration	Modularization
Transaction and Agency Costs	Firm-level Capabilities
Single-Invention Innovation Model	Multi-Invention Innovation Model

Table 1. Modes of Competition (Teece, 2012)

2.2. Innovation Ecosystems

To understand the business logic of the digital economy, one must look beyond the traditional strategy and innovation literature. A firm’s innovation challenges and competitiveness can no longer be seen in isolation or considered as solely dependent on the firm (Adner, 2012). As a result, firms in all industries are increasingly engaging in collaborative relationships, ranging from initiatives in optimized supplier management to

extended enterprises and ecosystems (Ritala et al. 2013). The term ecosystem was introduced in the strategic management literature by Moore (1993) who drew from ecology in order to illustrate the co-evolution and co-dependence of actors that surrounds a firm (customers, consumers, producers of complementary products and services, suppliers etc.). Innovation ecosystems is a more recent concept (e.g. Adner & Kapoor, 2010; Ritala et al. 2013) which is referred to in this study. An innovation ecosystem is defined as “*dynamic, purposive communities with complex, interlocking relationships built on collaboration, trust, and co-creation of value and specializing in exploitation of a shared set of complementary technologies or competencies.*” (Gobble, 2014:1).

Iansiti and Levien (2004) claim that firms that do not pay attention to their ecosystem ignore the reality of their interconnected environment. Today, a firm’s competitive advantage cannot be separated from the performance of the entire ecosystem which affects how contemporary businesses operate, strategize and innovate (Iansiti & Levien, 2004). Strong innovation ecosystems are productive and robust as they translate knowledge into increased value, thereby becoming almost resistant to disruptions (Autio & Llewellyn, 2014). Nevertheless, most incumbent firms are unable to shift from an internal innovation logic to exclusively rely on external innovation as products such as cars, pills or stoves will remain highly physical artifacts and continuously require economy of scale. Instead, their functions, surroundings and interfaces are increasingly digitalized. Hence, the challenge facing incumbent firms seems to be how to drive innovation forward through managing both internal and external sources while simultaneously overcoming the challenges inherent in an ecosystem structure (Ritala et al. 2013; Svahn, 2014).

A firm can take various positions in these ecosystems ranging from a focal actor (keystone) or non-focal actor (niche player) (Iansiti & Levien, 2004). Peppard and Rylander (2006) define a focal (network focal) as the organization or economic unit (e.g. corporation or division) whose business model relies on the ecosystem under consideration. The non-focal actor (network participant) is included in the focal actor’s networked environment and is directly affected by, or have a direct influence on, the focal actor’s value proposition. In this study we focus on the role of the focal actor. According to Iansiti and Levien (2004) the role of the focal actor is to orchestrate, that is to build and to manage, the innovation ecosystem in order to increase the overall value

creation. Faems et al. (2010) find that there is a positive indirect relationship between firms who innovate in ecosystems and increased financial performance. This is mainly a result of an increased innovation capacity. Iansiti and Levien (2004) also claim that a firm that manage to position themselves as a focal actor will become more profitable. On the other hand, taking the position as a focal actor in an innovation ecosystem and co-creating value with external actors is not easy. This is especially true for incumbent firms as it “requires a new innovation culture, strategic vision, courage, direction, and sense of urgency” (Lee et al. 2012, p. 14). Selander et al. (2013) suggest that orchestration of the innovation ecosystem often takes place through a platform that is provided by the focal actor.

2.3. Platforms

Among digitally born firms there are many examples of focal actors establishing a platform (e.g. Google, Apple and Facebook) to take a coordinating and enabling role in their innovation ecosystem (Gawer, 2014). However, platforms can be utilized to orchestrate an innovation ecosystem in less digital contexts as well. The literature on platforms has long been divided into an engineering view of platforms as *modular technological architectures* and an economic view on platforms as *markets* (Gawer, 2014).

The engineering view focuses on platforms as modular architectures where components can be systematically reused with the goal to facilitate innovation. According to this perspective platforms allow for increased innovation as they provide economies of scope in innovation (where the cost of jointly innovating product A & B is lower than innovating them separately). Modularity is a key characteristic in order to reduce the amount of information that designers or producers need in order to design the modules that enable focal actors to draw from external innovators and re-bundle the modules (Gawer, 2014).

The economic view see platforms as enablers of transactions between one or more agents. Here, platforms are synonym to “two-sided markets” (e.g. Rochet & Tirole, 2003), “multi-sided markets” (e.g. Rysman, 2009) or “multi-sided platforms” (e.g. Evans, 2003; Hagiu, 2014). An essential part of this perspective is the concept of “network effects”. Network effects occur when the value that one group of users or producers can

draw from the platform is either directly affected by the number of users or producers on the same side of the platform, or indirectly affected by the number of users or producers on the other side of the platform (Gawer, 2014).

By combining the literature on technical and economic platforms, Gawer (2014) proposes an integrative framework to bridge the two. An industry platform is defined as a set of resources organized in a common structure from which an external actor, organized in an innovation ecosystem, can efficiently develop their own complementary products, technologies or services. A feature that distinguishes industry platforms from supply-chain platforms is that owners of industry platforms do not necessarily know the identities of the external innovations that generate value through their platform beforehand (Gawer, 2014). In addition, an industry platform is also distinguishable through its enabling position, coordinating two or more groups of actors who benefit from network effects (Cusumano, 2010).

Regardless of how one looks at platforms, platform owners do not only need a platform with technological supremacy. To be able to take advantage of the platform they also need to develop a winning platform strategy and nurture a successful innovation ecosystem (Cusumano, 2010).

3. Platform Thinking

By aggregating the innovation ecosystem literature and the platform literature we have identified four dimensions that an incumbent firm need to master in order to leverage a platform and successfully orchestrate an innovation ecosystem: stimulate value creation in the innovation ecosystem, capture value from the innovations ecosystem, protect the value created in the innovation ecosystem and evolve the innovation ecosystem. These four dimensions make up our theoretical framework (an overview of the building blocks, operationalizations and literature can be found in Appendix A). We collectively refer to a firm's strategies and activities around these dimensions as *platform thinking*.

3.1. Stimulate Value Creation in the Innovation Ecosystem

Compared to value creation in linear value chains there is an increased complexity of value creation in an innovation ecosystem as it is dependent upon the success of multiple actors. Value creation is here referred to as the collaborative processes and/or activities that generate value for stakeholders and customers (Ritala et al. 2013). For value to be created in the innovation ecosystem, a holistic perspective must be taken to reduce innovation challenges in the entire ecosystem. A focal actor can reduce innovation challenges in the ecosystem through the orchestration of non-focal actors and by promoting the overall health of the ecosystem (Adner, 2012). When succeeding to do so the focal actor can co-innovate with external actors through collaboration and co-creation to jointly create more value in the innovation ecosystem than either of them would on their own (Adner, 2012; Lee et al. 2012).

First, the focal actor must provide non-focal actors with sufficient *incentives* to motivate them to participate in the innovation ecosystem (Chesbrough, 2006; Cusumano, 2010; Gawer & Cusumano, 2008; Hagi, 2014; Knight et al. 2015). This can be done by providing either extrinsic or intrinsic motivations (Boudreau & Lakhani, 2009). Extrinsic motivations are external motivations, such as monetary compensation (Boudreau & Lakhani, 2009) or the possibility of future rewards (Hars & Ou, 2002). Intrinsic motivations are non-tangible incentives such as status and reputation, recognition, skills development, altruism or the intellectual challenge (Boudreau & Lakhani, 2009; Janzik & Herstatt, 2008). The more attractive an incentive is to an external innovator, the more likely they are to participate in the firm's innovation initiative (von Hippel, 2007).

One way of providing incentives to external actors is to provide a multi-sided market where external actors can benefit from network effects. To do so, Gawer (2014) argues that the platform owner must ensure an installed base, meaning that one side of a multi-sided market must be large enough to attract the other side(s). The focal actor positions themselves in the middle of the market to simplify the interactions between the external actors (Gawer, 2014), allowing them to create and gain more value than they otherwise could have (Iansiti & Levien, 2004). Gawer (2014) describes two types of network effects: direct and indirect network effects. Direct network effects are when the benefits from a technology is dependent on the number of users of that specific technology. Indirect network effects arise when the participation of group A depends on the size of group B and when the participation of group B in turn depends on the size of group A. As the participation of one side of the platform depends on the participation of the other, a platform owner must often subsidize one of the sides or provide monetary rewards to innovators to ensure their participation before the platform achieves momentum. If the platform owner manages to get a sufficient installed base this will generate a positive feedback loop where both sides will benefit from and continue to innovate on the platform (Gawer, 2014).

Another incentive that a focal actor can provide is to allow for non-focal actors to use their resources to create value in the innovation ecosystem (Adner, 2012; Dahlander & Gann, 2010). This way the focal actor can provide a unique value in the ecosystem that the non-focal actors are not able to create themselves (Iansiti & Levien, 2004). There are numerous examples of internal resources that a focal actor strategically can share with non-focal actors such as know-how, equipment and technology, processes, data, R&D spillovers or access to delivery channels (Adner, 2012; Chesbrough, 2006; Dahlander & Gann, 2010). A focal actor can also provide interfaces to their platform, allowing external actors to draw from the platform's resources to create new innovations. Resources that connect the external actors to the focal actor's platform are referred to as boundary resources and are often exemplified by software development kits (SDK's) and/or application programming interfaces (API's) (Ghazawneh & Henfridsson, 2013). However, in this study we recognize that any artifact (conceptual or physical) that is shared between two or more actors at the border of two social worlds can be regarded as a boundary resource (Star & Griesemer, 1989). As the focal actor shares their resources

with the external actors they provide a shared syntax (Carlile, 2002) and a shared context (Star, 1989) to enable knowledge exchange between their organizational boundaries (Star & Griesemer, 1989). Boundary resources enable generativity, meaning that external actors can develop applications, products or services based on resources provided by the platform without involvement from the platform owner (Zittrain, 2006; Yoo et al. 2010). For non-focal actors to exploit boundary resources, the focal actor must provide a platform with a modular architecture and open interfaces (Ghazawneh & Henfridsson, 2013; Yoo et al. 2010).

Second, firms must establish *collaborative structures* to stimulate value creation. Collaborative structures set out to connect ecosystem participants, simplify interactions and lower transaction costs between them (Iansiti & Levien, 2004). To be able to share resources in a structured way the focal actor can form collaborative communities or competitive markets which can be exploited to reduce their costs of R&D or increase their innovation capacity (Boudreau & Lakhani, 2009). In collaborative communities multiple ecosystem actors pool their innovation capacity to share knowledge, skills and technologies (West & Gallagher, 2006). Communities are suitable when the innovation problem requires cumulative knowledge to find solutions that build on past advances as they are naturally oriented to stimulate collaboration among the external actors (Boudreau & Lakhani, 2009). By developing competitive markets the focal actor allow themselves to pit innovators against each other. This way they do not bear any risk in the early innovation process and they only have to reward the initiatives that they find successful and want to incorporate. Competitive markets encourage more diverse and heterogeneous innovations as contributions can come from external actors from various settings (Boudreau & Lakhani, 2009).

3.2. Capture Value from the Innovation Ecosystem

In contrast to value creation, value capture takes place on a firm-level and concerns how the focal actor restructure their competitive advantage and eventually realize value (financial or nonfinancial) from the innovation ecosystem (Ritala et al. 2013). First, the focal actor can capture value from the innovation ecosystem through their platform by *profiting from transactions* between two or more groups of users, consumers or producers according to the logic of two-sided markets. The focal actor then work to facilitate the transaction and the value of the platform will depend on one side's access to the other

side. Highly successful platforms might even be able to dominate a market if they manage to achieve strong network effects (Gawer, 2014).

Second, the focal actor can *profit from spillovers* that are generated in the innovation ecosystem. These can e.g. be resources, intellectual property or information that are generated inside or outside of the firm and that remains unused in relation to the focal actor's core offer or current business model. These spillovers could be exploited and taken to market in non-traditional ways, e.g. by being transferred to other actors in the innovation ecosystem who can make better use of them (Chesbrough, 2006). This can result in profits from licensing fees or from direct payments. Spillovers, often in the form of infant innovations, can also go to market through spin-off venture companies where they can receive adequate attention in order to mature (Chesbrough, 2006; Morabito, 2014). Examples of non-monetary rewards from spillovers can be the enhancement of internal innovation capacity and knowledge-exchanges with outside actors (Morabito, 2014).

