MASTER

What would you do HERE?

business model innovation for digital platform industries

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What would you do HERE? :

Business model innovation for digital platform industries

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In partial fulfilment of the requirements for the degree of

Master of Science
In Innovation Sciences

Eindhoven University of Technology

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Tata’s knowledge gained from the quest to learn, wisdom gained from experience and discipline in all small things inspire me to improve every day.
Abstract

Innovation for a firm is increasingly important. Continuous progress in ICT and rapid introduction of new technologies, requires firms to innovate continuously. The traditional framework for a firm to stay competitive in its business ecosystem required product innovation, but this idea is becoming outdated. This also while still product innovation continuous to be very vital for a firm. There are several reasons to this, such as only product innovation is not sufficient, to stay ahead in its game a firm requires not just product innovation, but also process innovation and innovation in business functions too. All aspects of a firms operation are becoming increasingly important. Traditionally innovation was viewed as a linear process, in which odds played a crucial role. However, nowadays this view has radically changed. Namely, innovations involve complex processes with internal dynamics which are often not taken into account by traditional frameworks for innovation.

This shift in understanding innovation at different operations of a firm, is important for the holistic view of innovation for a firm. This will facilitate the way how strategy for innovation is formulated, and will eventually influence policy building at regional levels. Understanding how firms that are already successful with product innovation perceive new technologies. Research has demonstrated how firms that fail to adopt dominant technologies, usually fall out of the competition, and eventually become non-existent. However when firms embrace new and dominant technologies, is it enough? If firms are adopting new technologies, what can a firm do beyond that to stay competitive? Among the other business aspects, business models adopted by the firm are in focus by some innovation researchers. The business model is the method of transaction adopted by a firm, the digital platform facilitates new methods of transactions. These digital platforms can innovate in this respect and create new value to their assets. The goal of this master thesis was to examine the platform leadership and innovation in business models. Study of the characteristics required for becoming platform leaders and usefulness in the ecosystem theory in strategy and policy making. This thesis is aimed to contribute in this field by adding to the industries studied. The concepts are tested and via an empirical study in the digital maps and navigation industry, with the focal firm HERE.

The main research question for this thesis is why and how does a platform leader need business model innovation? To investigate this research question, there are sub questions formulated, to what extent is business model innovation crucial for a platform leader in the navigation industry? What are the determinants of innovation in business models in the navigation industry? How the different ways of sourcing POI (Points of Interest) data are business model innovation within HERE? How does sourcing of POI data reflect business model innovation in the business of HERE and why is it important for a platform leader in the navigation industry?

Key Empirical Findings

Analysis of the case of HERE in the digital maps and navigation space presented the following main findings. First that business model innovation is required by a platform leader for value creation. The platform leader in this ecosystem is held by HERE, by the fact of their market share and product range. From the literature study, the platform leadership concepts are linked to the focal firm. The insights gained from these showed that the value chain configuration offers new business development opportunities for all involved players, there is a struggle for dominance between large players. Data is identified as a key ingredient factor in the struggle for market dominance. Data generation, sourcing and trading are key methods for platform leaders to build relationships with external partners and enable others to hop onto the platform. The key to this is to apply right management on the functional level at the right control points towards a desired future.
The business models under that data sourcing domain were classified into categories to identify innovation characteristics. These identified characteristics aided in studying and summarizing the innovativeness of the business models. Innovative business models are essential for creative transactions of data, this innovation will create monetary value as well as boost the bargaining power in the business ecosystem. Innovative business models are value generating for the platform owner as well as the users of the platform. The strengths and weaknesses of various business models are identified with the help of defined characteristics, which will help is selecting a business model according to the needs and situation. This study also resulted in positioning of the business models in the innovation ecosystem.

Findings for the platform leadership is to create data value with external partners and trade with data in an innovative manner. With these insights it is concluded that business scientists should focus on drivers that stimulate or hinder the growth of innovation ecosystem. It is proposed to keep focus on business model innovation as part of the innovation plan of a firm.
Chapter 1: Introduction

The question how firms innovate in order to position themselves in the competitive environment is a perpetual search, and keeps changing with time. There was a time, not so long ago, when “innovation” meant that companies needed to invest in extensive internal research laboratories, hire the most brilliant people they could find, and then wait patiently for novel products to emerge (Chesbrough H., 2007). Time has proven this is not enough, innovation is no longer a black box for which management has to wait endlessly. The idea is changing, there are more factors than just product development, which make a company innovative. A firm’s capability to adapt to market dynamics play a crucial role in its success. This adaption could mean adoption of new technologies, or even new ways for doing business. As firms adopt to new technologies, the conditions under which this is possible is subject to change, due the constant stream of developments in research but also in practice, such as changes in the way business is conducted. Better understanding of innovation help in developing methods to facilitate ways and means to generate and implement ideas generated not just in a firm but also ideas that are generated externally.

Firms that are subject to introduction of new technologies rapidly and which are also required to adopt new technologies for basic survival are ICT companies mainly. These firms which are often digital platforms offering a plethora of products from their specialized platform. With changing technology they are subject to market dynamics too. Most academic research into platforms is by scholars concerned with product development, technology strategy and industrial economics. The competition to become a digital platform leader has innovation as one of the most crucial deciding factors. Along the technological innovation, other business factors like valuation of information can play a crucial role for such companies. Business nowadays is assumed to take place in inter-dependent cross-industry networks and revolves around innovation (Adner, 2012).

The new age business hashtags of “Information technology” and “Information economics” tell tales about the value of information. However information in itself does not create value. Information technology continues to grow in the information economy front. The term information is used very broadly to be understood as anything that can be digitized - encoded as a stream of bits - is information. Books, music, business details are all information goods. The value of information can change, consumers differ greatly in how they value particular information goods (Shapiro & Varian, 2013). The cost of information will have variables like the cost to produce that information, cost to manage and various variables related to the value produced from the information. As technology changes and progresses new business models emerge and some old business models seemed to no longer apply. While new technologies bring new business models and some new ancillary rules, some basic laws of economics assert themselves.

In the information technology and economics, the value of information has been subject to change in various ways. However, it is not the data alone that adds value but the various capabilities to work with them that are value adding. As information technology allows for interconnection and exchange in much different ways than ever before, this inter-relationship, creates new ways of doing business. These new ways of doing business call for innovation. Thus making business model innovation important for the entire process of innovation at a firm level.

1.1 Review of traditional perspectives on firms

In the beginning phase of traditional economics theory, which is the neoclassical economics (NE) tradition, the main unit of research was generally industries. In this approach the firms were considered as entities being equal, differing only in size and efficiency of production process (Porter, 1980). These
constrained firms and their competitors were assumed to compete with each other for capturing value for their own benefits (Kelly, 1998). As managerial research and literature progressed such as Porters’, it highlighted the need for also taking into account the role of company behavior or managerial decisions in these same harshly competitive business environments (Porter, 1980) (Porter, 1985).

There was a time, innovations (which were also introduced at a later stage in economics), were also assessed from this point of view of single firms. Also during this time which was not so long ago when “innovation” meant that companies needed to invest in extensive internal research laboratories, hire the most brilliant people they could find and then wait patiently for novel products to emerge (Swann, 2014). The models of innovation (Mark I and Mark II) postulated by Schumpeter, who can be considered as a pioneer in innovation research, also supported this view. In Mark I newly established entrepreneurial firms were considered as the main source of innovation, whereas in Mark II natural monopolists or established incumbents were seen as the main source of innovation (Pyka & Anderson, 2012)

The innovations as it was assessed by these models often were categorized in a dichotomy. Namely, innovations produced by new entrants typically led to competition between firms characterized by creative destruction, whereas innovations produced by incumbents led to competition characterized by creative accumulation (Pyka & Anderson, 2012) Other similar concepts referring to the former dichotomy are product innovations versus process innovations, radical innovations versus incremental innovations. Or finally competence destroying innovations or competence enhancing innovations (Schilling , 2005).

These distinct innovations are solely assessed from the cost perspective rooted in the network economics theory (Swann, 2014). According to this rationale it is assumed that process innovation leads to a reduction in the fixed and/or marginal costs per unit which influences economies of scale and/or scope (Swann, 2014). In neoclassical (micro) economics theory, firm-level cost advantage (or value) is often achieved by these basic mechanisms (Besanko, Dranove, Shanley, & Schaefer, 2009). In summary, it can be stated that traditionally firms are embedded in harshly competitive environments in which innovation were sought with the idea for cost-reduction perspective.

1.2 Firms beyond traditional economies of scale

In contrast to this monist perspective, nowadays business takes place in interdependent networks or relationships and that these business networks have penetrated the global economy. Networks thread throughout our lives and provide the fabric for our societies and economies and the infrastructure for commerce, science and technology, social systems and education. A few traditional examples of networks which supply the basic foundation for economic and social activity are: transportation, communication, energy, and financial networks (Nagurney, 2002). With the advent of information technology, Shapiro and Varian (Shapiro & Varian, 1991) make a distinction between old and new economies. According to Shapiro & Varian the old economies are economies of scale. Most often, the scale increase is on the supply side of the economy. The main production costs go down due to scale increase.

The new economies are economies of networks. These network economies are also subject to scale effects. However, compared to the old economies of scale, the scale increase is on the demand side. In the new network economies, value is determined by network use. This implies that these networks become more valuable when they increase in size. According to Shapiro & Varian (1991): “Positive feedback makes the strong grow stronger and weak grow weaker”. The value of a network depends on the number of other people already connected to it. Large networks are more valuable than small networks and large networks will thus tend to attract more new customers, resulting in even larger networks. When value is determined by size, positive feedback leads to extremes: dominance of the
market by a single firm or technology. When two or more firms compete in a market where there is strong positive feedback, only one will emerge as winner.

The rules of the game as mentioned by Shapiro and Varian (2013) contain some of the factors such as rights, pricing, lock-in and feedback, which are subject to the dynamics of network economics. Most technology companies start out with trying to solve a certain problem of the market or in few cases, a service which the market can be better off with. The success of the introduction of a new solution can be cited to two main reasons that of either that the solution is cost-saving or the cost paid to switch to this new format is lower than the benefits of adoption. The second option means adoption where quantity or mass of adoption will be a factor to consider.

1.3 Business models, business strategy and innovation

Developments in the global economy have changed the traditional balance between customer and supplier. New communications and computing technology, and the establishment of reasonably open trading regimes, mean that customers have more choices, variegated customer needs can find expression, and supply alternatives are more transparent. Business therefore need to be more customer-centric, especially since technology has evolved to allow the lower cost provision of information and customer solutions. These developments in turn require business to re-evaluate the value propositions they present to customers- in many sectors, the supply side driven logic of the industrial era has become no longer viable.

This new environment has also amplified the need to consider not only how to address customer needs more astutely, but also how to capture value from providing new products and services. Without a well-developed business model, innovators will fail to either deliver- or to capture – value from heir innovations. This is particularly true of Internet companies, where the creation of revenue streams is often most perplexing because of customer expectations that basic services should be free.

A business model articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers. It also outlines the architecture if revenues, costs, and profits associated with the business enterprise delivering that value. The different elements that need to be determined in business model are listed by Teece (2010) as below.

- Selection of technologies and features to be embedded the product/service
- Determine benefit to customer from consuming/using the product/service
- Identify the market segment to be targeted
- Confirm available revenue streams
- Design mechanisms to capture value
- And back to step one again

The issue related to good business models design are all interrelated, and lie at the core of the fundamental question asked by business strategist- how does one build a sustainable competitive advantage and turn a super normal profit? A business model defines how the enterprise creates and delivers value to customers, and then converts payments received to profits. To profit from innovation, business pioneers need to excel not only at product innovation but also at business model designs, understanding business design options as well as customer needs and technological trajectories. Developing a successful business model is insufficient to assure competitive advantage as imitation is often easy: a differentiated (and hard to imitate) – yet effective and efficient- business model is more likely to yield profits. Business model innovation can itself be a path way to competitive advantage if the model is sufficiently differentiated and hard to replicate for incumbents and new entrants alike.
1.4 Previous research related to business leadership and innovation

Previous research regarding business networks (besides the business ecosystem), has provided dozens of concepts. Once an organization is fairly successful in providing a solution or alternative to the market, the natural course of action is to add to their services which are related, showing a type of evolution growth for the company and industry. This while they continue to improve and their core offering as per market requirements and expectations.

Among some requirements for organizations to make successful market offering and meet market demands a key differentiator is - Innovation. Innovation can be defined as the application of new ideas to the products, processes, or other aspects of the activities of a firm that lead to increased “value” (Greenhalgh & Rogers, 2010). The aspect of innovation can be looked at from various views, like that of product, process value generated from innovation. We will further look at aspects of organizations to understand innovation at the organization levels.

As an organization specializes in their offering and grows, it can specialize in single or multiple cores. The offering via which these services are offered can be labelled as a platform. Platforms which are defined as subsystems and interfaces that form a common structure from which a company can efficiently develop and produce a family of products (Gawer & Cusumano, 2014). In platform markets – industries are characterized by a foundation technology around which third party firms create complementary innovations.

1.5 Scope of research: from product and process innovation to business model innovation

In this section the scope of the research will be pointed out. By now, it should become clear that there are many areas of research and (slightly) different concepts which all provide valuable insights in how firms create value. First, the concepts of the why platform leadership is crucial for innovation. Second, how does this lead to concepts beyond product and process innovation. Both concepts will be dealt with more in detail in the following chapters. They will be briefly introduced here.

1.5.1 Platform leadership

Platform leadership is achieved when a single platform among competing platforms in an ecosystem becomes dominant. The dominance of a platform can be measured in many ways, like the applications supported by a single platform, the number of industry a single platform caters to. For a solution to have the potential to become platform, it should be already solving an essential problem in an industry. It should be easy to connect to or to build upon to expand this existing system of use as well as to allow new and unintended end-uses. The idea of platform leadership is to expand current solution offerings and extend them to other industries. The idea of a platform is also to attract other stakeholders onto it, other contributors’ means there will be collective problem solving as well as the risks are distributed. If these happen, then the expansion of the platform onto other industries makes it further possible. The role of the platform owners is to ensure the platform is beneficial to all the stakeholders as well as they have an open ear to their requirements continuously. Platform owners have to also ensure that stakeholders are enthused and have continued faith in the platform owners. We will further look at in detail the framework for becoming a platform leader as well as the essential qualities required for the same. Of course in this entire process for attaining platform leadership innovation is a key factor, where this innovation is essential and its value will also be part of this study. To understand this better will study beyond platform leadership, the domain of innovation in a firm with platform potential.

