



Can Denmark Teach the World How to Ride a Bike?

Unlocking the export potential in the Danish cycling industry through partnerships and innovation



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Abstract

Cities all over the world are developing and an increase in urbanization will create several challenges related to energy, environment and climate such as flash floods, carbon emissions and congestion. This will lead to a growing demand for smarter and more sustainable solutions. The Danish cities take a holistic approach to urban development and alternative modes of transportation are elements in the solution. Denmark has for many years been known as a bicycle nation and numerous Danish companies work with cycling or in related industries. Due to the long tradition and cultural background with cycling, the Danish companies hold great knowledge and resources to develop innovative solutions for specific challenges and the world is increasingly looking towards Denmark for inspiration. The thesis examines how innovation and partnership in the Danish cycling industry can lead to an exploitation of the export potential. In order to identify an international competitive advantage, Porter's Diamond Model is used as a framework, where the home demand is analysed through a PESTEL analysis and the factor conditions are identified by looking at the knowledge resources, where secondary data has been used as empirical evidence. The related and supporting industries are identified in a stakeholder map on the basis of the primary data, where semi-structured interviews have been conducted with companies in the industry, municipalities, and organisations. The salient stakeholders that possess all three attributes of urgency, power and legitimacy are consequently the municipalities and the related industries (transport, climate adaptation, architecture) where a horizontal integration in the value chain can benefit all actors. Through the analysis of the industry structure it is evident that such an integration is possible through a triple helix approach where public, private, and academia collaborate on the development of new innovative solutions. For a successful partnership, a governing body is necessary and the Cycling Embassy of Denmark potentially possesses these capabilities. A solution oriented partnership can incite the horizontal integration with other industries in order to develop solutions with multiple benefits as demanded by the cities. For a practical implementation, a platform for projects should be provided in order to inspire and illustrate the competences required to develop solutions. Thereby multiple stakeholders can join the partnership and contribute with knowledge in different areas. The industry should understand that a more holistic approach to both innovation, solution development and marketing is necessary in order to meet the demands from cities, both national and international.

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1. Introduction

Imagine, a new Berlin to be built from scratch every month? Or, a yearly population growth by the size of Germany? This is the development the world is facing. It is estimated that by 2050 there will be almost 10 billion people on the planet and with an increasing urbanisation more than 6 billion people will live in urban areas (United Nations, 2015). The development will create several challenges for cities and will lead to a growing demand for smarter and more sustainable solutions to handle the challenges. Estimates suggest that cities are responsible for 74% of global CO₂ emissions, with transport and buildings being among the largest contributors (UNEP, 2015). A large number of cities face significant energy, environmental and climate-related challenges now and in the future. The need for smart urban solutions has never been greater and only with a coordinated approach and action at the global, regional, national, and local levels it can be achieved. Cities are thus an integral part of the solution in fighting climate change.

Danish cities hold a long tradition for taking a holistic approach to urban development where the concern for the environment, people and business goes hand in hand. Copenhagen has set the very ambitious goal to be the first carbon neutral capital in the world by 2025 (City of Copenhagen, 2012). Copenhagen is often referred to as a role model when it comes to creating a sustainable city, and has several times been named the most liveable city in the world by magazines such as the Monocle (2014) and the Economist. In every aspect of urban planning the people and environment is taken into consideration. However, Copenhagen like many other cities, suffers from climate related problems such as congestion, flash floods, carbon emissions, and waste accumulation. This, combined with the ambitious climate targets, are drivers for why the city needs to rethink how the city's solutions are structured in new ways, such as utilization of big data and technologies. A smarter city approach where intelligent solutions are thought together and combined is therefore high on the city's agenda (City of Copenhagen, 2012). A city's challenges are not solved individually but as a combination aiming for the same target – a CO₂ neutral green and liveable city.