Third, the focal actor can capture value in the innovation ecosystem through developing *new value propositions*. This value can be captured from offering them as complements to the focal actor's core product or service. A complement is profitable to a focal actor as their customers value their core product or service more with the complement than they would have done without it (Brandenburger & Nalebuff, 1997). However, the focal actor do not have the resources to develop complements all by themselves and therefore they need to develop them in collaboration with external actors (Cusumano & Gawer, 2002). Firms often bundle their complementary products so that they can lower the costs for consumers and simultaneously increase their profits as they reach larger markets (Brandenburger & Nalebuff, 1997).

Zott and Amit (2010) add that business model innovation also is necessary to exploit new value propositions as it ensures value creation and value capture. This is also addressed by Zhu and Furr (2016) as essential when viewing your product as a platform. They argue that focal actors have to adopt hybrid business models that allows them to profit from their core while simultaneously co-develop new value propositions that generate independent revenue streams (Zhu & Furr, 2016). This is similar to the multimedia mindset discussed by Karimi and Walter (2015) where they argue that companies must

adopt a strategic mindset that guide their decisions and actions towards viewing their business as a portfolio of different products and services, each with their respective business model and distribution strategies.

3.3. Protect the Value Created in the Innovation Ecosystem

To be able to remain as a focal actor in an innovation ecosystem firms must take actions to protect the value created in the ecosystem. As a focal actor protection takes place on both a firm and an ecosystem level. First, the focal actor need to *protect their position* (Moore, 1993; Gawer, 2014). To be able to do this they must restrict access to the platform by establishing effective governance mechanisms. This includes knowing when to share and not to share the platform and its resources with complementors (Gawer, 2014), the aim being to promote standardization while still remain in control (Moore, 1993). Effective governance could also include knowing when to exclude an actor from the ecosystem, much like Apple excluded Google Maps from their ecosystem as a result of their increasingly threatening position. Platform owners must also balance control with giving away some of the power or value in order to ensure that complementors continue to innovate in ways that have a positive effect on the value created in the innovation ecosystem (Gawer, 2014). If a focal actor tries to exploit the ecosystem by extracting as much value as possible without making their own contribution they will ultimately drain the ecosystem and risk their own competitiveness (Iansiti & Levien, 2004). Hence, it is essential that the focal actor do not only protect their position but also ensures a fair distribution of the value between all ecosystem members (Cennamo & Santaló, 2015).

Second, the focal actor must *protect the ecosystem boundaries* from invasion or envelopment by competing ecosystems that may try to overthrow or take control of parts of the ecosystem (Eisenmann et al. 2006; Gawer, 2014; Moore, 1993). At the same time, the focal actor must also be proactive and hinder external actors from acting in competing ecosystems (Cennamo & Santaló, 2013; Katz & Shapiro, 1994) or engage in opportunistic behavior (Ritala et al. 2013). If an ecosystem is contaminated by opportunistic actions from participants, it may cause innovation processes to be less efficient or make actors leave the innovation ecosystem altogether (Ritala et al. 2013). Keeping actors loyal to the innovation ecosystem can be done in two ways: through control or through relations characterized by trust. One way to exercise control is through ensuring high switching costs which in turn result in lock-in effects (Katz & Shapiro,

1994). Lock-in strategies might include that a platform owner restricts the compatibility of their products or services to complements developed on the platform (Shapiro & Varian, 1999). On the other hand, Boudreau and Lakhani (2009) claim that control rarely is successful in collaborative environments as external actors will only allow it if they are absolutely confident that the focal actor will not exploit their contribution. Instead they suggest that a better way to retain external actors in the innovation ecosystem and avoid opportunistic behavior is to rely on soft mechanisms such as trust, reputation of fairness and relation building. Hence, positive relations with ecosystem actors may provide a protection of ecosystem boundaries that is equal in strength to that of control.

Third, the focal actor must *protect the innovation outcomes* created in the innovation ecosystem from competing ecosystems. Although a first mover advantage create some distance between the firm and its competitors, it is not a guarantee for success (Teece, 1986). Traditionally, the common way to do so is to set up contracts, patents or copyrights that will guide innovation appropriability and protect innovations through exclusive access (Ritala et al. 2013). In contrast, Henkel (2006) argues that exclusivity might not be the best option for a focal actor in an innovation ecosystem as protecting innovation outcomes might not generate the largest profit from the innovation. When open innovation is employed it could be more profitable for a focal actor to offer innovations to the innovation ecosystem for free as this allows for profits to be generated from complements rather than from the innovation itself. Consequently, protecting innovation outcomes might not be as central for a focal actor in an innovation ecosystem as preserving the ecosystem relations (Henkel, 2006).

3.4. Evolve the Innovation Ecosystems

As the focal actor's competitive environment constantly changes they must continuously ensure that external actors create value in the ecosystem and that the entire ecosystem stays competitive (Gawer, 2014; Iansiti & Levien, 2004). First, the focal actor must *expand their innovation ecosystem* by exploiting external innovation capabilities and resources as well as open innovation opportunities that might increase the attractiveness of their ecosystem (Chesbrough, 2006; Huizingh, 2011). This can be done by adopting options thinking, a strategic approach that allows the focal actor to experiment with various innovations and spreading their risk through making minor investments in different opportunities. Thereby, they give themselves the option to identify, develop and

realize new innovations in the future without having the obligation to invest further in an unfavorable innovation (Selander et al. 2013; Svahn et al. 2015). When expanding the innovation ecosystem it is important that the focal actor also ensure that the innovation ecosystem continues to grow in a controlled and strategic way as an unstructured expansion might jeopardize the focal actor's control. Evolution of the ecosystem should therefore be done through carefully balancing the stability of the innovation ecosystem with the incorporation of new innovations (Moore, 1993; Wareham et al. 2014). One way to do this is by creating a business unit that is separated from the core business and only focuses on innovation and finding new value propositions (Christensen, 1997; Christensen & Raynor, 2003).

Second, the focal actor must ensure that they have adequate *incorporation mechanisms* to integrate external innovation into their own innovation processes (West & Gallagher, 2006). This requires internal structures that secure the absorptive capacity of the firm. This means that firm is able to identify what external innovations that are relevant to them and then understand how those innovations can be combined with internal innovations to create an innovation that is suitable and relevant to the focal actor's needs. To be able to incorporate innovations into the organization, the focal actor must also establish an open culture that encourage collaborations with external actors (Chesbrough, 2006). An open culture and the political will of incorporating external innovations was pointed out early on by Katz and Allen (1982) as they investigated the Not Invented Here (NIH) syndrome. The NIH syndrome is referred to in order to describe how R&D teams with little communications with the outside world are more likely to reject innovations that originates from outside of the group to the point where it is likely to harm their performance.

Third, the focal actor must continuously *enhance their platform's performance* in order to evolve the innovation ecosystem. Because the focal actor cannot act on every opportunity alone or create all complements themselves (Cusumano & Gawer, 2002; Gawer & Cusumano, 2008), they have to provide a platform with open interfaces that enable generativity. This way external actors can develop complementary products and services without the participation of the focal actor (Ghazawneh & Henfridsson, 2013; Yoo et al. 2010). Consequently, the focal actor has the opportunity to draw from all the external resources and competencies that are available in the innovation ecosystem (Dahlander &

Gann, 2010). Since the focal actor set out to reduce the innovation barriers of the innovation ecosystem (Adner, 2012), enhancing platform performance should be done in conjunction with the needs of the non-focal actors and thus the platform interfaces should continuously be tuned over time (Eaton et al. 2015). To continuously ensure the creation of new innovations incumbents must incorporate outside innovations into the platform and restructure them so that they can be re-utilized by the external actors. This process is referred to as the generalization and specialization of boundary resources (Henfridsson et al. 2014). By doing so, the focal actor can reduce the complexity for new innovators (Gawer, 2014) allowing them to create even more specialized, niched innovations (Henfridsson et al. 2014).

4. Research Design

Eisenhardt (1989) suggests that case studies are used in order to provide a description, test or generate theory. With our conceptual model we combine the research on innovation ecosystems with the platform literature to generate theory within the field of platform thinking. To do so, a comparative case study with cross-sectional elements was designed. Bryman (2008) refer to this design as studying two or more contrasting cases, using more or less identical methods. The reason for relying on this design is that it allows us to better understand the social phenomenon of platform thinking as its manifestation can be studied and compared across different settings (Bryman, 2008). An overview of the research design is provided in Figure 1.

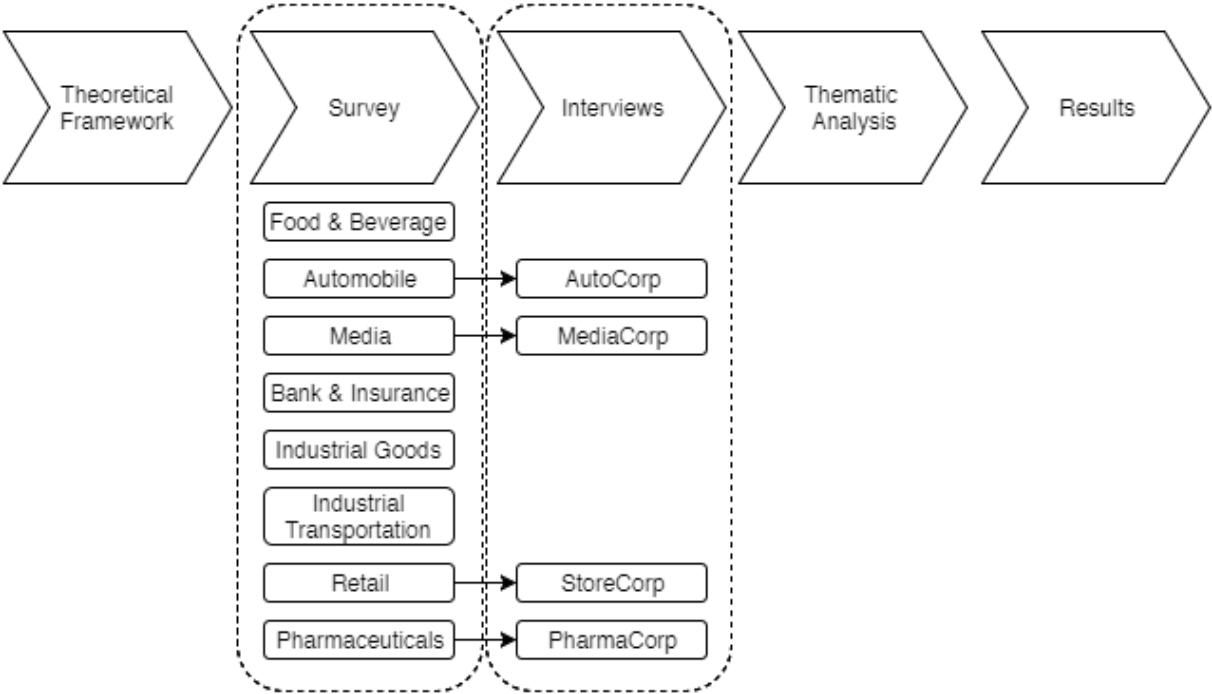


Figure 1. Research Design

4.1. Data Collection

This study relied on a mixed-methods approach for data collection as both a survey and a series of semi-structured interviews were used to address the research question (see Figure 1). The use of multiple sources of evidence is suitable when conducting a case study as it offers a possibility to describe the phenomenon in a holistic and detailed manner (Yin, 2003). According to Bryman, one motivation behind mixed-method research is to *“provide the context for understanding broad-brush quantitative findings”*

(2008:620). Another motivation to use a survey, when the aim is to identify particular categories of cases for semi-structured interviews, is as a basis for further sampling (Bryman, 2008). The approach taken in this study was to use a survey for both these purposes.

