INNOVATION AND SOCIETAL DISCOURSES

The Emergence and Origins of Innovations

Master Thesis
Organisational Innovation and Entrepreneurship

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Abstract

This thesis explores the underlying and preceding determinants of innovations, which according to the argumentation of the thesis, often is overlooked or ignored due to a predominant emphasis on how companies can organize in order to benefit from and capitalize on already realized innovations. Thus, the present thesis attempts to take a step back and reveal the mechanism that determines the emergence of a particular innovation within society, and as such, a pivotal point of the thesis is to augment existing theory and contribute to a better understanding of the origin of innovations and how they emerge in society.

This is done through a critical assessment of some of the most popularized innovation literature, which reveals how and why these perspectives and approaches to innovation reveal little about how and why innovations emerge. A central assertion is that the reviewed literature is limited by its departure from economics in understanding the origins and emergence of innovations, which often means that the context in which innovations occur are not adequately analyzed due to a primary focus on developing tools and approaches to exploit or realize innovations. Accordingly, a broadening of scope is suggested and a framework that analyzes innovations as the outcome of societal discourses is proposed.

The suggested framework is based on the notion of overlapping societal spheres, accumulated cultural forms, and social discourses and by utilizing these analytical tools the thesis undercovers the emergence of the electric vehicle (EV). As it is the intention to augment the existing literature on innovation, the analysis also shows how the economic infused literature can be rightfully applied, and as such, is capable of explaining certain aspects of the EV case. However, the analysis of societal discourses reveals the underlying and preceding determinants for this particular innovation, as it becomes apparent through an identification and assessment of an environmental discourse and a coexisting discourse on personal transportation that the emergence of the EV is, to a large extent, discursively determined. The framework of the present thesis indicates a certain level of prediction that cannot be obtained by utilizing existing innovation literature. Therefore, the present thesis provides valuable insights for business strategy through a more fundamental understanding of innovations, as the preceding and underlying determinants for the emergence of a particular innovation can be assessed and analyzed, which enables a level of prediction that can be utilized by businesses.

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Introduction

Innovation has become one of the most desirable objectives of the 21st century. No matter in which direction we look or what other objectives there might be involved, innovation is what we strive to achieve. To an extent, innovation has become a word, a concept, and an agenda that characterize modern humans and the society we live in. Everyone wants to be innovative. It does not matter if it is the chef who is coming up with a new dish, or the teacher finding new ways to teach, the large corporations that spend billions of dollars on research and development, or the policy makers who want to foster innovation. Everyone wants to innovate, and as a result, the term is applied broadly, to say the least, which naturally follows that its meaning and significance changes according to the situation in which it is used. The concept of innovation is applied to so many contexts that its core meaning and significance easily lose its relevance, not only that, but the literature describing and theorizing upon concepts of innovation seems to be too occupied with whatever focus or agenda in which the concept is applied to question what innovation really is, where it comes from or what the purpose of innovation is. Shortly put, the origin and emergence of innovations seem to be either ignored or taken for granted.

To an extent, much of what is said and written about innovation is not really about innovation, but about different modes or approaches to innovation. If innovation is seen as a foundation, then the many different approaches and perspectives can be seen as structures upon this foundation. It seems reasonable to assume that structures need a solid foundation in order to be stable, and thus, it seems just as reasonable to assume that the different modes or approaches to innovation need to be firmly grounded in the underlying foundation, which would be a common understanding of innovation. However, this seems not to be the case. In fact, it seems like innovation as a discipline is so scattered and confused that many have forgotten about the importance of a solid foundation.

The missing foundation arguably is the reason to why the innovation literature has become so scattered. It can be seen as a conceptual problem that needs to be resolved in order for innovation theories to not lose their relevance, as it has implications for the application of innovation theory in praxis. The innovation literature can be characterized as being high on

intent, but low on content, meaning that it is often difficult for companies to apply innovation theories in praxis. Thus, there seems to be a gap between academia and the practical application of the knowledge produced within it. This gap is likely due to a fluid foundation, meaning that the perspectives proposed are not rooted within a common frame of reference that is understood by practitioners, or academia for that matter. If there is no common understanding of innovation, companies will have a hard time applying theories, and if the theories themselves are disconnected from a core understanding, they can only be viewed in isolation.

The present thesis argues that by taking a step back and focusing on innovation at its core, both academia and businesses can benefit significantly. Existing theories will become more applicable to praxis and the discipline of innovation will become rooted in a solid foundation. Transforming an academic discipline is naturally out of scope for any master thesis and it is not the intention of this one either. Regardless, the claims in the present thesis points in the direction of such transformation, and should be perceived as indications of a conceptual problem and suggestions to why such a problem exists, how it can be solved, and what the expected benefits might be.

Even though the point of departure seems to be very critical towards the existing literature and achievements within academia, it is important to stress that the present thesis does acknowledge these achievements and all the knowledge it contains, and as such, does not argue that the existing perspectives are wrong or invalid. Instead, the desire and purpose is to augment the existing literature by seeking to identify the aforementioned foundation, the underlying core so to say, on which the perspectives can be stabilized. However, by taking a step back and examining the core, new insights are likely to emerge, and as such, the purpose is not only to provide a better understanding of existing concepts, but also to uncover new meanings and appliances to innovation that evolve from a more comprehensive understanding.

Research Questions

The present thesis seeks to investigate the existing literature on innovation with the purpose of identifying a common reference point that can serve as an indication of a foundation. It seeks to establish and test this foundation in an attempt to increase our understanding of the emergence and origins of innovations, while it also considers the significance of this understanding and its implication for theory and praxis. Accordingly, the following three research questions will guide the remainder of the thesis.

How and why does the innovation literature neglect the emergence and origins of innovations?

How can the emergence and origins of innovations be examined?

How can academia and businesses benefit from an understanding of the emergence and origins of innovations?

Thesis Structure

The thesis is structured as follows. Firstly, a critical review of innovation literature is conducted in order to establish the needed argumentation for taking a step back and reconsider the underlying assumptions for the theories reviewed. This part also serves as vital input for the analytical framework, which is developed with the purpose of establishing an approach, or a new lens, that can uncover the underlying meanings and significance of innovations in a way that the existing literature incapable of. The analytical framework should be seen as the outcome of the literature review and is therefore positioned within this larger section. The analytical framework is followed by a section on methodology, in which methodological concerns related to the approach employed in the thesis is considered. The next main part contains the analysis in which the analytical framework is applied and tested to a specific case of innovation. This is the case of the electric vehicle (EV), it is chosen because it potentially is a major innovation, but its future adoption is not yet determined. This ensures that the findings are relevant for the present day, while it also enables the analysis and conclusions to have a level of prediction. In the last part, discussion and conclusion, the significance and meaning of the findings are discussed and assessed in accordance with the research questions.

Literature Review and Analytical Framework

This section will serve as input for developing the analytical framework and is divided into two main parts. It first assesses the innovation literature positioned within the field of economics, and secondly, reviews perspectives from sociology and philosophy with the aim of developing a framework that reaches beyond the realm of economics. Thus, through a critical review of the existing innovation literature, shortcomings, gaps and aspects of innovation that is not treated adequately will emerge. Therefore, the purpose of the economic part is twofold. It serves as an introduction to some of the most popular innovation literature, while it also aims to identify the grounds for employing a more holistic understanding of innovations. The review argues that the scope of innovation studies should be extended beyond the fields of economics and that the majority of literature on innovation is limited by its departure from economics, especially in regards to understanding the emergence and origins of innovations.

The economic review takes departure in one of the most influential authors of innovation theory, the almost omnipresent, Joseph Schumpeter (born 1883). The review argues that the theories of Schumpeter can be related to the theories that came after him, at least at their most basic levels, and therefore, Schumpeter is used to tie the innovation theories together within the realm of economics. This departure will also provide the review with structure, as Schumpeter's ideas are applied to more contemporary theories, and thereby, creates reoccurring points of reference that evolves as the review progresses. To further structure the review, popularized innovation theories are presented and discussed in greater detail in small chapters, while other significant contributions are included in the assessment of these broader paradigms. Lastly, the economic review provides a preliminary conclusion that aims to summarize the findings and develop the requirements for further developing a framework that exceeds the economic sphere.

The second part of the review focuses on theories from sociology and psychology in an attempt to broaden the horizon in which innovation is viewed. According to one of the main assertions established in the economic review, the socio-psychological review explores the meaning of civil society in relation to innovations with the purpose of developing a framework that is able to analyze the context of innovations and establish an understanding that includes aspects of innovation not adequately explored in the innovation literature positioned within economics.

Specifically, this is done through the inclusion of perspectives on civil society developed by Jürgen Habermas (born 1929), William Ogburn (born 1886), and Michel Foucault (born 1926). It is worth to mention that the intention of the review is not to discredit any of the existing literature on innovation, but rather to build upon previous discoveries with the intention of establishing a framework that can enable new findings. Thus, the framework should be viewed as an extension to the existing literature, and as such, not considered in isolation.

Schumpeterian Economics

According to Schumpeter (1943, p. 72), an essential point to grasp about capitalism is that it is an evolutionary process, meaning that capitalism should be understood as a form or method of economic change that never can be stationary. Central in Schumpeter's major works (1934; 1939; 1943) is the difference between a static and dynamic analysis of the economy. He argued that the static understanding (general equilibrium theory) was incapable of explaining the inner workings of the economy, and therefore, only painted a partial picture of it (Schumpeter, 1934). As a result, Schumpeter theorized a dynamic understanding of the economy, which aimed to complement the static analysis where it was inadequate of explaining economic change.

In the dynamic understanding, economic change happens when already existing elements are combined into new combinations. In this process, entrepreneurs were given a central role, as Schumpeter (1934) argued that the role of the entrepreneur is to make these new combinations (p. 76). Schumpeter (1934) differentiated between innovation and invention, as the emphasis in innovation is not in the making of something entirely new, but rather combining what already exists in new and unexpected ways (p. 68). Likewise, inventions that are not commercially exploited are, according to Schumpeter, economically irrelevant. As mentioned, in Schumpeter's dynamic analysis the entrepreneur dominates what is going on, as opposed to the consumer in the general equilibrium theory. This difference is clearly illustrated, as Schumpeter (1934) argued that economic change is initiated by the producers, while the consumer is taught, if necessary, to want new things (p. 65). This is opposed to the static understanding, where a new want arises in consumers, which then is sought satisfied by producers.

These two perspectives was later dubbed as technology-push and demand-pull models of innovation and came to represent the two dominant views within the innovation literature that

expressed opposite opinions on innovation. Arguably, Schumpeter's notion of innovation being initiated by producers laid the foundation for the linear tech-push models, whereas demand-pull models received increased scholarly attention during the 1960-1980s due to the work of Schmookler who explained innovation in terms of demand mechanisms (Schmookler 1962a; Schmookler 1962b; Godin and Lane, 2013). The linear model can be considered the first theoretical framework for innovation (Godin, 2006) and was very influential in both academia and politics for decades (Mowery, 1983). However, both models are today abolished and should be seen as perspectives of the past that no longer are considered capable of explaining the innovation process (Rosenberg, 1974; Mowery and Rosenberg, 1979; Rosenberg, 1994). To an extent, the discussion of different innovation models indicates that theorizing on the innovation process has been troublesome, and if ever, little consensus has been reached within the innovation literature. As a result, more contemporary innovation theories seem to refrain from the use and development of models, and instead, adopt more case-specific approaches, which will become apparent as the review progresses, but for now, we will return to Schumpeter.

Schumpeter argued that there exists a resistance to change in society, which the entrepreneur needs to break through. It is in this light that the entrepreneur is treated much like a heroic figure in Schumpeter's writings, as the entrepreneur is said to have the strength and courage to challenge the accepted ways of doing things and be able to sweep aside the forces of tradition, indicating that the entrepreneur must have super-normal qualities of intellect and will (Schumpeter, 1934, pp. 79- 83). This view of individual capabilities having a large impact on innovation can be seen as reoccurring theme in the innovation literature (See for example Lazear, 2005; Zhao & Seibert, 2006; Nicolaou et al., 2008) and is arguably the reason to why the origins of innovations has a tendency to be treated much like a "black box". However, this view causes issues for a conceptual framework, as a focus on the relative performance and capabilities of individuals or firms is not capable of providing a nuanced or complex account of innovation and entrepreneurship that can be accounted for theoretically.

Schumpeter's dynamic analysis of the economy is further emphasized by the conceptualization of creative destruction, which Schumpeter explained as a process which constantly revolutionizes the economic structure from within, destroying the old structures, while giving way to new ones (Schumpeter, 1934, p. 67; 1943, p. 73). This indicates that Schumpeter asserts that economic change, and thereby, innovations originate endogenously in the economy. Therefore, creative

destruction can be seen as an evolutionary property of the economy, in which innovations has a central role.

Schumpeter argued that the process of creative destruction leads to a situation in which competition moves beyond being restricted to price. Accordingly, Schumpeter (1943) talks about a form of competition, which is fiercer than price competition, and this form of competition is at the core of economic development. This form of competition is explained as the outcome of the process of creative destruction, which poses an ever present threat, resulting in any businessman feeling he is in a competitive situation even though it is not immediately apparent from his business environment (p. 74). To explain this, Schumpeter (1943) use the example of retail trade, in which he argued that the competition that really matters does not come from additional shops of the same type, i.e. price competition. Rather, it comes from the department store, the chain store, the mail-order company and the supermarket (p. 75), all of which are examples of threats that are likely to destroy the existing economic structures (that of retail), while creating new ones doing so, and thus, examples of the type of competition that is posed through the process of creative destruction.

Schumpeter also proposed a theory of the business cycle, which according to (Swedberg, 1992), was inspired by the Clément Juglar (born 1819), who theorized that cycles of 7-11 years' duration occurred naturally and unavoidably in the capitalist society. Schumpeter (1934) described the business cycle as wavelike movements that the modern economy inevitably goes through, and like Juglar, Schumpeter also described the close links between ups and downs in the economy (p. 224). Schumpeter's version of the business cycle (1934; 1939) starts with entrepreneurial activities that result in a new combination. This provides the entrepreneur with profits that attract other entrepreneurs to the same area, and because the initial resistance to change is broken by the first entrepreneurs, it becomes easier for additional entrepreneurs to make more new combinations and imitations resulting in a swarm-like appearance of entrepreneurs to a certain area within the economy (1934, pp. 223-224).

With this swarm-like gathering of entrepreneurs, the economy enters a boom, with rising wages and interest rates, new jobs, and so on. After some time, a depression will occur due to decreased interest in new credit and a downward pressure on the interest rate caused by the entrepreneurs paying off their initial loans (Swedberg, 1992). Furthermore, Schumpeter argued that the bigger

the boom, the harder it will be to make accurate calculations about the future, which is likely to cause speculations that can further harm the economy. Moreover, new enterprises will be very sensitive to changes in the economic climate and are likely to go bankrupt, while old and established enterprises are able to fall back on accumulated resources. To Schumpeter, the nature of the capitalist system indicates that after some time of depression, new entrepreneurs will emerge in a new area of the economy, which will cause the whole cycle to start over (Swedberg, 1992). Thus, Schumpeter's business cycle ties economic bubbles to entrepreneurial activity by explaining how new combinations causes a swarm-like appearance of entrepreneurs to a certain area. However, Schumpeter considered the causes and effects of economic bubbles to be a property of the capitalist system and argued that the very nature of the system will cause fluctuations like these. It is highly interesting how Schumpeter theorized ups and downs in the economy with elements of entrepreneurial activity and speculations, as this sequence seem to explain some of the more recent economic bubbles, such as the IT-bubble that happened during the late 1990s. However, rather than shedding a negative light on innovative activity and entrepreneurship, Schumpeter's business cycle indicates skepticism towards the capitalist system, which is also expressed many other places in Schumpeter's writings.

In summary of the Schumpeterian view, the economy produces its own evolutionary conditions through innovations. Therefore, to explain the dynamisms of socio-economic evolution, Schumpeter stated that the introduction of innovations must be imperative to change. Accordingly, change continuously occurs because the motivation to innovate is inherent in the capitalist system, i.e. inherent in the incentive to create surpluses of revenues from entrepreneurial activity. Therefore, as markets, industries, and companies proclaim to be driven by divergent goals, which are manifested in a broad range of products and services, they nonetheless share the common goal of wanting to maximize their profit, and thus, economies evolve on the basis of a capitalistic infused incentive to gain revenue, which is achieved through innovation. This indicates that socio-economic change caused by innovations originates from within the economic system, meaning that aspects beyond the domain of economics are, to a large extent, irrelevant for the analysis of such change.