Urban transportation will be one of the main challenges facing cities. In Denmark, almost 23% of CO₂ emission comes from urban transportation and with an increased congestion, focus is on alternative greener transportation modes (Energistyrelsen, 2014). For many cities cycling can be part of the solution. Denmark has for many years been recognized as a cycling-nation with the development and implementation of numerous cycling solutions nationwide. As a result, a complete

industry for cycling solutions have appeared where companies are offering different products, services and concepts for cycling purposes to be used in urban areas. Different actors across the industry have collaborated to make cities for cyclists with the municipalities leading the way.

In Copenhagen, the bike mode share of commuters is 45 percent and in Amsterdam it is 34 percent (City of Copenhagen, 2015). Comparably, large cities like San Francisco, Montreal, Washington and Sydney all have a bike mode share lower than 3 percent. This high share of people on bikes gives Denmark and Copenhagen a high position as a cycling nation – and the world is in a higher degree looking for inspiration in Denmark and emphasizing its position as a great cycling nation. As an example, in November 2014 CNN shot a six-minute movie, biking around in Copenhagen in cargo bikes, showing the advantages of creating a good infrastructure for cyclist in the city, as part of a show about “The Perfect City” (CNN, 2014). The foreign interest and increasing inspiration of Copenhagen is evident by the numerous awards the city has been given, mainly due to the cycling culture.

A number of initiatives have throughout the years been launched in an attempt to capitalize on the interest in Danish cycling. National scenic routes have been opened to meet the demand from tourists and the concept of city-bikes was invented in Copenhagen. In 2009, the first Cycling Embassy was opened; Cycling Embassy of Denmark (CED). Danish Cyclist’s Federation cooperated with a number of the largest actors within the cycling industry in Denmark and created the embassy in order to meet the increasing international demand and interest in Denmark’s cycling solutions. Today, CED has 34 members, varying from different municipalities, architectural and consultant companies to manufactures of bicycle lights and bicycle counters.

Numerous Danish companies work with cycling or in related industries and the market for cycling solutions in Denmark is growing rapidly simultaneous with the increasing number of cyclists on the Danish roads. This trend is expected to continue on a global level in the coming years and the experiences, knowledge and solutions gained from Denmark therefore have the potential for a great international adventure. The Danish municipalities are the main drivers behind the success in getting people on their bikes due to the political framework and conditions the cycling industry have experienced. Many of the best cycling solutions are implemented in the municipalities, and the cities therefore act as perfect showcase examples when showing the world how to create a cycling culture

as in Denmark. One Danish company has already broken the code on how to exploit the international interest in Denmark. The architect company Gehl Architects has successfully exported their knowledge and resources to the city of New York, where cycling solutions from Denmark are implemented in the urban space. A new term has even been invented – “To Copenhagenize”. The world is looking for solutions to handle their challenges and Denmark are in forefront in developing the solutions.

Academia has also increasingly focused on how sustainable solutions can be a competitive advantage for companies and many scholars have examined the issue from different aspects. The thesis will combine a number of these theories with insights in the cycling industry. The author will draw on the knowledge gained from a minor on Sustainable Business where collaboration was emphasised as the key to innovation and theories such as the Triple Helix model by Etzkowitz (2000) and Solution Oriented Partnerships by Manzini (2004)¹ were introduced. Knowledge and theory about the national marketing advantages acquired from the master International Marketing and Management will further be drawn upon in relation to whether Denmark as a cycling nation can capitalise on the knowledge and experience in relation to export.

There is no doubt that Danish companies have a great potential when looking at the history and culture of cycling and urban transportation in Denmark. However, the question is whether the Danish stakeholders are able to use the advantages, drivers in the environment and value creation in order to reach new markets. With the rising demand from cities and increased global focus on cycling solutions, the Danish companies need to be innovative and in the front if they are not to be overtaken by other great cycling nations whom have seen the opportunities.

¹ Developed through the European Commission “GROWTH Programme” Research Project HiCS; Highly Customised Solutions.