As recommended by Eisenhardt (1989), the theoretical constructs (the four dimensions of platform thinking) were the foundations for both the survey and the interview guide, which implies a deductive element. Both of them departed from the theoretical framework that is used in order to provide an operationalization for each dimension of platform thinking (see Appendix A). Departing from these theoretical constructs was valuable because it allowed for a focused data collection and cross-case comparability. However, it also restricts the richness of the empirical material as respondents are not allowed to speak completely without boundaries (Bryman, 2008)

In both the survey and the interviews respondents were asked to answer according to their own perceptions and experiences. This was essential to capture the complex worldview of the respondents. However, the approach might also cause bias as the respondents may have felt inclined to give the answers assumed to be most desirable instead of what they really thought. A second motivation for deterring their answers could be to protect their personal integrity or the integrity of their firm (Bryman, 2008). In relation to the interviews, this bias has been mitigated through interviewing several respondents at the same firm. Overall, measures were taken in order to protect the integrity of the respondents and ensure truthful answers as both the survey and the interviews were anonymous. In addition, the organizations have been made unidentifiable in this study. It was also stressed during the semi-structured interviews that respondents were free to refuse to answer questions and they were given the opportunity to retrospectively review and withdraw their statements (Bryman, 2008).

The survey was constructed to first establish a few basic premises such as if the respondents see their firm as part of an innovation ecosystem and how they perceive their firm's position and role within that innovation ecosystem. Following this, respondents were asked questions to indicate to what extent their firm engages with various activities that correspond to the four dimensions of platform thinking. These activities were identified through the operationalization of the different building blocks (see Appendix

A). Answers were provided according to a four-point ordinal scale: “I disagree”, “I somewhat disagree”, “I somewhat agree” and “I agree”. Respondents also had the option to select “I do not know”. The reason for selecting a four-point scale was to force respondents to take a stand, something that they could have avoided on a 5 or 7-point scale by choosing a “middle way”. For the survey, 50% was considered an adequate response rate as recommended by Bryman (2008). An overview of the distribution of response rates for each industry can be found in Appendix C.

The semi-structured interviews departed from an interview guide (see Appendix D) with open-ended questions that covered the four dimensions of platform thinking. The questions were formulated to ask for concrete examples of how firms work with platform thinking. The interview guide was constructed to provide a foundation and ensure that all dimensions were addressed during each interview. 18 Interviews were held in Swedish or English and the majority of interviews were conducted in person, although a few were held by phone due to long distances.

4.2. Case Selection and Sampling

Due to their different characteristics, eight industries were selected to be included in the pilot study that encompassed a quantitative survey: automotive, food and beverage, media, bank and insurance, industrial goods, industrial transportation, retail and pharmaceuticals. An overview of the industries and their varying characteristics can be found in Appendix E. To identify respondents a sampling process was conducted in the following manner:

1. To identify Swedish incumbent firms, the 500 largest firms in Sweden were set as the sample population. The list was based on the incumbents’ turnover for 2013, (Sjögren, 2014).
2. The incumbents were divided into industries according to the definitions used in the Industry Classification Benchmark (ICB, 2012).
3. The 20 largest firms in each of the eight industries listed above were selected as the sample. A few of the selected industries did not comprise of 20 firms that were on the top 500 list. Therefore, the final sample only consisted of 140 firms across the eight industries.

4. Snowball sampling (Bryman, 2008) was used to identify respondents with adequate roles. Hence, respondents were identified through referral networks and through personal and recruiter accounts on LinkedIn. The respondents were required to hold senior or managerial positions within the following functions: 1) Innovation/R&D, 2) Business development or 3) Digitalization/IT.

As argued above, the purpose of the survey was to establish to what extent firms perceive that they work with the four dimensions that make up platform thinking. The two industries with the highest self-estimation scores (automotive and media) and the two industries with the lowest self-estimation scores (retail and pharmaceutical) were investigated further with semi-structured interviews (see Figure 1). Do note that food and beverage actually scored higher than both automotive and media on the self-estimation score (see Appendix C), however, that industry was not feasible to investigate as we were not able to identify adequate respondents that wanted to participate in the study.

This case selection strategy is what Eisenhardt (1989) refer to as ‘polar types’ and it is used to ensure a diverse sampling. As subjects for this study were strategically selected to represent particular types with varying characteristics, a purposive sampling technique was used (Bryman, 2008). The sampling strategy and technique ensures that firms and respondents are all selected based on their relevance to understanding platform thinking in multiple contexts (Bryman, 2008). This was desirable as the study set out to identify the incumbent’s capability gaps across industry boundaries.

When four industries with polar positions had been identified, one organization within each of the industries was selected with the objective to exemplify incumbents within that particular industry. These four organizations make up our investigated cases and are presented further in Table 2. The cases are considered to be exemplifying cases as this study is not particularly interested in the individual organizations per se, rather, the cases act as examples of organizations operating in the particular industries (Bryman, 2008).

Media	MediaCorp is one of Sweden's largest commercial TV stations with their main TV channel as their core product. In addition, MediaCorp owns several niche channels and air their content through both traditional and digital media.
Retail	StoreCorp is one of Sweden's largest food retailers. Grocery stores is the firm's core service, but their portfolio also comprises of businesses offering a range of complementary services.
Pharmaceuticals	PharmaCorp is a Swedish pharmaceutical firm active on a global market. The firm conducts discovery, manufacturing and distribution of prescription drugs and has established an innovation hub in one of their Swedish sites.
Automotive	AutoCorp is one of the largest car manufacturers in Sweden. The firm designs and manufactures passenger cars for a global market.

Table 2. Description of Cases

Interviews were conducted with 18 respondents in total, four or five from each firm. The respondents that participated in the interviews (see Table 3) were selected using the same method (snowball sampling) and the same criteria (holding managerial or senior roles in innovation/R&D, business development or digitalization/IT) as was employed for the survey.

Firm	Respondent	Role	Firm	Respondent	Role
MediaCorp	M1.	Business Development Director	PharmaCorp	P1.	Innovation Hub Manager
	M2.	Business Developer		P2.	IT Strategist
	M3.	Digital Strategist		P3.	Patent Advisor
	M4.	Business Strategist		P4.	Innovation Manager
	M5.	Product Strategist		P5.	Open Innovation Manager
StoreCorp	S1.	Business Strategy Director	AutoCorp	A1.	IT Director
	S2.	IT Manager		A2.	Innovation Manager
	S3.	Digital Strategist		A3.	Service Manager
	S4.	Business Strategist		A4.	Strategy Director

Table 3. Overview of the respondents' roles

It is important to note that relying on snowball sampling as a sampling method can be problematic as the gatekeepers that have recommended respondents may be biased in their selection of respondents, or in other ways influenced the respondents that this study was given access to (Bryman, 2008).

4.3. Analytical Method

A thematic analysis was conducted to make sense of the data collected during the semi-structured interviews. The analytical process followed a series of steps and began with transcribing 17 of the recorded interviews in their original language. One interview was documented through notes taken by the interviewer. The translation of quotes to English was done last in the process to avoid losing respondents own expressions and the underlying meaning of words in the translation.

When the raw data was in place the coding phase was initiated. Coding was done using the data analysis software Nvivo. The codes were built on the theoretical framework and the process followed a set of coding rules. Throughout the coding process check-coding was employed. Miles and Huberman (1994) refer to check-coding as the process when two coders code the same transcripts and then go through any disagreements. Disagreements indicate that the coding framework may have flaws that need to be managed. Spending time on check-coding is a way to maintain definitional clarity and to ensure reliability. Both investigators coded the first transcript together in order to talk through the framework and solve any initial misconceptions. Based on insights from the first round of coding the codes were slightly revised. After the initial round, check-coding was conducted in two sets: in the second round, four transcripts were coded by both investigators and checked. Slight modifications were made to the coding framework as a result. Then, in the third round the rest of the transcripts were coded and checked as well. As the entire material was check-coded in this study the authors have ensured maximum definitional clarity.

A thematic analysis was initiated when the empirical material had been assigned codes. During the thematic analysis the investigators went over all the codes again to identify patterns that emerged. Codes and text segments were grouped and regrouped into themes and new names were assigned to some of the codes to better reflect the language used in the empirical material, indicating a complementary inductive component. When each individual case had been investigated a cross-case analysis was made to identify similarities and differences between the cases with the aim to establish a rich understanding of the studied incumbents' capability gaps in relation to platform thinking (see Table 4).

5. Results

In this section the results from the data collection are presented. Initially, a selection of the survey results is displayed to provide a context to the results of the qualitative interviews. After this the interview results are presented to illustrate how the incumbents actually work with the four dimensions of platform thinking. The findings that support emerging platform thinking among the studied incumbents are summarized in a table at the end of this section in order to provide an overview (see Table 4).

The results of the survey showed that a majority (91%) of the investigated incumbent firms see themselves (agrees or somewhat agrees) as a central actor in at least one ecosystem. In these ecosystems a majority of the surveyed incumbents claim that they share internal resources with the external actors (69%), enable external actors to develop new products and services that complement their existing offer (77%) and encourage them to do so (73%). The motivations for doing so are to increase the incumbent firms' internal innovation capacity (85%) and/or lower the costs of R&D (67%). On the other hand, only half of the studied incumbents (49%) claim to provide incentives, monetary or non-monetary, in order to attract new external actors. The investigated incumbents also claim to enable interactions between two or more external actors (80%) but only 48% profit from such coordination. A majority of the studied incumbents also have strategies to ensure that their position in the ecosystem is not challenged (62%) and to ensure that the external actors stay loyal to the ecosystem (77%). Only around half of them (54%) have established mechanisms to protect the innovations created in the ecosystem.

Put together the results from the survey show that a majority of all respondents agrees or somewhat agrees to most statements. This indicates that a majority of the Swedish incumbents perceive that they have adopted platform thinking to some extent. We will now go on to explore in detail how the studied incumbents work with platform thinking and what the motivations are for doing so.

5.1. Stimulate Value Creation

Respondents from every investigated firm perceive that they have something that naturally incentivizes external actors such as brand value, market reach or industry experience. Despite this, the studied incumbents struggle to actively and consciously provide incentives to attract external innovators. The Digital Strategist argue that

StoreCorp does not do enough to make themselves attractive to external actors. In the interviews with StoreCorp, no evidence was found that the firm provide incentives in the form of sharing boundary resources or that they have established collaborative structures to allow for smooth cooperation with external actors in the innovation ecosystem.

Respondents from AutoCorp, PharmaCorp and MediaCorp say that their firm share boundary resources with external actors which indicates a shift towards increased collaboration with external actors and signs of emerging platform thinking. However, respondents from every firm address that there are great challenges in doing so and the degree to which they engage with these initiatives varies a lot. Being a R&D company, PharmaCorp share its knowledge and research insights in the form of clinical compounds through an open innovation portal. These are resources that external researchers can use at no (or very low) cost to advance their own research. AutoCorp provides temporary digital car keys to service providers, thereby allowing them to deliver goods directly to AutoCorp's cars and provide services directly to AutoCorp's installed base. This is an indication that AutoCorp view its core product (the car) as a platform that they can expose to innovation by providing boundary resources that allow external actors to innovate on it.

Among the firms, sharing resources such as information and data was identified as an area with huge potential but there are only a few examples where the studied incumbents currently manage to let external actors exploit their information. The Service Manager at AutoCorp provides an example where their cars share information on road conditions to allow for better road maintenance. Sharing such information is also recognized by the IT Director as essential to be able to generate novel innovations. At MediaCorp, the Business Development Director describes that the firm has had hackathons where data on consumer behavior have been provided to the participants. At the same time, sharing boundary resources is not considered very effective.

I have always said that if you would open the doors to our firm and let 15 entrepreneurs from different areas loose, there is a huge amount of assets they could grab and start building from. On the other hand, during my time here I have learned that nothing comes out of it. These great things, the

synergies, the interchanges, nothing comes out of it if we don't have a rock-solid buy-in.

Business Development Director, MediaCorp

When it comes to sharing API's, there is a difference in opinion both across and within the investigated incumbent firms. Since the media industry is characterized by copyrights and other proprietary protection mechanisms, the Business Developer and the Product Strategist both argue that such an open approach would be impossible at MediaCorp. Respondents from StoreCorp (S3) and AutoCorp (A3) both agree that providing API's is an area with great potential. The Digital Strategist from StoreCorp says that this could be a way to raise the quality among prospecting external actors that approaches them with innovations. However, sharing API's is argued to be complicated among the firms. This is mostly due to security aspects, although, at AutoCorp there are also other aspects that hinder them from providing API's to external developers.

The reason for not opening up is about maturity, both from our side and from the developers. Technically, it's possible for us to open up and let others build services connected to our cars but the maturity of the developer community just isn't there yet. It isn't as easy as taking an app that works on your iPad and put it in a car and think that everything will run smoothly.