As mentioned, Schumpeter's work can be related to most of the innovation literature that came after him. As a result, it is the purpose of the following sections is to include and discuss some of the more contemporary literature in relation to Schumpeter in an attempt to illustrate where and

why this literature falls short in explaining certain aspects of innovation. The perspectives discussed can be seen as an innovations best-seller and cover some of the most recent, most popularized, and most frequently applied perspectives that are likely to be part of any business school's curriculum on innovation. This is done due to the desire to take departure in the "state of the art", which arguably will enhance the relevance of the present thesis and ensure that it can be positioned within a contemporary context. We will start the discussion of contemporary literature with the introduction of disruptive innovations popularized by Clayton Christensen (Born 1952).

Disruptive Innovation

A growing body of innovation literature focuses on disruptive innovations and how the associated disruptive technologies have challenged entire industries. This body of literature seems to explain why it is difficult for many leading companies to stay at the top of their industries when technologies and markets change. The notion of disruption can be seen as an element of creative destruction, and to large extent, the literature on disruptive innovations can be seen as testament to the reality of creative destruction and an attempt to deal with the ever-present threat that it poses.

Disruptive innovation was popularized by Christensen in various books and articles, such as Christensen (1997) and Bower and Christensen (1995), and primarily argues that leading companies historically have failed because they tend to stay too close to their customers, and thereby, ignore new technologies that initially do not meet the requirements of their current customers. As a result, these technologies end up harming the established companies, but the technologies are initially ignored because they only appeal to small or emerging markets, meaning that established companies will have higher profit margins serving existing customers, which is what they tend to do (Bower and Christensen, 1995).

According to Christensen (1997), disruptive technologies have two important characteristics. Firstly, they typically present a different package of attributes than the ones valued by customers in mainstream markets. Secondly, the attributes that existing customers value improves at rapid speed, meaning that disruptive technologies in the future can become substitutes. Further, Christensen (1997) compares disruptive technologies to sustaining technologies. Sustaining is what established companies normally focus on, as they tend to maintain a rate of improvement,

meaning that they provide customers with something more or better in the attributes they already value. However, disruptive technologies introduce a different package and often perform worse along one or two dimensions that are of particular importance to existing customers (Bower and Christensen, 1995).

According to Christensen, leading firms are posed with a dilemma when confronting disruptive technologies, as these typically seem financially unattractive because disruptive technologies typically only have small or emerging markets associated with them to begin with. Additionally, established companies tend to have set up high cost structures to serve existing markets, while disruptive technologies typically require a lower and different type of cost structure (Bower and Christensen, 1995). As a result, managers are often posed with two choices when confronted with disruptive technologies. One is to go down-market and accept the lower profit margins of the new or emerging markets. The other is to ignore the disruptive technologies and go up-market with sustaining technologies and enter market segments with higher profit margins (Bower and Christensen, 1995).

In contrast, disruptive technologies often appeal to SMEs (Small and Medium-sized Enterprises) because the technologies typically do not require the high cost structures of established markets. Christensen provides various examples, mainly from the IT industry, of how companies pursuing disruptive technologies are able to secure a foothold in the emerging markets and improve the performance of their technologies, and when performance reaches certain levels, they become a threat to established companies. However, when disruptive companies begin to go up-market, the established players are often unprepared because they have been looking up-market themselves and not focused on threats from below. In most cases presented by Christensen, this results in life-threatening situations for established companies (Bower and Christensen, 1995).

Christensen further outlines a method for large corporations to identify and cultivate disruptive technologies, but the specifics of these methods are not relevant for this thesis. Briefly explained, Christensen (1997) suggests to place the responsibility for building a disruptive technology business in an independent organization, as *"small, hungry organizations are good at placing economical bets, rolling with the punches, and agilely changing product and market strategies in response to feedback from initial forays into the market"* (Bower and Christensen, 1995). In other words, companies have to abolish their traditional organizational settings and act more like

newly established SMEs. This indicates that the organizational structures of established companies are not considered innovative within the disruptive literature, while the characteristics of the organizational structure that is considered innovative are similar to the characteristics of the risk-willing Schumpeterian entrepreneur.

In Schumpeter's earlier work, the entrepreneur was described as possessing unique, personal characteristics that supposedly opened more possibilities to him than to his non-entrepreneurial peers, which indicates that solitary entrepreneurs realized innovations and thereby drove the evolution of the capitalist system. In later writings, Schumpeter modified his assertion, as he realized that the innovation-induced re-organization of markets gave rise to big corporations. In short, Schumpeter emphasized that big companies with vast amounts of resources were the best facilitators for entrepreneurs to commercialize new inventions or reconfigurations of existing products and services. Respectively, the two perspectives came to be known as Mark I and Mark II (Swedberg, 1992).

Christensen's account of what constitutes an organizational structure capable of realizing the potential of disruptive technologies is in support of Schumpeter's Mark I and questions Mark II, and thereby, questions the innovative capabilities of large corporations. This favor of Mark I and questioning of Mark II seems to be a general tendency in contemporary innovation theories, as big corporations and incumbent firms appears to be permeated by organizational inertia and myopia that fosters a reactionary attitude towards innovation (see for example Chesbrough, 2003; Cooper & Schendel, 1976; Foster, 1986; Utterback, 1994; von Hippel, 2005).

Disruptive innovation theory describes innovations as emerging exogenously to companies, as it is implied that innovative opportunities appear outside the company boundaries due to uncontrollable circumstances that leads to the development of new technologies. Thus, Christensen suggests that companies must organize internally in order to appreciate, handle and exploit circumstances, which are external to them. This view of innovations emerging exogenously seems to be another common denominator in contemporary theories. However, it does not conflict with Schumpeter's assertion that innovations are created within the economy. Instead, it indicates a difference in the level of analysis, as Schumpeter focused on innovation in a broader economic context and these perspectives employ a firm-specific focus. That aside, the exogenous view of innovations indicates a focal point in innovation theory on how already

realized inventions and innovations affect companies and industries, and not by what effects companies and industries can realize innovations.

In the next section, we will continue by reviewing another growing body of innovation literature known as open innovation, as we will see, this body of literature revolves around some of the same attitudes towards innovation as the expressed in disruptive innovation.

Open Innovation

Like the disruptive innovation literature, the open innovation paradigm is also centered around the notion that innovations exists in a space exogenous to companies, and that in order to realize the potential of innovations, organizations must adjust to changes in their external environments, indicating that the traditional organizational structures are not capable to fully realize the potential of innovations. The open innovation paradigm is best understood as the antithesis to what is known as the traditional vertical integration model where innovation is based on internal R&D activities that lead to internally developed products that are taken to the market by the firm (Chesbrough, Vanhaverbeke, and West, 2006)

As such, open innovation is characterized by the use of knowledge inflows and outflows aimed to accelerate internal innovation, while at the same time, expand the markets for external use of innovations. The paradigm assumes that companies should make use of both external and internal ideas, as well as internal and external paths to market (Chesbrough, 2003). Open innovation is based on the assumption that useful knowledge is widely distributed, which indicates that no matter the degree of internal skill of the firm, the organization must identify, connect to, and leverage on external knowledge as part of their innovation strategy in order to take full advantage of the innovative landscape and stay competitive (Chesbrough, 2003; Chesbrough, Vanhaverbeke and West, 2006). To quickly summarize, there is on the following page presented a table that further outlines the differences between closed and open innovation.

	Closed innovation principles	Open innovation principles
1.	The smart people in our field work for us.	Not all the smart people in the field work for us so we must find and tap into the knowledge and expertise of bright individuals outside our company.
2.	To profit from R&D, we must discover, develop, produce and ship it ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
3.	If we discover it ourselves, we will get it to market first.	We do not have to originate the research in order to profit from it.
4.	If we are the first to commercialise an innovation, we will win.	Building a better business model is better than getting to market first.
5.	If we create the most and best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
6.	We should control our IP so that our competitors do not profit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model.

Source: Chesbrough (2003)

Like with the disruptive innovation literature, the open innovation paradigm is seemingly a prescription to cultivation and preservation of internal organizational capabilities, which can ease the proliferation of innovations. The theories focus on how companies can identify, organize for, and learn from innovations when new ones suddenly emerge, i.e. the theories can be seen as tools to increase profitability through innovations. This departure is common in the innovation literature and is arguably due to the only incentive inherent in the capitalist system, which according to Schumpeter, is to create a surplus of revenue. Further, the *"Not all the smart people in the field work for us"* principle indicates that innovation is a matter of identifying the most competent individuals in relation to the properties of a particular innovation, and not necessarily in relation to the company itself, which also subscribes to Schumpeter's Mark I, while the "closed innovation" shares similarities with Mark II.

The Open Innovation paradigm describes an environment where knowledge is widely distributed, indicating that the traditional innovation paradigm faced another type of environment with less distributed knowledge. Thus, it can be asserted that changes in the exogenous environment change how companies must organize in order to realize innovations.

Nevertheless, the theoretical assertions presented in both the disruptive and open innovation literature presumes that innovation is readily available for management and that businesses, if managed appropriately, are capable at handling an innovation process. In the case of open innovation, this amounts to realizing that innovation's evolutionary properties can be applied to and influence the co-development of technologies, firms, and industries. While in the case of disruptive innovations it amounts to organizing like an SME with the characteristics of the Schumpeterian entrepreneur.

Therefore, the contemporary innovation literature discussed so far can be characterized as investigations in what organizational constellations are most efficient for anticipating innovation, which makes them reactive in regards to realizing innovations. To a large extent, innovation is treated like an inevitable and uncontrollable phenomenon that companies needs to deal with in order to stay competitive. However, this view implies that the emergence and origins of innovations is neglected. Yet, it is asserted that innovation continuously emerges in the external environment of companies, while these environments continuously evolve. As such, innovations are seemingly determined by the context in which they emerge, making it increasingly important to develop an understanding of these contexts. However, there is little or no emphasis on understanding the contexts or environments that seem to enable innovations in the first place because the primary focus is on how certain contexts demands certain organizational forms in order to proliferate on innovations.

The next section will continue to discuss proliferation and innovation, while further argue that the external environment to the firm is central in innovation theories, but that the focus is often on organizational forms or individual capabilities that can navigate such an environment.

User Innovation

A growing body of innovation literature focuses on user innovation. The concept was largely popularized by Eric von Hippel (Born 1941) and has received a great deal of attention in recent years. A focal point in the user innovation literature is so-called lead users. Von Hippel (1986) describes these as users that have strong needs that will become general needs of the more mainstream users months or years in the future. This makes them valuable business insights because they can be used in need forecasting and product development. To a certain extent, user innovation can be positioned within a demand based understanding of innovation, as it is implied that companies must identify and leverage on certain users who express needs that will be general needs in the future. In some measure, these particular users might represent aspects of changes in the surrounding context of innovations, only they, for some reason, are affected by these changes before the more general users.

Von Hippel (1986) defines lead users with the use of two characteristics. First, as mentioned above, they face needs that will be general in the marketplace in the future, and secondly, they are positioned to benefit significantly from a solution to these needs, even more so than general users, which explain why they are willing to innovate themselves. In later writings, von Hippel (2005) extends his view on lead users, as he describes a democratizing of innovations, in which users of products and services (both firms and individuals) are increasingly innovating for their own benefits (p. 2). Thus, von Hippel goes from a point where lead users are considered a valuable asset to product development and market research (von Hippel, 1986), to a point where the users themselves are considered a source of innovation (von Hippel, 2005). He further argues that user-centered innovation processes offer great advantages over manufacturer-centered innovation processes. For example, he argues that innovations that stem from lead users often tend to have greater commercial attractiveness (von Hippel, 2005, p. 4).

A large focus in von Hippel (2005) is the difference between user-centered innovation and the more traditional and closed model of innovation, in which products and services are developed by manufacturers, who use patents, copyrights, and other protections to prevent imitators from free riding on their innovations (von Hippel, 2005), which is similar to the traditional approach described in the disruptive and open innovation literature. In the traditional model, the only role of users is to have needs, which the manufacturers then seek to identify and satisfy by designing

and producing new products, which can be seen as an example of classic equilibrium theory and demand pull understanding of innovation.

However, von Hippel (2005) argues that users are increasingly innovating for themselves when they want something that is not available on the market and are able and willing to pay for its development (p. 5). They tend to develop their own innovations rather than hiring a manufacture due to agency cost, while in the case of individual user-innovations, enjoyment of the innovation process is also considered important. This tendency is explained as a result of a change in the enabling environment for innovation, as it has become increasingly easy for users to innovate due to access to tools and components for innovation, such as software and hardware, while easy access to an increasing innovation commons also play a large role (von Hippel, 2005). Furthermore, innovations that come from users is often revealed freely, as innovations are not made because of profit incentives, and often, the innovations benefits from feedback and additions that are only possible when freely revealed.

In this sense, democratizing of innovations argues that innovations are driven by other incentives than proliferation and that by detaching innovations from a firm setting the overall economic welfare will increase. This point is quite different than the on expressed in Schumpeter, as he argued that the only incentive in the capitalist system is to create surplus revenues. Furthermore, Schumpeter argued that inventions not brought to market are economically irrelevant, and therefore, not considered innovations. Schumpeter's view in this regards is characterized by increasing economic welfare through innovation by reaching and providing an innovation to a large share of the population, which is only obtainable through commercialization, at least at his time. However, the user innovation paradigm seems to describe an environment where it is possible to reach the population without the use of the traditional commercialization process. These two approaches bring about questions of the effect of the diffusion of innovations, which mode can diffuse an innovation more effectively? Can a democratizing of innovations really spread an innovation more effectively than a company driven by economic profits? And are the diffusion enabled by democratizing innovations economically relevant, and more importantly, are the innovations economically relevant? In the next section, we will take a closer look at elements of diffusion in relation to innovations, which might help to answer these questions.

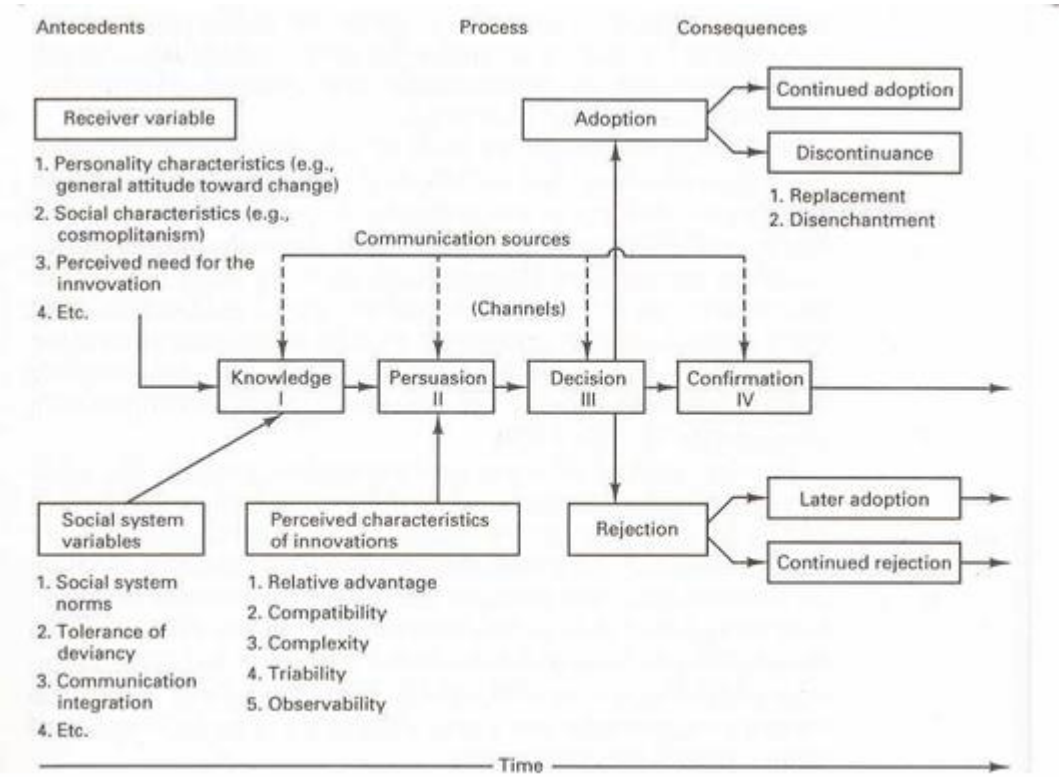
Diffusion of Innovations

Everett Roger's (born 1931) Diffusion of Innovations can be considered to be a landmark in the innovation literature and it provides a different take on innovation than the ones previously established in this review. Diffusion of Innovations takes departure from a communication point of view. It does, however, make use of interdisciplinary argumentation and has been widely used in business and is therefore included in the economic review.