1.1. Problem formulation

Based on the introduction the following research question will be investigated in the thesis:

How can innovation in the Danish cycling industry lead to an exploitation of the export potential?

The research questioned will be answered through the following sub-questions:

- *Who are the stakeholders in the Danish cycling industry and how are they structured?*
- *Given the drivers identified in the business environment, how should companies and organisations within the cycling industry optimally structure themselves in order to ensure international success?*
- *How can the triple helix model foster collaboration and support innovation?*
- *Can solution oriented partnerships foster innovation and open up to new markets within the cycling industry?*

The thesis will identify Copenhagen in the context of a smart city and develop an understanding of how the different solutions in combination can help the city achieve its 2025 carbon neutral targets. The unique cycling culture in Copenhagen is seen as an important element integrated in the city planning. All larger cities in the world face the challenges Copenhagen is trying to approach and the thesis will therefore explore how Copenhagen and the Danish innovative companies can exploit the knowledge and experience gained from many years of focus on urban challenges. The thesis will focus on cycling as an element in creating this smart city and investigate the structure of the industry and how it could be structured in order to foster a continued innovation to reach a competitive advantage in the global market.

As the members of the Cycling Embassy have a broad variety of activities and all must be expected to have a general interest in internationalisation due to its activities and purpose, the thesis will develop recommendations for the members on how they should structure themselves and potential initiatives to implement. The thesis will moreover provide an insight into whether the national competitive advantage can support the industry to exploit the export potential of the knowledge, solutions, and products developed in Denmark. Focus will be on identifying factors that can enable innovation to produce initiatives that can place the Danish cycling solutions in the top of the league, implemented in the smart city concept and contributing to a sustainable development. More

specifically, the aim of the thesis is to identify key success factors that draw upon initiatives taken by private and public bodies in cooperation to increase innovation and industry development both national as well as international. The thesis will conclude with suggestions for specific activities that can be seen as inspiration for the industry. Through the thesis, parallels will be drawn to the cases of the new bike share system in Copenhagen, Gobike and the new cycle tracks, the Cycle Super Highways to give a practical aspect to the theory applied.

1.2. Limitations

Due to the limited scope of the thesis, it will not be possible to analyse all actors in the industry in-depth and they will therefore be grouped in segments. The thesis will furthermore not analyse and focus on the specific value the export potential can financially benefit the companies. This limitation will allow for a greater focus on the innovation and structure of the industry in order to guide the actors in what direction to take.

The thesis will be limited to only focusing on exporting to developed and industrialised countries that to a larger degree resembles the environment in Denmark and Copenhagen from a technological and infrastructure perspective. Developing countries where the challenges for developing a cycling culture is larger and more complex in regards to infrastructure will therefore not be part of the analysis.

By limiting the scope of the thesis the aim is to be able to conduct an analysis that will result in concrete recommendations for changes, that will help the stakeholders in the cycling industry reaching new markets. The following section will give an overview of the theory used to explore and analyse the research topic.

1.3. Theory

The thesis will analyse the national competitive advantage within the cycling industry, and how relevant actors can exploit the export potential in an international context. Traditionally, competitors entering a foreign new market typically start with considerable disadvantages relative to existing home competitors, which will usually have superior market knowledge, established relations with local customers, or strong supply chains. For a company to survive in a foreign market, it must have a significant competitive advantage to overcome the disadvantages. In order to understand and

explore whether the Danish companies in the cycling industry have a competitive advantage, Porter's Diamond model will be used.

Porter (1990) suggests four interacting determinants of national advantage in particular industries that individually and as a system constitute the playing field that each nation establishes and operates for its industries. The four attributes are factor conditions, demand conditions, related and supporting industries, and firm strategy, structure and rivalry. Porter furthermore argues that companies achieve competitive advantage through acts of innovation. Innovation can be manifested in a new product design, a new production process or even a new marketing approach (Porter, 1990). Innovation in the cycling industry is therefore a key element and the thesis will analyse and attempt to identify a method as to how the actors can foster and achieve it. Porter (1990) further argues that government should be considered and in relation to the cycling industry it is evident that it plays a key role.