Strategy Director, AutoCorp

In each of the studied firms respondents understand the importance of an installed base in order to trigger network effects and attract external actors (be it user groups or developer communities). AutoCorp, StoreCorp and MediaCorp all take measures to maintain their installed base. AutoCorp set out to build their own installed base around one of their core business areas. According to the Service Manager, digitalization has altered the competitive conditions as they have a higher take rate on connected cars than their competitors. Therefore, their installed base of connected cars provides a unique competitive advantage where the indirect network effects attract external actors to create digital services around the cars in collaboration with AutoCorp. Respondents from StoreCorp express that it is vital for them to maintain their installed base of customers and that they extend their offer with health services and coffee shops in the stores in order *“to ensure that a sufficient stream of visitors choose to shop at our stores”* (S1).

MediaCorp employ a similar strategy to maintain their installed base of content consumers as they extend their offer with additional content e.g. on social media.

In addition, both MediaCorp and AutoCorp tap into already existing ecosystems when it comes to areas outside of their core-competence.

For example, even if we would build an AutoCorp App Store, even if it was the best App Store in the world, the developer communities might not be interested in building services to that platform anyway [...] You would have to build a platform that attracts developers, otherwise you'll end up building every business service yourself anyway.

Strategy Director, AutoCorp

Respondents from MediaCorp describe that they have other reasons to utilize someone else's installed base: users want high quality content and they want to be able to consume it seamlessly across platforms. Therefore, MediaCorp distributes their material on several popular platforms and focus on creating high quality content, the downside being that *“we give our competitor lots of user data that we don't have access to and we know that user data is highly valuable both today and in the future”* (M4). On the other hand MediaCorp has managed to establish a large installed base (although mediated) of social media followers which they successfully use to attract viewers back to their traditional media channels. Such features indicate emerging platform thinking where the incumbents under investigation focus on providing a unique value and build an ecosystem around it while simultaneously tapping into existing platforms in areas where they do not have a competitive advantage.

When it comes to establishing collaborative structures, the Patent Advisor and the Open Innovation Manager both describe that PharmaCorp utilizes innovation challenges to attract external innovators that contributes with ideas or research. These challenges can be categorized as competitive markets where PharmaCorp stimulates value creation through pitting external actors against each other. There are incentives for the external actors to participate in these competitive markets as the winners of these challenges are rewarded with cash prizes or offerings of partnership. PharmaCorp has also established a collaborative community in the shape of an innovation hub. In the hub, smaller companies can collaborate and co-innovate both with each other and with PharmaCorp.

The Innovation Hub Manager says that the external companies' competencies blend together in information asymmetries to create a unique innovation environment where PharmaCorp is able to facilitate collaborations. Several incentives are provided to encourage external actors to innovate, the Innovation Hub Manager explains: "*the external actors can use our human capital and the infrastructure that we have here*" (P1). This can both excel the innovation capacity of the external actors and lower their operational costs.

There are costs you get for doing something wrong. A lot can be gained if we can avoid that and ensure that you do the right thing. The other thing is that we try to lower the barriers for the companies. For example, if someone is about to do an experiment and needs a hammer and we have three hammers, and it is possible to loan them the hammers, we will do that. The hammer doesn't break just because you hammer one more nail.

Innovation Hub Manager, PharmaCorp

There are also examples of other forms of collaborative structures. Respondents from both MediaCorp (M1) and AutoCorp (A2) say that they facilitate workshops where they collaborate and share knowledge with external actors. Even though these initiatives have characteristics of collaborative communities they tend to be one-time events rather than ongoing efforts. The respondents (M1 & A2) describe that the external actors often are driven by intrinsic motivations and that they are happy to join these initiatives because it is an opportunity to meet new people, learn new things and solve problems together.

There's a common agenda but everyone provides insights from different angles and that's what's interesting about these discussions. Those are the incentives, you don't get any specific out of it other than, hopefully, a widened perspectives and new ideas.

Business Development Director, MediaCorp

Even though respondents from AutoCorp, MediaCorp and PharmaCorp exemplify that they have established collaborative structures where they collaborate with external actors, a majority of those collaborations are still done in traditional customer-supplier relations. This seems to be especially true in StoreCorp where no signs of collaborative structures have been found.

We are definitely part of an ecosystem but it's not really an even relationship.

We are the client and they are suppliers. It's more that we buy a service.

Business Strategy Director, StoreCorp.

5.2. Capture Value from the Innovation Ecosystem

Even though most of the studied incumbents have established some collaborative structures, incorporating external contributions seem to be problematic and might require a shift of mind.

We don't do that [draw from user-generated content] because we're in a position where we provide more qualitative, or non-user generated, content. But of course there is a lot of to gain from involving and engaging the users in the digital transformation. You shouldn't underestimate it but we have to ask ourselves if that's the position we should take? And if we do, should we mix [our content] with yours? How is that going to work?

Business Developer, MediaCorp

StoreCorp and MediaCorp display elements of platform thinking as they capture monetary profits through enabling transactions between a two-sided market. The Business Strategist at StoreCorp recognizes that the store can be seen as an economic platform as they profit from offering a marketplace where wholesalers or producers can offer their products to consumers. MediaCorp also has a long tradition of acting as a broker in a multi-sided market and the firm captures value from transactions mainly in three ways. First, they charge advertisers for displaying ads to content consumers. Second, they have established a talent network where they act as mediators between social media profiles and advertisers and charge for their coordinating efforts. Third, MediaCorp receives commission for selling third-party products that are advertised in its productions through the web shop. AutoCorp's initiative with the digital key is also an example of an innovation where profits are generated from transactions as AutoCorp charges the service provider for the right to deliver goods to the drivers' cars.

Respondents from the studied incumbents also express that they try to capture value from the innovation ecosystem by profiting from spillovers that are unused in relation to their core offer. During the interviews, both financial and non-financial profits were

exemplified but StoreCorp and MediaCorp struggle to be able to turn spillovers into profits. StoreCorp recently developed a new initiative where it is able to exploit spillovers (customer data) and sell it to producers. The challenge lies within turning the large volumes of raw data into insights. *“The least of our problems is if we will be able to charge the suppliers for the data. [...] This is information that we own and they want”* (S1). MediaCorp has not been able to exploit spillovers yet. A respondent claim that the difficult part is to localize them and expresses that *“everyone understands the potential but we have a long way to go”* (M3). Respondents from AutoCorp do express that they capture value from sharing spillovers (information on road condition) in terms of brand value but that it is difficult to know what type of customer data that is legitimate and ethical to commercialize. Respondents from every investigated firm have addressed such issues.

The authorities would like to know the route people drive and technically we could identify how a specific car is driven from this to that street but then all of a sudden we would be able to identify people’s identities. We have a large internal resistance against compromising our customers’ integrity like that - while other types of information, such as road condition, might be possible to share.

Service Manager, AutoCorp

PharmaCorp is the only organization identified that currently gain monetary profits from spillovers (clinical compounds): *“we do have two examples where we have been able to out-license compounds”* (P5). Nonetheless, their Patent Advisor argues that the compounds are freely available and that the aim of their open innovation initiatives is largely to strengthen their reputation, something that eventually might lead to an increased income. Another respondent from PharmaCorp further discusses these non-monetary values.

We would not be able to use it [the spillovers] anyway. If someone else can use it we are happy to share. By doing so, we can create a larger value for everyone involved and collaborating with other scientists also creates value for us internally. [...] We are able to tap into cutting-edge science wherever it

is happening and we are able to access people with unique expertise that we may not have within our organization. That is difficult to put a price on.

Open Innovation Manager, PharmaCorp

PharmaCorp also captures value from spin-outs of infant innovations that they do not have the opportunity to develop within the organization. This indicates that PharmaCorp has initiated discussions of how to capture value from spillovers and adopt platform thinking.

Furthermore, each of the investigated incumbents recognizes that their traditional business models are challenged by digitalization. As an example, a respondent from StoreCorp speculates about online retail aggregators where customers in the future could purchase whatever they need, including food, through a single website (i.e. much like Amazon.com).

It might be like this; let's say that in five years, 20% of all grocery shopping is done online. What would be different for us in such a world? What do we have to do to stay relevant, keep our market shares and hopefully increase our business?

Business Strategist, StoreCorp

In each of the investigated firms, new value propositions that have been bundled as complements to strengthen the firm's core product or service have been identified. These have been developed as a response to an increasingly competitive landscape characterized by a service-dominant logic. In addition to the digital key, AutoCorp has developed a new infotainment platform that is included when their customers purchase a larger entertainment equipment. *"Building complements is not primarily a source of revenue for us [...] it is more about creating an attractive product"* (A4). StoreCorp has complemented their core offer by adding new services in the stores such as health check-ups and coffee shops. These services do not generate revenues by themselves; *"at best, we break even [...] but if we can strengthen our position and get another percent of visitors to walk into our stores that would generate revenue"* (S1). Extending MediaCorp's content into social media has also created an increase in the consumption of their core service: *"it is a completely new kind of involvement so this has really contributed to the consumption of our core service"* (M3). Respondents from

PharmaCorp also discuss how complements have the ability to create significant value for them by strengthening their core product.

If we create a brand that attracts market shares through creating solutions that ensure that patients stay on their treatments, take their medicine as they should etc. - that will show up on our bottom line. So it is really clear to us, it's a short way to value creation. Our digital complements do not need to be profitable by themselves which is a great advantage.

IT Strategist, PharmaCorp

This indicates that PharmaCorp sees their medicine, the pill, as a platform to which complementary services can be developed. Similarly, there are signs of MediaCorp exploiting their content (their core service) as a platform when they build additional services around it. However, respondents have not explicitly referred to these activities in terms of a platform. As far as developing hybrid business models and profiting from multiple revenue streams, all of the studied firms express that this is a pressing issue. This is especially true at MediaCorp since the firm has seen a drastic drop in advertising revenues lately.

I do not think that we should enter the spice industry, we certainly shouldn't, but we shouldn't let go of that business either. Historically we have been able to ignore those revenues because we did not have a reason to get out of bed for those smaller businesses. However, if we look ahead the situation will be different.

Business Development Director, MediaCorp

As a response to the new business climate MediaCorp has developed new types of services that allow advertisers to draw from the large group of followers they have on social media. This is a type of revenue stream that they have not had before. Another new type of revenue stream that MediaCorp developed lately is complements connected to a few particular strategic areas.

We also have a web shop connected to our food concept where one can buy [third party] cooking and baking gadgets. That is also a revenue stream that we focus on. We discuss how we can extend this with additional services that

increase the value of our core service but it might also generate new types of revenues.

Business Developer, MediaCorp

The respondents realize that these investment might not be very significant on their own, instead they argue that a number of such investments could make up for the decreasing profit from their core business; *“To us, it’s all about having a digital business that’s large enough when our core business totally drops”* (M5). This indicates a shift at MediaCorp where multiple revenue streams are seen as a way to stay competitive but so far these new value propositions have only generated only moderate revenues. The same trend can be recognized at AutoCorp as their initiative with the digital key, a solution that charge service providers for their access to drivers, is far from profitable.

We have covered most of the costs because of the brand value and we have had the service-providers cover some of the costs, however, currently we do not even have the means to charge the end-customer for the transaction.

Service Manager, AutoCorp

Driving new revenue streams is challenging and both AutoCorp and StoreCorp agree that it takes time to show results. StoreCorp has recently started their initiative around sponsored recipes where producers and wholesalers pay to get their product featured. However, the firm has not been able to realize any larger revenues from this initiative. MediaCorp’s Business Developer argues that it is a big challenge for an incumbent firm to find new revenue streams to replace a potential loss in the core business. A respondent from AutoCorp also addresses this insecurity.

“I think it’s a big risk for us to take on other roles right now [...] We want to protect the core business and sell cars rather than go into the unknown where you don’t know how anything is going to play out”.

Service Manager, AutoCorp

There are also political challenges related to the shift from a core revenue stream to multiple revenue streams. Respondents from MediaCorp give an example of how they have started to charge consumers of their content directly through subscriptions. However, such new revenue streams cannibalize on both AutoCorp’s and MediaCorp’s

distributors which is conflicting as they are still essential in order for the firms to reach many of their end-customers. In MediaCorp there is a dire need to pursue new revenue streams, however, the initiatives that are exemplified are not very mature and have barely been commercialized: *“finding new revenues from the end-customer is a focus for MediaCorp, but we haven't really gotten around to it.”* (M3).