1.5.2 Business model innovation

Whenever a business enterprise is established, whether explicitly or implicitly it employs a particular business model that describes the design or architecture of the value creation, delivery, and capture
mechanisms it employs. The essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profits (Teece D. J., 2010). A superior technology may fail if the business model is not good enough. A well thought business model is as essential as the technology. The business model defines how the product will reach the end-user, and is also part of the entire user experience. The business models is essential from the fact that it defines the monetization of technology. The business model is key to how monetization happens and funds are generated for the firm, this can also further determine the investments and further research, development and expansion activities of the firm. The various business models and scenarios will be studied. The scenarios will be studied to understand better the various opportunities and option available to a firm. This is interesting from the strategic viewpoint.

The study will enable to analyze the business path and map it with the vision of the leadership team. The study will give an overview of the recent trends and ways of business in the innovation ecosystem. The mapping of the vision of leadership along with current situation, will guide in making educated strategic decisions. The idea of this study is to better understand the options available in various scenarios and helping in analyzing which decision is better suited at particular times. At the crossroad of decision making, essentially stakeholders are brought in and an all-pleasing decision is tried to reach at amicably. However in the fast pace technology business, where a platform affects which reach far and wide have to be thoughtfully treaded. The decisions have to be made keeping in mind not just technological and business but also long term plans and effects.

1.5.3 HERE and Points of interest

For the purpose of this thesis, a focal firm is selected for study. HERE is a firm in the business of digital maps and navigation services, with a major Europe operations office in Eindhoven. Product managers for the west European market as well as the global leads are based here in Eindhoven.

HERE has its roots in a start-up which began life-mapping San Francisco in the mid-1980s. This company would later become known as Navigation technologies and then as NAVTEQ and eventually as HERE. In 1994 they developed the first automotive-grade map. HERE is currently co-owned by German automotive companies Audi, BMW and Daimler. HERE has created maps for 196 countries with many of navigation grade. In addition there is public transit maps for 5000 cities and indoor maps for nearly 13000 venues. HERE maps are currently present in 4 out of 5 cars with in-dash navigation in the market. HERE is cited to have 85% of the market share in navigation services, making it a leader in the maps and navigation business ecosystem.

In its constant endeavor to better its product, HERE is in a continuous process of improvement and including new features. The HERE products are required to make navigation easier as well as maintain high standards of navigation purpose, with intelligent information. HERE being a leader is also at risk to lose their monopoly position with their platform if it does not keep up with technology, ways of doing business as well as generate innovation on both fronts. HERE is working on various products to support the autonomous driving projects by automakers. The autonomous driving projects require maps of very high grade quality. This also requires for dependability on information provided by the maps. The information provided by the HERE navigation, can be collected by themselves or sourced from suppliers. This data sourced from various sources may have differential value. HERE sources the data based on its requirements, and trends in the industry. The data requirement has been increasing exponentially and is expected to increase at high rates in the coming years. This data can be sourced in exchange for different not just monetary value but also other good, like data exchanged for data. To source this data in large quantity as well as its utilization, requires strategic planning. As the value of data is dynamic and keeps changing with time, it is important to receive value as per requirement as well as what it is exchanged for. It is important to receive data at not just the right price, but also to receive the type of required data, and receive it in a manner required by the firm. These are criteria for
data requirement that will ensure they are used in an efficient manner. Among the different kinds of sourcing activities, one kind of data sourced is Point of interest (POI) data, POI is a specific point location on the map that someone may find useful or interesting like hotel, fuel stations or camp sites. This POI data sourcing which is at a project level in the business of HERE will be our focus to answer the below research questions

1.5.4 Research questions
The research question will delve into the importance of business models for platform leaders. The sub research questions will aim at linking the idea of innovation with business models, and its importance in the digital maps and navigation industry.

To answer the main research question, sub questions are derived that form a link between platform leadership and business model innovation. The sub research questions are aimed at understanding the importance of business model innovation and how they are implemented at a firm level.

**Main research question**

Why and how does a platform leader in the navigation industry create business model innovation?

**Sub research Questions**

1. To what extent is business model innovation crucial for a platform leader?
   (See chapter 2)
2. What are the determinant characteristics of innovation in business models in the navigation industry?
   (See chapter 3)
3. How are the different ways of sourcing POI (Points of interest) business model innovations at HERE?
   (See chapter 4)
4. How are the characteristics of innovation in business model reflected in the business models for sourcing POI data in the business of HERE and why is it important for a platform leader in the navigation industry?
   (See chapter 5)
Chapter 2: Platform leadership and business model innovation: Theoretical discussion

Gawer and Cusmano (2014) suggest two types of platforms namely; internal or company-specific and external or industry-wide platforms. Internal or company specific platforms are defined as set of assets organized in a common structure from which a company can efficiently develop and produce a stream of derivative products. Internal products, services or technologies that act as a foundation upon which external innovators, organized as an innovative business ecosystem, can develop their own complementary products, technologies, or services. With the advancement in technology there is changes in business and economy structure. There is a central difference between the old and new economies: the old industrial economy was driven by economies of scale; the new information economy is driven by the economies of networks (Shapiro & Varian, 1999). That means when there are more users who adopt a platform, the more valuable the platform becomes to the owner and the users. This is because of growing access to the network of users and often to a growing set of complementary innovations. Since platforms have the ability to create a multiplayer ecosystem, they can be subject to network effects. Digital platforms are distinct in the sense that they are often associated with “network effects”

To understand economies of network better, understanding the concept of network effects is crucial. The network effect is a phenomenon whereby a good or service becomes more valuable when more people use it. Shapiro & Varian (1991) make a distinction between old and new economies. According to Shapiro & Varian the old economies are economies of scale. Most often, the scale increase in on the supply side of the economy. The main production costs go down due to scale increase. The new economies are economies of networks. These network economies are also subject to scale effects. However, compared to the old economies of scale, the scale increase is on the demand side.

In the new network economies, value is determined by network use. This implies that these networks become more valuable when they increase in size. According to Shapiro & Varian (2013): “Positive feedback makes the strong grow stronger and weak grow weaker”. The value of a network depends on the number of other people already connected to it. Large networks are more valuable than small networks, large networks will thus tend to attract even more new customers, resulting in even larger networks. When value is determined by size, positive feedback leads to extremes: dominance of the market by a single firm or technology. To gain from network effects, firms have to have a certain number of minimum subscribers/users also called as critical mass beyond which growth is imminent.

One key-objective for platform-based new product development seems to be the ability to increase product variety and meet diverse customer requirements, business needs, and technical advancements while maintaining economies of scale and scope within manufacturing process. Researchers have identified a few fundamental design principles or “design rules” that appear to operate in internal product platforms, in particular the stability of the system architecture, and the systematic or planned reuse of modular components (Gawer & Cusumano, 2014).

Rashik Parmar (2014) in the discussion of patterns of Innovation discusses the patterns of using data, which aid or form the basics of innovation. As per them the five patterns are:

1. Augmenting products to generate data
2. Digitizing data
3. Combining data within and across industries
4. Trading data
5. Codifying a distinctive service capability.

The first pattern of Augmenting products so as to develop capabilities of gathering and crunching enormous and detailed data in a variety of contexts, which can be used to improve the design, operation,
maintenance, and repair of assets or to enhance how an activity is carried out. Such capabilities, in turn can become the basis of new business models. The second pattern of digitizing data has unlimited opportunities, giving rise to new business models, e.g. iTunes, streaming video services, e-readers giving rise to new businesses and business models. Digitized versions of physical assets are transforming the way people operate across industries. As digitalization of assets expands, the competitive advantage shifts reducing the distribution costs and increasing efficiency. Enabling offerings with more choices and more tailored services to be possible efficiently. The third pattern of combining data within and across industries, the science of big data, along with new IT standards that allow enhanced data integration, makes it possible to co-ordinate information across industries or sectors in new ways. Consider the example of electric grid data combined with probe data from electric vehicles, being used to design and implement electric charging station networks. The fourth pattern of trading data is the ability to combine disparate data sets allowing companies to develop a variety of new offerings for adjacent businesses, e.g. of the Vodafone and TomTom partnership, where Vodafone could identify from its customers who were travelling in a vehicle and monitor their speed, trading this information to TomTom so as to identify traffic congestion, improve traffic and transit management. The fifth pattern is of codifying a distinctive service capability. IT systems have helped automate business processes. Companies have a practical way to take process they have perfected, standardize them to other parties.

Any process that is best in class but not central to a company’s competitive advantage can thus be turned into a profitable business. IBM’s global expense reporting solution was originally developed to automate all steps in the company’s internal travel bookings and expense reporting processes. IBM found that in addition to reducing related administrative costs by 60-75% the systems that helped ensure that employees complied with corporate T&E policies, lowering total expense spending by up to 4%. Later realizing that many of its customers would be interested in achieving comparable savings, IBM turned the system into a service. There are many such examples which can be cited where internal practices became global services. This is not restricted to IT processes alone. If companies make these industry leading capabilities available to other companies as a service, it could launch a new line of business. That business could in theory be developed into a disruptive platform.

By identifying what is the information availability and what can be further cultivated within, gives insight into an organization’s capabilities for itself. This can help enhance what can be produced with available resources and also recognize shortcomings. To overcome these shortcomings how can one develop to fill the gaps internally or even with the help of co-operation with external partners.

2.1 Platforms and platform (strategies) Leadership:
Achieving platform status requires specific decisions that govern technology evolution, product and system design and business relationships within the ecosystem (these are different decisions than those made when pursuing a product strategy (Gawer & Cusumano, 2008). To have platform potential research suggests that a product must satisfy two prerequisite conditions: 1) It should perform at least one essential function within what can be described as a “system of use” or solve an essential technological problem within an industry, and 2) It should be easy to connect to or to build upon to expand the system of use as well as to allow new and unintended end-uses. To test these conditions one can evaluate whether the overall system could function without the particular product or technology. Also to test whether a product or a technology is easy to connect to or build upon.

Michael Cusumano and Annabelle Gawer (2002) have identified 4 levers of platform leadership, 1) Scope 2) Product technology 3) External relationships 4) Internal organization. Scope comprises the amount of innovation the company does internally and how much it encourages outsiders to do. Managers of companies that are or want to be platform leaders, will need to make a roadmap for the extent to which they will have in-house capability and the extent to which they will allow the market to
create complementors. For the product technology lever decisions about the architecture of the product and the broader platform needs to be taken. This has to be in terms of modularity i.e. how open their interfaces should be and how much information to disclose to outsiders, who can later become competitors or complementors. The third lever is external relationships in which managers must decide how competitive or collaborative they want to be. This also means handling potential conflicts of interest. The fourth lever of internal organization, the right internal structure can help platform producers manage external and internal conflicts of interest. The goals, organization culture and communication are key features in this lever to manage. Platform leaders need to have a vision that extends beyond their current business operations and the technical specifications of one product or one component. The ecosystem can be greater than the sum of its parts if companies follow a leader and create new futures together. Complementors need to understand the vision of the platform leader in their industry and make bets on what that vision means for their own future. The vision is most important as platform leaders need to influence the complementary innovations made by outside companies.

In the recent past there have been advances in technology on the front of, increased datafication of things, increased memory storage capacity and increased processing power. This has led to a dramatic increase in the amount of data. When the Gutenberg press was invented there was a doubling of information stock every 50 years (Mayer-Schonberger & Cukier, 2013). Information today grows at a much faster rate. The various predictions for the growth rate of information point towards exponential growth. This information is exchangeable and tradeable, which means the value of an information and data can be generated. However deriving the value for a set of data, is much more than arithmetic of demand and supply. As value can be derived from data, and until this is not derived, determining it is difficult.

2.2 Platform Ecosystems

Platforms are creating entirely new blueprints for competition, one that puts ecosystems in head-to-head competition. The ongoing migration from product and service competition to platform-based competition in many industries and markets is driven by the following forces - packetization of products, services and activities; software embedding and ubiquitous networking of everyday objects; and the increased need for specialization. These are increasingly infusing the characteristics of the software industry into many nontechnology industries. What served well in product-based markets can become their Achilles’ heel in platform-based markets. Managing a platform based business requires an entirely different mindset for strategy. Most of the old rules of business are alive and well, but many of the assumptions behind them do not hold true in such environments. However few observers have moved beyond individual superstar anecdotes such as Apple, Facebook and Amazon to analyze the broader principle and mechanisms that generalize beyond them. How should platforms be designed? How should they be governed, controlled and priced? How can the work of so many be coordinated in the absence of familiar organizational structure? How do these choices shape their evolvability? Their competitive durability and their survival? How can their design create win-win propositions for app-developers and users? How does a product or a service evolve to become a platform? (Tiwana, 2013)

Tiwana (2013) discusses two premises, first the migration of competition from products to platforms in technology industries requires a different mindset for managing them. Second, evolvability in unforeseeable ways is key to thriving in platform markets but is rarely the dominant emphasis in complex software systems. Architecture and strategy are the two gears of a platform’s evolutionary motor that must interlock and align. Evolution is therefore predicated in the interplay between its irreversible architecture and how it is governed. Platforms that thrive are the ones whose ecosystems outpace rival ones in the evolutionary race. The 5 drivers of the migration towards the software platforms according to (Tiwana, 2013) are listed as
1. The need for deepening specialization as first struggle to deliver increasingly complex products and services
2. The “packetization” of products, services, business processes and activities
3. The baking of routine business activities into software across a plethora of industries.
4. The emergence of the Internet of Things
5. The growing ubiquity of cheap, fast and untethered digital networks.

The confluence of these drivers can infuse properties of software platforms into products and services.