Porter's diamond model is able to determine the competitiveness of an industry based on the conditions in the home country, however the model has been criticised by a number of scholars. Cartwrights (1991) criticise the model for the limited usefulness of focusing on national determinants of competitiveness for home-based industries that export a high proportion of their production. Ohmae (1987) believes that determinants at the international level may be as crucial for its international competitiveness as determinants inside a home-base. Some of the biggest critics of the model is Rugman and Verbeke (1993) who further argue that distinction should be made between those determinants of competitiveness that are largely exogenous (outside the system) and those that can be potentially endogenous (inside the system). The criticism will be considered throughout the thesis and the model will be adapted when necessary.

The research questions will be answered through a thorough analysis of the cycling industry in Denmark. Porter's Diamond has been used by governments aiming to increase the competitive advantage of their local industries (Johnson, et al., 2008) and will in this thesis be used as the framework for whether a national competitive advantage can be achieved, what actors can benefit from it and analyse whether the national environment in Denmark foster innovation. The four internationalisation drivers will each be analysed using relevant theory and literature that will help to explore the sub research questions. The structure of the thesis is therefore based on the framework illustrated in Chapter 1.7, where the four closely related factors will be analysed.

Home Demand Conditions

The home demand conditions will be analysed through a PESTEL analysis that will provide the historical background for how Copenhagen has become a city of cyclists and how it is rooted in the culture. A PESTEL analysis will look at the different factors in the external environment that directly or indirectly affects the conditions for the using cycling as a business model. It will provide a comprehensive list of influences that can support the identification of possible markets, that will help ensure the Danish companies a greater likelihood for an export success. The impact from government will be included in the analysis as governments can foster local industries by raising safety or environmental standards, thereby creating sophisticated demand conditions.

Factor Conditions

The factor conditions in a country play a vital role in the decision to internationalise. All nations possess factors of product that are the inputs necessary to compete in an industry. The terminology is known from economic theory and can be grouped into broad categories such as human resources, physical resources, knowledge resources, capital resources, and infrastructure. Freeman argues that the mix of factors employed differs widely among industries (Freeman, 1984). The human, knowledge, and capital resources are important in relation to the cycling industry in Denmark and will therefore be the point of departure for the analysis, where innovation and spill over effects will be recognised. The analysis will draw parallels to the PESTEL analysis, but provide a deeper perspective into the conditions for a competitive advantage.

The primary analysis will be based on the two determinants “related and supporting industries” and “firm strategy, structure, and rivalry” that will be described in the following two important sections.

Related and Supporting Industries

The third broad determinant of national competitive advantage in Porter’s diamond model is the presence of supplier or related industries that are internationally competitive. In order to understand who can benefit from internationalisation, it is necessary to identify the actors that actually exist in the industry. A stakeholder mapping of the Danish cycling industry will identify and categorize the actors that are likely to be affected by proposed actions. Freeman (1984) proposes a definition of stakeholders as “*Any group or individual who can affect or is affected by the achievement of the firm’s*

objective” (Freeman, 1984, page 25) and asserted the importance to assess stakeholders’ impact on the company and understand their “fit” by assessing their values, needs, and concerns. The knowledge gathered from a stakeholder mapping can therefore be used to assess how the interest of the involved stakeholders should be addressed in order to increase internationalisation (Freeman, et al., 2008).

The stakeholders in the Danish cycling industry will be identified and placed in the stakeholder map introduced by Freeman et al. (2008) however, not analysed from a specific firm’s perspective, but from a general industry view in order to get an overview of the entire industry. It is thereby possible to analyse the relations between the stakeholders and indicate which relations need to be strengthened or established. Through the stakeholder analysis it will be possible to gain an insight into the structure of the industry and provide an understanding of the different players in the market that directly or indirectly affects the conditions for a competitive advantage.