5.3. Protect the Value created in the Ecosystem

The Innovation Manager at AutoCorp argues that: *“it is pretty hard to knock out the traditional car industry. We have a footprint that stretch around the globe and it is pretty complex to manufacture a car.”* In addition, when asked about how they view competition from non-traditional actors, respondents from several of the investigated incumbents express that they are not worried but rather see this as an opportunity to collaborate.

If they [Apple or Google] succeed with something that might overlap with what we do, I would consider it an opportunity rather than a threat. [...] We could definitely cooperate.

Innovation Manager, PharmaCorp

Non-traditional actors are not seen as threats to PharmaCorp as they lack the unique industry competences that are necessary for them to truly become competitors. Despite these optimistic reflections some of the respondents are uncertain about how their firm's position might change due to digitalization. They express signs of draining value from the innovation ecosystem as a response rather than to distribute it among ecosystem actors.

We do not know if we are going to collaborate around the digital revenue streams [with our complementor]. Until now we have tried to keep the revenues to ourselves [...] but there is certainly a risk that we will become competitors in the digital space or that they will want a part of our profits.

Business Strategist, MediaCorp

All respondents from StoreCorp argue that the physical store is facing increased competition from online competitors, an area where they have initiated a response by starting their own online alternative. Similarly, MediaCorp has tried to develop new

business areas themselves but in doing so they also tend to move away from collaborations all together.

One strategy that we try to employ around this new strategic area is to keep the system closed. We develop the complementary services in house and own the platform and the web shop ourselves.

Business Development Director, MediaCorp

Furthermore, respondents from every firm express that it is very important for them to make strategic decisions about who they share their resources with to ensure that their investments of time and resources are able to generate value and to mitigate any risk of reputational damage. The Open Innovation Manager from PharmaCorp conclude that although the compounds are open for anyone to use they “*only initiate collaborations with researchers that we are confident have the ability to achieve what they set out to do.*” Hence, there are processes where PharmaCorp judge the relevance and feasibility of the collaboration and consider if the external innovators have the capabilities to carry out the project. These principles can be considered as having governance mechanisms in place.

Respondents also indicate that they have established switching costs and lock-in effects in some ways. The Business Strategist at StoreCorp expresses that they have an advantage thanks to their customer loyalty programs and extensive services. Brand value and customer loyalty is seen as the foremost way to hinder customers from leaving the ecosystem. The Business Strategist at MediaCorp also claims that they fend off competitors through their customer relations: “*We have a position and dialogue with our customers that is strong enough to handle that competition*” (M3). Ensuring loyalty from their customers is thereby done by providing a unique value in the innovation ecosystem.

We have an advantage against Netflix or Youtube [competing ecosystems]. There is certainly Swedish content on Youtube but that's of another character. Netflix is really good for TV series but it's mostly American series. So that [providing Swedish content] is a way to, perhaps not protect, but to keep our strong Swedish position.

New Business Developer, MediaCorp

Respondents from both PharmaCorp and AutoCorp express moderate arguments that ecosystem relations might be a way to protect their ecosystem boundaries. AutoCorp suggest that because they have managed to establish relations with external innovators around the digital key this can work as a protection from competition in the future. At PharmaCorp there is an outspoken focus on ecosystem relations built on trust.

We are building a very strong relation to these firms [collaborators]. Therefore it would be a failure if we couldn't indirectly exploit the fact that we have an established relationship and get an advantage the day they are looking for a partner. We have already seen that it pays off and that is just pure decency, not a requirement we put on them. [...] It builds on trust, good relations and goodwill from both parties.

Innovation Hub Manager, PharmaCorp

But as important as strong relations might be, respondents from every incumbent in this study express that they heavily rely on legal protection of their innovations.

We will be fearless in ensuring that no one gets access to our properties [...] [our competitors] will never be able to use our properties but I think that one should be open to collaborations and investigate how we could move forward together towards new revenues.

Business Development Director, MediaCorp

A respondent from MediaCorp notices the changing nature of how incumbents can no longer protect their innovation outcomes through exclusivity. This notion of non-exclusivity implies that there is an understanding for the idea that protecting your innovations might not always be what is most profitable.

I don't think that we can hide our business secrets any longer, those times have passed. Now it is more about copying everything you see and make something really good out of it that benefits your own product.

Product Strategist, MediaCorp

Several respondents reflect that it might not be possible to protect your firm position, ecosystem boundaries or innovations through exclusivity any longer. Even so,

PharmaCorp and AutoCorp are the only ones arguing that the solution might be to focus on trust and ecosystem relations as a mean of protection.

5.4. Evolve the Innovation Ecosystem

Respondents from each firm claim that they work with screening their environment for new opportunities to expand their ecosystem. In every firm there is some sort of innovation group, innovation forum, innovation network or similar that works more or less exclusively with identifying new opportunities. These groups work a little differently across investigated firms but are generally a standalone unit with resources and mandate to experiment with new ideas. This allow them to focus on evolution through finding new value propositions while the core business at the same time can focus on stability.

A company needs to have both, you can't just have a top-down approach. From the top you need to focus on the core business and rely on these stand-alone units [for innovation] to be successful. It's an important part of innovation and value creation.

Innovation Manager, PharmaCorp

Another way to create new value propositions is to integrate external and internal innovation. Respondents from MediaCorp (M2) and AutoCorp (A2) discuss this. MediaCorp currently investigate how the firm can integrate virtual reality technology with their core offer to create new innovations and user experiences for their content consumers. AutoCorp initiated a collaboration with a start-ups where they integrated a programmable hardware with their smart-phone application to allow drivers to control their cars remotely. To be able to utilize such new technologies the studied firms collaborate with tech-firms or smaller startups. However, in most cases the incumbent firms in this study hire consultants or acquire companies with particular skills that they lack internally.

Respondents from each of the studied incumbent describe that they, through their search efforts, have identified some areas they that the firm wants to exploit through a more strategic approach. Respondents from MediaCorp (M1 and M2) describe that they have selected a few areas where they would like to build ecosystems. These areas might not be profitable today but could offer new sources of value in the future. As an example, they have invested in a company providing a smartphone app that can be used by local sport

teams and communities. Respondents from PharmaCorp express that they invest moderate sums in the development of infant innovations that might be profitable to the firm in the future. Examples of such investments could be the sponsoring of a PhD student (P4) or funding to interesting projects identified through the innovation challenges (P3). At StoreCorp the IT Manager says that they elaborate with new technologies and products to see how they can exploit them and to learn for future projects. Of these explorative projects one out of three might actually be successful, an approach that can be tricky at an incumbent firm that often requires a strong business case in order to allocate resources.

You know how it is in large companies, they want a business case to know how they can benefit from this. Sometimes I have to do an inverted business case and ask: how much will it cost to not do this? It will cost us an enormous amount of money, we will have a slow start and we will have to spend a lot of money in six months just to catch up. It is better to do it now. Sure, it will cost us some money but so what?

IT Manager, StoreCorp

The IT Manager from StoreCorp says that such initiatives are as much about the learning process and creating a solid foundation for the future as they are about actually producing new products or services. This way they can realize innovations much faster in the future when they might have the need to. These initiatives, found at multiple firms, indicate some level of platform thinking as the studied incumbent firms show signs of options thinking when they invest in opportunities that have an uncertain outcome but allow them to have a variety of options in the future. Nonetheless, working with options thinking might be easier said than done.

There is an inherent conflict between the growth that is necessary for incumbents to evolve and the stability required to still operate their core business. The New Business Developer points out that MediaCorp cannot do everything, the new initiatives still have to relate somewhat to their core business. This way, they can exploit their competitive advantages from their core in new settings. The Business Strategy Director from StoreCorp also addresses the challenge of finding a balance between doing something very good and doing new things. This balance is also a challenge for AutoCorp:

We cannot act on every possibility, we have to draw the line somewhere. We have been doing some things that might be close to crossing the line but that also depends on how you look at it. In what perspective are we thinking? The things we do right now might be suitable for AutoCorp in five years, they might be a part of the product or the service offer, but today they aren't.

Innovation Manager, AutoCorp

Although several of the studied incumbents are able to identify innovations outside of their organizational boundaries, all of them lack absorptive capacity and the adequate structures to fully manage inbound innovation. The Patent Advisor says that PharmaCorp has these structures established in one part of the firm but that they lack them in other areas. Among the investigated firms these structures are identified as essential to be able to incorporate external innovation and deliver new value propositions to their customers. *“I think that we could be better at opening up [to collaborators], but that also requires that there is a structure and organization that can handle what gets through in a good way”* (M2). Respondents from PharmaCorp and AutoCorp (P4 and A2) say that they try to influence their firm's culture by presenting positive results from small innovation initiatives to create a positive attitude towards innovation.

There is however one large challenge to overcome even if the studied firms are able to establish structures to incorporate and manage inbound innovations. A vast majority of the complementary innovations the investigated firms utilize today have been developed in house or in traditional supplier relations. This means that the studied incumbents do not exploit innovation ecosystem the extent suggested by platform thinking. Respondents from several firms express that their firm must be engaged in the innovation processes somehow: *“It is important that we can have control over what others build from our resources [to avoid reputational damage]”* (M2). This mindset cause great troubles as the investigated incumbents do not have the resources to engage in all external initiatives.

“The flow [of innovations] is so large that we cannot evaluate everything. [...] It is almost impossible for us to identify what is relevant and what is not”

Business Strategy Director, StoreCorp

In addition, respondents from PharmaCorp (P3 and P5) point out that the internal culture has to be open and encourage employees to share both insights and problems, otherwise

they will not be able to draw from external innovators. From the interviews, there are indications of a rather open culture in relation to PharmaCorp's innovation hub. The Innovation Hub Manager explains that the initiative has had top-management support from the beginning and that PharmaCorp's employees have been very positive toward the initiative. In addition, they have been able to integrate external innovation through a knowledge-exchange where PharmaCorp match a few employees with companies in the hub. These employees have worked as a part of the external innovator's team, with the motivation to learn new methods and practices. Additional signs of absorptive capacity is found as PharmaCorp has managed to combine external and internal innovation in two new partnerships over the course of the innovation hub's first year.

To evolve the innovation ecosystem, incumbents must also enhance their platform performance by tuning the boundary resources to fit the innovation needs of external actors. This is described by the Open Innovation Manager at PharmaCorp who claims that the firm is able to revise what resources they share through the innovation portal upon requests from external actors. This indicates that PharmaCorp tune the resources they share in the innovation ecosystem to a certain extent. Furthermore, the innovation hub seems to have some generative characteristics that indicates platform thinking as it provides structures for external innovators to innovate together without the involvement of PharmaCorp.

All that we do is to create the foundation for something to happen. We might have a theoretical idea that if mix A with B we will get something awesome. Unfortunately, we cannot prioritize that but what we can do is to put two such companies next to each other and see what happens. It's kind of like an innovation playground with the innovation system as a court. As an outcome of this we have seven companies that have established formal collaborations with each other. So, the train of thought must have been somewhat right when we wanted to combine A with B.

Innovation Hub Manager, PharmaCorp

5.5. Emerging Platform Thinking

In Table 4 we present the findings that indicate emerging platform thinking among the investigated firms.