Platform based software ecosystems such as the iOS and its 800000 “apps” produced by 200000 firms or Facebook and its 9 million apps are increasingly becoming the dominant model for the software and digital services. The utility of any platform is shaped by the ecosystem that surrounds it. Taking the example of Apple’s record breaking iOS platform including the iPhone, iPod and iPad. The value to its 365 million users comes largely from the 800000 complementary apps over which Apple has little ownership. Unlike traditional software development, platforms are designed to leverage the expertise of a diverse developer community with ingenuity, hunger, skills and appreciation of user needs that platform owners might not possesses. The emergence of such platform ecosystems (simple systems, composed of diverse smaller systems) change the locus of innovation from a firm to a massive network outside the firm. The goal is to develop new capabilities and foster innovations unforeseeable by the platform’s original designers. The idea of a platform is not new. Product families have existed in the tooling industry for decades.

Software platforms function on a scale that is unprecedented in the industrial age because they allow literally hundreds of thousands of companies to collectively do things that a traditional network of partners or intricate supply chains could not even dream of accomplishing. The potential power of platform ecosystems comes from leveraging the unique expertise of many, diverse independent app developers driven by market incentives on a scale that is impossible to replicate within a single organization. The platform model essentially outsources innovation to thousands of outside partners that used to be done in-house, who bear all the costs and risks of innovating and then share the proceeds with the platform owner. The potent mix of specialized expertise with disciplining power of the markets, can foster innovation at a rate that exceeds by order of magnitude conventional business models. Products that became platforms from 1990 until 2004 enjoyed a 500% increase in innovation, most of which came from outside developers. (Bourdreau, 2010). A platform’s success therefore depends not only on the platform owner, but also in a multitude of ecosystem partner’s ability to deliver (Adner, 2012).

2.2.1 Elements of a platform ecosystem

A platform based ecosystem consists of two major elements – a platform and complementary apps, as illustrated in figure 2.1.
A software platform is a software based product or service that serves as a foundation on which outside parties can build complementary products or services. A software platform is therefore an extensible software-based system that provides the core functionality shared by “apps” that interoperate with it, and the interfaces through which they interoperate (Tiwana, 2013). We refer to the lead firm primarily responsible for the platform as the platform owner, sometimes also called the ecosystem’s keystone firm (Iansiti & Levien, 2004) or the economic catalyst (Schmalense & Evans, 2007). Platform ownership can be shared by multiple firms and a platform need not be proprietary or for profit. An app refers to an add-on software subsystems or software service that connects to the platform to extend its functionality. Although such complementary subsystems are often also called add-ons, plug-ins, modules, and extensions, here we refer to such platform complements simply as apps and their developers as app developers. Apps are complementary goods for platforms; platforms are functionality more desirable when there are a wide variety of complements available to them (Two products are complements when one increases the attractiveness for the other, think of cookies and milk or a laptop and a web browser.) For example, internet streaming boxes are more desirable when streaming content is widely available; smartphones are more valuable when networks supporting them exist, Amazon’s Kindle is more valuable when publishers produce e-books. The platform therefore consists of the enabling core technologies and shared infrastructure that apps can leverage. Apps access and build on the functionality of the platform through a set of interfaces that allow them to communicate, interact and interoperate with the platform. The collection of the platform and apps that interoperate with it represents the platform’s ecosystem.

Outside of these central elements of a platform ecosystem are three other contextual features: end-users, rival platform ecosystems, and the competitive environment in which they exist. End-users are the collection of existing and prospective adopters of the platform. The characteristics and diversity of this market evolves over time and as industries coverage and split. A platform ecosystem exists within a larger competitive environment, often competing with other rival platform ecosystems. The competition within this environment is rarely directly among the platforms themselves but rather among competing ecosystems. If a platform has increasing number of apps using the platform and in turn increased number of end-users it becomes stronger in the competition with other rival platform ecosystems. Increasing
number of apps and users increases the size of the platform in terms of its span and reachability. The more number of apps also means increased dependencies and access to assets of partner or platform users. The more intense this competition, the more important a platform’s evolution becomes for surviving and thriving. A vibrant and dynamic ecosystem is therefore key to the survival of any software platform, and increasing of products and services as they morph into platforms or become subservient complements of another platform.

2.3 Value chain of a platform ecosystem
An ecosystem can also be divided into its upstream and downstream parts of a value chain, the upstream part of the value chain is what goes into producing the platform itself (component and hardware suppliers, software licensor, manufacturing partners, and network connectivity providers). The downstream part of the value chain includes platform complement producers (primarily app developers and complementary service providers), end-users who adopt it, and other intermediaries between the platform owner and end-users such as retailers and carriers (Adner & Kapoor, 2010). Apps are therefore downward complements to a platform. Downstream complements are bundled by a platform’s end-users to customize the platform to their unique needs (Adner & Kapoor, 2010).

Other downstream complements are necessary but insufficient to sustain differentiation of a platform vis-à-vis rival platform. The platform itself therefore serves as only one part of the larger bundled system from which the platform’s end users derive value. The attractiveness of a platform to end-users comes not from the platform itself but from what they can do with it. The fate and survival of a platform then critically hinges on the diversity and vibrancy of its downstream ecosystem. The evolutionary battles of platform dominance and survival are fought primarily downstream, where formidable competitive barriers for rival platforms can be created. That does not mean that the upstream is unimportant, the upstream is responsible for the quality the platform can provide to the downstream, impacting the quality delivered by downstream components.

![Figure 2.2: Upstream and downstream parts of platform value chains.](image-url)
2.4 Business model innovation: Open (Chesbrough) versus Proprietary (Teece)

Whenever a business enterprise is established, whether explicitly or implicitly it employs a particular business model that describes the design or architecture of the value creation, delivery, and capture mechanisms it employs. The essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profits (Teece D. J., 2010). Business models matter, a better business model will beat a better idea or technology. But business models are not all the same. To innovate your business model, you must first understand what it is, and then examine what paths exist for you to improve upon it. In the following sections are summaries of business models defined by researchers, and their viewpoints on the same.

The researcher Henry Chesbrough promotes the term “Open Innovation”, Chesbrough is professor and faculty director of the Center for Open Innovation at the Haas School of Business at the University of California. The term refers to the use of both inflows and outflows of knowledge to improve internal innovation and expand the markets for external exploitation of innovation. Chesbrough also extends this idea to business model innovation.

While researcher David Teece, who also had a stint at the Hass business school at the University of California, stresses on profitability with respect to competition. He argues about the imitability and complementary assets for capturing the value of innovation. Each of the ideas are discussed in detail further.

2.4.1 The Chesbrough idea for business model innovation:

According to Chesbrough (2007) a business model performs two important functions: value creation and value capture. First, it defines a series of activities, from procuring raw materials to satisfying the final consumer, which will yield a new product or service in such a way that there is net value created throughout the various activities. This is crucial according to Chesbrough, as according to him if there is no net creation of value, the other companies involved in the set of activities won’t participate. Chesbrough who is an advocate of open innovation also extends the benefits of it to business model innovation too, and identifies the following 6 functions of a business model.

1. Articulate the value proposition, that is, the value created for users by the offering
2. Identify a market segment, that is, the users to whom the offering is useful and for what purpose
3. Define the structure of the value chain required by the firm to create and distribute the offering and determine the complementary assets needed to support the firm’s position in this chain. This includes the firm’s suppliers and customers, and should extend from the raw material to the final customer.
4. Specify the revenue generation mechanism(s) for the firm, and estimate the cost structure and the profit potential of producing the offering, given the value proposition and value chain structure chosen.
5. Describe the position of the firm within the value network (also referred to as an ecosystem) linking suppliers and customers, including identification of potential complementors and competitors
6. Formulate the competitive strategy by which the innovating firm will gain and hold advantage over rivals

These functions point ways to certain improvements that can be made to a business model. To innovate in the domain of business model, it is important to identify what it is and then examine the paths which exist for improvement. In order to do this a firm needs to identify value creation in its structure, for who specifically is this value being created, where is the value created being generated in the value chain. After this the relation between the revenue generation and value creation needs to be identified. Once these are identified the firms position in relation to its suppliers and customers, and potential changes in the position of these. The identification of other players in the ecosystem and the possible competitive
movements by them, help to formulate a competitive strategy by which the innovating firm can gain and hold advantage over rivals.

Chesbrough in (Business model innovation: it's not just about technology anymore, 2007) builds a business model framework (BMF), the framework identifies 6 types of business models that sequence from very basic to models to far more advanced ones. Using this framework, firms can assess where their current business model stands in relation to its potential and then define appropriate next steps for further advancement of that model.

Listed below are the types of models in the BMF and descriptions to identify the type:

Type1 - Company has an undifferentiated business model: Firms that do not articulate a distinct business model and lack a process for managing it can be categorized as type 1 business models. A business using an undifferentiated business model competes on price and availability, and serves customers who buy on that criteria. The firms following this, are usually selling commodity and are often caught in the “commodity trap”.

Type2 - Company has some differentiation in its business model: The firms in this category have created some degree of differentiation in its products or services. This differentiator allows the firm to target customers other than those that buy simply upon price and availability. This allows the type 2 company to serve a different and less congested market segment from that served by its type 1 counterpart. However these companies may lack resources and staying power to invest in the supporting innovations to sustain its differentiated position. This gives rise to the pattern of so-called “one-hit-wonders” where a company or inventor has a successful first product, but is unable to follow up this success with additional products of similar success. Many technology startup companies fall into this type, where they are successful with their first idea, but lack continuity or ail to generate investments for various reasons.

Type3 - Company develops a segmented business model: A company in this category can compete in different segments simultaneously. More of the market is thus served, and more profit is extracted. The price sensitive segment provides the volume base for high volume low cost production. The performance segment supplies high margin for the business. Other niches can now be addressed, creating a stronger presence in the distribution channels. This supports the firm’s ability to plan for its future via a product and technology roadmaps. This allows room for experimentation and helps avert the one-hit wonder syndrome. However these types of business models remain vulnerable to any major new technical shift beyond the scope of their current business and innovation activities and also major shifts in market. Industries that are vertically integrated among these are most vulnerable.

Type4 - Company has an externally aware business model: In this business model, the company has started to open itself to external ideas and technologies in the development and execution of the business. This by itself unlocks a significantly greater set of resources available to such a company. The roadmaps of these companies, show relationship with external partners, identifying projects that fulfill some of these needs. Suppliers and customer relations are key to such roadmaps, sharing the firm’s plan with them help in planning activities for all partners.

Type5 - Company integrates its innovation process with its business model: In this the company’s business model plays a key integrative role within the company. Suppliers and customers now enjoy a formalized institutional access to the firm’s innovation process, and this access is reciprocated by the suppliers and customers. This enables customers and suppliers to share their own roadmaps with the company, giving the company much better visibility into the customer’s future requirements. This process makes a company look at their entire supply-chain process all the way to the basic raw materials. As they look for major technical shifts or cost reduction opportunities. This business model and affiliated processes help in understanding customer’s customer and understanding their unmet needs and opportunities.
Type 6 - Company’s business model in an adaptive platform: This type of business model is a more open and adaptive one in comparison to type 4 and 5. Thus ability to adapt requires a commitment to experimentation with one or more business model variants. There are various mechanisms used to experiment with the different business models. In this type key suppliers and customers become business partners, the relationship allows sharing of technical knowledge as well as business risk. Large corporations usually fall as part of this category. This type allows integration of the company’s business model throughout the value chain. In this was the company can attract other companies to invest their resources, expanding the value of the platform without consuming extra investment by the platform maker.

With all these types of business model categorization by Chesbrough, a company can identify itself with one of them in the BMF. Once a company is able to identify itself with one of the business models, the thing to do next is to move to a higher level of category. Chesbrough mentions if a company identifies itself as type 6, there is good news as well as bad news for the company. The good news being that it is highly likely that the business model of the company is profitable and difficult to imitate. The bad news is that no great business model lasts forever. Chesbrough cites the example of Xerox’s highly successful leasing business model, which was later upset by Japanese firms entering the market with a simpler copier with replaceable cartridges that could be sold through retailers.

2.4.2 The Teece idea for capturing value of innovation:
According to Teece (2010) business model choices define the architecture of the business, and expansion paths develop from there on out. But once established, enterprises often encounter immense difficulty in changing business models. Teece cites the examples of the difficulties American Express and Discover Card experienced, in trying to morph to hybrid models where they issue cards themselves while simultaneously looking to persuade banks as partners to act as card issuers for them. This is clearly incongruous – their main competitors (Visa and MasterCard, who provide network services only and don’t compete with banks in issuing credit cards) are not hobbled by such relationship conflicts, and are clearly likely to be the bank’s preferred partners.

Barriers to imitating business model: At a superficial level all business models might seem easy to imitate- certainly the basic idea and the business logic behind a new model is unlikely to enjoy intellectual property protection. Descriptions of a business model may enjoy copyright protection, but that is unlikely to be a barrier to copying its basic core ‘idea’. A business model can be made difficult to imitate because of the following reasons. First, implementing a business model may require systems, processes and assets that are hard to replicate- such was the situation with potential entrants into the towns too small to sustain a Wal-Mart type of competitor. Second, there may be a level of opacity Lipmann and Rumelt (1982) has referred to this opacity as ‘uncertain imitability’ that makes it difficult for outsiders to understand in sufficient detail how a business model is implemented, or which of its elements in fact constitute the source of customer acceptability. Thirdly, even if it is transparently obvious how to replicate a pioneer’s business model, incumbents in the industry may be reluctant to do so if it involves cannibalizing existing sales and profits or upsetting other important business relationships. When incumbents are constrained in this way, the pioneer of a new business model may enjoy a considerable period of limited competitive response. Notwithstanding these constrains the competition is likely to be vigorous because other new entrants, similar unconstrained by incumbency and cannibalization anxieties, will be equally free to enter.

Business model learning: Even if an incumbent competitor learns new business models and is able to imitate a business model it does not guarantee that the firm will be successful to the pioneer of the business model. Teece quotes the example of Netflix and Blockbuster Online, where Blockbuster the imitator is looking to imitate the business model of Netflix, but was unsuccessful. Blockbuster implemented a close facsimile of the Netflix business model (even its web site was very similar,
featuring starts, recommendations, box shots and the “dynamic queue”) and achieved reasonable success, undoubtedly blunting Netflix’s growth. While blockbuster Online was a good defensive move, Netflix’s pioneering status and its capacity to improve its business model, and enforce its patents, has helped undergird its competitive advantage. Technological innovation does not guarantee business success – new product development efforts should be coupled with a business model defining their “go to market” and “capturing value” strategies.