Diffusion is a process of communication that utilizes different channels over time to reach the members of a social system, in this sense, diffusion of innovations should be understood as a special type of communication concerned with the spread of ideas, practices or objects that are perceived as new by the unit of adoption (Rogers, 1995, pp. 10-11). The rate of adoption is determined by the characteristics of the innovation as perceived by members of the social system who is exposed to the innovation (Rogers, 1995; p. 11). Rogers (1995) attributes four main elements to the diffusion of innovations. These are: 1) the innovation itself, 2) communication channels, 3) time, and 4) the social system that provides the context for the innovation (p. 10).

Rogers (1995) classify the rates of adoption of new ideas and suggests a percentage divide of the different classifications. The divide looks as follows: Innovators (2.5%), Early adopters (13.5%), Early majority (34%), Late majority (34%), and finally, Laggards (16%) (p. 262). With the use of these categories, Rogers (1995) explains the different speeds of adopting an innovation, as he explains the degree to which some will adopt innovations earlier than others. Rogers (1995) argues that the different classes are dependent on the state of adoption of the preceding class, making the process of adoption both a linear and chain like effect (pp. 264-265).

One of the most distinctive problems in the diffusion of innovations is that participants tend to be heterophyllous, meaning that individuals tend to surround themselves with those they share similarities with, which impedes the spread of an innovation (Rogers, 1995, pp. 349-350). For example, a change agent is typically more technically competent than his or her clients, which often leads to ineffective communication, simply because they do not "speak the same language".



Source: Rogers (1995)

The picture above shows the diffusion of innovations model in its full extent. It consists of sequential adoption and implementation stages that can help predict the diffusion of innovations over time and space. The model has been widely used in marketing relations because of the importance of identifying and leveraging on the different adopter categories, of which, especially the early adopters have received attention, as they are said to have a central role in the successful diffusion of innovations. The model can be said to provide a demand understanding of innovation, as identifying and leveraging on different adopter categories can be seen as a way of seeking to identify and satisfy demands for a given innovation. However, the theory is not a classical example of demand-pull like the one explained previously, because it takes departure in supply-side mechanics, which means that the model take into account both demand and supply-side mechanics, much like the so-called coupling models that became popular in innovations theory after the demand-pull era, see for example Rothwell (1992). Nevertheless, the diffusion model can be characterized as an objectified approach to innovation, where a given innovation is treated like an object that is associated with a level of demand, in the case of diffusion of innovations, this demand can be identified and altered if approached correctly. Thus, the model

is capable of providing companies with objectives and guidelines to achieve successful diffusion of innovations, and can therefore, be positioned within the economic realm, as it becomes a tool to proliferate on innovations, and thereby, share the economic incentive suggested by Schumpeter. However, the model can only be applied after an innovation has emerged, meaning that it ignores the origins of innovations. Like mentioned in user innovation, the distinction between different levels of users/adoptors might indicate a desire to identify changes that are reflected through these "front-running" individuals, which could indicate changes in the context for innovation, and as such, the identification of said individuals can be seen as a strategy for identifying changes in the environment in which innovations emerge.

Risk and Uncertainty

An important topic in relation to understanding innovation in the capitalist system is risk and uncertainty. Schumpeter does not say much about this area, except that the entrepreneur is willing to accept higher levels of risk, which is why he engages in innovation in the first place. Thus, Schumpeter acknowledges that innovation and risk are related, but his concepts do not go much further than this. However, risk and uncertainty is an underlying theme of innovation that can be related to every theory included in this review, and arguably, to any theory regarding innovation in the capitalist system. Accordingly, this last section before the preliminary conclusion of the economic review will investigate risk and uncertainty more thoroughly by discussing the work of Kenneth Arrow (born 1921).

According to Arrow (1962) a central economic fact about the processes of invention and research is that they are dedicated to the production of information. By applying the general case of uncertainty in production relations to the production of information, Arrow (1962) states that, by definition, the production of information must be seen as a risky process, as it is implied that information only arises in the context of uncertainty because it is not possible to accurately predict outputs from inputs in its production, which is likely to lead to an underinvestment in innovation due to risk aversion.

However, there exist several devices within the market economies that allow producers to mitigate risk, however, these are imperfect and tend to bring about a difficult moral factor, as insurance against risk can easily lead to a weakening of incentives to efficiency and give rise to deviant forms of behavior (Arrow, 1962). Arrow (1962) argues that the moral factor is too great

and if insurance existed in the case of producing new information, the incentive to successfully do so, would be greatly weakened, which could eventually lead to an enfeeblement of the economy.

A major theme in Arrow (1962) is the problems of appropriability of information, which is caused by the indivisible nature of information. For example, if an individual has a monopoly on a valuable piece of information, the information cannot be sold on an open market because the first buyer of this information can easily destroy the monopoly, as he or she, would be able to reproduce the information at little or no cost. On the other hand, when a piece of information is sold, it does not reduce the amount of information that the seller possesses (Arrow, 1962). This paradox is known as the information paradox, and according to Arrow (1962), the paradox makes it extremely difficult to define property rights in relation to information and even more difficult to figure out how these can be transferred.

Nevertheless, there exists a long history of trials and tribulations over the status of information as a commodity, to which the outcome has been a significant array of legal measures enforcing property rights, of these, the most classic example is the patent system (Elam and Arrow, 1993). Even though many legal forms of protection exist in the area of production and trade of information, the area is still subject to yet another paradox because a buyer of information cannot know the true value of a piece of information until it has been acquired. This means that the potential buyer of information always has to base their decision on less than optimal criteria, since the buyer never know what they are paying for, and if they knew before the transaction, they would have acquired the information, at least partly, at no cost (Arrow, 1962).

As indicated above, there exist considerable difficulties in appropriating information, but it gets even more complicated because information is not only the product of the inventive activity, it is also a major input, as previous information has a strong productive role in the creation of new information (Arrow, 1962). According to Arrow (1962), this observation does not create any new difficulties in principle, it does, however, intensify the previously established ones, as the appropriation of information for use in further research is more difficult to appropriate than information used in producing commodities. Furthermore, the value of information for use in developing new information is much more conjectural than the value of information used in production, which indicates that its value is much more likely to be underestimated. As a result

of this, the demand is likely to be suboptimal if a price is charged for the information. This means that basic research, which outcome is only used as an information input into other inventive activities is especially unlikely to be rewarded, and as such, basic research is only likely to have commercial value to the firm undertaking it if other firms are prevented from using the information obtained. However, such a restriction on the transmission of information will reduce the efficiency of inventive activity in general, while also reducing the overall quantity of inventive activities undertaken (Arrow, 1962). Thus, a competitive market economy is, from an economic welfare perspective, unable to achieve optimal allocation of resources for inventions due to the problems related to appropriating and transferring information (Arrow, 1962).

Arrow's information paradox indicates that the patent system is necessary for a market economy, as companies would otherwise be reluctant to invest in innovation. Therefore, patents can be considered to solve the information paradox, but at the cost of lost welfare, since information should be transferred at no cost seen from an economic welfare perspective. This is probably why Liivak (2012) argues that Arrow's argumentation does not provide any justification for the patent system. While Thambisetty (2007) states that many patents are not well-defined property rights, especially in the case of newly arising technologies, because patents are subject to intrinsic and extrinsic uncertainty that make them very opaque representations of the underlying inventions, and in these cases, patents are not capable of resolving the information paradox.

Arrow's contributions highlight the importance of policy-making in the area of innovation and protection of new inventions, which can be seen as a paradox between increasing the rate of innovations and creating profit incentives through protective measures. In this way, the risk mitigation involved in innovative activities seems to function like a double-edged sword. On one side, increasing the incentives to engage in innovation. While on the other side, preventing companies from using innovation to the extent that economic allocation becomes optimal.

In the majority of contemporary innovation literature, new ways of innovating and new focuses within innovation are presented as a contrast to the traditional understanding and approach to innovation, i.e. the literature takes departure in perspectives that are claimed to be outdated. This is also the case for disruptive innovation, open innovation, user innovation, and to a lesser extent, diffusion of innovations. In this regard, the particular context surrounding innovations

becomes increasingly important to understand, as it seemingly dictates the focuses and approaches employed in innovation theory. The information paradox and problems of appropriability of information help our understanding of the traditional approach to innovation, as it explains why the majority of large corporations have established closed organizational structures to anticipate innovation. It also signifies that innovations are assessed in terms of an economic inventive, which according to Schumpeter, is solely to create surplus revenues.

Furthermore, the constellations of risk mitigations processes can be seen as a support of the traditional approach to innovation, and while patents and IPRs can be said to be necessary to increase incentives, they seem to be an obstacle to many of the more contemporary approaches to innovation. Therefore, it can be asserted that the surrounding environment of innovations has changed, but some of the institutions that inevitably are part of this environment or context have not, which is likely to cause problems for both companies and theorists dealing with contemporary innovation approaches.

The inclusion of the work of Arrow marks the end of the economic part of the review, and the following section will briefly outline what has been established so far.

Preliminary Conclusion

In this last section of the economic part of the literature review, general tendencies in the literature are outlined, while the section argues for a broader and more holistic understanding innovation based on disciplines outside of economics.

Firstly, innovation theory have a tendency to view innovation as a phenomenon that occurs due to changes in the firm's environment, i.e. the emergence of innovations are explained as exogenous events companies cannot control. This makes the theories reactive and the focus is often characterized by what organizational constellations or individual capabilities are relatively better at handling an innovation process in accordance to the surrounding contexts. Secondly, economic theory operates with only one specific incentive for innovation, i.e. creating surplus revenues, while other incentives are ignored or treated as a "black box", as they are enclosed within the mind of user innovators, entrepreneurial individuals or attributed to the capabilities certain firms. Thirdly, the different perspectives can be seen as responses to changes in the context surrounding innovations, which inevitably will make the perspectives obsolete as the

context for innovation changes. Furthermore, the literature is, to a large extent, based on specific cases, and as such, the cases upon which theory is build is arguably positioned within specific contexts, which makes it difficult to generalize best practices and methods for realizing innovations. Thus, companies in different areas of the economy are likely to be posed with dissimilar contexts, which necessitate that the approaches they need to employ must also be different and be aligned with a specific context in order to be relevant. This ultimately means that firm-specific approaches become insufficient in providing companies with guidance, while a general approach to understanding these contexts is not explored due to a primary focus on tools and methods to proliferate on innovations as perceived through the predefined contexts that are presented in relation to given case of innovation.

This also indicates that innovation does not originate due to a certain organizational structure or capabilities of individuals. Even though ideas, inventions, and innovations unquestionably are commercialized by human actors, the innovative opportunity itself must emerge as a result of the contexts. Therefore, it can be asserted that both companies and academia can benefit from developing an understanding of the contexts in which innovations originate. This enhanced focus on context will arguably result in a framework that is more widely applicable, as companies will be able to analyze their own specific contexts rather than relying on strategic suggestions based on cases such as the ones emphasized in the innovation literature. Essentially, a framework that enables an understanding of the contexts in which innovations emerge has the potential to identify innovative opportunities, and as such, must be seen as having a high level of significance compared to theories based on specific cases observed in retrospect. In continuation of this argumentation, the next chapter focuses on how we can enable a broader focus on the enabling environment in which innovations emerge.

Innovation Beyond Economics

One of the main claims of the preceding chapter was that innovation theories are limited by their departure from economics and particularly when it comes to the understanding of the origins of innovations and the environments in which they emerge. As a result, it was argued that innovation theories can benefit from a broadening of scope. Arguably, this can be achieved by including additional disciplines, which can help us achieve a more comprehensive understanding of the contexts in which innovations emerge. This section will continue by discussing how such a framework can be developed and how we can expand on previous literature and enable findings it is incapable of. It has been established that the contexts in which innovations occur is not adequately analyzed, at most, different contexts are described, and in most cases, they are taken for granted due to a primary focus on developing tools to exploit or realize a given innovation.

However, these contexts seems to be pivotal for the emergence of innovations, while changes in theoretical perspectives on innovation indicate that the contexts are subject to continuous changes, meaning that perspectives and modes of innovation are likely to grow obsolete as the context changes. This explains the many different models, perspectives, and focuses on innovation that have emerged over time, as these can be seen as a response to innovation as observed within contemporary contexts, while it increases the importance of developing a framework that can analyze these contexts.

In an attempt to broaden the scope and establish a framework that takes into consideration the conceptual problems described so forth, this section argues that the context that constitutes the external environment to firms in which innovations emerge can be identified and analyzed in terms of the overlapping spheres of society. More specifically, this section asserts that civil society, and thereby, the context for innovation can be understood in terms of social discourses. The following section will argue why society is chosen as the subject of analysis and how this relates to the emergence of innovations.

Social Spheres

According to philosopher and sociologist, Jürgen Habermas (born 1929), civil society has an institutional core that exists outside of the sphere of state and economy. Habermas states that *"Such organizations range from, for example, churches, cultural associations, sport clubs and debating societies to independent media, academics, groups of concerned citizens, grass-roots initiatives and organizations of gender, race and sexuality, all the way to occupational associations, political parties and labor unions."* (Habermas, 1992, p. 453 cited in Flyvbjerg, 1998). Thus, Habermas argues that society should be perceived and analyzed through a broader perspective than that of state and economy because it is affected by a long range of overlapping institutional spheres. This understanding of overlapping spheres indicates that the context in which innovations emerge cannot be adequately examined by primarily focusing on economics.

This understanding can be seen to conflict with Schumpeter's idea of economies being characterized by evolutionary conditions that are created from within, as it suggests that the economic sphere is interrelated with other social spheres, such as for example politics, science, culture, religion, etc. It is worth to mention that Schumpeter did acknowledge the importance of a multi-disciplinary approach as he stated that "*A fact is never exclusively or purely economic; other – and often more important – aspects always exist" (*Schumpeter, 1934, p. 3). However, Schumpeter positioned capitalism as the foundation for all innovation, as he argued that "*Everyone must, at least in part, act economically; everyone must either be an 'economic subject' (…) or be dependent upon one*" (ibid.). As mentioned previously, in the Schumpeterian view, the economy does not have other needs than increased profits. This indicates that human needs besides that of surplus revenue cannot be explained by an economic approach or argumentation. However, Habermas' notion of overlapping social spheres and the inability of economically induced innovation literature to analyze the context of innovations indicates that innovations can be understood as being affected by a combination of societal spheres, rather than just the economic. Thus, it becomes increasingly important to exceed the Schumpeterian understanding and regard a multitude of societal spheres as influencing innovators, innovations, and the context by which they are determined.

In the next section, we will further investigate how civil society specifically can be tied to innovations by examining the contributions of sociologist William Ogburn (born 1986), who argued that social change is caused by technological inventions.

Social Change

An overarching focus in Ogburn's writings is social change, as he seeks to explain why it occurs, why certain conditions resist change, how culture grows and how civilization has reached its current state (Ogburn, 1922, p. v). In relations to this, Ogburn argued that a central factor of social change is technological inventions, indicating that the very key to understanding social change is to comprehend how inventions are made and diffused (Godin, 2010). Accordingly, Ogburn believed that the mechanism of social change is found within the social heritage, a term he used to refer to human culture, which he further divided in two aspects – material and adaptive culture (Ogburn, 1922, p. 63). He used the notion of material culture to refer to technical inventions, tools, mechanical processes, weapons, and other material items. Whereas adaptive culture covered norms, codes, folkways, social and political institutions, i.e. the elements of culture that has to adjust or adapt to advances in the material base (Ogburn, 1922, p. 129-130). Accordingly, social change happens when there is a change in any of the above-mentioned elements. Ogburn asserted that the main driving force of this change is caused by an accumulation of cultural forms, which is turn, is caused by mechanical inventions and scientific discovery (Ogburn, 1922). Thus, according to Ogburn, social change is caused by new inventions, which in turn, are enabled through the social heritage, i.e. an accumulation of past inventions and their related adaptive cultures.

These observations by Ogburn positions innovations as an outcome of an ever-changing society, which is based on our social heritage. Like that of Habermas, Ogburn's writing suggests that the emergence of innovations is based on a multitude of elements found within civil society, and thereby, suggests that civil society is a viable subject of analysis in regards to the origins of innovations. Ogburn's view also conflicts with Schumpeter, as Schumpeter's large focus on individual capabilities of entrepreneurs becomes irrelevant because Ogburn asserts that the accumulated cultural forms are better at explaining how innovations emerge than the actions of entrepreneurial individuals and companies. From the understanding of accumulated cultural forms and social change, the "black box" of subscribing successful innovations to the mental

abilities of humans or organizational capabilities of individual firms is effectively removed, while it also provides argumentation for why civil society is a central key to understanding the emergence of innovations.

However, neither Habermas nor Ogburn provides the framework with methods for measuring society and how it affects the emergence of innovations. The inclusion of the two can be seen as supportive argumentation for focusing on civil society and not an indication of how an analysis of the context of innovations should be conducted. The following section, however, digs deeper into how to analyze innovations beyond the economic sphere with the introduction of the notion of social discourses and the accumulated knowledge they contain.