	Stimulate	Capture	Protect	Evolve
PharmaCorp	<p>Provide incentives:</p> <ul style="list-style-type: none"> ● Access to clinical compounds through the innovation portal ● Financial rewards from R&D challenges ● Offers of partnership ● Access to infrastructure & equipment for participants the hub ● Provide industry knowledge & expertise for participants the hub <p>Establish collaborative structures:</p> <ul style="list-style-type: none"> ● Create competitive markets through innovation challenges ● Create collaborative communities through the innovation hub 	<p>Profit from spillovers:</p> <ul style="list-style-type: none"> ● Out-license compounds ● Gain reputational value from sharing clinical compounds ● Gain access to external cutting edge knowledge through the innovation portal ● Spin-out infant innovations <p>Profit from new value propositions:</p> <ul style="list-style-type: none"> ● Improved effect of treatments through digital solutions (such as digital measurement devices and dosage administration aid) 	<p>Protect firm position:</p> <ul style="list-style-type: none"> ● A team that judge the feasibility and relevance of new collaborations with external actors <p>Protect ecosystem boundaries:</p> <ul style="list-style-type: none"> ● Trust and informal relations with the external actors in the innovation hub 	<p>Expand the ecosystem:</p> <ul style="list-style-type: none"> ● Establishing independent innovation units such as the intellectual pharma team ● Identify and invest in early stage technologies <p>Incorporation mechanisms:</p> <ul style="list-style-type: none"> ● An open culture in relation to the innovation hub due to support among management and employees ● Combine the innovation of hub participants with internal innovation e.g. through creating new partnerships ● Learn from the hub participants through creating structures for knowledge-exchange <p>Enhance platform performance</p> <ul style="list-style-type: none"> ● Provide structures in the innovation hub so that participants can innovate together without the involvement of PharmaCorp ● Revise what resources to offer participants in the innovation portal
AutoCorp	<p>Provide incentives:</p> <ul style="list-style-type: none"> ● Offer service providers access to the installed base (the drivers) through the digital key ● Share information on road conditions with authorities ● Tap into external ecosystem to access the developer community and avoid building their own installed base in non-competitive areas ● Trigger network effects by ensuring a large user base around the connected car <p>Establish collaborative structures:</p> <ul style="list-style-type: none"> ● Innovation workshops 	<p>Profit from transactions:</p> <ul style="list-style-type: none"> ● Charge the service provider for the transaction between them and the drivers <p>Profit from spillovers:</p> <ul style="list-style-type: none"> ● Gain brand value from sharing information on road conditions <p>Profit from new value propositions:</p> <ul style="list-style-type: none"> ● Enhanced customer experience through an infotainment platform ● Profit from new revenue streams through charging the service provider for the transaction between them and the driver 	<p>Protect ecosystem boundaries:</p> <ul style="list-style-type: none"> ● Establish relations with external actors in the innovation ecosystem surrounding the digital key 	<p>Expand the ecosystem:</p> <ul style="list-style-type: none"> ● Establish an independent innovation unit with a network throughout the organization <p>Incorporation mechanisms:</p> <ul style="list-style-type: none"> ● Integrate start-up technology with their own application

	with internal and external participants			
StoreCorp	<p>Provide incentives:</p> <ul style="list-style-type: none"> ● Maintain an installed base of customers through extending their offer e.g. with health services and coffee shops in stores 	<p>Profit from transactions:</p> <ul style="list-style-type: none"> ● Profit from transaction between wholesalers/ producers and customers by providing a marketplace <p>Profit from spillovers:</p> <ul style="list-style-type: none"> ● Selling data to wholesalers/producers on how customers purchase specific products from StoreCorp's assortment <p>Profit from new value propositions:</p> <ul style="list-style-type: none"> ● Enhanced customer experience through health services and coffee shops in stores ● Charge producers and wholesalers for featuring their products in recipes 	<p>Protect ecosystem boundaries:</p> <ul style="list-style-type: none"> ● Loyalty systems to create high switching costs for customers 	<p>Expand the ecosystem:</p> <ul style="list-style-type: none"> ● Establish an independent innovation unit with representatives from several business units ● Experimenting with new technologies to learn for future initiatives
MediaCorp	<p>Provide incentives:</p> <ul style="list-style-type: none"> ● Share consumer data during workshops with suppliers, customers and complementors ● Tap into Facebook's and other social media platforms' ecosystems to access the social media users and avoid building their own installed base in non-competitive areas ● Maintain an installed base of consumers through extending their content on social media and in other channels <p>Establish collaborative structures:</p> <ul style="list-style-type: none"> ● Facilitate workshops with suppliers, customers and complementors 	<p>Profit from transactions:</p> <ul style="list-style-type: none"> ● Charge advertisers for displaying ads to content consumer ● Charge for the mediation between talents from the talent network and advertisers ● Charge third-party product owners for the orders placed by content consumers in the web shop <p>Profit from new value propositions:</p> <ul style="list-style-type: none"> ● Use complementary content in social media to draw traffic to the core service ● Developing and bundling new types of digital product packages for advertisers built on the social media channel to create new revenue streams ● Develop niche complements for particular consumer groups within strategically relevant areas to strengthen their loyalty to the core service ● Generate new revenue streams through charging content consumers directly 	<p>Protect ecosystem boundaries</p> <ul style="list-style-type: none"> ● Ensure loyalty of consumers by providing unique and local content 	<p>Expand the ecosystem:</p> <ul style="list-style-type: none"> ● Establish an independent innovation unit that is not attached to the core business but work continuously to integrate new innovations in the organization ● Invest in several new and strategically relevant business areas to explore them further and see what might become profitable in the future <p>Incorporation mechanisms:</p> <ul style="list-style-type: none"> ● Experiment with virtual reality technology to understand how that could be integrated with internal innovation

Table 4. Emerging platform thinking

6. Discussion

The survey results show that a majority of the surveyed incumbent firms see themselves as a focal actor in an ecosystem where they share resources and collaborate with external actors. The responses suggest that the Swedish incumbents are aware of the potential benefits of platform thinking and that these areas are perceived as important to their future success. On the other hand, when compiling the findings from all data sources a nuanced and more complex picture emerged. The interviews suggest that although evidence of platform thinking was found in each of the investigated incumbents, these initiatives are isolated and experimental in relation to their core business. We therefore conclude that a majority of the studied firms still struggle with the shift from a product focus to a platform focus (Zhu & Furr, 2016) and that incumbent firms must overcome several challenges in order to adopt platform thinking. From the empirical material, four have been identified that incumbent firms must develop to overcome their greatest challenges and make the shifts required to be able to adopt platform thinking: the capability to share resources unconditionally, the capability to capture value from multiple revenue streams, the capability to establish ecosystem relations, and the capability to establish generative structures.

6.1. From Sourcing Innovation to Open Innovation

In each of the investigated firms, sharing boundary resources with external actors in the innovation ecosystem is related to many challenges, ranging from privacy and regulatory issues to identifying what resources to share. There is a traditional mindset among the studied incumbents as they want to be able to specify the outcomes of innovation projects before they share any resources with external actors. The incumbents in our study also express that they carefully choose who to collaborate with to avoid spending time and resources on unsuccessful collaborations or partnerships that may put their brand value at risk. It is clear that although we have identified initiatives that relate to some of the building blocks that make up the dimension of stimulating, the incumbent firms in our study are mainly rely on traditional supplier relations. This means that most of the innovations developed in the innovation ecosystems surrounding the investigated firms are sourced upon request by the incumbents.

To attain the position as a focal actor in an innovation ecosystem, Gawer (2014) suggest that firms must move away from dictating the innovation process towards taking on a more enabling role without determining or specifying the desired innovation outcome. By sharing boundary resources without specifying the outcome incumbent firms can provide a unique value in the innovation ecosystem (Iansiti & Levien, 2004). These resources can be used by external actors to jointly create a greater value than any single actor could have on their own (Adner, 2012). Such an approach is referred to as open innovation and is a distinguishable feature to expand the value creation in an innovation ecosystem (Chesbrough & Appleyard, 2007). Among the studied firms, there are signs of emerging activities related to stimulating value through open innovation. As an example, PharmaCorp utilizes its innovation hub and the innovation portal as means to share both knowledge and infrastructure without specifying the outcome, allowing external actors to draw from their resources to innovate. AutoCorp shares a digital key and information generated by their cars with external actors. Even if this is currently done in a very controlled fashion, several respondents indicate that this is about to change. On the other hand, MediaCorp seems more reluctant to share resources with the innovation ecosystem and refer to the nature of their industry as proprietary. Nevertheless, there have been initiatives where MediaCorp managed to localize internal resources (customer data) that they have ownership of and share that on an experimental level with external actors. At StoreCorp, no activities were found where they have been able to provided boundary resources to external innovators.

Stimulating value creation through an open innovation approach is becoming increasingly important as firms in the digital economy need to shift their focus from cost reduction toward value maximization (Morabito, 2014, Ng, 2014). By making this shift in focus and actively engage in innovation ecosystems, incumbent firms can benefit from an increased financial performance (Faems et al. 2010) and an improved resistance to disruptive innovations (Autio & Llewellyn, 2014). To adopt platform thinking, incumbent firms must therefore develop the capability to share resources without specifying the innovation outcome.

6.2. From a Core Dependence to Revenue Diversity

The incumbents in this study rely on business models where they profit from a single revenue stream. The investigated incumbents see the car, the pill, the physical store and

the media content as their core business and their complements are foremost considered as ways to increase their profits from that core. This might be due to the fact that all of the studied incumbents' core product or service still generate large profits, hence, there is no pressing urgency to transform their business model as they still can rely on their core business. Be that as it may, disruptions in other industries show that new value propositions might materialize so fast in the mind of consumers and users that incumbents do not have the time to react before they are obsolete (Weill & Woerner, 2013). If the disruptive innovation occurs within the incumbents' core business and strikes at their single revenue stream, they are extremely vulnerable. This issue was addressed by many of the respondents who posed questions such as: what happens if patients and hospitals start paying for the outcome of the medicine and not the pill itself? What happens if drivers no longer own their own car? What happens if customers buy a majority of groceries online? What happens if viewers start consuming all of our content on third-party platforms?

The move away from relying on a single revenue stream has thus been identified as the largest challenge for the incumbent firms' moving forward. The characteristics of the digital economy requires firms to adopt hybrid business models to be able to exploit multiple revenue streams while still retain the revenues generated from their core business (Karimi & Walter, 2015; Zhu & Furr, 2016; Zott & Amit, 2010). Signs of such emerging platform thinking have been identified in every incumbent under investigation: PharmaCorp manages to create revenues from their clinical compounds; AutoCorp generates revenue from the service providers who pay to access their installed base; StoreCorp are just at the outset of selling data on customer behavior to producers and wholesalers; and MediaCorp has developed new digital products for their business customers and a web shop on the consumer side of the business. Even so, none of these initiatives offer a substantial stream of revenues. At best, they are barely pulling their own weight.

As platform thinking allows for an increased value creation, a hybrid business becomes essential to maximize the potential value gains. By embracing a diversity of revenue streams incumbents can truly benefit from the new opportunities that emerge as a result of the value creation in an innovation ecosystem (Birkinshaw et al. 2012; Gopalakrishnan et al. 2010; Kurti, 2015; Morabito, 2014; Ng, 2014). In addition, a hybrid business model

decreases the vulnerability of firms in a turbulent business landscape as their revenue streams become increasingly adaptable and flexible (Karimi & Walter, 2015). Hence, to adopt platform thinking incumbents must develop the capability to capture value from multiple revenue streams.

6.3. From Exclusive Access to Value Distribution

Our study indicates that the investigated incumbents mainly rely on traditional customer-supplier relations governed by control and legal contracts in order to protect their position, their ecosystem boundaries and their innovation outcomes. Several respondents from the studied incumbents point out that their firm tries to protect new initiatives by ensuring that no external actor gets access to them. Paradoxically, several respondents also claim that their firm cannot protect new innovation outcomes in an increasingly digital environment. The new landscape pose challenges to the incumbents as traditional sources of competitive advantage (such as central store locations, advanced production processes or high brand value) might not be sufficient to ensure the firms' position in the digital economy (Teece, 2012).

Traditional protection mechanisms are becoming less useful as participation in ecosystems is foremost characterized by "*interlocking relationships built on collaboration, trust, and co-creation of value*" (Gobble, 2014:1). In such collaborative environments, control is rarely successful as a mean to protect the value creation (Boudreau & Lakhani, 2009; Henkel, 2006). Instead, a resistant ecosystem is built on a fair distribution of value between all ecosystem members (Cennamo & Santaló, 2015) and trust among ecosystem actors (Ritala et al. 2013). We have seen emerging signs of platform thinking among the incumbents under investigation as some of the respondents discuss a more relation-centric approach towards protecting value. PharmaCorp is the only firm that emphasize trust in the relations between themselves and the external actors in the innovation hub. In addition, AutoCorp also express that established ecosystem relations is an important part of protecting their position against competing ecosystems.

Contradictory to traditional modes of competition, a firm protect the value created in the innovation ecosystem by sharing some of their power (Gawer, 2014) as this ensures loyalty among the ecosystem participants (Cennamo & Santaló, 2015). In the digital economy, a focal actor's competitiveness relies on the resistance of the entire ecosystem

(Adner, 2012). This requires a shift from control and exclusivity towards establishing trust and building strong relations (Boudreau & Lakhani, 2009; Henkel, 2006). Therefore, to adopt platform thinking incumbents must develop the capability to protect the created value through interdependent relations.