Profiting from innovation framework: Figuring out how to capture value from innovation is a key element of business model design. Every new product development effort should be coupled with development of a business model which defines its “go to market” and “capturing value” strategies. Clearly technological innovation by itself does not automatically guarantee business or economic success. Scholars have recognized that technological innovation without a commercialization strategy is as likely to lead to the (self-) destruction of creative enterprises as it is to profitable (Schumpeterian) creative destruction, technological innovation is often assumed by some to lead inexorably to commercial success. Good business model design and implementation, coupled with careful strategic analysis, are necessary for technological innovation to succeed commercially: otherwise, even creative companies will flounder. Quintessential examples of firms that succeeded at technological innovation but failed to get the business model and the technology strategy right are EMI (The CAT scanner) and Xerox.

The profiting from Innovation framework can thus be considered as a tool to help business models, and using it allows one to map business model selection to type of innovation, while simultaneously enabling one to figure out where intellectual property monetization through licensing’s likely to be viable, and where it’s not, or where some kind of vertical integration is indicated.

- At one end of the scale stands the integrated business model, in which an innovating firm bundles innovation and product together, and assumes the responsibility for the entire value chain from A to Z including design, manufacturing, and distribution. Clearly, companies that have the right assets already in place are well equipped to do this; but the framework also indicates when the internal development and commercialization strategy is a necessity.
- The other extreme of the scale is the outsourced (pure licensing) business approach, one that has been embraced by a number of companies, like Rambus (semiconductor memory) and Dolby (high fidelity noise reduction technology). With respect to licensing versus internal commercialization by the innovator, the framework yields answers calibrated according to the strength of the appropriability/intellectual property regime. Thus one could license- and expect the licensing model to work- only if one had strong intellectual property rights: without them the licensee might well be the one who captures value, at the expense of the innovator.
- In between there are hybrid approaches involving a mixture if the two approaches (e.g. outsource manufacturing; provide company owned sales and support). Hybrid approaches are the most common, but they also require strong selection and orchestration skills on the part of the management.

The profiting from the Innovation framework can thus be considered as a tool to help design business models, and using it allows one to map business model selection to type of innovation, while simultaneously enabling one to figure out where intellectual property monetization through licensing is likely to be viable, and where it’s not, or where some kind of vertical integration is indicated. Although (by construction) it is silent on many issues such as market segmentation and the choice of product features, it nevertheless can provide insights into how a value chain ought to be assembled. And it can predict winners and losers from the competitive process in the context where a customer need is being met.
2.4.3 Complementarities and contrasts of the Chesbrough and Teece idea

From the above summaries of the ideas of Chesbrough and Teece we can draw contrasting ideas as well as similarities between the two. It can be understood that the Chesbrough view is internal to a firm and the Teece view is more external to a firm. A firm can understand its own character and classify its strengths and capabilities with respect to innovation from the Chesbrough framework. It is part of an internal structure and improvisation plan. It is more like a ladder to climb. While the Teece viewpoint is from the external factors that can influence an innovation produced by a company. It is like strategically creating a maze or labyrinth around in the ecosystem, while the firm is expected to climb the ladder. According to Chesbrough a company has different stages at which it can identify itself based on its current operations and plan its path ahead, while Teece draws the conditions for profitability from an innovation. Teece explains based on the business model the ability to make profits as well as the possibility for competitors to imitate and draw profits and have a share of the pie. Both Teece and Chesbrough argue, no matter how innovative the technology or solution is and how innovative the accompanying business model is, it is short-lived until the profits can be reaped. The life of the technology/solution and business model will last until another technology/solution and business model is introduced and accepted in the market. This new technology/solution maybe by the same firm or another firm. Another aspect of this is the bargaining power of entities in the ecosystem. The bargaining power also determines the profitability of the entities in the value chain. The higher the bargaining power more are possibilities for increasing profitability for a firm. Both the activities of innovation internally and ecosystem management have to be run parallel, and should be made to work in sync with each other. There should be stress on importance of ecosystem management, as no matter how innovative the company is, management of its innovation in external situations and influence of outside effects is important.

2.5 Summary

Gawer and Cusumano explain the characteristics of a platform and how for a platform when there are more users who adopt a platform, the more valuable the platform becomes to the owner and the users.
Shapiro and Varian discuss the network created due to a platform and the network effects. Positive feedback makes the strong grow stronger and weak grow weaker”. The value of a network depends on the number of other people already connected to it. Large networks are more valuable than small networks, large networks will thus tend to attract even more new customers, resulting in even larger networks. Data is shared and exchanged in this network and the value of this data is also deterministic of the net value of a network. There are some guidelines by Rashik Parmar on how data value is augmented. The platform ecosystem and platform leadership theories are discussed like how more number of apps developed on a platform attract more users to the app and thus users of the platform. This increases the value of the app and makes it a platform leader. However the survival of a leader as one is the challenge and there are many ways to try to maintain the position as a platform leader. One of the key ways is by continuously providing increased value to the partners in the ecosystem. The value chain of an ecosystem discusses the flow and relationships of various entities in the ecosystem. It is important that the value addition is delivered to as many of these entities as possible. Chesbrough and Teece discuss two contrasting yet complementary ways for platform leadership.

From the above discussed theories the answer to the sub research question1 can be understood, which is for the digital platforms to thrive, capturing value of data is crucial and important to attain and maintain the position of a platform leader. This is in addition to value creation for partners via the technology provision as well as new goods and services. For this value capture of data it needs to be traded in innovative ways, the innovative ways to trade data can be done by innovation in business models which deal with trade of data.

The focus for this thesis will be on business model innovation in data sourcing, the sourcing of data for the business of HERE can be done in various ways. HERE procures Point of Information (POI) data for its products from various enterprises, the characteristics of this aspect of data sourcing will be studied (this is explained in detail further). The various business models are identified and explained in the coming chapters. The characteristics that will be looked for in the business models for sourcing data are listed as novelty, efficiency, complementarities, lock-in, experimentation, learning and value creation for consumers. These characteristics are selected from the point of view of platform leadership. What are the business model characteristics that enable the partners to join the platform and in turn is beneficial to the platform leader? Characteristics like complementarities, lock-in and value creation for customers ensure that partners prefer the platform provider and it encourages them to work for further development of the platform. These characteristics provide mutual benefit and foster trust between the platform leader and partner. The characteristics of novelty, efficiency are markers against other platform providers and help partners in making the choice of a platform provider, these characteristics are vital for attracting partners to the platform, after which characteristics of complementarities, lock-in and value creation is what keep them. The characteristics of learning and experimentation are vital from the future perspective, they allow the growth of partners and also the platform leader, making it a fruitful partnership for all participants. These characteristics will help in measuring to what extend business model innovation fosters growth of the platform and what it adds to the platform.
Chapter 3: Characteristics and determinants of business model innovation

3.1 Characteristics of business model

Despite business model lineage going back to when societies began engaging in barter exchange, business models have only been explicitly coming under the scanner of the people in the recent times (Teece D. J., 2010). Driving factors include the emerging knowledge economy, growth of the internet and e-commerce, the outsourcing and offshoring of many businesses activities, and the restructuring of the financial services industry around the world. In particular, the way in which companies make money nowadays is different from the industrial era, where scale was important and the capturing value thesis was relatively simple i.e. the enterprise simply packed its technology and intellectual property into a product which it sold, either as a discreet item or as bundled package. The existence of electronic computers that allow low cost financial statement modelling has facilitated the exploration of alternative assumptions about revenues and costs.

Additional impetus has come from the growth of the internet, which has raised anew, and in a transparent way, fundamental questions about how a business can deliver value to the customer, and how they can capture value from delivering new information services that users often expect to receive without charge. It has allowed individuals and business easy access to vast amounts of data and information, and customer power has increased along with shopping being made easier. In some industries, such as recording industry, internet enabled digital downloads compete with established channels (such as physical product sales) and, partly because of the ubiquity of illegal distribution of digital downloading, the music recording industry is being challenged to completely re-think its business models. More generally, the internet is causing many ‘brick and mortar’ companies to rethink their business models.

No matter what the sector, there are criteria that enable one to determine whether or not one has designed a good business model. A good business model yields value proposition that are compelling to customers, archives advantageous cost and risk structures, and enables significant value capture by the business that generates and delivers products and services. ‘Designing’ a business correctly, and figuring out the implementing – and then refining- commercially viable architectures for revenues and for costs are critical to enterprise success. It is essential when the enterprise is first created; but keeping the model viable is also likely to be a continuing task (Teece D. J., 2010).

A good business model will provide considerable value to the customer and collect (for the developer and implementer of the business model) a viable portion of this in revenues. But developing a successful business model (no matter how novel) is insufficient in and of itself to assure competitive advantage. Once implemented, the gross elements of business models are often quite transparent and (in principal easy to imitate – indeed, it is usually just a matter of few years- if not months- before an evidently successful new business model elicits imitative efforts. In practice, successful business model to some degree are adopted by multiple competitors. A good business model is more generic than a business strategy. Business strategy and business model are interlinked their analysis needs to be coupled. For better understanding of both.

The business model developed around Google’s product/service innovation required heavy investment in computing power as well as in software. Google writes its own software and builds its own computers. It takes advantage of its considerable computing power to count words and links, and to combine information about words and links. This allows the google search engine to take more factors into account than others currently in the market. The google revenue model eschewed funding from advertisers: directed search biased to favor advertisers was perceived by Google’s founders as degrading to the integrity of the search process and to its emerging brand.
In short, innovating with business models will not, by itself, build enterprise-level competitive advantage. However, new business models, or refinement or existing ones, like new products themselves, often result in lower cost or increased value to the consumer, if not easily replicated by competitors, they can provide an opportunity to generate higher returns to the pioneer, at least until their novel features are copied.

3.2 Conceptual framework
Economic theory implicitly assumes that any trade that takes place around tangible products: intangibles are usually an afterthought. In standard approaches to competitive markets, the idea of capturing value is quite simply assumed away: inventions are often assumed to create value naturally whilst protected by patents, firms can capture value by simply selling output in established markets, which are assumed to exist for all products and inventions. Thus it is assumed that if value is delivered, customers will pay for it. As noted earlier, information industries have always raised challenging business model issues because information is often difficult to price, and consumers have many ways to obtain certain types of information without paying. Figuring out how to earn revenue (i.e. capture value) from the provision of information to user/customers is a key (but not the only) element of business model design in the information sector.

A business model pioneered by one company in one space may be adopted by another company in another space. A business model articulates the logic, the data, and other evidence that supports a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value. Business model choices define the architecture of the business, and expansion paths developed from there on. But once established, enterprises often encounter immense difficulty in changing business model.

In this study the focus will be on the upstream part of the value chain, the transaction between the component supplier and the platform owner. We will examine all the available types of transactions, which define the business model between these entities. The transactions involve exchange of data and monetary, there are multiple ways these transactions are made, based on the market dynamics.

From the theoretical discussion the following conceptual model can be derived. In the research the properties of the characteristics of a business model are aids for identifying them.
The framework consists mainly of characteristics for identifying business models, the identified characteristics are listed as novelty, efficiency, complementarities, lock-in, experimentation and learning. These characteristics are obtained from literature, the boxed representation shows the literature where these characteristics were drawn from. Some of the key words for each of the characteristics are also represented in the framework. The characteristics are explained in detail below.

**Novelty:** Novelty is about producing something that is original or can be perceived to be original (Borgh, Cloodt, & Romme, 2012). In a digital ecosystem, novelty can arise from introducing facilities which stimulate jointly working and new ways of interaction, creating new partnerships. When the partners work jointly on projects there is interaction and exchange of ideas. In the case of free exchange of data, there is interaction and discussions on possibilities of improvement, as one of the partners would like to start monetization form the interaction. These interactions lead to generation of novel ideas typical to that situation or ideas that meet the requirements of both the participants. We expect there to be novelty if there is deliberation to jointly work. Also when there is existence of free exchange, it is expected this will be converted to a novel way of exchanging assets as time passes.

**Efficiency:** For the case of efficiency, literature cites it as decrease in costs, however for our study as data is involved we will consider efficiency as reduced use of resources with similar or increased output. Cost reduction process can be many, but when data is involved, the idea is to receive accurate data with minimum efforts. As data is of various type and each will change at different intervals efficiency in dealing with data exchange is of high priority. Efficiency can be increased by continuous provision of training to partners for provision of requirements and making regular checks on these. Based on the results of training and checks improvements can be done at regular intervals.

**Complementarities:** When a bundle of goods or services together provides more value than the total value of the goods separately, complementarities are present (Amit & Zott, 2001). Participants are likely to generate complementarities when there is sharing of tools and resources, as both parties will be working towards improvement and increasing value for each other beyond regular situations. This sharing of resources and achieving results that are useful to all participants is generation of greater value.
Lock-in: Lock-in implies that partners are demotivated to leave the platform and choose another platform over the existing one. Partners are motivated to stay and improve continuously. Lock-in is expected to be generated when there is revenue sharing, as this is not easy to let-go as well as ways to improve and increase this revenue is a priority for the platform-user. Lock-in is expected to make a long term commitment building factors of trust and understanding among the platforms owners and users.

Experimentation and Learning: In this research the characteristic of experimentation is referred to as the possibility to experiment beyond the existing business model. Properties like the jointly working on shared tools and freely utilizing data, can lead to new ideas being pushed and tried. The possibility of learning is a complex characteristic to study by properties, as this is characteristic to be studied over time as well as the expectations and methods can vary. Since this is a characteristic expected from all the transactions. It is assumed all participants actively or passively are learning, since data exchange is involved, this will be used as a control variable in our study.

In summary and answer to the sub research question 2, the characteristics of novelty, efficiency, complementarities, lock-in, experimentation and learning in business models are identified from literature as determinants of how innovative a business model is. These characteristics will be the focus for our study of business models in this research. The key properties of these characteristics will be sought during the study.