The Discourses of Society

The point of departure in Foucault's discourse analysis is that all aspects of society are preconditioned by restrictions that transcend the individual's cognitive capabilities. These restrictions are formed by discourses and the knowledge they contain, which determines human cognition, speech, and action in all aspects of society. As such, the discourse analysis focuses on the interplay of the rules that make the appearance of objects possible (Foucault, 1972, pp. 31-32). According to Foucault, a discourse consists of chains of objects or statements, institutionalized practices, and historically and culturally given rules that control what is reasonable to say and think about a given topic. It should be noted that the original subject of Foucault's discourse analysis is not innovations, but the significance of language to human cognition. However, if human language and cognition are restricted by discourses and knowledge in all aspects of society, a similar point of departure can be adopted in the case of innovations, as the emergence of innovations must be governed by both knowledge and the cognition this knowledge allows. Thus, the restrictive preconditions to cognition indicate that innovations can be seen as being determined by discourses and the knowledge they contain. Therefore, the emergence of innovations can be seen as an outcome of the restrictions to human cognition, or in other words, the emergence of innovations can be analyzed in effect of the limitations to human cognition as determined by the discourses. As a result, it becomes increasingly important to analyze what restrictions is limiting human cognition and action, and thereby, the emergence and origins of innovations.

According to Foucault, discourses carry knowledge, which means that knowledge constitutes what is possible to say and think within a discourse (Foucault, 1972; Flyvbjerg, 1998; Andersen, 1999). Accordingly, knowledge has a central role in the discourse analysis, and knowledge and discourses should be considered mutually dependent. Furthermore, Foucault distinguishes between two types of knowledge, namely, connaissance and savoir. Connaissance is referring to the formalized and rule-governed knowledge developed within scientific disciplines such as economics, physics, medicine, and so on (Andersen, 1999). While savior is a broader notion of knowledge that encompasses all aspects of the human creation and accumulation of knowledge (Foucault, 1972; Andersen, 1999; Nilsson, 2009). Thus, knowledge should not be perceived solely within a scientific context, but rather it should include unscientific knowledge that governs human actions, such as habits, culture, religion, traditions, etc. According to Foucault (1972), knowledge exists beyond scientific knowledge, but knowledge does not exist without discourses. Needless to say, innovations revolves around new knowledge and it can, therefore, be argued that discourses can be considered a central element in the analysis of innovations, as new knowledge, and thereby, innovations, can be seen as being determined by the knowledge located within the discourses.

Foucault is probably most famous for his development of the so-called genealogy, which he used to analyze power relations in the western society. However, initially, Foucault developed an approach he called the archaeology of knowledge, which can be seen as a predecessor to his genealogy. As such, the genealogy is an extension to the archaeology, but should not be perceived as a higher level of understanding, as the primary focus in two approaches differs (Nilsson, 2009). As mentioned, the primary focus in the genealogy is on power relations, while the intention of Foucault's archaeology is to locate the preconditions for savoir (Foucault, 1972; Nilsson, 2009). The Archaeology of Knowledge (1972) is Foucault's conceptualization of the methodology he employed in the early period of his career, but he only described and explained these approaches years after he employed them, meaning that he never employed the specific methodology he described. Furthermore, his work cannot be considered as a conclusive theory because it is intentionally unsystematic and unmethodical (Andersen, 1999).

Regardless, the archaeology can be seen as a method to disclose the "hidden" knowledge contained within the archives of a discourse (Nilsson, 2009). Archives represent the general system of the formation and transformation of statements, and should, therefore, be perceived as

"*(…) the law of what can be said, the system that governs the appearance of statements as unique events"* (Foucault, 1972, p. 129). In this sense, archives can be seen as a rule-set for how different statements are grouped and combined, and thereby, determine and limits what is possible to say and think about a certain topic in a specific society, at a specific time (Nilsson, 2009). Thus, statements have a significant position in the discourse analysis, as the archives expose themselves in the grouping and combinations of statements. Furthermore, statements are the smallest analytical unit and should not be confused with utterances. Thus, a statement is not a sentence or a speech act, but a function that makes structures and entities appear (Nilsson, 2009).

Thus, the present framework aims to analyze the discursively accumulated knowledge that arguably explains the origin and determines the emergence of innovations. In this sense, the analytical subject becomes the discourse, the discursively accumulated knowledge, and the discursive rules that govern the creation of objects, structures, and entities such as inventions, innovations, political decisions, economic development, and the discursive statements. According to Foucault, the discourse is the final analytical level and these should be treated as monuments, meaning that the investigator should not try to disclose any underlying reasoning to the discourse, which implies that the focus should be on the discourse, the archives, and the accumulated knowledge that it governs. Therefore, the discourse analysis involves locating and analyzing statements and their mutual relations in order to expose the archives, i.e. the rules governing the evolvement of the discourse and the knowledge it contains. Arguably, this will expose the underlying context for the emergence and origin of innovations, as these can be seen in effect of the limitations to human cognition as determined by the discourses (Anderson, 1999).

As a result, the present framework arguably enables an understanding of the underlying contexts for innovations by primarily focusing on analyzing what determines these contexts, and thereby, innovations. This approach differs significantly from the literature reviewed, as this literature is characterized by a primary focus on capabilities and constellations with the aim to anticipate and proliferate on innovations. Thus, the present thesis aims to change the analytical level and approach in an attempt to achieve results that are critically different from the ones observed in the literature. However, as mentioned before, it is not the intention to discredit any of the existing literature or their approaches, and as such, the framework should be seen as an extension to this literature, which enables an understanding of why certain organizational

constellations or capabilities are better capable of anticipating innovations. However, a framework that analyzes the contexts for innovations through societal discourses and their accumulated knowledge can arguably be used proactively by companies to identify innovative opportunities. Thus, the present framework indicates an aspect of prediction, meaning that a central difference between the present framework and the existing literature can be seen in effect of the strategic recommendation they enable. More specifically, the majority of the contemporary innovation literature brings forth strategic suggestions based on specific cases observed in retrospect, and as it has been argued so far, this limits the relevance of such recommendations. On the other hand, the present framework has the potential to enable companies to analyze the context surrounding innovations within their own specific domain, meaning that they become able to base their innovation strategies on insights that have a higher level of relevance.

Methodology

The choice to use a Foucauldian inspired discourse analysis has some implications for methodology. Firstly, a discourse analysis is not just one approach, but a series of approaches that can be used to explore many different social domains in many types of studies, and as such, there is no clear consensus as to what constitutes a discourse or how to analyze them (Jørgensen and Phillips, 2002). Furthermore, Foucault did not develop a specific methodology or analytical framework around his work, partly because he did not want to form or constitute a school of thought, as such, his approaches are characterized as being intentionally unsystematic and giving little weight to methodological concerns, which makes it difficult to replicate (Anderson, 1999).

Therefore, the intended usage of Foucault's archeology can be seen as a light version of his so-called methodology, as it makes little sense to try to replicate the approaches he applied. An orthodox application of his archeology would indicate a level of analysis that is way beyond the scope of the present thesis, or any master thesis for that matter, and instead, his method is used in a way that seems to fit the purpose and the study of innovation. In a sense, this is likely how he intended his work, as we wrote that *"All my books are little tool boxes (...) if people want to open them, to use this sentence or that idea as a screwdriver or spanner to short-circuit, discredit or*

smash systems of power, including eventually those from which my books have emerged (...) so much better!" (Foucault, 1979, p. 109).

However, there is a methodological premise in Foucault's work, and because discourses play a significant role in constructing what is real for each of us, the underlying premise for using Foucault is social constructionism (Jørgensen and Phillips, 2002). To an extent, the theory becomes the method, while discourse analysis is not a method in its own regard or an explicit approach to qualitative research, it is an approach to knowledge and generation of it. Foucault's discourse analysis can thus be seen as the complete package that includes both theory and method, and choosing discourse analysis means choosing discourse as theory and social constructionism as the premise of analysis (Jørgensen and Phillips, 2002).

Thus, the usage of discourse analysis is grounded in the theoretical premise of social constructionism, which means that our knowledge of the world is not to be treated as objective truth, and as such, reality is only accessible to us through categories, meaning that our knowledge and representations of the world are not reflections of the reality "out there", but instead should be seen as products of our ways of categorizing the world (Burr, 1995, p. 3). In relation to the present framework, this means that knowledge and representations of the world are to be seen as products of a discourse. In social constructionism, people are seen as historical and cultural beings, meaning that our views and knowledge about the world are the products of historically situated interchanges among people (Gergen, 1985). This implies that the ways in which we understand and represent the world are historically and culturally specific. Thus our understanding and representations are contingent, meaning that our views and identities could have been different and can change over time (Burr, 1995, p. 3).

Furthermore, social constructionism indicates that our ways of understanding the world are created and maintained by social processes (Burr, 1995, p. 4). Thus, knowledge is created through social interaction in which we construct common truths and compete about what is true and false (Jørgensen and Phillips, 2002). Within social constructionism, there is a link between knowledge and social action (Burr, 1995, p. 5). Meaning that, within a particular worldview, some forms of action become natural and others unthinkable, indicating that different social understandings of the world lead to different social actions, which means that the social construction of knowledge and truth has social consequences (Jørgensen and Phillips, 2002).

As the thesis has so forth shown, present innovation theory contains substantial shortcomings in regards to analyzing and understanding the origin and emergence of innovations. Accordingly, a purpose of the present thesis is to question some of the underlying assumptions of innovation theory, and thereby, increase our understanding of innovations, their origin and how they emerge. This approach is similar to that of Andersen (1999), who argues that it is often necessary to take a step back and question the presumed categories, their construction, their history, and placement, in order to not analyze the future in terms of the standards of the past. For Andersen (1999), this entails a shift from the primacy of ontology to the primacy of epistemology, as it becomes increasingly important to investigate where we are watching from when we observe "what is out there". Accordingly, this way of asking entails a shift from method to analytical strategy. To summarize the difference, Andersen (1999) makes use of the following table.

Method	**Analytical strategy**
Observation of an object.	Observations of observations as observations.
The goal is to produce true knowledge about a given object.	The goal is to question presumptions and to de-ontologies.
What procedural rules need to be employed in order to produce scientific knowledge?	Which analytical strategies can enable us to obtain knowledge that is critically different from the existing knowledge?

Source: Andersen (1999) (Own translation)

Thus, an analytical strategy is not methodological rules, but a strategy used to construct the observation of others as an object for one's own observations with the purpose of describing from where the researcher, himself, is describing the world. For the present thesis this means that, so far, a central aspect has been to describe from which position innovations are described and analyzed. Thus, the purpose of the analytical strategy is to analyze innovation from a significantly different position than the already existing literature, which is obtained by using Foucault's discourse analysis. However, the employment of an analytical strategy does not imply that methodological concerns lose their relevance altogether, as Anderson (1999) states that methodological and analytical strategic perspectives can exist side-by-side and that within one

analytical strategy, different methods can be reintroduced, which the analytical strategy then has to question.

The research design of the present thesis is primarily characterized and influenced by the concept of analytical strategy rather than methodological concerns, as the purpose of the thesis is to obtain knowledge critically different from the existing system of meaning, and therefore, sets out to question the presumptions of the existing categories of innovation theory. In order to do this, theories on innovation are employed together with Foucault's archaeology, which arguably will disclose aspects of innovations and their origin that are not encompassed by the categories and presuppositions of innovations theory.

The usage of discourse analysis and focus on analytical strategy creates a more open and free stance towards methodological questions, however, this can be seen as an issue for the validity of the research, as some might say that the approach employed here is too lax. However, the central point in succumbing to an analytical strategy is that the focus on what procedural rules that need to be employed in order to create scientific knowledge becomes less important, while it is considered necessary to diverge from these procedural rules in order to obtain knowledge that is critically different from the existing knowledge. Thus, the present thesis acknowledges that there are validity issues concerning the approach employed, but these issues are considered to be outweighed by the importance of obtaining knowledge that is critically different from the existing knowledge base.

Furthermore, there are considerable validity issues when making use of a singular case. Firstly, the selection and presentation of a case can never be objective, as the selection is always based on some subjective criteria and the presentation of a case is made by the researcher who decides what to include and what not to include. Secondly, when using a singular case, there is no evidence to support that the findings are generalizable and that the findings are not just particular to the case at hand. However, a large focus and value of the present thesis is the theoretical aspect, and as indicated, the analytical strategy has been employed throughout the literature review, as it can be characterized as "observations of observations as observations" as suggested by Andersen (1999). Thus, the analytical value is not only the case analysis. Instead, the case should be seen as support for the findings of the previous section. Furthermore, it is questionable what would be obtained by conducting a multiple case study, because, if two or

three cases were analyzed, the issue of generalizability would still be present, while the subjectivity involved in case selection and presentation would contradict the attempt to triangulate. Thus, there are considerable validity pitfalls when using a singular case, but by acknowledging these and explaining the methodological reasons to why a singular case is used, these pitfalls becomes less significant and the research arguably obtains a level of transparency.

Analysis

The following section contains the case analysis of the thesis. The purpose is to present a case to which the theoretical framework can be applied in order to further develop and sustain the argumentation of the thesis. Firstly, the case of the EV is presented with a focus on its historical development and advances made within the EV technology. Secondly, perspectives from the economically induced innovation literature are applied to the case in order to illustrate the limitation of such theories, and thus, further solidify the claim that present theory contributes little to our understanding of the emergence and origins of innovations, and thereby, its underlying determinants. This is also done, however, to acknowledge present theory and show that the claims of these theories are valid and capable of explaining innovations within their presupposed paradigms, while it is also relevant to include these theories because the present thesis aims to augment rather than substitute them. Thirdly, the discursive framework is employed in order to test if the framework is applicable to the case of innovation and to what extent it is capable of explaining the emergence and origins of innovations in relation to the EV.

The Case of the Electric Vehicle

The first small-scale EVs were developed more than 150 years ago (Electricauto.org, n.d; Bellis, 2016.). It is difficult to pinpoint the invention of the EV to one inventor or country, and it should rather be seen as series of developments that happened throughout the 19th century in various countries (Energy.gov, 2015; Bellis, 2016). Like the majority of automotive innovations at the time, the EV emerged primarily in the US, and therefore, the following presentation of the earliest EVs is primarily focusing on the US market from 1889 to mid-1920s. This seems like a fitting temporal limitation, as Thomas Edison built the first EV using nickel-alkaline batteries in 1889 (Electricauto.org, n.d.), while the mid-1920s marks a point in time where internal combustion engine (ICE) vehicles seem to have attained industry dominance (Ibid.).

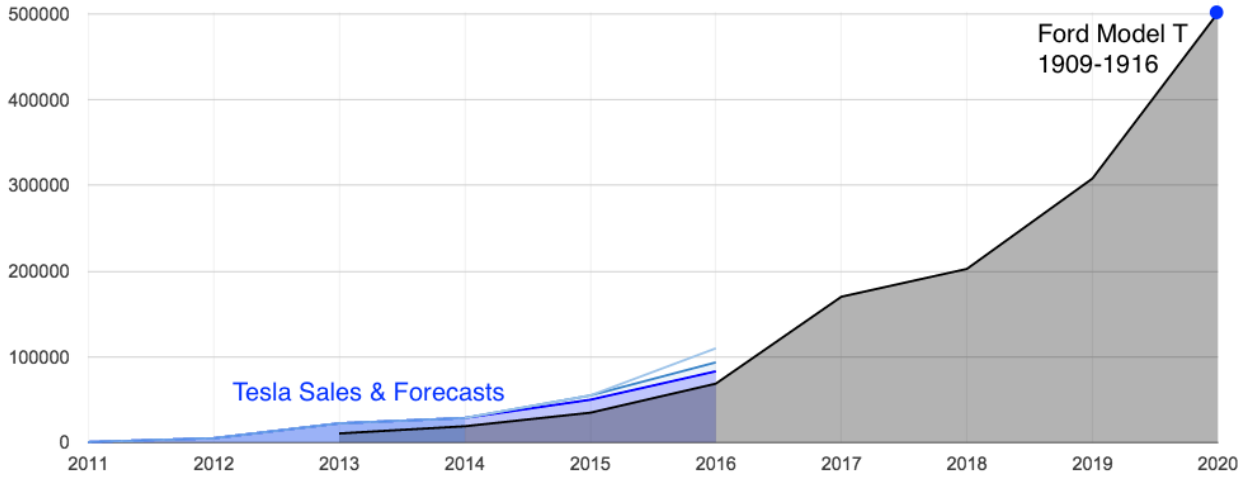
Initially, the EVs can be considered to have a competitive advantage, since they were cable at driving faster than both ICE and steam-powered vehicles. Furthermore, EVs did not make noise or smell like the ICE vehicles, while EVs performed better in snow and was easier to drive because there was no need for changing gear (Bellis, 2016). Regardless of these presumed advantages, the amount of cars produced in the U.S. in 1900 was more or less evenly divided between steam, electricity, and gasoline powered cars (Electricauto.org, n.d.). However, in 1904 the car manufacturing industry was significantly changed, some might say revolutionized, when Henry Ford initiated the assembly-line production of ICE vehicles, which enabled low cost and high volume production. As a result, Ford was able to reduce the price per vehicle of the popular Model T from approximately 850 US$ in 1909 to 290 US$ in 1920 (People.hofstra.edu, 2017). In contrast, the price for the less efficiently produced EVs was approximately 1,750 US$ in 1912 (Bellis, 2016), while the price was more or less stagnant in the years where Ford realized enormous cost-cutting in production and gradually lowered the prices of the model T (Electricauto.org, n.d.). Thus, ICE vehicles gained a significant price advantage.