6.4. From a Product Focus to Platform Thinking

There are signs of the incumbents moving towards platform thinking as each of the studied firms have established independent units that work with screening their surroundings for new innovations, new technologies and new value propositions. These units allow for the firm's to be focused on the core operations while simultaneously explore innovations. There are a few examples where the incumbents in this study have managed to integrate external and internal innovation. However, there is seldom enough time, resources, or sufficient structures to evaluate the opportunities, incorporate new innovations or deploy new collaborations. Consequently, innovations are almost exclusively developed internally to the investigated firms. This occurs despite the fact that several respondents recognize that innovation no longer is contained within organizational boundaries. In addition, the incumbents in this study also recognize that they lack the resources and capabilities to do everything themselves which results in slow innovation processes. This situation is what we refer to as a product focus, where incumbent firms do not expose their core product or service to external innovation and hence cannot exploit it as a platform to let external actors participate in the value creation.

The notion that the investigated incumbents tend to innovate within their organizational boundaries is problematic in an increasingly competitive business landscape. Dahlander and Gann (2010) argue that the firms who enable their innovation ecosystem to co-innovate with them will attain a dramatic increase in innovative capacity and available resources. To be able to establish an enhanced innovation capacity and access the resources available in the innovation ecosystem, our findings suggest that incumbents must provide a platform with open interfaces that enable generativity (Ghazawneh & Henfridsson, 2013). This allows for the development of innovative products and services without the involvement of the incumbent firms (Zittrain, 2006; Yoo et al. 2010). By establishing such generative structures, the incumbent firms can expose their core product or service to the innovativeness of actors outside their organizational boundaries

(Adner, 2012; Chesbrough, 2006; Dahlander & Gann, 2010) and thus utilize it as a platform (Svahn, 2014). Signs of such generativity have only been identified at PharmaCorp. As mentioned by the Innovation Hub Manager, they set out to lower the barriers for the external actors by creating an innovative environment where external actors have the right prerequisites to innovate.

As a result of establishing generative structures, the incumbents do not have to spend resources on identifying and creating complements. Instead, their platform enables the creation of externally created complements (Cusumano & Gawer, 2002). By continuously listening to the needs of the external actors and revise what resources are offered to them through the platform, the incumbent firms allow for external actors to develop complementary innovations (Eaton et al. 2015; Henfridsson et al. 2014; Moore, 1993). In addition, the incumbents ensure the interdependency of their relations with external actors (Boudreau & Lakhani, 2009; Henkel, 2006). Embracing the dimension of evolving the innovation ecosystem ultimately creates a self-reinforcing loop that continuously maximizes the value generated in the innovation ecosystem (Gawer, 2014; Iansiti & Levien, 2004). Hence, to adopt platform thinking incumbent firms need to develop the capability to create generative structures.

6.5. Adopting Platform Thinking

Based on the empirical evidence, we suggest that platform thinking should be seen as an iterative, self-reinforcing innovation loop where the dimensions are connected and intertwined rather than stand-alone steps. We suggest that this loop should be viewed as a learning process, first tentatively proceeded with just one or a few of the building blocks for each dimension in place. As a result of organizational learning the innovation process is performed with increasing confidence, adding new building blocks every round. Nevertheless, we suggest that there is a predetermined order of the dimensions that make up platform thinking. These four dimensions are developed through acquiring the corresponding capability.

First, we find that the studied incumbents have good prerequisites to adopt the capability to share resources without specifying the innovation outcome. This is because they already serve an installed base, have a high brand value that attracts external actors and possess a great deal of resources that they could share with external actors. The

challenges for the incumbents in this study have been to identify these resources and use them as strategic inputs in the innovation process. Even so, it is recognized among the firms that sharing boundary resources will be an important activity when creating new value in the future. As a result of our observations in this study, we suggest that the capability to share resources without specifying the innovation outcome is the first capability that incumbents will develop in relation to adopting platform thinking.

Following this, we argue that the investigated incumbents also are quite well equipped to develop the capability to capture value from multiple revenue streams. In the interviews, respondents seem fully aware of the consequences with relying on a single revenue stream. We have also been able to identify initiatives across industries where the incumbents in this study try to establish parallel revenue streams. Nonetheless, the incumbents still need to figure out how to actually profit from these new revenue streams. This might be challenging as all of the investigated firms are still heavily reliant on their core business that generates large profits. However, as the respondents recognize the importance of new revenue streams in the future, especially since digitalization opens up new opportunities for them, we suggest that incumbents are likely to develop the capability to capture value from multiple revenue streams as the next step in the loop.

Further, we find that protecting the value in the innovation ecosystem through interdependent relations is very complex for the incumbents that we investigated. Currently, they have few ecosystem relations in place where they do not rely on contracts or other control mechanisms to secure the created value. The only type of external actor that the studied incumbents traditionally retain through trust and loyal relations are their customers. We suggest that in order to protect the value created in the innovation ecosystem, incumbents must create similar relations based on trust and loyalty with their external innovators. Nevertheless, the greatest issue incumbents face when protecting the created value through interdependent relations is that they need a shift in mindset. First, unlike their awareness of the problems of value capture, the studied incumbents do not fully realize the extent to which their current firm position and competitiveness is threatened. Respondents from the investigated incumbents heavily rely on their established brand value and present market position and argue that they therefore do not need to protect their position. Second, it is recognized among the incumbents in this study that there is a problem with protecting value and innovations through exclusive

access. However, in contrast to the situation with value capture, the investigated incumbents do not seem to know how to solve this problem. Very few respondents suggest that ecosystem relations might be the key to future competitiveness. The challenges posed in relation to protecting the created value through interdependent relations suggest that this dimension is developed later in the loop, after firms started to acquire the capability to capture value from multiple revenue streams.

Finally, we suggest that the capability to create generative structures is a capability that cannot be seen in isolation to the same extent as the previous capabilities. Unlike previous capabilities that are concerned with the borderland between the incumbent firm and its external innovators, or with more demarcated areas of the organization, this capability is more complex. To establish generative structures, the incumbents would need to fundamentally redesign both their organizational structures and culture. As indicated in the interviews, this is such a large shift in the firms' business logic that it must be done incrementally. By providing continuous proof of concept through the other dimensions, incumbents can create a momentum for extending their collaborative initiatives. Therefore, the capability to establish generative structures is developed as a last step in the loop. According to the iterative logic of platform thinking, developing generative structures pose new demands on incumbent's value stimulation. Thus, the first iteration of platform thinking is completed (illustrated in Figure 2).

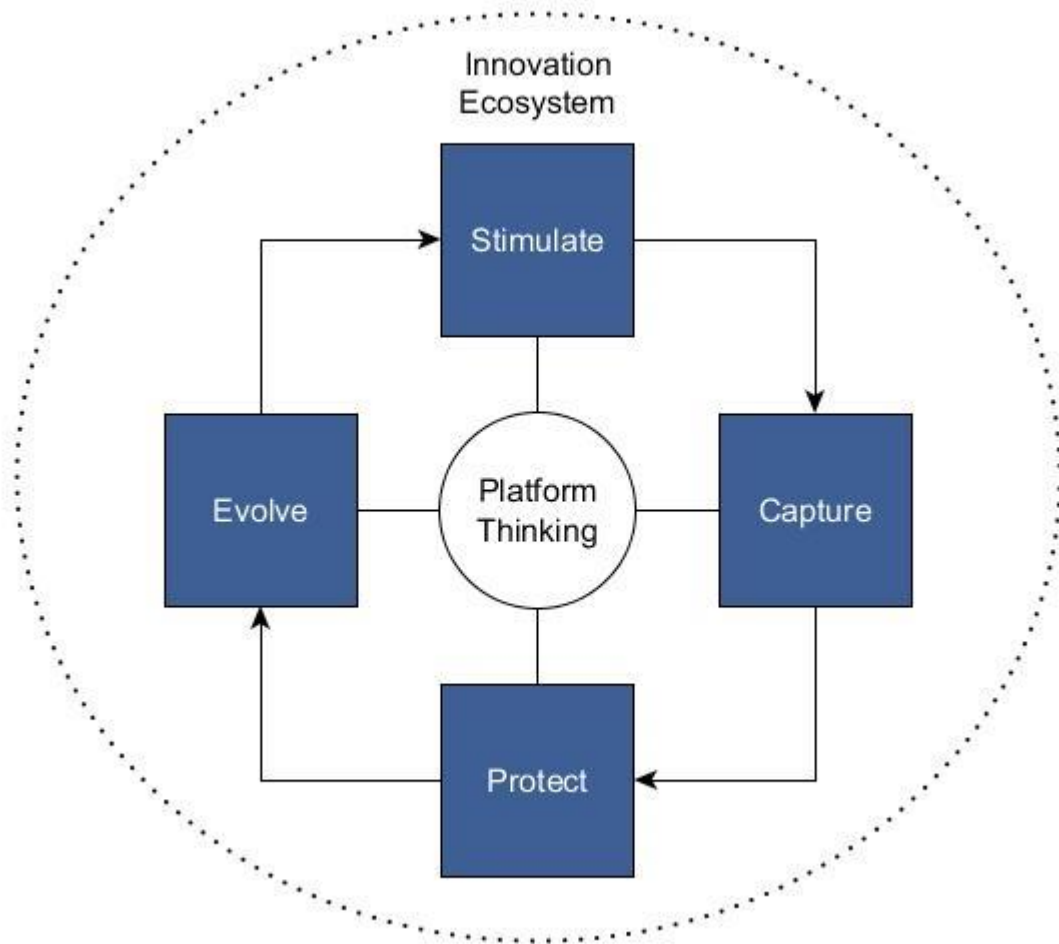


Figure 2. Platform Thinking

6.6. Limitations and Implications for Theory and Practice

This study makes a theoretical contribution to two streams of literature: innovation ecosystems and platforms. Platform thinking contributes to the innovation ecosystem literature by answering question of how firms actually engage in innovation ecosystems and the challenges they face when attempting to become the leading firm in a collaborative setting. In turn, we contribute to the platform literature as questions of how incumbents can leverage platforms in innovation ecosystems have been answered. Finally, the capabilities necessary to adopt platform thinking and the order at which incumbents may develop these capabilities have been identified.

The study has provided several implications for practice as we have identified capabilities that incumbents across industries must develop in order to take on the role of a focal actor in an innovation ecosystem. The four dimensions of platform thinking give

practitioners a tool to evaluate their innovation efforts in a more holistic and nuanced way. A gap analysis based on the conceptual model, its dimensions, building blocks and operationalization offer practitioners a framework to estimate their current status and what strategic actions that can be taken to adopt platform thinking. The fact that this study generates knowledge on how these theoretical concepts play out in less digital industries makes its contribution even more essential for practice.

One limitation to this study is the number of cases investigated. We suggest that future research draw from a larger sample in order to investigate if platform thinking is applicable in additional, less digital industries. This would help to further strengthen the reliability of our findings (Bryman, 2008). In addition, as the majority of the data collected in this study was of qualitative nature, we suggest that the order at which incumbents adopt the different dimensions of platform thinking should be further investigated using a quantitative method to establish causality. The quantitative results from the survey indicate that no specific industry trend could be made out. As an example, the pharmaceutical industry ranked themselves lowest out of the eight industries investigated, while the semi-structured interviews indicated that PharmaCorp had adopted platform thinking to a relatively a large extent. Although it is not impossible that platform thinking is not foremost correlated with industry adherence, this indication could also be a result of too complex questions, unfit to employ in a survey. To find solid evidence to support claims of industry independence, it would be fruitful to employ an approach where platform thinking could be measured in absolute terms and the correlations with dependent variables could be investigated.

7. Conclusions

This study set out to answer the question of what capabilities incumbent firms need to leverage innovation ecosystems through platform thinking. To answer this question, a comparative case study with a mixed-methods approach was employed to investigate incumbent firms from industries with varying characteristics. Four capabilities have been identified that the incumbents across industries need to develop in order to adopt platform thinking; the capability to share resources without specifying the innovation outcome; the capability to capture value from multiple revenue streams; the capability to protect the created value through interdependent relations; and the capability to create generative structures. By developing these capabilities, incumbent firms can increase their resistance to disruptive innovations and maximize the value generated in the innovation ecosystem, thus being able stay competitive and thrive in the digital economy.