3.3 Methodology
The goal of this study is to examine and understand the dynamics of platform leadership, followed by business model innovation in the digital business, by specifically taking up the case study of the digital maps and navigation business. To achieve this goal, different theories and guidelines are studied for the theoretical developments in these fields. To do this literature and illustrated examples which had the key words of digital platforms and business models were selected. The next step in this process was to selectively make a list of relevant literature required for the thesis. An extensive literature study of research conducted on platform leadership as well as the innovation in business model studies was done. The next step was to match the traits of platform leadership with the case study at hand, and draw observations and comments on them. Then for the study on innovation in business models, an area of business was selected which is the sourcing of data for their own products. A set of transactions are selected from the various business models in the value chain. This information is streamlined and organized into understandable format and tabulated to compartmentalize and analyze them. To analyze these business models at a project level characteristics of business models are identified, which will help in understanding to what extend does business model innovation foster growth of the platform. Since this is measured at the project level of a firm, we will understand the area of business for the application these business models and try to understand how they are implemented at the firm level. The business models are studied with the backdrop of the platform leadership scenario. The following sections discuss in the detail the methodology

3.3.1 Unit of analysis
The theory section introduced concepts of platform leadership and business model innovation. As a result, the questions for the case study are related to these concepts and already form a narrow focus on the case. This narrow focus consists of placing our focus onto the digital mapping and navigation business. This ecosystem consists of the elements: players, technologies, products and services. These elements constitute our unit of analysis. By analyzing these elements, we try to grasp the concepts of platform leadership better and also relate the problems and opportunities related to business model innovation.
3.3.2  Case selection
The case is selected after an internship at the firm. The growing industry of digital maps and navigation and the increasing importance of innovation in the industry made it lucrative and enticing. The previous experience in the field of GIS (Geographical information system) helped in understand the business and technicalities better, as well as the potential in the near future. Possible areas of study were discussed with leaders and business experts, complemented by a requirement of study in certain segments of the business.

Since the unit of analysis is focused on a single firm and its relationship with upstream entities in the value chain, we needed cases that have documentation as well as a sizeable timeline. After speaking to several project leaders within different departments, attention was drawn to business models and innovation in them. The field has few studies, but the potential and rising importance cannot be ignored. By understanding the existing business models and scenario of the possibility of innovation and development can be explored.

The quantum of documents for study under business model innovation was very high in terms of contracts and as the time limit did not permit to read them all, these were classified in various groups, which will be discussed later, and a few handful were selected for examination, the reading of agreements for a particular section was continued until there was satisfaction of understanding and possibility to generalize the category in a broad manner. These readings were used for the analysis as well as quoting them in the research.

3.3.3  Data collection
A hallmark of case study research is the use of multiple data sources (Baxter & Jack, 2008). Multiple data sources enhance data credibility (Yin, 2003) (Patton, 1990), which makes it a good research strategy to follow. Furthermore a case study research also offers the unique opportunity to examine data that is obtained qualitatively, via for instance interviews and observations, with data that is quantitatively such as statistic and survey data (Baxter & Jack, 2008). The following section will describe data collection sources.

3.3.3.1  Documents
Documents were made available from the various related departments in preparation. Documents were used to gain an understanding of the business and relationships in the ecosystem. In addition, documents offered insights into the opportunities seized in the past as well as the failure incurred by the firm. Additional data was gathered via news articles and internet. Internal documentation software were accessed for data retrieval and analysis. There were several of these repositories that needed to be accessed in a systematic order.

3.3.3.2  Interviews
Discussions with various members of the firm happened in both formal as well as informal settings. If required some of these were conducted in a very formal recoded setting to direct question is a structured manned, as well as to create an atmosphere where the focus was created as well as an opportunity for reflection was created. These interviews were used as supportive part of the study and not necessarily as the main data for the research. To list some of the interviewees, the product manager for POI, who is responsible end to end for the product POI was interviewed at multiple occasions both informally and formally. The head of the business unit for regional map and content for Western Europe, was interviewed for her vision for the future trade of data. A discussion with the head of GIS engineering was held, to discuss feasibilities for data exchange and value creation. The head for product management of all products globally was interviewed to understand the scope of innovation for POI data collection.
3.3.3 Other data sources
In addition to documentation, internet findings and interviews, the researcher engaged in meetings, town halls, and deep-dive sessions to gain better understanding of the industry dynamics and “hot topics. It was also a good opportunity to understand various perspectives and takes on the similar topics. Regular updates on strategy from the new leadership team was being tracked, via the various modes of communication used, such as video Q&As, internal communication forums like “Yammer”.

3.4 Research quality
The last section of the methodology chapter will end by showing how we have tried to solidify our findings on the aspect of validation and reliability

3.4.1 Validity
The issue of internal validity was tackled by the following guidelines for data triangulation summarized by Creswell (1994). This resulted in the following steps: first our results have been presented to experts within the firm. Secondly, we discussed or findings with participants. As a result, we have prevented unfounded conclusions and secured validity of our findings. Finally, our data has been triangulated with other data sources such as documentation from press releases, company records, policy documents, and congress proceedings.

3.4.2 Reliability
Creswell summarizes reliability as “the issue of generalizability, the uniqueness of a study within a specific context”. The methodology used for this study has been carefully described and recorded, and evaluated, as recommended by (Yin, 2003). Therefore we hope this approach will be easily reproducible for other cases. However the platform analysis is subject to individual cases and will depend on the industry under study and its development in comparison to related industries.

The methodology adapted was tested by undertaking a case study approach. The pitfall of our research strategy is that we have limited ourselves to one case study, making our assumptions for the extended ecosystem. However, by concentrating on a single case study, we obtained rich data and a detailed understanding of the context in which we applied the concepts of platform leadership. It can therefore be concluded that the work of this research provides a good fundament for using concepts in the field of ecosystem theory and the methodology as a practical tool for further analyzes.
Chapter 4: Platform leadership and business model innovation in the digital maps and navigation industry: The case of HERE

4.1 Background: HERE

In order to understand these from an organization perspective, we will consider the case from a single organization level. HERE Global BV is a company primarily in the digital maps and navigation business, by provisioning of mapping data, technologies and services to the automotive, consumer and enterprise sectors. HERE was founded in 1985 with the idea that paper maps will one day be obsolete. HERE is currently co-owned by German automotive companies Audi, BMW and Daimler. HERE has created maps for 196 countries with many of navigation grade. In addition there is public transit maps for 5000 cities and indoor maps for nearly 13000 venues. Using data collection vehicles equipped with LiDAR technology, accurate highly detailed models of the world are created. The location platform provides key services such as geocoding, routing, traffic and positioning.

HERE has its roots in a start-up which began life-mapping San Francisco in the mid-1980s. This company would later become known as Navigation technologies and then as NAVTEQ and eventually as HERE. In 1994 they developed the first automotive-grade map which covers Germany and features for the first time in the embedded navigation system of BMW E38. This enabled BMW in the USA to launch the first in-car navigation system. In 2004 the map database is enriched to power Automatic Driver Assistance Systems (ADAS). In 2006 BMW adopts the NAVTEQ adaptive cruise control using ADAS maps data to anticipate speed, curvature, slope and banking of the road ahead. In the meanwhile in 2006 Nokia acquires Gate5, a Berlin-based mobile location software company. The Nokia N95 the first flagship with smartphone with integrated GPS and “hybrid” (online and offline) maps was launched in 2007. Following which in 2008 Nokia acquired NAVTEQ, expanding its mapping business in a big way. In 2009 with predictive cruise control, Daimler trucks are the first to demonstrate fuel efficiencies using the company’s ADAS data for long-haul trucking. The smart predictive cruise control anticipates the incline, crest and decline on the road to build momentum, decrease speed and utilize built moment respectively. The company in efforts to strengthen map-building efforts in 2012 with the acquisition of California based “Earthmine” and its innovative data collection capabilities. Thus beginning the project to map the world in high-definition. Also in 2012 NAVTEQ is fully integrated into Nokia and becomes part of a new mapping business called HERE. Some of the recent highlights of the organization are in the automotive sector. In 2013 HERE and Mercedes Benz introduced the self-driving S500, this car combines sophisticated sensors and high definition maps from HERE to drive itself. This was tested on the historical Manheim-Pforzheim route taken by the first Benz patent Motorwagen took 125 years ago. HERE introduced a “hybrid” navigation solution bringing the personalized and smartphone experience to the in-car infotainment space. In 2015 HERE and BMW partner to develop connected driving experiences powered by the HERE location cloud, including smart recommendations for parking and fuel; sharing your destination and estimated time of arrival; safety alerts for hazards, speed restrictions and traffic and a companion smart-phone app which connects to your car. Jaguar Land Rover in 2015 was the first carmaker to commercially deploy HERE Auto, and end-to-end cloud enabled smart guidance solution. The Jaguar XF, the first car with HERE Auto, learns driver’s commuting patterns and preferences over time to provide a more personalized experience. (HERE document, 2016)

In its constant endeavor to better its product, HERE is in a continuous process of improvement and including new features. The HERE products are required to make navigation easier as well as maintain high standards of navigation purpose, with intelligent information. HERE is also working on various products to support the autonomous driving projects by automakers. The autonomous driving projects require maps of very high grade quality. This also requires for dependability on information provided by the maps. The information provided by the HERE navigation, can be collected by themselves or
sourced from suppliers. This data sourced from various sources may have differential value. HERE sources the data based on its requirements, and trends in the industry. The data requirement has been increasing exponentially and is expected to increase at high rates in the coming years. To source this data in large quantity as well as its utilization, requires strategic planning. As the value of data is dynamic and keeps changing with time, it is important to receive value as per requirement as well as what it is exchanged for. It is important to receive data at not just the right price, but also to receive the type of required data, and receive it in a manner required by the firm. These are criteria for data requirement that will ensure they are used in an efficient manner. We will further understand the value of data and also put it in the context of the business of HERE.

Big Data and data value: To understand the possible value of data we can consider the case of Facebook. In 2012 the day Facebook’s shares opened, the gap between its formal assets and its unrecorded intangible value was nearly $100 billion. This seems ludicrous. The unrecorded intangible value was mainly for the data owned by Facebook. The valuation of Facebook was historic in as it was the largest valuation to date for a newly listed public company. The question that rose form the historic valuation for a newly listed public company was – How to value data? Investors started to take notice of the option value of data. Share price may swell for companies that have data and can collect it easily, and may shrink otherwise. The data does not have to formally show up on the balance sheets for this to happen. Markets and investors will price these intangible assets into their valuation- albeit with difficulty. But as accounting quandaries and liability concerns are alleviated, it is almost certain that the value of data will show up on corporate balance sheets and emerge as a new asset class (Mayer-Schonberger & Cukier, 2013).

Data’s value is like an iceberg floating in the ocean. Only a tiny part of it is visible at first sight. Innovative companies that can generate secondary use of information generated for a primary purpose reap potentially huge benefits. To understand this Mayer-Schonberger & Cukier, (2013) explain citing the example of electric car’s battery level indicators telling drivers when to fill up and power-grids usage data collected by the utility company so it can manage the stability of the grid. These two primary sets of data find new value when applied to a new requirement which is to answer the questions of, where to recharge and where to build electric-vehicle service stations. Companies process this data not once but over and over again.

With new methods, tools and a new generation of statisticians companies are increasingly becoming aware of value of data. The value of data is what one can gain from all the possible ways it can be employed. The infinite potential uses are like options, in the practical sense of choices. The data’s worth is the sum of these choices: the “option value” of data (Mayer-Schonberger & Cukier, 2013). According to Mayer-Schonberger and Cukier (2013) there are three potent ways to unleash data’s option value: The reuse of data, recombinant data, and extensible data. These are described hereby below pointwise;

- The reuse of data: Data or information by itself does not create value, the value has to be added by making use of it to build insight. The data gathered may be simple data for the generator, but the insight of its usefulness for somebody else is what can create value and make it tradeable. Such as search queries and buying pattern on an ecommerce website to analyze and predict the financial health of a region.
- Recombinant data: Data that seems dormant, can be given a new lease of life by recombination. As systems work in tandem and cause-effect relationships can help in recombining data to generate a whole new perspective. In this situation the sum is much more valuable than its parts, and when we recombine the sums of multiple datasets together, that sum too is worth more than its individual ingredients. Recombination of electric grid usage and electric car charging station to plan new charging points for electric vehicles.
- Extensible data: This kind of data can be confused with the first one where data is reused. However extensible data is to design extensibility form the onset, so that it is suitable for multiple uses.
This can be more challenging as one may not be able to realize the possible uses of data initially but only once it has begun. The idea is if a single dataset can be used in multiple instances if it can be collected in a certain way. For instance security cameras helping with security, but also identification of customer flow pattern in a shop.

4.2 Importance of POI for Platform development

Rapid changes in information and communication technologies have facilitated new types of technology-mediated interactions between economic agents. These developments have enabled firms to fundamentally change the way they “do business” in particular, the ways they organize and conduct exchanges and activities across firm and industry boundaries with customers, vendors and partners and other stakeholders. In the business of HERE, there is an essential part for sourcing data. This activity is for sourcing data which are later part of the additional contents of a navigation map. This contents can be information regarding public transport, or cafes in an area, that a user is looking for. If the information is a point on the map it is typically called as a Point of Interest. Point of interest (POI) is a feature on a map (or in a geo-dataset) that occupies a particular point, as opposed to a linear feature like roads or area of land use. Some examples of types of POIs.

- Churches, schools, town halls, distinctive buildings
- Post offices, shops, postboxes, telephone boxes
- Pubs (pub names are useful when navigating by map)
- Car parks and lay-bys (and whether free or not)
- Speed cameras
- Tourist attractions Most times POIs are mapped as nodes.

A GPS point of interest specifies, at minimum, the latitude and longitude of the POI. The additional data available can vary based on many factors. In the navigation business, this is a very important data component, in many ways, and adds more value to a basic navigation map. The POI information can connect business to tourists for example. It is important for tourists to find information when at a new location, and is as much important for business to connect with tourists. The same for all the other kinds of POI information like car parks, eatery joints, with information like opening hours and other helpful information. The applications for POI are extensive and are growing continuously.