However, the initial advantages of the EVs also slowly disappeared. For example, The Detroit Electric (TDE) which was produced from 1907 to 1942 and can be considered to be one of the major successes in early EV history was advertised with a driving range of 115 km between battery recharges. However, the top speed of TDE was only about 32 km/h (Detroitelectric.org, 2015), which was about half of the top speed of Ford's Model T (Media.ford.com, 2012). As result, TDE was mostly sold to physicians and female drivers in urban areas who only had to travel short distances and who desired the dependable and immediate start without hand cranking of the engine, which was required by early ICE vehicles (En.wikipedia.org, 2016), and thus, TDE can be considered to have been serving a niche market. However, this advantage was also eliminated by the invention of the electric starter in 1912 (Electricauto.org, n.d.). In comparison of the two technologies, Ford sold around 15 million of the Model T from 1908 to 1927 (People.hofstra.edu, 2017), whereas the TDE was only sold in 14,000 copies from 1906 to 1939 (En.wikipedia.org, 2016). In addition to the technological aspect, changes to infrastructure also worked against the emergence of the EV. Initially, the only drivable roads were inside of towns, indicating that the limited driving range of EVs did not pose as a disadvantage (Bellis, 2016). However, as the infrastructure was gradually expanded it became possible to travel further by car, which made the limited driving range of EVs a disadvantage.

Between the mid-1920s and mid-1960s, the interest for EVs seems to be at an all-time low due to the much better performance of ICE vehicles (Bellis, 2016). However, during the 1950s and 1960s, a range of studies was conducted that concluded that a significant portion of air pollution was caused by ICE-vehicles and that air pollution posed a serious health threat to the general public (Long, 2000; McNeill, 2000). Furthermore, the geopolitical situation of the 1960s and 1970s fostered nations of national self-sufficiency, meaning that most countries found it necessary to reduce its dependency on imported foreign crude oil (Long, 2000). Additionally, it became apparent that the natural reserves of crude oil might not be endless, speculations that culminated in the 1973 oil crisis (Ibid.). The developments explained above led to a renewed focus on sustainability and alternative fueled vehicles entered the agenda of policy makers. Thus, government and public opinion gradually became focused of the negative side-effects of human living such as industrial pollution, consumer waste, production and disposal, and most importantly, the shortage of fossil fuels. This led to the re-emergence of the EV technology, but this time, because of its positive environmental impact (Energy.gov, 2015).

Many attempts were made to produce EVs from the 1960s until the 1990s. However, the prudence of these is questionable and despite the many attempts, no type of EV ever experienced a level of commercial success that can be compared to any mass-produced ICE-vehicle at the time. In fact, all EVs produced between 1970 and 2000 were produced in limited numbers, and in most cases, production was quickly discontinued due to lack of commercial success. In the early 2000s, the environmental concern seemed to have gained renewed momentum, and in more recent years, environmental sustainability has received more attention than ever before. As a result, the EV technology has become increasingly prudent and increased sales of EVs can be observed (EV-volumes, 2016).

However, the EVs have not experienced the commercial success that perhaps could be expected, and even though it has become less rare to see EVs in the streets, it can still be considered a niche market, as EVs only make up 0.01% of the total global stock (Randall, 2016). However, indications of change can be found, as the global sales of EVs reached unprecedented levels in 2016, which is a 60 percent growth compared to the year before (Ev-volumes.com, 2016). Furthermore, 60 percent is also roughly the annual growth rate that Tesla forecasts for sales through 2020, and interestingly, 60 percent is also the growth rate that the Model T experienced during the 1910s (Randall, 2015).



Source: Randall (2015)

Furthermore, Companies such as Chevy and Nissan have announced that they plan to start selling long-range EVs in the $30,000 range in the near future, while both carmakers and tech companies are investing billions in EV technology (Randall, 2016). According to forecasting by Bloomberg, EVs will by 2022 cost less and perform better than most ICE counterparts, and when this happens, there will be a liftoff in sales of EVs, and by 2040, 35% of all new cars will be EVs (Ibid.). Thus, numerous indicators can be found that EVs are emerging and that the EVs will pose as a direct competition to the ICE technology in the near future.

This short introduction to the case already indicates that the EV innovation has emerged due to circumstances that are not determined economically, which reinforce the inclination to further analyze the social discourses that are related to this particular innovation. However, as mentioned before, the thesis acknowledges the existing literature and aims to augment it. Therefore, the following sections will illustrate how theories and perspectives included in the literature review can be applied to the present case.

Disruptive innovation

According to a recent McKinsey report on the future of the automotive industry, four disruptive technology-driven trends that profoundly will change the automotive industry are identified. These are diverse mobility, autonomous driving, electrifications, and connectivity (McKinsey & Company, 2016). While the report covers all four disruptive forces and their related technologies, what is of interest of the present thesis is of course what the report has to say about electrifications. Accordingly, it is argued that EVs are becoming increasingly viable and competitive due to stricter emission regulations, lower battery costs, widely available charging stations, and increasing consumer acceptance. This is presumed to create a new and strong momentum for EVs, which could result in EVs penetrating the automotive market (Ibid.). Furthermore, the report argues that the speed of adoption will be determined by the interaction of consumer pull (partially driven by the total cost of ownership) and regulatory push, which will vary strongly at the regional and local level. Therefore, the McKinsey report argues that the share of EVs in 2030 can range from 10 to 50 percent of new vehicles with adoption rates being highest in developed and dense cities with strict emission regulations and consumer incentives such as tax breaks, special parking, and driving privileges, discounted electricity pricing, and so on. On the other hand, sales will be lower in small towns and rural areas with lower levels of charging infrastructure and higher dependency on driving range. However, as the technology of batteries improves, the local differences will become less significant, and EVs are therefore expected to gradually gain market share from ICE vehicles across all customer segments (Ibid.).

A similar view is expressed by Seba (2014), who writes that the age of energy and transportation will be over by 2030 and that exponentially improving technologies such as solar, EVs, and autonomous cars will disrupt and sweep away the energy and transportation industries as we know them. Many others also write about disruption in the automotive industry, for example, Infosys, a consultancy firm, writes that *"the automotive industry is approaching a tipping point for disruption (…)"* (Ashokkuma and Sethuraman, 2016), while CEO of General Motors, Marry Barra said at a conference in 2015 that *"the auto industry is poised for more change in the next five to ten years than it has seen in the past 50 (…)"* (The CyberWire, 2016). At first sight, the EV can certainly be seen as a disruptive technology that is bound to change the auto industry in

profound ways, which theoretically means that new companies, such as Tesla, can be expected to use the EV technology to gain a foothold in the industry and later challenge established players.

However, this is not the case. Even though Tesla have been described by various medias as being one of the latest examples of industry disruptors, the EV technology is better characterized as a sustaining technology and Tesla as a classic sustaining innovator that focuses on a product that offers incrementally better performance at a higher price. According to the disruptive innovation theory, if the EV technology was considered disruptive, and Tesla a disruptor, there would be no strong competitive response in terms of Tesla's initial market share. This is not the case, since most industry incumbents are investing heavily in EV technology, and many traditional manufacturers can be seen as competitors because most of these also pursue the EV technology. Therefore, according to the disruptive innovation theory, the EV is a sustaining innovation, and therefore, competitors will emerge and challenge the market, however, this might not be so obvious because the market for EVs still is relatively small.

One of the reasons to why the EV technology has been seen as a case of disruption is arguably the loose application of the term. Since Christensen developed the theory of disruption, the concept of disruption has been used to describe elements of changes in the competitive landscape that not necessarily has to anything to do with the characteristics of disruption he described in the theory (Harvard Business Review, 2015). As such, the term disruption has become a buzzword that covers all developments that potentially can change how companies compete within a given industry. In this sense, the case of EVs in more recent times might better be described as forces of creative destruction, and while there are certain similarities between the two concepts, creative destruction is less specific and seems to be more applicable to the case at hand. A core difference between disruptive innovation and creative destruction is found in the words describing the concepts. Disruption "disrupts" an industry, whereas creative destruction "destroys" an industry. In this sense, disruption can be seen as a precondition to and milder version of creative destruction. However, as the EV technology is to be considered a sustaining innovation rather than disruptive, the example of EVs shows how sustaining innovations can potentially lead to creative destruction, which will be the case if the projections of EV sales hold true and everyone can be expected to drive EVs in the future. If this happens, the value of competence, patents, and factories for ICE vehicles has effectively been destroyed. This indicates that disruptive

innovations are always cases of creative destruction, while sustaining innovations can be, but not necessarily are examples of creative destruction.

Thus, the automotive industry is likely to change profoundly, and the EV technology can be expected to be one of the reasons to this change. However, some questions are left unanswered, why is it not until now that the EV technology has emerged as a viable innovation and competitor to the ICE technology. The EV technology has been on the horizon for a long time, but only now is it described as a disruptive force and can be seen as an element of creative destruction. As such, the underlying determinants for the emergence of the EV are not explored or considered by employing a disruptive lens nor can it be explained by creative destruction.

The Entrepreneur

The analysis of the emergence of EVs can easily be coupled to an argumentation of the importance of the actions of entrepreneurial individuals. In the early EV history, we saw how EVs gradually became inferior to ICE vehicles, which can be attributed to the actions of Henry Ford. Thus, Henry Ford's entrepreneurial capabilities arguably played a significant role in the transformation of transportation, which led to the domination of the ICE and laid the foundation for the automotive industry. To an extent, the same can be said about Tesla's Elon Musk in relation to the most recent developments made within EVs. In this sense, the capabilities of individuals and their associated firms could be attributed to the developments observable in history, which would indicate that the innovations made, to some extent, is an outcome of their remarkable intellect, will, and visions. However, in relation to present thesis, such an analysis would have considerable shortcomings in relation to understanding the origin and emergence of innovations.

An analysis of entrepreneurial capabilities of individuals, or firms for that matter, would "black box" innovation into personal characteristics and abilities. The analysis would then only be able to conclude what characteristics have been an asset to realizing innovations in the particular cases. As such, the analysis would become a tribute to Ford and Musk and the capabilities that arguably led to the developments within their fields, which to some extent, could lead to generalizable observations to form desirable personal traits of entrepreneurs, leaders, and firms, that potentially could lead to successful innovations. However, by doing so, we would be appointing a large share of the subject, i.e. innovation, into the minds of individuals, which have

obvious implications for measurement and generalizability. It is worth to mention that the present thesis does not intend to neglect the importance of activities of entrepreneurial individuals or firms and the capabilities that potentially can lead to successful innovations, but nonetheless, as the theoretical framework of the present thesis indicates, the aim is to augment such views and thereby extend our understanding of the emergence of innovations.

In relation to this, the present framework suggests that by focusing on the environments in which these entrepreneurial individuals and firms operate more fundamental aspects of innovations can be revealed. Thus, instead of focusing on capabilities resulting in certain developments and realization of innovations, the framework indicates that an analysis of the context in which these individuals are positioned should be the subject, as it would enable us to uncover elements of innovation that traditional approaches is incapable of, and thereby, augment our understanding of innovations and how they emerge. The discursive approach to this indicates that entrepreneurs and their actions are limited by discursively accumulated knowledge positioned in society, which means that the developments that are made by, for example Ford and Musk, can be seen as the outcome of these discursive formations, rather than their individual capabilities. Thus, it is the societal discourses that make their achievements possible, while their actions are preconditioned by the same discourses. This means that the "black box" is effectively removed, as innovations can be seen as an outcome of the accumulated knowledge in society, which indicates that the specific actions leading to a given innovation are less relevant, at least in relation to understanding the emergence of innovations. To a certain extent, innovations become an inevitable force that is positioned within broader society.

Open innovation

Another focus that would be worthwhile to adopt in the analysis of EVs is that of open innovation because many of the recent developments made within the EV technology have been achieved through partnerships. For example, Tesla and Nissan both established close ties to battery manufacturers (Nec.co.jp, 2008; Tesla.com, 2011). While both Tesla and Ford has offered their patents for licensing in the hope of increasing EV adoption and improving the supporting infrastructure (Spours, 2015). According to Kevin Layden, Ford's Director of Electrification Programs, the goal is to foster industry-wide innovation, as he states *"The way to provide the best technology is through constant development and progress. By sharing our research with other*

companies, we will accelerate the growth of electrified-vehicle technology and deliver even better products to customers." (Hard, 2015).

In part, the open innovation approach in the auto industry can be seen as a result of competition being won by so-called connected cars. Many of the recent improvements in cars are of technological character, meaning that tech firms increasingly have entered the car manufacturing industry and gained importance with peripheral equipment and technologies (Spours, 2015). Thus, traditional car manufacturers are more reliant on innovations that lie outside of their core competencies, meaning that they benefit greatly by collaborating with tech companies. Furthermore, the developments indicate that consumers are unwilling to pay more for physical car features, but they are influenced by software related innovations. The tendency described above is true for all cars, but the EVs are even more reliant on tech type innovations, which means that tech firms are just as, if not more, competitive than traditional car manufacturers in certain aspects of EV development. This indicates that traditional manufacturers are forced to open up their innovation approach in order to access talent and be at the forefront of innovation in relation to EV development, which is also what can be observed in the industry.

In short, the open innovation paradigm is capable of explaining some of the strategic elements of innovation within the EV sector, as there are numerous examples of how car manufacturers are forced to cooperate with tech companies, and vice versa. Furthermore, both Ford and Tesla have made their patents available in an attempt to accelerate the overall growth of the EV industry. However, like with the other perspectives discussed in the literature review, the open innovation analysis neglects the emergence of innovations. In accordance to the argumentation of the present thesis, there is an underlying level of analysis in relation to innovations and their origins that are left unanswered by focusing on innovation strategy and how innovations can be fostered on an industry basis, which is largely what a focus on open innovation implies in the case of the EV.

Preliminary Conclusion

One of the purposes of the present thesis is to augment existing theory with an understanding of the emergence and origins of innovations. Therefore, it is important to illustrate how these perspectives are related to and capable of explaining certain aspects of innovation in the case of the EV. Some of the most relevant of those are explained on the previous pages, while others will be excluded from a more detailed application, as substantial argumentation for the shortcomings of such theories arguably has been established. For example, Roger's diffusion of innovation and notion of early adopters could also rightfully have been applied to the case, while user innovations could be applied, but to a lesser extent.

Nevertheless, the literature review indicated that these theories all suffer from shortcomings and does not question why certain innovations emerge instead of others. Thus, the purpose of this first part of the analysis is to acknowledge that the existing literature can rightfully be applied and is capable of explaining certain aspects of the case. However, as both the literature review and the analysis so forth have shown, there are elements of innovations that the theories take for granted or simply neglect. Accordingly, the remainder of the analysis will focus on these gaps, as it will seek to analyze the emergence and origins of the EV innovation with the use of a Foucault-inspired analysis of societal discourses.

The Social Discourse

The 1950's can be seen as the beginning of a long range of environmental studies (Long, 2000), which all can be analyzed as discursive statements, meaning that they are part of the discursive archives that governs an environmental discourse, and as such, the EV technology is arguably viewed and assessed by actors in society in effect of this discourse. Thus, an environmental discourse can be identified and the emergence of the EV can be expected to be determined by this discourse because what can be said and thought about air pollution, climate changes, and more broadly, negative side-effects of human consumption can be expected to influence what can be said and thought about the EV technology. Environmental studies are to be considered as statements of connaissance due to their scientific nature, and as such, the environmental discourse is characterized by a large amount of scientific knowledge dating back to the 1950s that provide support for the EV technology because of the health problems related to car emissions and the issue of climate change.

There are expressions of environmental concerns pre-dating the second half of the 20th century. However, an examination of the pre-1950 environmental literature reveals that the dominant concern was conservation of natural resources, and as such, there was only occasional treatment of pollution-related issues (Long, 2000). However, in the post-war period of the 1950s and 1960s, the economic re-birth of Western Europe and the continued rapid industrialization of North America created the foundation for an increased environmental awareness (Ibid.). In short, the unleashed economic growth intensified existing environmental threats, while it generated entirely new ones. Furthermore, the newly created wealth arguably provided the motivation and financial resources for nations and individuals to begin pursuing quality of life goals beyond basic human needs.