The model for stakeholder identification has been criticised by a number of scholars, among others Mitchell et al. who believe that it is too static and does not consider the dynamics of stakeholders. They argue that stakeholders possess some combination of three critical attributes; power, legitimacy, and urgency and predict that the salience of a particular stakeholder to a company is low if only one attribute is present, moderate if two attributes are present, and high if all three attributes are present (Mitchell, et al., 1997). Stakeholders can increase their salience by acquiring some of the missing attributes thereby changing and increasing the model’s dynamics. The salience framework will therefore be applied to the most important stakeholders identified through Freeman et al.’s stakeholder map and gain an understanding of their importance to the industry.

The stakeholder mapping will recognise actors in industry and Porter argues that these supporting and related industries can support the industry in focus achieving a successful international competitive advantage.

Industry Strategy, Structure, and Rivalry

The theory above suggests how changes in the structure of the industry and potential collaboration can increase innovation. The role of government is acknowledged as encouraging cooperation between suppliers and buyers on a domestic level, for instance by facilitating partnerships of related and supporting industries. The Triple Helix model developed by Etzkowitz et al. (2000) will after the

stakeholder mapping be examined in regards to the Danish cycling industry to support innovation and collaboration. The triple helix concept was initiated by Etzkowitz (1993) and interprets the shift from an industry-government process, to a triadic relationship between industry-government-university in a knowledge based society. Etzkowitz argues that the potential for innovation and economic development is also highly based on the role of research institutions where elements from all three bodies can generate new institutional and social formats for the production, transfer and application of knowledge.

A number of methods for an increased internationalisation and innovation of sustainable products have in recent years been developed by different scholars. Each suggesting how strategic alliances among a network of different stakeholders sharing common visions can foster innovation. Jégou et al. (2004) defines such partnership as “*a strategic alliance generated and implemented in a specific context: a partnership that has to be able to act in a given social and business environment, where several opportunities and limits are already existent.*” (Jégou et al., 2004, page 5). Krucken, et al. (2006) correspondingly defines it as “*strategic partnerships sharing a common vision about how to deliver a conceived solution idea*” (Krucken, et al., 2006, p. 1503). The building up of patterns of collaboration between different social players is resulting in a *co-production of sustainable solutions*. These solutions are highly contextualised, thus appropriate for the specific characteristics of a target context (Manzini et al. 2004).

The concept of sustainable solutions in a solution oriented partnership presupposes a strategic alliance where collaboration of various players, that being private firms, public institutions, voluntary associations and directly or indirectly, the end-users themselves. This network model should be able to activate win-win relations between the stakeholders as it is not only the companies that can see a value in the increased interest and growth in the number of cyclists. A shared value approach is therefore in a larger degree being advocated for where it is suggested that companies can tangibly advance their competitive position while simultaneously enhance societal conditions as suggested by Porter and Kramer (2006). Such value is created collaboratively between business and society, and the mapping of stakeholders and analysis of the drivers for a competitive advantage will show the relations between the stakeholders and the industry environment. When analysing the value created for the different stakeholders it is possible to understand how the industry should be structured to achieve economic growth and the diamond framework will provide insights into partnership

development. The framework has been a widely used tool to analyse a variety of industries and to assess how their individual elements affect the productivity and innovation.

Creating shared value where synergies are possible is thus the foundation to whether a cluster or solution oriented partnership could be developed and the different stakeholders would be able to enjoy the spill over effects of a combined effort for internationalisation. As Moreno, et al. (2005) state, clusters foster innovation activity. However, in an industry that is not heavily technology driven but highly idea driven innovation can take the shape as many different dimensions and it will be analysed whether the Danish cycling industry is structured to foster this innovation necessary for creating a competitive advantage in a global market.