The challenge with POI data is the collection of POI information, which is very vast as well as changing. There are various websites that specialize in the collection, verification and management as well as distribution of POI which end users can load into their devices to replace or supplement the existing POI. Commercial POI collections which are based on subscription, are usually protected by copyright. However the collection of this information on a global level is a challenge. This involves collection of POI information at a local level.

At HERE, the POI data is collected by the organization in many ways. There are many suppliers, who provide POI data of various kinds. For example, fuel or gas station information, is supplied by a particular vendor, which is the specialized information this company maintains. The business models for exchange of POI information, or data are of many kinds. This is based on the value of information itself, as well as possibilities of exchange of data also.

4.2.1 Business models for POI data transactions

The dynamics during negotiation of data sourcing can be different. We will look at the overview of all the type of data sourcing models that currently exist in the organization. The organization currently
sources POI data and categorizes the transaction types into various kinds. These are registered in the internal system under the following data model categories:

1. Free
2. Fixed Fee
3. Per unit fees
4. Revenue share
5. Paid inclusion
6. Incentives
7. Hybrid
8. Barter

In the following section, each of these kinds of business models are discussed in detail. The free data is data that is available for free, from organizations as a by-product of their business or organization. These can be governmental organizations NGO etc. The motive for providing the data for free can be to ensure critical information is available on navigation maps. Or sometimes simply for the reason to ensure certain information is available on navigation maps. The fixed fee model is a very linear model, where the vendor makes an offer and the buyer pays the price for the data. The per unit fees business model is for when business provide POI data, and this is paid by the rate of per piece or unit. Revenue share model is based on sharing revenue with the supplier, typically transactions costs can be an example in this scenario. The paid inclusion is when a supplier pays to be included in the navigation system, this is typical of businesses for who there is much added benefit to be on the map with updated information. The incentives model means that the supplier receives no direct monetary payment, but is based on incentive depending on the business the supplier is involved in. The hybrid model, is based on a combination of different models from the entire list working together. The barter system is where, the business model is based on exchange of information based on business requirements of both parties i.e. the supplier or the vendor and the buyer.

Thousands of different agreements with data suppliers are maintained by HERE on sugarCRM, the table 4.1 is the count of POI agreements registered each year since 2003. There is a steady increase in the sourcing from the year 2003. The growth rate has been 10.70% for the year 2013-2014 and 39.57% for the year 2014-2015. The sudden rise in this sourcing was due to conscious and deliberate sourcing activities. They were sourced in various ways which will be discussed further in detail. This increase in sourcing is in all types of data, as well as all kinds of sourcing models. The rate of sourcing POI information is expected to continue. The sources for this POI information are majorly business and aggregators. Business can be establishments of various kinds, but having relevant information for the navigation industry, take for instance the petrol stations. Various organization who held information vital for navigation like municipalities are also among these data suppliers. Aggregators are mainly dealers of data, who have access to scattered information and can act as a one stop shop for certain kind of information, like chain restaurants data. There are agreements registered prior to 2007 however are ignored in this study, for the fact that they are few in number. For the purpose of this study we will only look at agreements post 2007 (unless specified for special cases). There are all the types of business models in the set of POI sourcing, however what are the business models that are more popular in comparison to others?
The business agreements were classified based on the types. In the POI sourcing business models the free business model is most popular, followed by fixed fee, which is very low in number in comparison to the free business model. The next most popular business model is per unit fees and revenue share, which are similar in number. These are followed by the paid inclusion, incentives, hybrid, and barter. The business models starting per unit fees, revenue share, paid inclusion, incentives, hybrid and barter are very low in number in comparison to the others. The popularity of the free business model can be cited to various reasons, the main reason being market conditions. As the penetration of navigation and location based services is yet to penetrate into other markets and be more widely used, this could be one of the reasons many businesses share data for free, and find sharing the information as an advantage for their own businesses. The split of each of these business models year wise is represented in the figure 4.2, it clearly show the number of free business models for sourcing of POI is much higher than the other business models. While at the same time, barter and incentive business models are the least in number. The reason for free business model being so popular and growing at such high rates can be cited to the reason of impetus on open data by organizations. In the recent past, the demand as well as willingness to share open data has increased, government organization incentivizing open data. This has led to HERE to access all the possible data available. This is of course a very efficient and minimum resource requiring effort. As there is no hassle of being bound by conditions for the usage of the data. This is a situation where HERE has taken advantage of the market scenario, which in itself is because of actively seeking novel ways for collection of POI data. In figure 4.3, the free business models is filtered out to highlight the trends in other business models.

Table 4.1 Classification of POI agreements based on type of business model

<table>
<thead>
<tr>
<th>Source Category</th>
<th>POI</th>
</tr>
</thead>
</table>

Figure 4.1 The growth rate of the number of POI sources
<table>
<thead>
<tr>
<th>Year (Multiple Items)</th>
<th>Count of Business/Sourcing Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free</td>
<td>2040</td>
</tr>
<tr>
<td>Fixed Fee</td>
<td>218</td>
</tr>
<tr>
<td>N/A</td>
<td>177</td>
</tr>
<tr>
<td>Per Unit Fees</td>
<td>13</td>
</tr>
<tr>
<td>Revenue Share</td>
<td>10</td>
</tr>
<tr>
<td>Paid Inclusion</td>
<td>7</td>
</tr>
<tr>
<td>Incentives</td>
<td>3</td>
</tr>
<tr>
<td>Hybrid</td>
<td>2</td>
</tr>
<tr>
<td>Barter</td>
<td>2</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>2472</strong></td>
</tr>
</tbody>
</table>

**Figure 4.2** POI sourcing agreements business model wise
In the figure 4.3 it is seen that the next most popular POI sourcing model is the fixed fees type, these are related to important POIs which were required to be on maps to enhance quality and customer satisfaction. The least popular business model among these categories is the barter business model, followed by the incentives business model, this may be due to the amount of efforts and resources these business models require. The analysis of the innovativeness of these business models will give an insight into how the entire POI sourcing is placed in the company and what kind of business models are in favor and which are not. For this we will look into each of the business models in detail further.

4.2.2 Analysis of business model characteristics

Characteristics of a business model are drawn from literature which we will look for in the business models of HERE. There are in all 7 characteristics identified for the study of POI sourcing business models. They are listed as novelty, efficiency, complementarities, lock-in, experimentation and learning. Characteristic of value creation for consumer is a control variable, as all business models are meant to create value for consumers. This characteristic is checked for in all the available business models. The characteristic of experimentation and learning is a variable desirable from business model innovation, as new business models should enable learning new things about the business and exploration of possibilities. Since within the realm of business model innovation, experimentation is an integral part, what are the possibilities of experimenting further? Is a feature desirable, as the technology progresses the business models need to catchup too. The four main characteristics of novelty, efficiency, complementarities and lock-in are selected from the literatures discussed, mainly the research by Amit and Zott (2001) where value creation is emphasized on from novelty and creating complementarities. Figuring out how to capture value from innovation is a key element of business model design (Teece D., 2010). According to Teece the more complementary assets created more are the chances of profit as well as increasing the bargaining power. According to (Chesbrough H., 2007), if there is no net creation of value, the companies involved in the set of activities won’t participate, meaning value creation is essential for lock-in. This also increases chances of partners coming on board of the platform and followed by increased users of the platform.
For the analysis of POI sourcing business models we will be looking at these 7 characteristics in the business models discussed earlier. To look for these characteristics, agreement formed are going to be accessed via the agreement number in sugarCRM and looking up the content ID, and matching this content ID on the Stellent software. While sugarCRM contains information of the agreements, Stellent stores the copies of these agreements. Since the numbers of these agreements are large, each business model type is selected to be studied one at a time. The free business model was selected, from the list of available agreements, a few were selected from the available range of timeline. If the category has agreements form 2010-2016, one was selected from each of these years. If the kind of businesses or supplier these agreements are made with are of a single type for example fuel gas stations, they were chosen from these categories. However if there were more than one type, the agreements were selected from a mix of the available types. If the initially chosen documents were insufficient to reach conclusions of characteristics of the business model category, more agreements were selected until satisfaction. For standard agreements like fixed fee and per unit fees, were standard texts and having the details of fees and data to be exchanged.

4.2.3 Analysis of the POI sourcing business models and its characteristics

In this section each of the business models in the context of HERE are discussed in detail. Each of the business model is discussed in terms of flow of assets between the concerned entities, discussing the merits and conditions for these business models. Further the key words found in the agreements for these business models are discussed, leading to a discussion on the characteristics of each of the business models based on the characteristics drawn for analysis. These are then cumulated at the end for a business model to business model comparison.

4.2.3.1 Free business model

The figure 4.4 is the diagrammatic representation of the free business model transaction. In this business model transaction, HERE receives the data practically in exchange for nothing. The flow of data is unidirectional. The data flows from the business, or data generator or the aggregator to HERE for no monetary transaction. This is a very novel business model, as the need of one is created into an advantage for another, this kind of business model is expected to create learning in terms of market requirements. However a user should be aware when the tables could turn and conditions change.
The key words that aid in determining and identifying characteristics of a business model are represented below. The hallmark of a free business model are the words “Free”, “free of charge” and “no fees”. Since there is a formal agreement on data sharing and this is a no strings attached type of agreement, most of these agreements were appreciation for the sharing of data by saying “Thankyou” to the supplier organizations. This business model comes with no strings attached hence there is freedom to use the data freely as required. Among the words we expected were words that expressed jointly working together and the free exchange of data. Some of the statements in these agreements are 1. “We would like to thank XYZ (“Supplier”) for its decision to share its ABC data and future updates with HERE Global BV and its affiliates (“HERE”) 2. Data provided free of charge and no fees or compensation will be due from HERE or its customers to suppliers for any use of the data. Figure 4.5 is a diagrammatic representation of the frequently used words in these agreements. The characteristics of these business models based on these words and statements made in the agreements are discussed below.

Figure 4.4 Free business model
Figure 4.5 - Free business model

Novelty: Determining which data can be accessed for free is a novelty in itself for a business, and so for all data that is received for free is considered as a novelty.

Efficiency: Since this data is available for free it surely reduces use of monetary resources, increasing expectation for efficiency.

Complementarities: As this is free data, one of the partners could be looking to monetize on this further and increasing possibility for creation of complementarities.

Lock-in: As data is for free, there is no guarantee it will be free for long, as well as there is no motivation to continue this, lowering the expectation for lock-in

Experimentation and learning: Free data as explained earlier, one of the partners could be looking to monetize at a certain point, increasing the willingness to experiment and come up with new ideas. This in turn increases the learning process.
4.2.3.2 Fixed Fees business model

The figure 4.6 is a diagrammatic representation of the fixed fee business model transaction. In this business model as the name suggests there is a fixed fee against data. This may be fees paid by the supplier along with the data or the in the reverse direction i.e. HERE paying a fixed fee for the data. These two are not distinguished, but are together called as the fixed fee business model. Since this is a very standard business model, there is hardly any scope for experimentation meaning there is very little scope for learning anything new, however it can be one of the most efficient ways to do business.

![Diagram of Fixed Fees Business Model](image)

**Figure 4.6 Fixed fees business model**

The key words identified for these agreements to decide if they tend stronger towards a business model or to signify if they fit in the categories. These key words for fixed fees business model are represented in the diagrammatic representation below. Since there is monetary transaction, there is an involvement of the discussion on fees and interval of payments etc. Since the fees is payed for, there needs to be quality, in order to ensure the value worth, quality tests are crucial to these agreements. Among the words expected in these agreements were relating to regular status checks, as price is paid quality needs to be tested for. Some of the typical statements from these agreements are “HERE shall pay fixed fees or hourly rates as…”, “Fees for services...” Figure4.7 is a diagrammatic representation of the frequent words in the fixed fee model. The characteristics of these business models based on these words and statements made in the agreements are discussed below. The important city destinations are popular among the fixed fees agreements for POIs.
Novelty: Since fixed fee is a very standard transaction it cannot be considered as anything new and hence not so novel. This is a simple monetary transaction.

Efficiency: The fixed fee transaction is a very efficient way to source data, as a good supplier needs to be identified and a determined price needs to be paid.

Complementarities: Since this is a standard transaction, there is not scope of added value generation and hence no complementarities are expected.

Lock-in: Participants are free to leave, as in a supplier can stop supplying whenever required, and the requirement to source may not exist. Hence there is not much scope for creation of lock-in.

Experimentation and learning: Experimentation is not something that is possible in a standardized transaction, so there is no possibility on this front. Learning is a continuous process and is expected from all of the participants.
4.2.3.3 Per unit fees business model

The figure 4.8 is the diagrammatic representation of the per unit fees business model. This business model is similar to the fixed fee transaction, however the price point is based on the quantum of data. The fees may be fixed but depends on the quantity of data received, this is for data where high volumes have higher value, and also where HERE can control the quantum of required data. This control allows it to decide when and how much to procure. Since this is a transaction similar to the fixed fees model, the characteristics as well as the benefits derived from this model, is expected to be very similar to the fixed fees model.

![Per unit fees diagram](image)

*Figure 4.8 Per unit fees*

The per unit fees model is similar to the fixed fees model in terms of the fact that it is linear, and a very traditional way to trade. This is preferred when the quantity is varied and changing. The per unit fees business model is hence expected to similar to the fixed fees in characteristics. The typical words expected in the agreements of these business models are relating to fees and quality. The typical statements of these agreements are quantity related terms in numbers and quality related terms like freshness. Apart from these the types of required POIs are discussed in detail. The kind of agreements are mostly used for obtaining POI data of large cities, where POI of major and high people density areas. Figure 4.9 is a diagrammatic representation of the words found frequently in the agreements and the characteristic analysis of these business models.
Novelty: This is a straight forward transaction with not much novelty, a monetary value is paid for whatever is required.

Efficiency: This is an efficient way to receive quality and dynamic data.

Complementarities: This can create value, and is up to the buyer to get more form the data that is sourced.

Lock-in: As either partner is free to leave the partnership whenever they feel like, there is not much expectation for lock-in.