However, the many scientific studies that gradually evolved from the 1950s until the 1990s, which amounts to connaissance statements indicating that the fuel economy and ICE vehicles are harmful to public health, did not lead to any significant change in consumption, especially in regards to personal transportation. For example, total energy consumption and crude oil consumption has steadily increased since the 1970s (Indexmundi.com, 2017; Eia.gov, 2012). Therefore, the early phase of the discourse is characterized by a long line of evidence of environmental concerns, which gradually have increased the amount and intensity of environmental organizations, government agencies, acts and regulations, while an increasing number of man-made environmental accidents like the Love Canal, Three Mile Island, and Chernobyl all presumably also have intensified the environmental discourse. However, a full exploration of all environmental accidents, laws, acts, and movements is beyond the scope of the current analysis. What is central to notice about the early phase of the environmental discourse is that, despite the knowledge within connaissance that proves ICE vehicles are harmful, there has not been any significant change in consumption, which indicates that the environmental concern has not entered into the broader notion of knowledge contained within savoir.

This observation indicates that scientific knowledge can be considered to be a sub-knowledge that is positioned within the larger pool of knowledge that governs human cognition and action. Thus, the unscientific savoir is superior in governing human cognition, and connaissance can be seen as a supplement to the creation of statements and achieves that through accumulation makes up a discourse. Therefore, it can be argued that crucial changes in regards to cognition and action within the environmental discourse are primarily determined by savoir because the

statements of connaissance have in themselves not been able to influence a change towards more sustainable consumption. Thus, the almost negligible sales of EVs during the early phase of the environmental discourse can be explained by the little amounts of savoir that can be identified. In other words, the beginning of the environmental discourse is predominantly based on connaissance statements, and as such, the environmental concerns does not enter into the more broad knowledge pool of savoir, which determines human cognition, speech, and action, and thereby, arguably also the broader interest in EV technology.

However, in more recent years, there has been a significant increase in sustainable consumption, which indicates a broader environmental awareness, indicating that the environmental discourse is increasingly manifested through savoir. This trend can be observed by looking at increases in sales of ecological products, statistics of recycling, increases in sales of energy saving light bulbs, solar panels, and of course, the latest sales statistics of EVs (See appendix #1). These indicate an increased environmental awareness beginning around 2000 that has gradually increased in intensity until present day. However, the change towards environmentally friendly consumption, i.e. change in savoir, can be characterized as being slow because it have lagged decades behind the evidence contained in the accumulated scientific knowledge, and as such, the discursive changes do not fit the urgency that has been stressed within science. Nonetheless, a change in savior can be identified, which indicates that EVs are increasingly considered urgent and prudent in terms of the common knowledge that governs human cognition and action, which would indicate an increased interest in the EV technology, and if the tendency continues, the EVs can be expected to pose as a direct competition to the ICE vehicles in the future. However, it is important to understand how the environmental discourse has evolved, and more specifically, how it has been transformed from being predominantly characterized by connaissance to becoming part of the more common knowledge of savoir, which is used by consumers to assess the EV, but also by potential innovators to assess innovative opportunities within the EV area. In other words, it is essential to know how the environmental discourse has changed, and by what effects savoir has developed within the discourse.

To illustrate this, it becomes increasingly valuable to pose a temporal limitation to the analysis, meaning that the following focuses on discursive changes that can be observed during the 1990s as these changes arguably have led to the increased environmental awareness that can be observed from early 2000s until today. Arguably, a temporal limitation like this only has limited

implications for the analysis, because the accumulated knowledge and discursive changes predating a specific point in time is manifested in the state of the discourse as perceived at this particular point in time. Thus, discursive changes predating 1990s are not overlooked or neglected by looking at the state of the discourse in the 1990s.

In 1992 the World Health Organization wrote in the introduction to their report on public health that *"Since the 1960's, the world's motor vehicle fleet has been growing faster than its population. (…) unless controls are applied or strengthened immediately the damage to public health will become very serious."* (Mage and Zali, 1992). The report indicates the extent to which the environmental discourse had developed by the early 1990s. The World Health Organization positions harmful emissions from cars as the prime factor in the deterioration of the global air quality and calls for immediate political intervention in order to solve the issue. Thus, by the early 1990s, the environmental discourse can be observed in terms of politics, which means that knowledge within the discourse is being reproduced in terms of political statements.

The UN Earth Summit was also held in 1992, which was where the Convention on Climate Change was first negotiated. The objective of this convention is to *"stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"* (Unfccc.int, 2014). The convention does not set any binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanism. Instead, it outlines how specific international treaties can be negotiated to set binding limits on greenhouse gasses, these are called protocols or agreements. The Kyoto Protocol of 1997 was the first binding obligation for developed countries to reduce their greenhouse gas emissions, while the Paris Agreement of 2015 is the latest achievement of the convention.

The Kyoto Protocol can be seen as an example of the environmental acts that have been ratified over the years due to the accumulated scientific knowledge within the environmental discourse. As such, the Kyoto Protocol is an example of how accumulated scientific knowledge influence policy makers and how global political consensus have effects on national environmental policies, which in turn, affects a wide range of local industries and markets. Thus, connaissance statements within the environmental discourse seem to have gradually influenced the political sphere to increasingly become occupied with the issue of climate change, which means that

knowledge within the discourse is reproduced in savoir statements of what is ideologically good for society. Not only are politicians influenced by scientific knowledge, they also use it actively in their argumentation to achieve reliability and transparency. However, the knowledge politics produces should be considered as savoir, and to an extent, the reproduction of knowledge through political awareness and action towards a given problem can be seen as a transformation of connaissance into savoir. Not only do political decisions and opinions amount to statements in themselves, but due to mass media coverage and public interest in the political agenda, connaissance statements are transformed and included within the broader notion of savoir.

An initiative like the Kyoto Protocol and its effects indicates a discursive causality that shows how scientific knowledge come to influence the political discourse, which initiates a change in the political agenda, and through these changes, a subsequent change is induced the broader knowledge that governs human cognition and action. In other words, it transforms connaissance into savoir. Thus, it seems that the environmental discourse have gradually developed and through political consensus on environmental issues, the environmental concerns have increasingly been included in the broader notions of knowledge contained within savoir. The archives of a discourse are created by the accumulated knowledge within the discourse, and changes in this knowledge base determine the production and reproduction of knowledge, which can be identified in terms of new statements. Therefore, if the environmental discourse has created a change in the notion of savoir, this change would be identifiable through a reaction or adjustment in the overlapping spheres of society. As such, companies' adaptation to regulation or changes in consumer preferences can be seen as evidence that a change in the discourse has occurred and that knowledge within the discourse is being reproduced in terms of savior.

Some examples of this can be seen in effect of some of the views that developed within sociology during the late 1980s and 1990s because many of these describe societal transformations such as ecological modernization and sustainable development, which indicates an increasing environmental consensus in the general public. An example is Beck's (1992) notion of the risk society, in which he argued that risks caused by human agency had become the predominant product of industrial society. According to Beck (1992), contemporary society is characterized by a consensus regarding the reality of risk of environmental issues, which has marked a historical transformation towards a new global state of mind. This global state of mind is referred to as reflexive modernization (Ibid.) And while Beck's publication in itself should be treated as a

scientific statement because it is knowledge contained within an academic discipline, the information it contains is significant for understanding the state of the environmental discourse in terms of savoir because it positions humans within a contemporary society where they are well informed and aware of environmental risks. As such, the consequences of industrialization and the accompanying risk indicate that climate changes are perceived to be real and part of the human conscience. Beck's notion of the risk society and similar accounts within sociology, such as Giddens (1990), Mol and Spaargaren (1993), Lash, Szerszynski and Wynne (1996), and Giddens and Sutton (2009) all indicates increasing amounts of savoir in the environmental discourse, meaning that, during the 1990s, the environmental concern increasingly can be considered part of the common knowledge that determines human cognition, action, and speech.

So forth, the analysis has indicated a causality in the transformation of the environmental discourse, as it has shown how science have influenced the political sphere with notions of sustainability, which have led to policies that restrict the possibilities of the private sphere, and thereby, make the environmental discourse observable in terms of savoir. Arguably, restrictions that are posed through policies influence what is considered viable consumption and investment, and thereby, changes consumption patterns and business praxis. Thus, what is considered rational to say and think about the environmental concern has gradually changed towards the notions that were only identifiable in terms of connaissance in the early phase of the discourse, meaning that, by the 1990s, politicians, consumers, companies, and potential innovators are increasingly influenced by the environmental concern.

The gradual transformation can also be observed in terms of business practices, as it has become increasingly normal for companies to engage Corporate Social Responsibility (CSR), while the discipline of CSR emerged during the same period as society became preoccupied with the negative side effects of human living (Carroll, 1999). CSR has often been criticized for being made due to legislative restrictions or stakeholder pressure, which indicates that it can be seen as a result of discursive changes within the environmental discourse and a testament to discursive causality because legislative restrictions and stakeholder pressure can be seen as expressions of savoir and the development of it. CSR indicates the causality between connaissance and savoir because it evolved as the dangers of climate change were made real by scientific prognoses, which led to regulatory policies being enforced upon the industries that were to blame and on the consumers who bought environmentally unfriendly products (Ibid.). Thus, CSR can be seen as

a testament to the causality within the environmental discourse, as it shows how scientific knowledge is being transformed into savoir through policies that restrict both businesses and consumers, and thus changes the discursive archives.

As mentioned, a change in consumption patterns can also be identified, and while sustainable products and ecology have become increasingly normal there are still many products and consumption patterns that are directly harmful to the environment, while significant changes can only be identified in more recent years. In short, what can be observed is a gradual transformation of the environmental discourse, but seen in retrospect, this transformation is characterized as being very slow, and it does not reflect the achievements made within science or the political awareness of the problem, indicating that the discourse has not been substantially solidified in terms of savoir. The environmental discourse is, like any other discourse, primarily influenced by savoir, and as the analysis has shown so forth, the environmental discourse is characterized by a large amount of connaissance, and even though savoir have increasingly evolved, it has not been enough to manifest a change in consumption or a business interest in environmental issues that reflects the knowledge contained within connaissance.

As indicated, it is possible to identify statements in all instances where knowledge is produced and reproduced within a discourse, which means that it is possible to identify changes in the direction that is likely to lead to the broader acceptance of and interest in the EV technology. These changes can be assessed to either work for or against the emergence of the EV because the accumulated knowledge within the discourse continuously expands, but at the same time, the presents a common reference point for participants in the discourse. Thus, as the rules of what can be said and thought within the discourse changes, the discourse itself changes, and it is through an assessment of these changes that the emergence of the EV can be determined. For example, if the rules of the discourse are changed towards Beck's (1992) notion of the risk society and reflexive modernity, which indicates an increased environmental conscious in the western world, then the environmental discourse will inevitably render the EV technology is considered to be urgent and prudent, which would lead to an increased focus, acceptance, and interest in this technology, and likely lead to its emergence.

In effect, the limited success of the EV can be explained by a discourse that does not support its emergence in terms of savior and even though the EV has scientifically been considered to be

very urgent and needed, the common knowledge that governs consumer preferences have not allow it to emerge. Thus, the environmental discourse has not manifested the necessary change in savoir that is needed to lead to the emergence of the EV, indicating that what has deterred companies and consumers from investing in EVs has been discursively determined.

A central observation so forth is that politicians can be seen as having a central function in the production and reproduction of knowledge within the environmental discourse. For example, the UN Convention on Climate Change's annual meetings known as Conference of the Parties (COP), which the Kyoto Protocol and Paris Agreement was an outcome of, receives a great deal of media attention, indicating that the political action and agenda is transforming the savoir of the environmental discourse. Another central observation is that the transformation of the environmental discourse has been characterized as being slow, which can be seen through the extent to which the notion of savoir is solidified in society.

However, another reason for the slow transformation is arguably because the environmental discourse is affected and limited by other coexisting discourses. The notion of coexisting discourses, would explain why businesses have been criticized for lagging behind in terms of sustainability and environmental concerns, as there most likely exists a discourse that determines what is considered sensible to say and think in terms of managerial issues, and thereby, determines what managers deem rational to say and think in terms of production possibilities, efficiency, profit maximizations, and so on, which also affects what consumers deem rational to say and think in terms of price and quality. However, as the environmental discourse is increasingly manifested through savoir, the attitude towards unsustainable products and business practices becomes more critical for consumers, and therefore, companies are forced to adapt to the discursive changes, which to a large extent, explains how CSR has evolved.

The emergence of the EV can be expected to be determined by multiple discourse, and as such, a coexisting discourse on personal transportation is important to consider. Possibly, and most likely, there are other discourses that have effects of the environmental discourse and the emergence of the EV, but the discourse on personal transportation seems to be the most significant to consider. This discourse arguably predates the environmental discourse, and as such, can be considered to be more solidified in society, meaning that it have more accumulated knowledge associated with it, especially in regards to savoir. Therefore, the notion of savoir

within the personal transportation discourse can be expected to be a determinant of preferences and expectations in relation to car consumption, which is likely to have obstructed the emergence of EVs because the technology is viewed according to notions such as convenience, freedom, flexibility, and other concepts that are associated with ICE vehicles. Thus, different discourses affect each other, and the discourse on personal transportation can be seen as a limitation or conflicting force to the environmental discourse in regards to the emergence of the EV. On the other hand, the environmental discourse can also be said to challenge the discourse of personal transportation because the knowledge it contains is based on developments in the ICE technology, which within the environmental discourse is considered harmful and unsustainable. Thus, it can be asserted that the emergence of the EV is determined by multiple discourses and that the coexisting discourse of personal transportation has posed an obstruction to its emergence because this discourse is likely to determine what can be said and thought about convenience, price, driving range, etc. Thus, the EV technology is not only determined by what the environmental discourse allows in terms of savoir but equally important is the discourse on personal transportation.

As an example of this, (Gould and Golob, 1998) made a research on the attitude towards EVs, which concluded that the opinion towards EVs could weaken over time because as people acquired information about EVs from mass media or conversation they became less favorable about its benefits. Gould and Golob (1998) suspected that this decline was related to negative information about vehicle range or stories about electricity generation and fuel source. As such, it is evident that the EV technology should not only be viewed in terms of the environmental discourse, but factors such as driving range, which is determined by the personal transformation discourse, are likely to work against the emergence of EVs. Furthermore, the study of Gould and Golob (1998) also shows how the knowledge base on which EVs are assessed continuously develops as new knowledge constantly is being produced and dispersed by mass media and everyday conversation, which shapes the future knowledge that could, or could not, lead to increased interest in and broader acceptance of EVs.

Even though the environmental discourse increasingly allows the EV to emerge, the discourse on personal transportation seems to limits its emergence. As mentioned, the discourse on personal transport has arguably evolved due to advancement within ICE technology that has made cars widely available and relatively cheap. These developments can be expected to subsequently have

affected and even created additional discourses, as the achievements within ICE vehicles have influenced and made possible a long range of aspects that are central to modern society. For example, suburban living is, to a large extent, made possible by cars and the possibility to commute to work, while countries have developed their entire infrastructure on the premise of widely available cars with a long driving range. Thus, the personal transportation discourse is arguably much deeper ingrained in contemporary society, which likely indicates that it is less inclined to change, even though the knowledge contained within the environmental discourse positions these developments as unsustainable.

In this sense, innovations can be seen in effect of a given discourse that at some point in time allows it to emerge. But most likely, can an innovation never be assessed in terms of one discourse, as it is dispersed between multiple discourses that evolve independently of each other and likely pose limitations to one another. In the case of the EV, it is evident that the environmental discourse has allowed the emergence of the EVs for quite some time, but its emergence is also determined by what is considered sensible to say and think in parameters that are governed by the accumulated knowledge in the discourse of personal transportation, i.e. it is viewed in terms of a consensus that is built around the developments made within ICE vehicles. To an extent, the discourse on personal transportation and the benefits made possible by more or less hundred years of development within ICE vehicles seems to be much more ingrained in society and have therefore posed serious limitations to the emergence of EVs.

The evidence presented so far serves as proof that the reality of climate change has reached a point where it is no longer debatable, which signifies a change in savoir, meaning that an increased interest in EVs can be expected. However, significant barriers found in the coexisting discourse of personal transportation can still be expected to obstruct the emergence of the EV. Furthermore, the analysis indicates that the environmental discourse have moved in a direction that renders the success of EVs an inevitable reality of the future, while it also shows how the success of the EV innovation is determined in terms of social discourses, which is governed primarily by savoir of the political, corporate and private sphere, which in turn, determines the consumer preferences, attitudes, and level of acceptance, while it also determines investments and interest in the technology.