The analysis of a solution oriented partnership in the cycling industry can facilitate and support dialogue between the actors that will generate a convergence of ideas. Innovation involving many actors requires mutual understanding of a problem and the identification of common interests and possible synergies. It involves the mutual exploration of different solutions and finally defining and fine-tuning a common objective. This requires processes of communication which can support strategic conversation throughout the innovation process. It also requires those processes to have a shared vision, thereby increasing the shared value (Krucken, et al., 2006).

The theory proposed by Krucken et al. (2006) will help governments to understand how the constitution of partnerships of companies, organisations, and institutions are able to provide industrial solutions customised to different contexts of use and in different markets. Thus, the thesis will provide an insight into how the industry could make a paradigm shift towards more integrate and innovate solutions.

Porter (1990) argues that a nation's position in some determinants may not be unique. However, national advantage arises when the system is unique. The entire system is difficult and time-consuming to duplicate. The mutual reinforcement and dependence of the determinants are essential and the system is hard to create from another home base. The important role of the interactions among the determinants means that the likelihood of achieving and sustaining advantage in an industry depends in part on how effectively the interactions work in a nation. The speed and efficacy with which the entire diamond develops will determine which nations gain advantage.

The following section will provide an insight into the methodology used to support the literature findings.

1.4. Methodology

In order to achieve a reliable and valid analysis using the theory described above, the construction of a suitable methodology is crucial when collecting data for analysing and knowledge creation purposes. This section will therefore present an appropriate method for collecting data to give a thorough and in-depth answer to the research questions based on theoretical arguments.

This research design is based on inductive reasoning where there exists an acceptance of the scientist as a part of the research findings as he brings his own assumptions into the arena. Inductive reasoning begins by examining the social world and then develops a theory consistent with what is discovered. This approach is called grounded research and is a circular process where data collected from the social world and theory is constantly reevaluated. It means that the researcher can return to the field to collect data and then apply different theories according to relevance (Eriksson, et al., 2008).

Inductive reasoning is typically defined as moving from the specific to a final generalization while deductive reasoning reaches a specific conclusion based on generalizations. Therefore research which is experimental and observative in nature is best expressed inductively while research with a more formal nature such as laws, rules and acknowledged principals is better expressed deductively (Eriksson, et al., 2008).

The research can be described as knowledge creating, as the investigation covers an undiscovered area through a combination of qualitative and quantitative methods. However, the thesis can also be seen as laying the foundation for further research within the area. A deeper analysis of the area in focus should be done in order to fully understand and benefit from the findings in the study.

Prior to the thesis, knowledge about the topic has been gained and research within the area has supported the development of the research dilemma. A general personal interest from the author about the topic has been an important element in addition to a professional interest. The author works for

State of Green, Denmark's official green brand, and is therefore directly involved with actors and challenges within the cycling industry on a regular basis.²

The export and internationalization potential in the cycling industry has, as far as the author knows, not earlier been explored or researched by academia. The structure of the thesis is based on Porter's Diamond model as described in the theory section. The following section will outline how the collection of empirical data will support the theoretical framework and lay the foundation for the analysis.

1.5. Empirical data

To answer the problem formulation both primary and secondary data will be collected and provide the foundation for the research. It will be based on quantitative and qualitative research methods and in order to get substantial information semi-structured interviews with leading experts and stakeholders within the cycling industry in Denmark will be conducted and form the basis of the analysis.

Primary data is developed by the researcher, with the specific purpose of meeting the exact objectives of the research problem analysed. On the contrary, secondary data is defined as already existing information, originally generated for other purposes, but may be useful in the specific context of the researcher's analysis. (Blumberg, et al., 2011)

The main difference between a qualitative and quantitative method is whether the aim of the research is to be able to make a qualification or quantification of data. Qualitative methods include research such as in-depth interviews, group discussions and focus groups. Quantitative methods focus on statistics, numbers and figures. The two approaches are not mutual exclusive and scholars agree that qualitative research can carry out research objectives that quantitative methods cannot. The important element is to understand when to use the respective methods and how to mix them. The choice of perfect mix will relate to the individual project and problem formulation. The following section will validate the chosen method in relation to the thesis's problem formulation.