Experimentation and learning: As this is standard monetary transaction the scope for experimentation is reduced. However there is scope for learning the value of data.
4.2.3.4 Revenue share business model

The figure 4.10 is the diagrammatic representation of the Revenue share business model. This business model can be slightly more complex in comparison to the previously discussed business models. As the name suggests the revenue generated is shared between various parties. This revenue may be generated by any of the entities. For revenue sharing, the entities receive revenue based on initially negotiated criteria, this is a mutually beneficial situation, where the entities both are enthusiastic about making maximum monetary profits. This business model may involve transaction of data, this exchange of data may be bidirectional. Since this is a relatively complex business model, each business model can be unique in itself creating novelty and also building longer term partnerships. It is expected that there is much to learn from these business models as well as value addition is tremendous.

For the revenue share model, the sharing of monetary gains is the crux. Words like “revenue distribution”, “calculation of revenue share” are expected for sure. In the agreements the typical statements observed are “On a monthly X will pay x% of the net revenue received by Y from....” and “...quality score on quarterly basis...” Based on these statements, the words represented in figure 4.11 are found to be frequent. These words and statements show that revenue share agreements have primary emphasis on the revenue generation and sharing, once this is smooth and running, the partners can work on growing it further in various ways and exploring new ideas to implement and make profitable. The regular updates and meeting increases interaction and exchange of ideas, creating conditions for discussions of implementable innovative ideas. Below the figure 4.11 is the analysis of characteristics of these business models.
**Novelty:** This is expected to be novel, as the ways to share revenue can be varied and novel.

**Efficiency:** This is not expected to be a very efficient business model as there is much resource used in scouting for partners to share revenue, figuring out the revenue sharing type, and this is a continued effort reducing expectation for efficiency.

**Complementarities:** The possibility to work together continuously increases the generation of ideas as well as new value, increasing expectation for complementarities.

**Lock-in:** Since there is revenue sharing both partners are motivated to stay in the partnership increasing value for themselves, increasing the expectation or lock-in.

**Experimentation and learning:** The continuous working together creates an environment for continued experimentation and learning.

*Figure 4.11 - Revenue share business model*
4.2.3.5 Paid Inclusion business model

The figure 4.12 is the diagrammatic representation of the Paid inclusion business model, in this there is a monetary transaction or a fee paid for data to be included in the HERE data. The monetary transaction is unidirectional and can be from the business or data generator to the supplier or aggregator or from the business or data generator to HERE directly. In this business model the data flow is also unidirectional. This data model can be a type of fixed fee, where the payment direction is reversed, there is very little scope for experimentation.

In this kind of business model, the business coming forward to get their data included are seen to be eager to spread get their data published in as many fronts as possible. This they achieve by giving free permission to utilize the data are required by the firm after primary inclusion in the maps. Depending on if the data is shared on a one time basis or at regular intervals, the mention of status check is made. The typical statements in these type of agreements are “...incorporating merchant business locations...”, “…distribute merchant data…” The characteristics observed from these words and statements are made below the figure 4.13.
Figure 4.13 Paid inclusion business model

Novelty: This is a novel business model as the identification of business willing to pay to be part of the platform and share its assets as well is a novelty in itself.

Efficiency: This is an efficient way to receive data, in terms of its accuracy and quality.

Complementarities: The expectation for creation of complementarities is low, as this becomes a straightforward monetary transaction.

Lock-in: There is no motivation to continue for suppliers, unless they are receiving value addition, decreasing the expectation.

Experimentation and learning: There is not much expectation for experimentation for this business model. However learning for the platform owner is available, also this is a transaction that helps in determining the value of data.
4.2.3.6 Incentive business model

The figure 4.14 is the diagrammatic representation of the Incentive business model, in this model there is incentive for receipt and transaction of data. This transaction involves more than just exchange of data or monetary value. The transaction may include flow of knowledge and skills in exchange of data increasing learning. A special arrow in the diagram is representative of this kind of exchange. However there is risk of losing as soon as the incentive is absent or the value of the incentive diminishes, so there is no expectation of lock-in creation via this business model.

![Incentive Business Model Diagram]

*Figure 4.14 Incentive business model*

The certain key words identified for these agreements are mapped in the figure below in figure 4.15. In the incentive business model, the incentives to be shared are discussed in detail. These incentives can be in the form of sharing assets or providing training or even providing access to certain facilities. Data. Some of the typical statements made in this kind of business model are “... under the community expert program...”, “...provide onsite training...” These words which represent the exchange of technology and allow access to mapping tools are observed. The incentive business models are popular agreements made with universities and institutions. These universities are interested in obtaining training in exchange of providing data available to them. Below figure 4.15 is the analysis of the characteristics of the incentive business model.
**Novelty:** Coming up with incentives to motivate partners to share data is creation of novelty. Novelty is hence expected from the incentive type of business model.

**Efficiency:** There is sharing of resources and figuring out what are the resources may increase its utilization or might decrease. The expectation is this is reduced efficiency as most of the efforts are into designing the incentive.

**Complementarities:** Sharing of resources means jointly working together, creating opportunities for value creation. Increasing the expectation of complementarities.

**Lock-in:** This is a free interaction, and there is no motivation to stay if the value creation is not appropriate enough, reducing the expectation for value creation.

**Experimentation and learning:** The possibility to experiment is high with these business models as the types of incentives can be tried and tested endlessly. Learning is expected in these kinds of incentive partnerships.
4.2.3.7 Barter business model:
The figure 4.16 is the diagrammatic representation of the barter business model. The supplier can be anyone, a business, data generator or an aggregator. To understand the barter part of the business model, we will consider the receipt of data by HERE. Data is received by HERE from one of these entities, the data transaction is bi-directional, the monetary transaction between HERE and the supplier is a free transaction. However if there is an aggregator who is supplying the data to HERE, how this supplier receives the data from a data generator or business may be independent and varying i.e. it may be a monetary or a free transaction.

![Figure 4.16 Barter business model](image)

In the barter business model, exchange terms are most commonly used. These business models are not so common, and very few were available to study. Public transport companies are common among such agreements. Key words like “community expert program”, “introduction of technologies that support geographical knowledge” are the kinds which indicate sharing of resources and knowledge among partners. Keywords like “without any costs” indicate no kind of monetary transaction. Below the figure 4.17 is the analyses of the characteristics of the barter business model.
**Figure 4.17 - Barter business model**

**Novelty:** Since barter is exchange of data, both partners need to find data that is useful for them and efficient to utilize. Once the unique data to be exchanged is decided, this is a novelty as it is unique. This requires the partners to work jointly to come together to work on what is most beneficial to both.

**Efficiency:** Efficiency is about reducing use of resources, but the process of deciding on the type of data to be exchanged is time consuming. Depending on the type of data the requirement to revisit it will vary widely.

**Complementarities:** Since in barter there is an effort to look for the requirements for each other, and this is revisited, complementarities are created at varying levels.

**Lock-in:** Barter is a free transaction and participants are free to move out of any time. However the efforts put into the transactions and the efforts to find improve motivates the participants to carry on, and lock-in is created in these kind of transactions.

**Experimentation and learning:** As there is continuous exchange of ideas on data exchange of various kinds, there is possibility to experiment with these. This is a continuous learning process from all aspects.
Based on the above discussed business models, POI data may be sourced from any supplier worldwide for any geographical region. POI’s collection and integration in the map in large scale is a relatively new part of the map and navigation content. This information is collected from multiple sources as discussed via multiple business models. To analyze these business models further, a central repository of all the historical POI agreements at HERE was accessed. This repository which is called as “sugarCRM” maintains a database of the details of sourcing agreements, these sourcing agreements also include the POI sourcing agreements. To list some of the information maintained in the repository for agreement reference are agreement ID, agreement effective date, agreement type, business/sourcing model, costs related details, legal related details and other sourcing and maintenance related details. The sugarCRM maintains information of not just POIs but other map and content sourcing details. The relevant information regarding POI data was extracted for the purpose of analysis. The aim of the analysis was to study the trends in the sourcing of POI from the business models perspective. It is conscience knowledge that these business models are not at a company level but at project level. Business models at project level may or may not be practiced at company level. However since business models are transaction between two parties, the results can be applied at company levels.

To compare the business models on a single measuring scale, there are certain features that can be checked for in each of the business models. These characteristics that we will look for in business models also discussed earlier are listed as, novelty, efficiency, complementarities, lock-in, experimentation, learning and value creation for consumers. Characteristics like complementarities, lock-in and value creation for customers ensure that partners prefer the platform provider and it encourages them to work for further development of the platform. These characteristics provide mutual benefit and foster trust between the platform leader and partner. The characteristics of novelty, efficiency are markers against other platform providers and help partners in making the choice of a platform provider, these characteristics are vital for attracting partners to the platform, after which characteristics of complementarities, lock-in and value creation is what keep them. The characteristics of learning and experimentation are vital from the future perspective, they allow the growth of partners and also the platform leader. Making it a fruitful partnership for all participants. These characteristics will help in measuring to what extend business model innovation fosters growth of the platform and what it adds to the platform.

Each of the characteristics offered by the various business models have different things to offer. Efficiency is about achieving maximum productivity with minimum wasted effort or expense. This explains the competence of a business model. Most of business models listed are efficient methods, the incentive and barter business models are not the most efficient ones, as these require more human efforts and matching partners consumes more employee talent. Complementarities in business transactions can be explained as a relationship or situation in which two or more different things improve or emphasize each other’s qualities. Among the listed business models, most of the business models are complementarities for participating partners, the ones where complementarities have not much scope are per unit fees and paid inclusion. These are business models more dependent on transactions of needs, i.e. simple transactions, where monetary a value can be easily exchanged for data. The scope for exchange of other assets is not explored or possible.

Lock-in in business models, can be explained as creation of dependency between participants for products and services. One of the participants is unable to use another vendor without substantial switching costs. Lock-in is created when there is exchange of more than just monetary value, as exchange of other assets creates dependencies. Lock-in is possible in business models of the type, revenue share, barter and hybrid, as these involve exchange of data assets or even knowledge and skill assets. Experimentation characteristics in business models are for the business models in which there is possibility of experimentation in the existing business model. These are possible in business models that involve more than just monetary exchange for sourced data. There is space for experimentation in free, revenue share, incentives, hybrid and barter business models. This experimentation is what gives
rise to novelty in business models. The scope for experimentation in business must be highly valued by organizations, as this will also allow for higher innovation testing grounds. Learning opportunity for business models are available in all, this may be influenced on personal bias towards learning, as leaning is always possible, irrespective of other criteria like requirements compatibility. Learning goals may be different from learning achieved, but that cannot mean learning is absent. Hence learning opportunities are available in all types of business models and beyond. If there is a business transaction, it has the sole purpose i.e. to create value for consumers. All the business model types are for value generation to the consumer, hence all types of business models have the characteristic of value creation form the consumer perspective.

While looking for novelty in a business model we will be looking for the quality of being new, unusual and unique. We will look for this characteristic in business models, comparing them to usual transactions in the market being used since quite some time. Referring table 4.2 we will analyze the characteristics for each of the business models. According to the table 4.2 the free business model is a novelty type as it needs to be figured out, which business match the data requirement. As well as which businesses are willing to share their data for with respect to long time period as well as upgraded data under this business model. In the case of free business models, indoor maps data is a popular agreement type. The location provide the indoor maps of venues with details of floor plan. A good example is the indoor maps of airports, travelers are usually new to airports and navigation through can be complicated. The indoor maps help in navigation as well as attract customers to shops and facilities of the airport, making its utilization more efficient. These maps act as complementarities to both parties, as data exchanged can be used for each other’s business improvisation. There is no lock-in created for this kind of business model at the moment, as a supplier can decide to leave at any point or stop updating the data. There is experimentation in terms of the footfall and also room for experimentation is big, as IoT develops further more experiments can be conducted creating value for all stakeholders. There is novelty or experimentation in this business model as

In the case of fixed fees, services are a popular category, services can mean toll pay point information. This is a POI that will come in the way of a driver, and there is no incentive like need to attract customer for this POI. However having this information is important from the customer point of view as it can help plan journey better. A fixed fees can give access to this information static or dynamic. Dynamic data will allow update of real time toll and rates and other information. This business model surely adds efficiency and complementarities creating value for customers.

In the case of per unit fees, address points are the most popular category for sourcing. This is a more premium variety of fixed fees, where the volumes are revenue for the supplier. However point addressing is also vital information for navigation and destination routing. Since this is in ways similar to the fixed fees the characteristics are also similar to the fixed fees. The revenue share business model is one of the most dynamic business models available, this entails sharing of generated revenue between partners. Though the number of contracts are few in number the popular category among this is advertising agencies. The advertising agencies will share revenue, for the lead of customer to products and services via HERE or can be even vice versa. Since this is a dynamic business model, most of the characteristics are in it. There is possibility of lock-in in this business model, as once there is revenue generation and sharing, there is also asset sharing beyond just data. This makes relationships stronger and further creates lock-in for the partner to choose the platform as there is guaranteed source of revenue. The next business model is the paid inclusion type, this is a business model with higher efficiency, business which would like to be present on navigation maps, will pay platform providers to include them. This data can be share via the business directly or through an aggregator. Depending on the value generated for the provider the platform provider has bargaining power.

The incentive business model is an incentive based business model, there may or may not be monetary transaction. The most popular data sourced in this category is the road/ street data, which is usually
provided by municipalities. In exchange of this data which is essential for navigation purposes, incentives are created as per need basis. This adds novelty and creates complementarities for both parties making space for experimentation and learning. However since this is incentive based, there is no lock-in as the parties are free to feel loss of incentive and leave as when they like. It is vital in this business model to create an incentive so strong that there is long term partnership and value addition. The barter business model is exchange of data for data or any other asset like knowledge sharing or provision of training facility. The most popular type of data sourced under this category is public transport data and road/street data. This may not be an efficient business model, as the data exchanged for receiving similar data may be different in different regions, and figuring out the best data for exchange is a resource consuming task. The other characteristics of complementarities and lock-in may be created based on individual cases. The hybrid business model is a combination of all the above discussed business models and hence can have characteristics depending on the combinations. All these characteristics described for each of the business cases above are marked as “X” against them if present and left blank if not present. This is summarized in tabular format in table 4.3.