Discussion and Conclusion

In this last chapter, the significance of the approach of the present thesis and the findings it enables are discussed in relation to academia and business practices. As such, the relevance and implication of the study are discussed in order to outline what benefits can be achieved by understanding and analyzing the emergence and origins of innovations as the outcome of societal discourses. The chapter ends with the conclusion of the thesis, which will summarize the findings and assess them in relation to the initial research questions.

The two primary discourses relating to the EV technology can be seen as conflicting forces, which makes it possible to outline a multiple scenario setting. In the first scenario, the emergence of EVs is made possible because the environmental discourse allows it, and the EV is, in terms of the personal transportation discourse, considered a rational choice, meaning that driving range and the price is at least comparable to ICE vehicles. In the second scenario, the reasoning in the environmental discourse is considered more important than the notions contained within the personal transportation discourse, meaning that the EV will emerge regardless of its limited driving range and higher price. In the third and last scenario, the environmental discourse weighs less than the personal transportation discourse, which means that the notions contained in the personal transportation discourse are considered to be more important than the notions contained in the environmental discourse, indicating that the EV will not emerge unless it provides additional advantages over ICE vehicles. Of these three scenarios, the last scenario seems to characterize what has happened in the case of the EV, indicating that the notions within the personal transportation discourse of what is considered acceptable in terms of driving range, price, and convenience can be considered to be more important than the environmental impact of consumption.

As indicated throughout the analysis, the environmental discourse has continuously evolved, rendering the EV increasingly prudent and urgent, indicating that what is sensible to say and think about environmental sustainability and personal transportation is likely to be in a state of continuous change. Evidence indicates that the environmental discourse has evolved more rapidly in recent years, and as such, the discourse can be expected to increasingly weigh more and have an increased effect on car consumption patterns and overall interest in the EV technology. To an extent, if the discursive changes continuous in a similar manner as observed in

recent years, the parameters that determine what is sensible to say and think about the capabilities of cars is likely to also change because the environmental discourse affects the personal transportation discourse. If this happens, the EV will become increasingly viable as it becomes more and more disconnected from the views and values that are expressed in terms of the paradigms of the fuel economy, which will result in increased interest and focus on the EV technology.

The approach outlined in the present thesis presents a different, and arguably, more comprehensive understanding of innovations and their origins, which can be asserted to have significance in relation to business strategy and identification of innovative opportunities. By expanding the understanding of innovations, their origin, and how they emerge, through an understanding of contemporary society and the accumulated knowledge manifested in societal discourses, a deeper understanding of the context in which innovations emerge is achieved. Arguably, this can help change the ontology of innovations and improves our understanding of innovations by making their origins and emergence more observable. As indicated in the analysis, innovations seem to have a lineage that is linked to the societal discourses that govern a given innovation, which indicates that, if it is possible to disclose the discourses relating to a particular innovation before it emerges, then it is possible to locate and assess innovative opportunities through an assessment of these discourses. To an extent, the analysis of the EV indicated that this is likely to be the case. In principle, all innovations can be expected to be determined by one or more discourses, indicating that the identification and assessment of societal discourses can be employed to reveal innovative opportunities. Not only are the views and attitude of consumers determined by the social discourses, but the discourses themselves, are also determinants of what types of innovations that emerge, as they pose as a limitation to human cognition and action in all aspects of society, meaning that entrepreneurs and companies also view and act according to what the discourses allow.

The approach of the present thesis could potentially be utilized in relation to market research because the assessment of societal discourses provide a deep understanding of customer segments by assessing the knowledge base they use to view a product or service, indicating that the potential appeal of a new product or service can be assessed. Thus, the circumstances affecting customers and their assessment of a product or service are determined by a discourse. Furthermore, by focusing on the discourse, especially in terms of savoir, it is possible to identify

and analyze potential customer segments and predict expected changes in consumption. Thus, discursive changes are likely to influence consumption patterns, indicating that insights generated through discourse analysis can be strategically employed and used as market insight or reveal innovative opportunities.

Additionally, the present thesis indicates that the identification of innovative opportunities in terms of social problems such as global warming or other environmental concerns are likely to lead to successful innovations because such innovations are aligned with the societal discourses of contemporary society, which determines what is considered prudent and urgent. To an extent, the present thesis can be seen as an argumentation for businesses to seek to solve social problems because by focusing on a problem that is widely approved as being real and urgent, i.e. have a large discursively accumulated knowledge base associated with it, a given innovation can be expected to be more successful and will arguably be easier dispersed and adopted faster. Likewise, can future problems create new innovative opportunities, new customer segments, and human needs that did not exist previously, which means that through identification and examination of societal problems and their related discourses, companies could potentially obtain first-mover advantages or adjust their product portfolios to be aligned with these discourses.

If innovative opportunities can be predicted in terms of societal discourses, which can be assessed and analyzed, it becomes increasingly interesting to consider whether companies actively can seek to transform and create discourses in relation to their products and services. The analysis has shown how science and politics are central in forming a given discourse, but theoretically, there is no apparent reason to why a company should not also be able to influence, create and transform a discourse on a given subject, as a central element in the development of savoir is obtained through publicity to the general public, indicating that companies could potentially be able to influence savoir and transform a discourse in the direction that fits with their business objectives. Thus, companies can be expected to be able to actively seek to form and transform a given discourse, and thereby, initiate the production and reproduction of knowledge manifested trough savoir.

Future research could focus on refining the parameters to a more comprehensive model of prediction. The present thesis suggests that due to a discursive causality between connaissance

and savoir there is a form of lineage for a given innovation that can be analyzed and accessed before it emerges because the discourse can be seen as gradually allowing a given innovation to emerge. Therefore, if the parameters and circumstances for discursive changes are made more accessible and generalizable, such an approach would be of significant value to businesses. The first step in this direction could be to investigate the causality in multiple discourses and specifically look for increases and changes in savoir within these in order to analyze if common determinants for such changes exists. However, the present thesis indicates that there is a lag or delay between the accumulated knowledge contained in connaissance and the broader notion of savoir, which might indicate that a similar lag can be expected in other discourses. If such lag is a general observation, it would arguably make the prediction more valuable because companies would be able to actively seek to transform the discourse in the desired direction, while there would also be time to adjust strategy and product portfolio to withstand or benefit from the discursive changes observed.

The discursive approach to understanding innovations can be seen to augment existing perspectives on innovation. For example, when Schumpeter writes that inventions that are not commercially exploited are economically irrelevant, he indicates that an invention only becomes an innovation if it is commercially pursued. Thus, a successful innovation must be one which receives considerable amounts of attention in terms of sales and dispersion. In relation to the present framework, the attention that an invention or innovation receives is determined by certain convictions that exist in society, meaning that the success of an innovation is determined by these convictions and that an invention can only emerge as an innovation if the societal discourses allow this. Schumpeter also wrote that consumers can be taught to want new things by producers, which can be seen to conflict with the understanding of the present framework because it neglects the importance of the accumulated knowledge positioned within society. However, as discussed previously, companies can be expected to be able to actively seek to influence a given discourse, and in this case, Schumpeter's argument fits the present framework, and to an extent, it explains more precisely how consumers can be taught to want new things.

In relation to disruptive innovation, the present framework can be used as an indication of why certain technologies are disruptive because these can be seen as being technologies that are well aligned with the discursive changes. Social discourses are continuously evolving, indicating that preferences and needs associated with given technology also are in a state of continuous change.

This is likely to explain why sustaining technologies at some point in time becomes inferior to disruptive technologies because sustaining technologies slowly becomes out of sync with the changes in the societal discourses. A similar view can be expressed in relation to creative destruction because changes in societal discourses determines the innovative opportunities in a specific area, which indicates that the ever-present threat mentioned by Schumpeter, can be seen as a threat of discursive changes that is exposed to businesses whose strategies, products or services are not aligned with the societal discourse and the changes within these.

Roger's diffusion of innovation can also be augmented by the notion of social discourses because his adopter categories can be used to signify the extent to which savoir is manifested within a given discourse. It also supports the notion of production and reproduction within a discourse because his categories influence each other and the adoption of an innovation is characterized as a gradual phenomenon, which is similar to how savoir develops within a discourse. In the case of the EV, Roger's theory would likely focus on early adopters and position the EV somewhere early on the diffusion stage, which in relation to the present framework, would indicate that savoir increasingly is manifested within the environmental discourse. A central difference between these two approaches is that Roger's theory focuses on already realized innovations, whereas the discursive approach is capable of analyzing a potential innovation before it emerges. Thus, the discursive approach takes a step back and provides a more comprehensive understanding of innovations by giving an account of how and why they emerge.

Likewise, can user innovation be explained by the discursive lens, as user innovators can be viewed as individuals that are able to understand the discourses they are part of, which enables them to make innovations that are aligned with these discourses. Why they increasingly are innovating themselves can, however, not be explained by a discursive approach, and in principle, this does not matter. What is central is that users who, like all other humans, are participants of a discourse are able to observe changes in this discourse, which enables them to pursue new innovative opportunities. Similarly, can the entrepreneurial individuals and innovative companies that are often used as examples in the innovation literature be seen as being able to positioning their products or services in alignment with a discourse, often this been explained by their mental abilities or organizational capabilities, but in relation to the present framework, it seems likely that they are able to understand and observe discursive changes that lead to innovative opportunities. Thus, successful innovations can be seen as innovations that are

aligned with the discourses of society, while the discourses themselves are a precondition factor that allows an innovation to emerge.

Conclusion

This last section will conclude the present thesis by summarizing the findings and viewing them in relation to the initial research questions. The thesis has established that an innovation emerges due to certain convictions that exist in society. These convictions can be assessed in terms of social discourses and innovations are therefore discursively restricted and based on accumulated knowledge found within these discourses. Furthermore, the analysis indicates that innovations possess a form of lineage that is expressed through the evolvement of social discourse. This lineage can be uncovered analytically because of a discursive causality between scientific knowledge, politics, and the common knowledge that governs cognition and action, which indicates that the discursive approach unlocks a level of possible forecasting, as discursive changes can be identified and these determines innovative opportunities. Especially, changes in savior are to be considered important because these changes indicate changes in the attitude and interest towards a given innovation because participants of a discourse view the innovation and innovative opportunities in terms of the accumulated knowledge that governs human cognition and action, which is manifested through savoir.

The first research question was sought answered through a critical assessment of contemporary innovation literature. This assessment showed how and why the innovation literature tends to neglect the origins and emergence of innovations. It was argued that due to a departure from economics, an understanding of the underlying contexts in which innovations emergence cannot be adequately analyzed because these contexts are situated and determined by convictions that exist in broader society. As a result, the innovation literature tends to take the emergence and origins of innovations for granted, and instead, focus on approaches to how already realized innovations can be exploited within corporate settings. Thus, the underlying premise for contemporary innovation literature is economics, but this very premise poses a limitation to the understanding of innovation and how they emerge, while it also limits the interest in and significance of such an understanding.

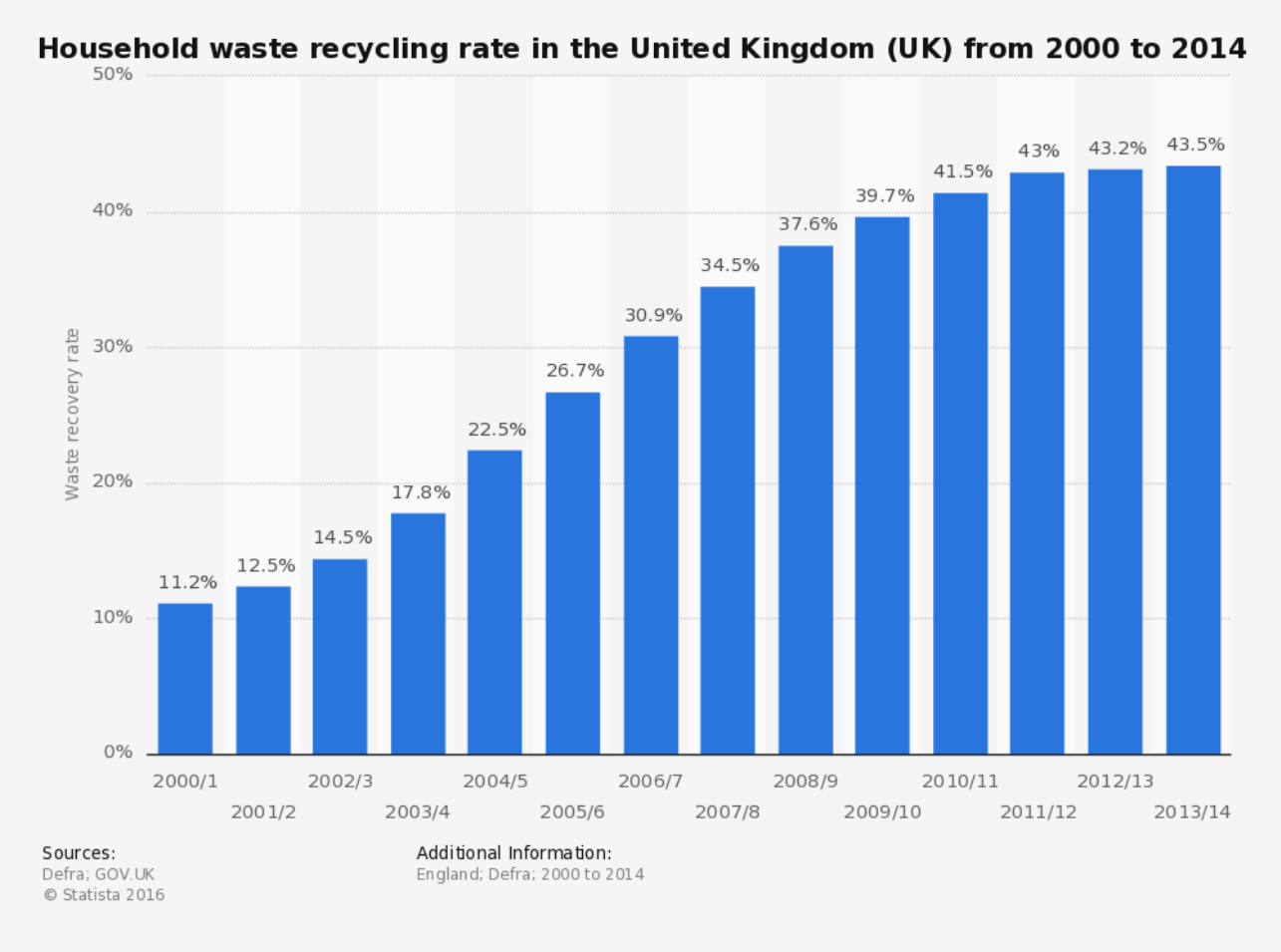
The second research question was sought answered through a discussion of how an analytical framework capable of analyzing the emergence and origins of innovations can be developed. It

was argued that the emergence and origins of innovation must be examined by expanding the scope beyond economics, and as such, a focus on broader society must be adopted. This was obtained by introducing the notions of overlapping societal spheres, accumulated cultural forms, and societal discourses. The framework indicated that by focusing on social discourses and the accumulated knowledge contained within connaissance and savoir the under the underlying and preconditioning contexts due to which innovation emerge would become observable and assessable. Thus, an understanding of the emergence and origins of innovations can be obtained through the analysis of social discourses. By employing this framework in the analysis of the EV innovation, it became apparent that the emergence of the EV has been determined by the two conflicting discourses of environmental sustainability and personal transportation. The analysis further showed how a lineage between connaissance and savoir could be observed within the environmental discourse, while the changes that had most significance for the emergence of the EV could be seen in effect of the extent to which savoir had developed within the environmental discourse.

In relation to third and last research question it was argued that businesses can benefit substantially from a more comprehensive understanding of the emergence and origins of innovations, as the approach of the present thesis can be expected to have strategic value for companies because the insights obtained through the analysis of discourses relating to a specific innovation can be used in the assessment of present and future markets, while it also can be used to indicate innovative opportunities. It was also discussed how the existing literature can benefit from a more comprehensive understanding of the emergence and origins of innovation, and as such, the discursive understanding of how innovation emerge can be used to augment the existing literature by providing insights into the preconditioning foundation for innovations, and thereby, the existing literature.