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Appendix A: Capabilities of Platform Thinking

Dimensions of Platform Thinking		
1. Stimulate Value Creation in the Innovation Ecosystem		
Building blocks	Operationalization	Corresponding Authors
1a. Provide incentives	Trigger network effects	Gawer, 2014; Iansiti & Levien, 2004
	Provide boundary resources	Dahlander & Gann, 2010; Ghazawneh & Henfridsson, 2013; Huizingh, 2011; Yoo et al. 2010; Zittrain, 2006; Star, 1989
1b. Establish collaborative structures	Develop collaborative communities	Faems et al. 2010; West & Gallagher 2006
	Develop competitive markets	Boudreau & Lakhani, 2009
2. Capture Value from the Innovation Ecosystem		
Building blocks	Operationalization	Corresponding Authors
2a. Profit from transactions	Enable transactions between of two or more user/producer groups	Gawer, 2014; Eisenmann et al. 2006; Hagi, 2014
2b. Profit from spillovers	Out-license and/or sell spillovers	Chesbrough, 2006; Morabito, 2014
	Embrace spinoffs/spinouts	Chesbrough, 2006; Morabito, 2014; West & Gallagher 2006
2c. Profit from new value propositions	Complements that strengthen core product or service	Brandenburger & Nalebuff 1997; Chesbrough & Appleyard, 2007
	Hybrid business models	Zhu & Furr, 2016
3. Protect the Value Created Innovation Ecosystem		
Building blocks	Operationalization	Corresponding Authors
3a. Protect firm position	Establish platform governance mechanisms	Gawer, 2014
	Ensure even distribution of value in the ecosystem	Gawer, 2014; Cennamo & Santaló, 2015
3b. Protect ecosystem	Establish lock-ins/switching costs	Katz & Shapiro, 1994, Shapiro & Varian, 1999

boundaries	Ensure trust and loyalty to the ecosystem	Ritala et al. 2013; Boudreau & Lakhani 2009
3c. Protect innovation outcomes	Protect innovation outcomes through legal means	Ritala et al. 2013; Teece, 1986
	Establish ecosystem relations instead of protecting innovation outcomes	Henkel 2006
4. Evolve the Innovation Ecosystem		
Building blocks	Operationalization	Corresponding Authors
4a. Expand the ecosystem	Adopt Options Thinking	Selander et al. 2013; Svahn et al. 2015
	Balance between stability and growth	Moore, 1993; Wareham et al. 2014
4b. Ensure incorporation mechanisms	Establish absorptive capacity	West & Gallagher, 2006
	Establish open culture and political will	Katz & Allen, 1982; West & Gallagher 2006
4c. Enhance platform performance	Tune boundary resources	Eaton et al. 2015
	Ensure generalization and specialization	Henfridsson et al. 2014

Appendix B: Survey Results

	I agree	I somewhat agree	I somewhat disagree	I disagree	I do not know
We are a part of one or several ecosystems, together with external actors, where we innovate together	49 (52%)	35 (38%)	5 (5%)	5 (5%)	0 (0%)
In our ecosystem actors share technologies, information, resources, knowledge and/or other inputs with each other	37 (39%)	38 (40%)	12 (14%)	5 (5%)	2 (2%)
We see ourselves as a central actor in at least one ecosystem	58 (65%)	23 (26%)	6 (7%)	2 (2%)	0 (0%)
To effectively innovate and operate, at least a few external actors in our ecosystem are dependent on something unique that we provide	56 (63%)	22 (25%)	8 (9%)	2 (2%)	1 (1%)
We enable interactions between two or more external actors (e.g. consider how travel agents allow travelers and hotels or airlines to interact with each other)	45 (52%)	24 (28%)	11 (13%)	4 (5%)	3 (3%)
We enable external actors to develop new products or services that complement our existing products or services	40 (46%)	27 (31%)	13 (15%)	6 (7%)	1 (1%)
We provide incentives (monetary and/or non-monetary) in order to motivate external actors in our ecosystem to innovate	14 (16%)	29 (33%)	19 (22%)	21 (24%)	4 (5%)
We take actions to increase the number of customers/users that use our product or service because it will attract additional customers/users to use our product or service	55 (63%)	24 (28%)	4 (5%)	3 (3%)	1 (1%)
We take actions to increase the number of customers/users that use our product or service because it will trigger other groups of external actors to innovate in our ecosystem	21 (24%)	24 (28%)	22 (25%)	12 (14%)	8 (9%)
We share internal resources (e.g. technologies, information, resources, knowledge and/or other inputs) with the external actors in our ecosystem	23 (26%)	37 (43%)	18 (21%)	7 (8%)	2 (2%)
We use external innovation in order to improve our internal innovation capacity	41 (47%)	24 (28%)	12 (14%)	3 (3%)	7 (8%)

We use the external actors in our ecosystem to lower our costs of R&D	34 (39%)	24 (28%)	15 (17%)	10 (11%)	4 (5%)
We have a strategy to ensure that our position in the ecosystem is not challenged	15 (17%)	39 (45%)	22 (25%)	5 (6%)	6 (7%)
We have a strategy to ensure that external actors stay loyal to, and act in the best interest of, the ecosystem	20 (23%)	38 (44%)	20 (23%)	7 (8%)	2 (2%)
We have established mechanisms to protect the innovations created in the ecosystem	17 (20%)	30 (34%)	22 (26%)	10 (11%)	8 (9%)
We profit from coordinating transactions between two groups of external actors (e.g. consider how a bank profits from the transaction between credit card holders and merchants)	19 (22%)	23 (26%)	14 (16%)	24 (28%)	7 (8%)
We search for opportunities where we can benefit from internal resources, intellectual property and/or information that is unused in relation to our core offer	37 (43%)	32 (36%)	11 (13%)	4 (5%)	3 (3%)
We encourage external actors to develop goods and services that complements our core offer	37 (43%)	26 (30%)	14 (15%)	5 (6%)	5 (6%)
We continuously screen our surroundings to identify new collaborations and opportunities	45 (52%)	30 (34%)	9 (10%)	3 (3%)	0 (0%)
We continuously expand our ecosystem (e.g. through facilitating new interactions between the existing actors in our ecosystem or through attracting new groups of external actors).	24 (28%)	37 (43%)	22 (25%)	1 (1%)	3 (3%)
We listen to the needs of the external actors in the ecosystem and provide them with new or altered resources to help them innovate	25 (29%)	33 (38%)	19 (22%)	3 (2%)	6 (7%)

Appendix C: Distribution of Survey Answers

Industry	Sample size	Number of responses	Response rate	Average self-estimation score	Rank (perceived adoption of platform thinking)
Food & Beverage	20	10	50%	3.27	1
Automobile	17	11	65%	3.26	2
Media	13	10	77%	3.21	3
Bank & Insurance	11	10	91%	3.03	4
Industrial Goods	20	16	80%	2.85	5
Industrial Transportation	19	12	63%	2.78	6
Retail	20	10	50%	2.68	7
Pharmaceuticals	20	15	75%	2.13	8
Total	140	94	67%	2.90	-

Appendix D: Interview Guide

1. Hur har ni gjort för att arbeta med att stimulera värdeskapande i innovationsekosystemet?

- Erbjuder ni några incitament för att innovatörer ska skapa värde i ert innovationsekosystem? Vilka typer av incitament?
- Behöver ni se till att tillräckligt många användare tar till sig er produkt/tjänst för att det ska vara lönt för externa aktörer att innovera i ert innovationsekosystem? Hur gör ni det? (skapa en installerad bas för att trigga nätverkseffekter)
- Delar ni resurser med externa aktörer i innovationsekosystemet? Vilka resurser?

2. Hur har ni gjort för att skydda det värdet som skapas i innovationsekosystemet?

- Kan ni skydda er position i innovationsekosystemet så att andra aktörer inte går in och tar er plats? Hur gör ni det?
- Kan ni skydda innovationsekosystemets gränser så att konkurrerande ekosystem inte tar över eller slukar delar av ert ekosystem? Hur gör ni det?
- Kan ni skydda de innovationer som skapas av diverse innovatörer i innovationsekosystemet? Hur gör ni det?

3. Hur har ni gjort för att fånga det värde som skapas i innovationsekosystemet?

- Kan ni tjäna på transaktioner som sker mellan externa aktörer? På vilket sätt?
- Kan ni tjäna på outnyttjade resurser som i dagsläget inte behövs som en del av er kärnverksamhet? På vilket sätt?
- Kan ni direkt eller indirekt tjäna på kompletterande produkter/tjänster? På vilket sätt?
- Bidrar extern innovation till att förbättra er interna innovationskraft? På vilket sätt?
- Kan ni använda er av extern innovation för att sänka era utvecklingskostnader?

4. Hur har ni gjort för att utveckla innovationsekosystemet?

- Arbetar ni med att screena omgivningen och identifiera nya samarbeten/möjligheter? Hur gör ni det?
- Arbetar ni med att utveckla ekosystemet genom att attrahera nya partners eller skapa nya samarbeten mellan befintliga partners? Hur gör ni det?
- Arbetar ni med att anpassa vad ni delar för resurser för att kontinuerligt tillfredsställa ekosystemets behov? Hur ser ni till att det är rätt resurser ni delar?

5. Finns det ytterligare områden aktiviteter som varit nödvändiga för att etablera plattformstänkande?

6. Extra

- Vilka utmaningar finns i framtiden?
- Vad har det funnits för centrala roller?

Appendix E: Industry Characteristics

Industry	Characteristics	Deliverable	Customer group*	Position in value chain
Media	This industry is characterized by producers, operators and broadcasters of radio, television, music and filmed entertainment. Also includes companies providing advertising, public relations and marketing service, billboard providers, telemarketers and publishers of information (ICB, 2012). This means that the media industry is characterized by service companies, serving both businesses and end consumers. Firms in this industry are both producers and providers of the service.	Service	B2C	Producer & supplier
Retail	Retailers and wholesalers of consumer products and services, including food retailers and distributors, operators of pharmacies and retailers specializing in one class of goods such as electronics or books (ICB, 2012). Retail provide a service to an end customers and are not concerned with manufacturing.	Service	B2C	Supplier
Bank & Insurance	The industry includes banks providing a broad range of financial services, including retail banking, loans and money transmissions. Insurance companies engaged with life and nonlife insurance, as well as reinsurance. Insurance brokers and agencies (ICB, 2012). The bank and insurance industry is also a service industry, providing services to both businesses and consumers.	Service	B2B & B2C	Supplier
Industrial Transportation	Operators of mail and package delivery services and companies providing services to the Industrial Transportation sector. Providers of on-water transportation for commercial markets (such as container shipping), industrial railway transportation and railway lines and commercial trucking services (ICB, 2012). This is a service industry that provide services to other businesses.	Service	B2B	Supplier
Auto-mobile	This industry is largely made up of makers of motorcycles and passenger vehicles. It also involves manufacturers and distributors of new and replacement parts for motorcycles and automobiles, such as engines, carburetors, batteries and tires (ICB, 2012). The industry is centralized around a physical product manufactured for consumers.	Product	B2C	Producer
Industrial Goods	Industrial goods encompass manufacturers of aircrafts and components and equipment for the defense industry. It also includes makers and distributors of products used for packaging, electrical parts, commercial vehicles and heavy machinery. Makers and installers of industrial machinery and factory equipment (ICB, 2012). This industry is primarily concerned with the production of a physical product for the benefit of other businesses.	Product	B2B	Producer
Pharmaceuticals	Companies engaged in research into and development of biological substances for the purposes of drug discovery and diagnostic development. Also includes manufacturers of prescription or over-the-counter drugs, such as aspirin, cold remedies and birth control pills (ICB, 2012). The pharmaceutical industry is characterized by a physical product that they manufacture for businesses that in turn provide customers with the drugs.	Product	B2B	Producer

Food & Beverage	The food and beverage industry includes producers, distillers, shippers etc. of wine and spirits and manufacturers, bottlers and distributors of non-alcoholic beverages. It also includes companies that grow, raise or produce agricultural products or livestock, as well as food producers (ICB, 2012). The industry is characterized by the production of a physical goods that is sold to a wholesaler before reaching customers.	Product	B2B	Producer
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*B2B = Business to business, B2C = Business to consumer