Table 4.2 Analysis of POI sourcing models

<table>
<thead>
<tr>
<th>Type of Agreement</th>
<th>Novelty</th>
<th>Efficiency</th>
<th>Complementarities</th>
<th>Lock-In</th>
<th>Experimentation</th>
<th>Learning</th>
<th>Value creation for consumers</th>
</tr>
</thead>
<tbody>
<tr>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fixed Fee</td>
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<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Per Unit Fees</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Revenue Share</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Paid Inclusion</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Incentives</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Hybrid</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Barter</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

From the above table, it is observed that learning and value creation for consumers are characteristics in all of the business models. The exchange of data, itself bring lessons in new kinds of transactions. For simple transactions like fixed fees, where it is data exchanged for money, the possibility for exploring other models is available, else also why other models are not possible can be discussed. There is value creation in all of the business models, as exchange and addition of information adds value and makes the content rich and dynamic. The complementarities is a characteristic found in most of these business models, as data is exchanged, both parties are gainers and their respective products get more value. This also increases efficiency, or as the phrase goes “shooting two birds with one stone”. Characteristics of novelty and experimentation are similar, as they both have elements of new in them. The possibility of experimentation in a business model is possible when the idea is new and or new things can be tried. Novelty in a business model is when the idea is new as well as unique in itself, making
it one of its own kind. A novel idea can be success after experimentation, and open for imitation. Lock-in in a business model is difficult to achieve characteristic, at the same time it is a much desired characteristic out of a business model. Lock-in means long term commitment as well as continuous inflow of assets. Lock-in also means building of trust and creation of a network effect attracting more players on the platform. Since all these business models are different in form and unique to themselves there is a stroke of newness and possibility for further exploration. From this analysis it can be summarized that, each of the business models are unique, and have their own special characteristics. It is up to the managers to decide what suits best a situation, based on the above analysis. There needs to be careful strategy planning and vision comparison with the business models. The entire portfolio of POI sourcing also needs to be evaluated at regular intervals, based on the frequency of sourcing.

This continuous analysis and tracking also raises the question of further growth and adding more types of business models to the portfolio. This requires innovation in business models, innovation can be tried and achieved as a further step from the above. The characteristics that are desired by the firm need to be listed, and building of business models from the requirements should be a priority. Second to this should also be the market requirements, what are the kinds of business models the markets are favorable to support?

Sourcing of POI data is continuous and can be reflected in the quality of the products and services, which effects the overall position of the firm in the market. POI data needs to be fresh and up to date, this depends on the ways it is sourced and ingested, making it very crucial for a platform leader to source it in an innovative way, to increase efficiency and maintain its leadership position.
Summary and Managerial Conclusions

5.1 Summary
This section is an overview of the findings, based on which managerial recommendations are made. At the beginning of the thesis there were two goals. The first was to study the platform ecosystem of the digital maps and navigation industry, this leading to understanding the characteristics of a platform leader in the ecosystem and what it takes to be a platform leader. This was started with studying the works of (Cusumano & Gawer, 2002), (Gawer & Cusumano, 2008), (Tiwana, 2013), (Schmalensee & Evans, 2007), (Gawer & Cusumano, 2014) who have studied ecosystems as well as firm in various market scenarios. The second objective was to pick one of the essential characteristics for becoming a platform leader and analyzing for a focal firm in the digital maps and navigation ecosystem. For this innovation in business models was chosen, in particular the business models for sourcing of POI data was chosen. During the entire study, the level of analysis was shifted from the ecosystem to firm level. The advantage is that the complexity of interdependencies in studying the ecosystem is decreased by having a vantage point of the firm and understanding their challenges in parallel. The concepts of the why platform leadership is crucial for innovation? Second, how does this lead to concepts beyond product and process innovation?

The notion of achieving platform leadership, not only lies in the ecosystem but also in the firm unit. Becoming a platform leader calls for innovation at various stages of the business, this involves introduction of new products and services continuously. Introduction of new products and services is crucial to make a firm successful, further growth can be achieved by creating dependencies of other industries on these products and services. As other industries get interlinked and interrelated the platform grows, inviting others to participate as well as contribute. For the success of new products and services in the business of HERE, fresh data is crucial. The sourcing of this data is the crux of the success of new products and services.

Since this is a continuous process, the effect of sourced data on products and services is large. These effects can reflect in the quality and user experience of the products and services. The continuous sourcing means that large resources are dedicated in the activity. For a platform leader to maintain its position the sourcing of this data has to be done in a very smart and efficient way, identifying new ways to source data continuously. To answer our research question, it is extremely important for a platform leader in the ICT business like that of the navigation industry to innovate with business models to come up with more and more efficient ways to deal with ever changing data.

To identify innovation in business models, the following 6 characteristics of a business model were identified form the literature, 1. Novelty 2. Efficiency 3. Complementarities 4. Lock-in 5. Experimentation 6. Learning. These characteristics are determinants of innovation in a business model. The identified characteristics are further applied to various business models to understand innovation in them.

The following 8 types of sourcing of POI information or business models of sourcing POI information were identified 1. Barter 2. Fixed Fee 3. Free 4. Hybrid 5. Incentives 6. Paid inclusion 7. Per unit fees 8. Revenue sharing. The characteristics of each of these business models is discussed in details in the section 4.2.3. According to this analysis the per unit fees and the fixed fee business model can be considered as the least innovative, while the Revenue sharing, barter and incentive business models as the most innovative ones. The free, paid inclusion and hybrid can be dependent of the case by case basis. The agreements for sourcing POI data show that the most innovative, revenue sharing, barter and incentive are very low in number, while the free, paid inclusion and hybrid are larger in number. The least innovative of fixed fees and per unit fees are available in not such large quantities but are a significant number in comparison.
The conclusion for revenue sharing, barter and incentive business model to be the most innovative, can be cited to the reason that they exchange much more than just data or monetary value. In these cases both partners work together continuously to create value for each other. This working together continuously is crucial for the business of data. This mutual value creation is the hallmark of platform leadership for a navigation industry.

HERE applies these business model innovations for sourcing of POI data, however this is not a conscious decision, nor is there a leadership direction in this regard. These are taking place by the reasons of HERE’s position in the industry, strategic decision making within the organization and other market dynamics. However these is no clear vision on how to increase the sourcing of POI information in innovative ways.

Since HERE enjoys large market share overall, it can be concluded that its ways of POI sourcing are successful. However this is not the right picture as its POI sourcing is not reflective in its overall business. To understand this better, the various products and their standing in the market will be required to study at product level and competition data will be needed to compare to understand other offerings and the rate of their demand.

For the case of digital maps and navigation industry, we can conclude at this conjuncture that the ecosystem is still in the developing stage for platform leadership. HERE has all the required characteristics for developing further its platform and maintaining its positions as a leader. It should draft a strong strategy and follow it. This is an opportunity not to be missed and harvest the work done and reputation created until now. The ecosystem of the digital maps and navigation industry is growing at exponential rates. There is penetration of other industries into these products and services. Though HERE is aware of these trends, there needs to be tremendous efforts towards faster growth, inclusion of partners and outsider contributors. HERE will also need to have a plan in place to grow laterally, i.e. to penetrate the new markets as well as create space in for it in other markets where location based services have not yet entered. Giving impetus to innovation, for trail of new products and services is vital, while HERE is on its toes with respect to product innovation as well as service innovation, there are other industry trends that are shaping the market and will be vital for HERE These are important for HERE if it wants to have the competitive edge for itself. After successful product and process innovation, there is scope in innovating in the way these are introduced to the market. A good technology requires the accompaniment of a very good business model to access the markets and make the most out of the opportunity. These are well argued by both (Teece D., 2010)and (Chesbrough H., 2007).

5.2 Managerial recommendations

Business model innovation is crucial, however this is a cyclic process, where one has to be led by another. A good product innovation should be followed by business model innovation. To sustain this business model innovation, a company has to make continuous product innovations as a business model innovation may not last very long. They are like a symbiotic relationship, one does better in the presence of another. A business model innovation allows for fearless product innovation and a good product innovation demands a business model innovation for its best potential to be exploited. The first practical research step entailed the identification of the various business models. Identifying the various type, marking their commonalities and differences. This helped in characterization of the business models. For instance the revenue share and barter business models are similar in character but quite different in terms of the value they bring to the table. In addition, this helped in understanding HERE’s capabilities for business model innovation, which is largely driven by external market conditions. There is no deliberate effort towards this, however there is sufficient resources to realize this. The product managers in partnership with other required business units can ideate and experiment on this front, as they have the understanding of the business, market requirements as well as the internal product capabilities.
From all the above, the usefulness of innovation to become platform leaders was illustrated, as well as the required steps and some possibilities were discussed. By linking platform leadership and business model innovation, it is shown how business model innovation is among the one the key areas to be managed to maximize the present opportunities in the business ecosystem. By charting and locating the opportunities and bottlenecks that stimulate or hinder the future growth of the business model innovation, it is an opportunity for managers to develop a strategy lock-in some key partners at this stage. It is this role of the business model innovation manager that can be fulfilled by product managers in consultation with internal as well as external partners. The role of a business model innovation manager should be aimed at finding the key drivers for experimentation and implementation to achieve desired results.

Concluding the overall thesis research, the following can be stated. The notion of becoming a platform leadership in an ecosystem is useful in this case scenario. Since business is becoming more modularized, centered around a certain common platform where innovations emerge, this is an opportunity not to be missed. Using this notion also helps in analyzing the complex relationships, interdependencies, enabling technologies, and making progress. One of the avenues or game changers in innovation can be the business model innovation. Therefore, there should be efforts made in this direction, by using the available study and taking other stakeholders into confidence for experimentation and trials. By using both the platform leadership as well as business model innovation concepts, tools developed can add to the understanding and characterization of business models, leadership characteristics and market dynamics to develop plans and strategy by managers and policy makers.
Chapter 6: Discussion
This section is a reflection on the research conducted in this thesis. The theoretical and practical implications are discussed further, following which the limitations of this study will be highlighted and suggestions for further research are offered.

6.1 Theoretical Implications
The main theoretical implication for research is that researchers should carefully choose their level of analysis. The business ecosystem and platform leadership is more suitable for industry level analysis over a certain time period. On the other hand, the business model innovation is focused on specific transactions possibilities between companies. This study used these approaches and illustrated how the deeper understanding can help firms strategize business operations.

Secondly, it is discussed in the theory chapter how limited the study on business model innovation is in certain aspects, the reason being the changes on that front are slow and take time to prove themselves. Currently the focus is on studying product and process innovation at the firm level to a large extend. However this is slowly shifting to other facets of a business for innovation. This thesis has aimed to provide more focus to these other facets one being business models. However the results of this thesis should be challenged by others and should be further investigated with empirical research.

6.2 Practical Implications
Using the platform leadership theory analysis creates new insights for management of other firms belonging to varied industries. The industries should have clarity on what level the ecosystems are developed for platform leadership. Following which the various facets of the business organization have to be identified for innovation and differentiation.

Management should focus on managing and monitoring the business model innovation and its effects on platform leadership in the ecosystem, these effects can be two ways. If we take the examples of other success stories like google, IBM or the examples discussed previously, we see that they challenged the incumbents and solved problems of other industries too. This is done by introduction of new products and methods of business transactions and growing in other industries. Taking a firm perspective, this encourages experimentation at various levels in the business and thus the emergence of new, completely different innovations. The firm largely focusses on product innovation, which is crucial, but the key is also to focus on the best way to introduce them to the market and create dependencies among the partners for longer period of time. Unfortunately, this study does not delve into understanding how business model innovation can be achieved, it is largely though to be a process of trial and error and experimentation. For instance, are certain business in need of location based services, but with some innovation in the way business are done.

For management, the recognition that firms leverage on each other complementarities for the creation of new business and innovation is crucial. As a result, practical management implications should be focused on achieving the most attractive partners to join the platforms this thinking requires a broad view in how relationships influence different business activities and value creation efforts that can sometimes lead to conflicting individual firm interests. Therefore, developing and consciously strategizing towards becoming a platform leader and guiding certain innovation in business models can help to overcome individual conflict.

6.3 Limitations
The study was initially conceptualized for platform leadership and industry relationship, however due to the lack of platform development this was shelved partially. This led to the study of business model...
innovation. In addition we studied these business models from the perspective of only firm. The theoretical foundations for the study of platform leadership were based on sectors apart from the digital maps and location based service industry, however they were technology based industries and from a time period not very long ago. The determination of platform leaders is based on theories, there is not a way of measuring when a firm becomes a leader. The conclusions on that perspective are based on the available theories and comparison to available scenarios.

Secondly, by studying the business models, the innovation in the domain was studied based on the available data. It is important to apply this methodology to other business transactions within the firm. In addition, applying this methodology to other firms as well as industries may provide new and interesting ways to cross reference findings on the micro as well as macro level. Therefore a new case study with a more quantitative research will help in adding to the existing study, and validate the methodology if it is truly valuable to the managers and policy makers and that out concepts for platform leadership as well as business model innovation are appropriate.

A second methodological limitation is that our case study has specific characteristics related to the digital maps and location based technology sector. As a result, findings on ecosystem platform leadership or the identified opportunities and bottlenecks cannot be generalized into other industry sectors blindly. Conducting more case studies into different industry sectors will create more general guidelines for business model innovation.

Finally, the industry shows much scope for growth and progress in the coming years, due to which a clear platform leader was not defined. Therefore taking this perspective of a platform leader and the aspiration to become one might have presented different insights into how opportunities and bottlenecks emerged.

6.4 Suggestions for future research

The reflection on the study by highlighting its limitations already revealed sufficient suggestions for the future research. First of all, a literature review should be conducted on the platform leadership to validate assumptions on becoming platform leaders. In addition, the business model innovation study can be both theoretically and empirically investigated further.

More empirical evidence is needed to test the concepts of platform leadership and business model innovation. Research questions that are related to this issue are numerous. For instance the other aspects of platform leadership, like the network studies and adoption of new technology. When business mode innovations are developed over time, what determines its imitability and how can that be protected for a longer time period. Or how to ensure protectionism of business model innovations? What are the best methods to experimentation of business model innovation? To what extend are the experimentations in business model innovations successful? It is answers to these questions that are of most interest to managers. Therefore different business model innovation projects based on value creation should be investigated to examine different ways to make them work.
Bibliography