Appendix #1

Statistics that was referenced in the analysis:



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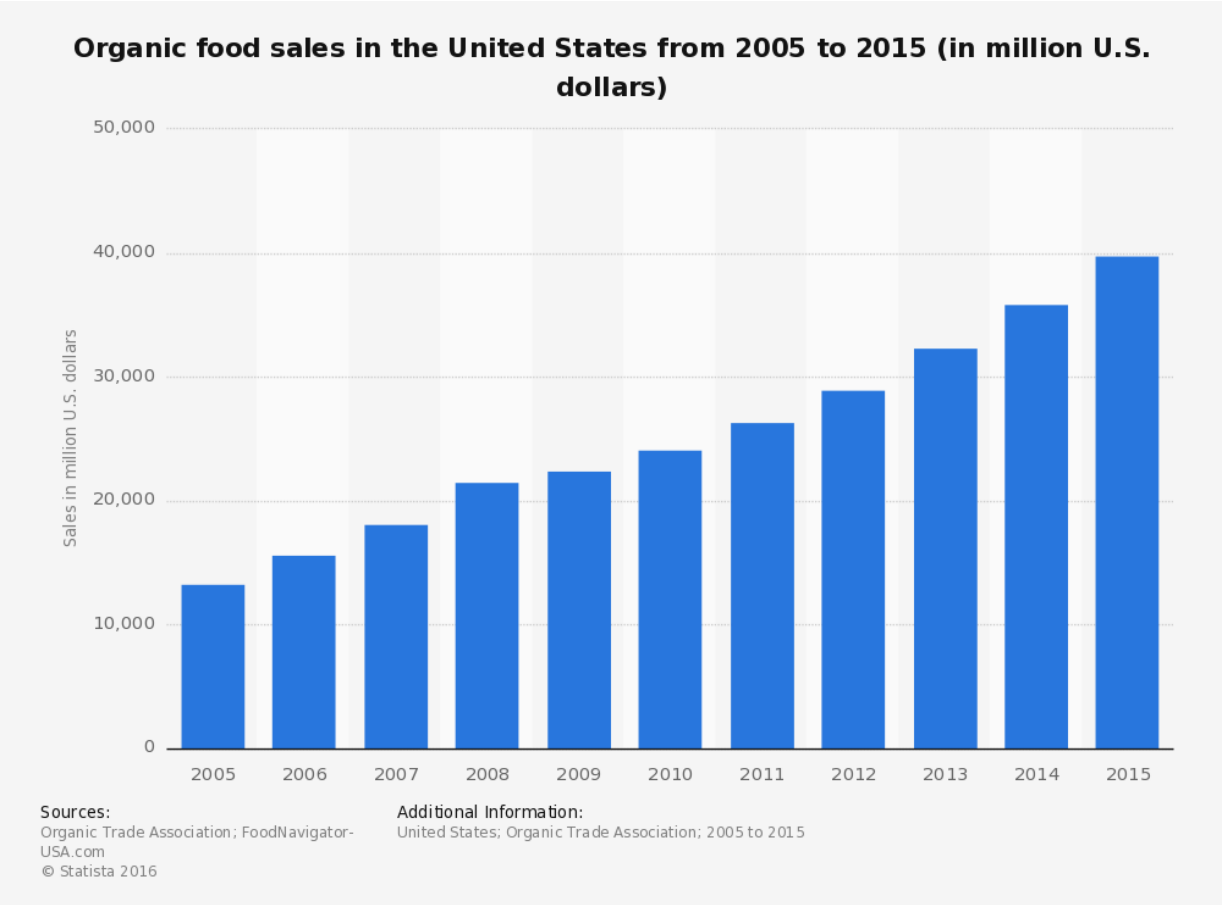

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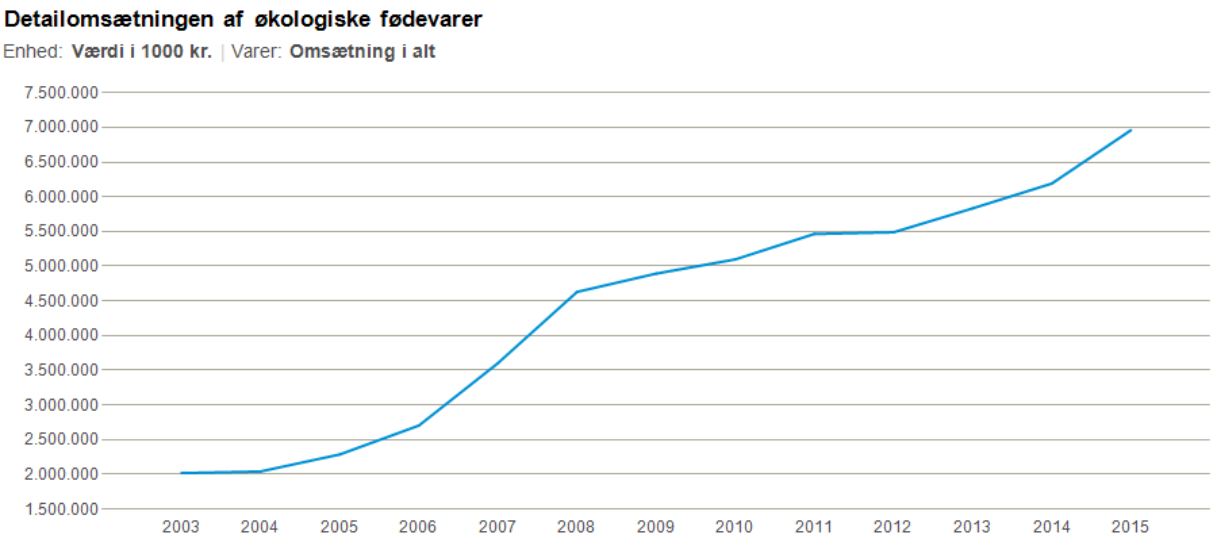

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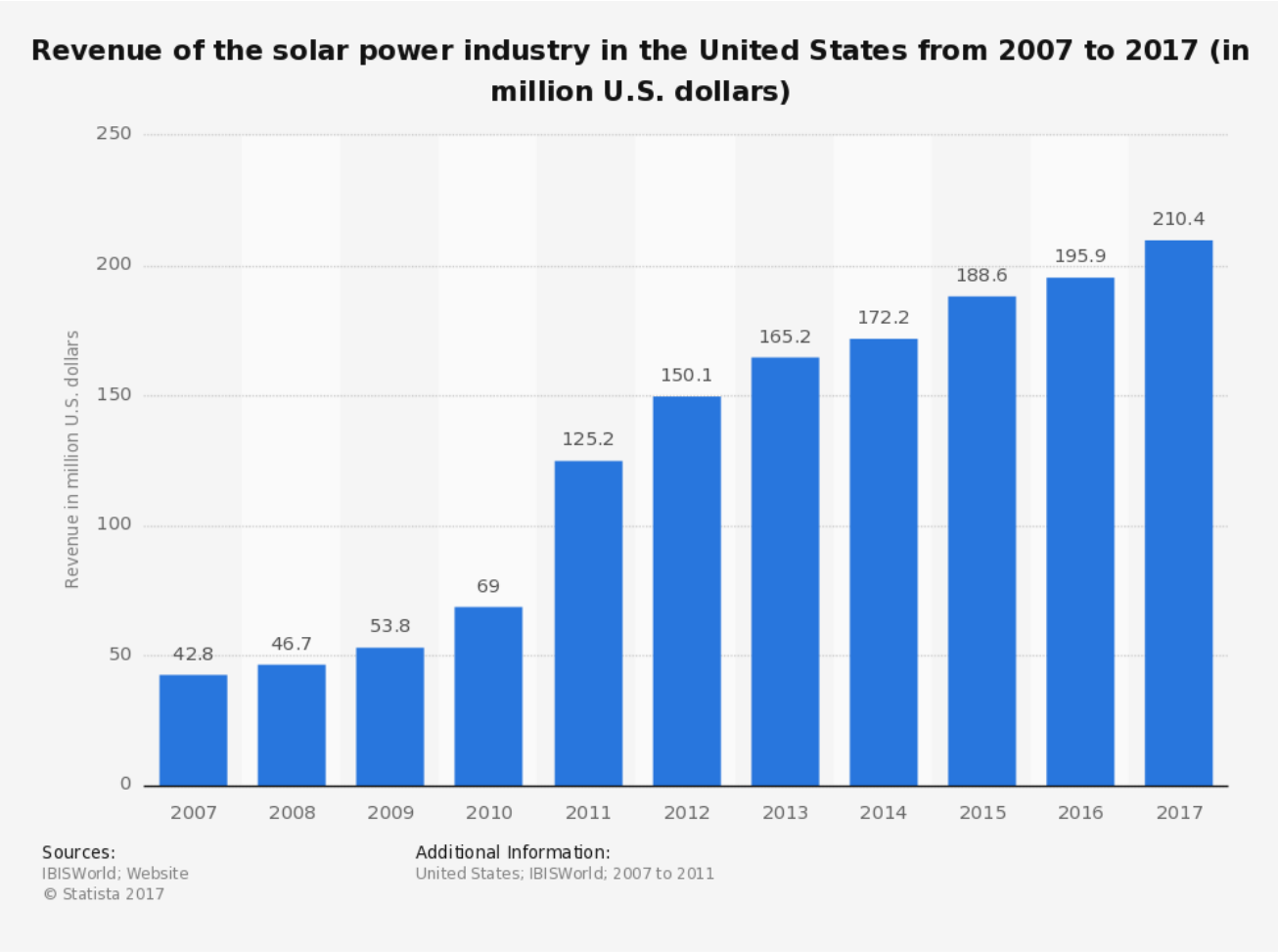

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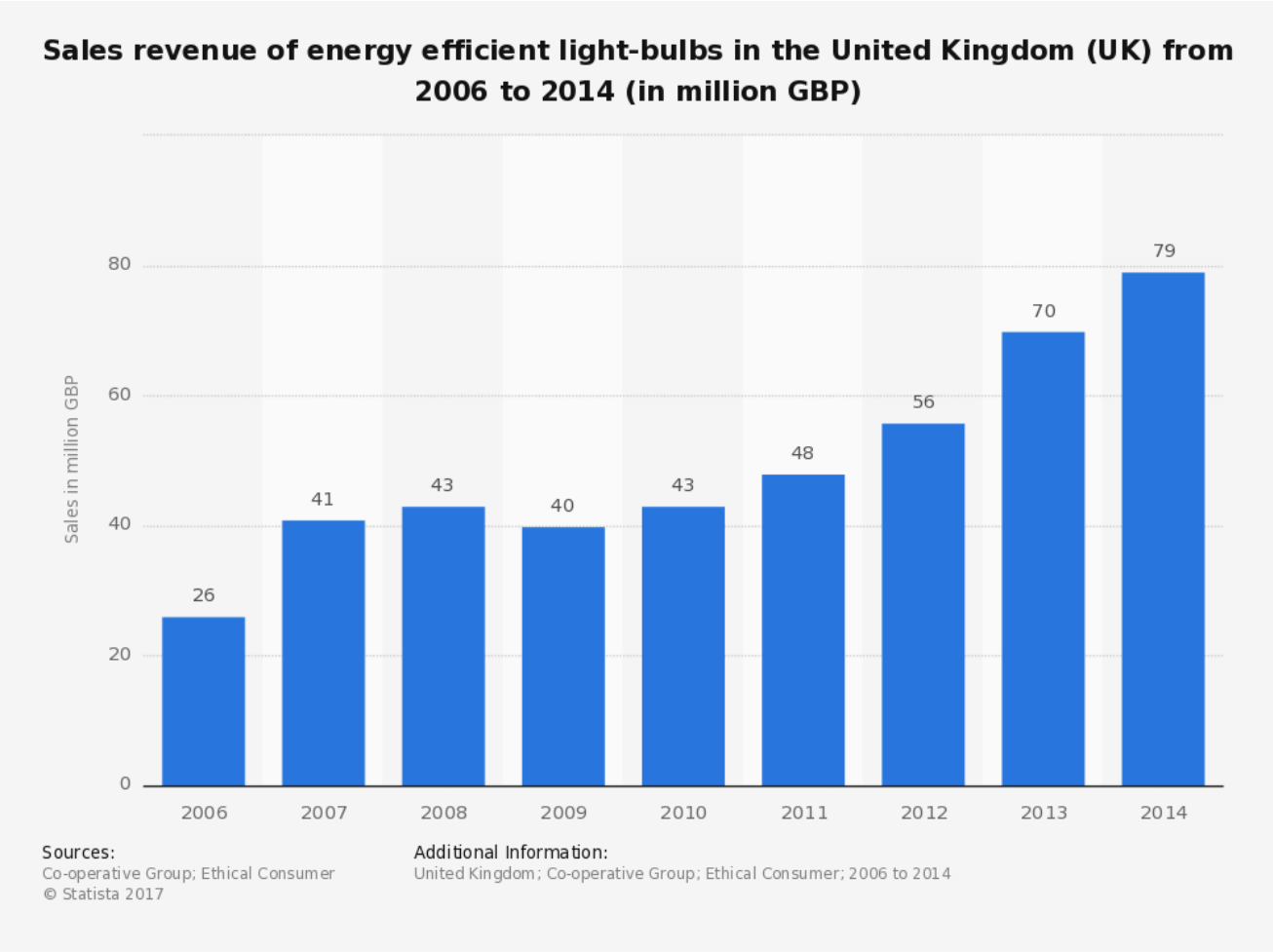

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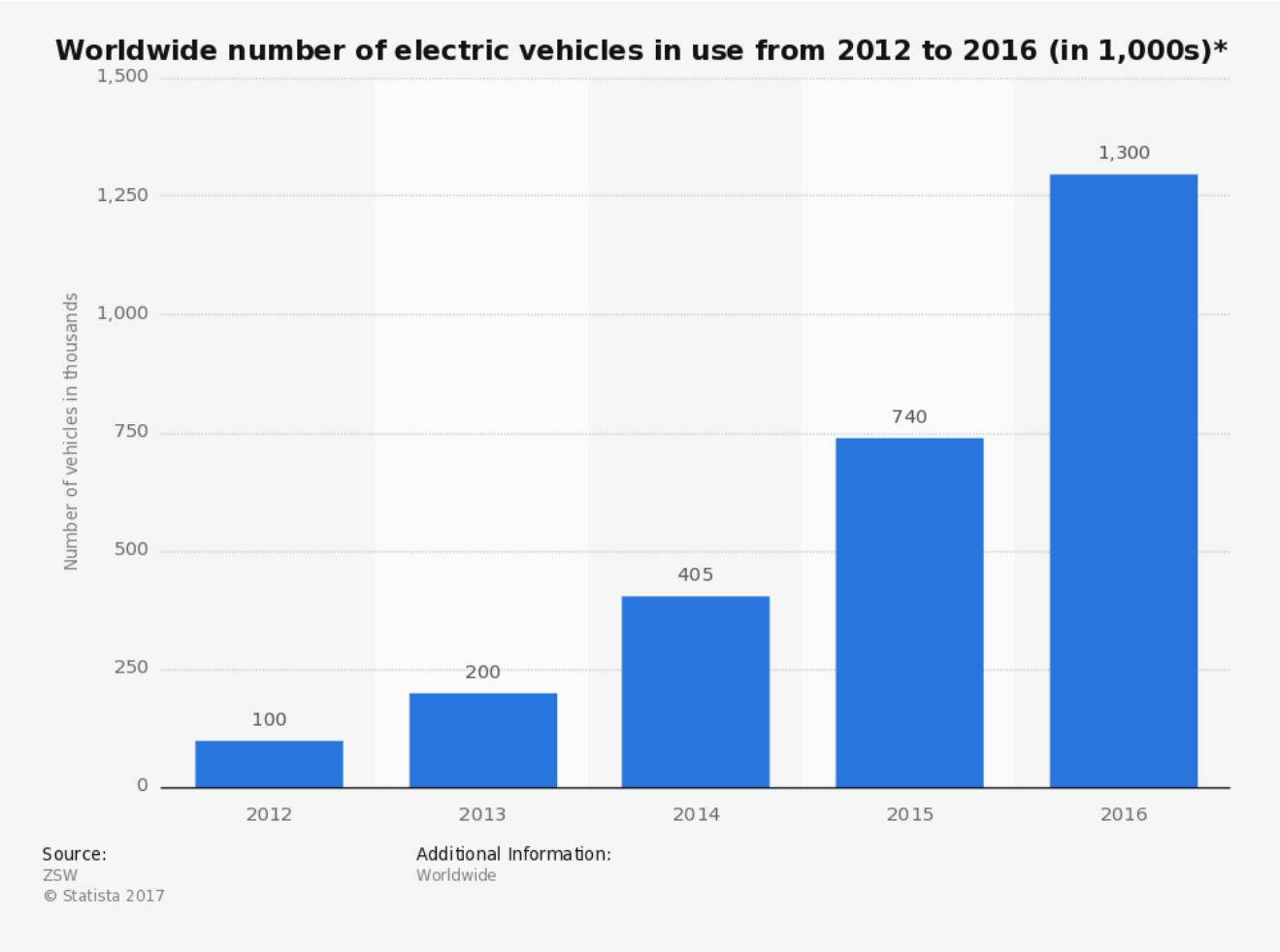

Source: Statista

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