² State of Green is a public-private partnership owned by the Danish government and four large business organisations; Confederation of Danish Industry, the Danish Energy Association, the Danish Agriculture and Food Council and the Danish Wind Industry Association. The purpose of the organisation is to market the Danish companies and solutions within the green and clean tech industry in order to increase export and attract foreign direct investments to Denmark.

1.5.1. Semi-structured interviews

Qualitative research is appropriate when working under a social constructivistic approach as it considers that truth is not objective and cannot disclose any pure knowledge only how the world is perceived through the individual. In order to answer the research question it is required to create new empirical data.

The list of interviewees have been selected on the basis of the chosen cases and research question. Representatives from the companies VEKSØ, Gobike, and HOE360 Consulting (see appendix 1-3 for short introduction to the companies) will contribute to the analysis from a company perspective, representatives from the Copenhagen and Gladsaxe Municipality will give a local government perspective, and industry experts with an international outlook from Cycling Embassy of Denmark and State of Green will give a market perspective. Marianne Weinrich from VEKSØ could furthermore elaborate on the industry movement in general with her role as Chairman of Cycling Embassy of Denmark.

The chosen form of interview can be classified as semi-structured as the interviewee has a say in what he or she thinks is important to add to the interview, even though the presence of the interviewer and other forms of control such as a dictaphone will prevent the interviewee to gain full control of the situation and further add to the validity of the source of information throughout the thesis (Scott, et al., 2006). The semi-structured interview was chosen due to the need to obtain a vast amount of different information about the industry. The thesis will further attempt to follow Kvale et al. as they argue:

“The qualitative research interview attempts to understand the world from the subjects’ point of view, to unfold the meaning of their experiences, to uncover their lived world prior to scientific explanations.” (Kvale, et al., 2009, page 1)

The guided and semi-structured interview contributes to a framework of the topics and problem areas the author would like answered. All the interviews were prepared with an interview guide (enclosed in appendix) where an outline of topics to be covered was included and questions was suggested as according to Kvale et al. (2009). However there was given room for variations in wording and sequence of the questions depending on how the interview would evolve. This made it possible for the interviewee to elaborate on interesting topics and the interviewer was free to probe for more in-

depth responses. The advantage of this type of interview is that the outline is prepared and the interview is somewhat systematic and comprehensive while the tone of the interview is left conversational and informal.

Both open and closed end questions were used. For questions that relate to facts, closed end questions were asked, and for questions where more speech was encouraged, the interviewee was asked open-ended questions. Kvale et al. argue that it is important to keep the interview dynamic in order to promote interaction and conversation (Kvale, et al., 2009). Furthermore, the interviews were conducted in Danish and recorded and transcribed afterwards for later interpretation. The quotes used in the thesis are translated and made reader-friendly. A transcript of the interviews has been attached as an appendix (cf. enclosed appendix list).

List of interviewees:

Name	Organisation and role	Perspective
Ivan Christensen	Gladsaxe Municipality – Street and Park Director	Public perspective
Lars Bruhn	Gobike – Investor and Chairman of the board	Company perspective
Ditte Møller Munch	Copenhagen Municipality - Mobility expert, Sharing Copenhagen	Public perspective
Marianne Weinrich	VEKSØ - Mobility consultant and Chairman of Cycling Embassy of Denmark	Company perspective and industry overview
Majken Kalhave	State of Green – Senior Project Manager and Responsible for Sustainable Transportation	Market perspective
Niels Hoe	HOE360 Consulting - Owner	Company perspective
Tine Brand-Nielsen	Secretariat for Cycle Super Highways – Project Manager	Public perspective

The interviews have all been conducted in the time period between the 11th of August to the 6th of October 2015 and events after this date is therefore not considered by the interviewees in the interviews.

In addition to the interviews, since the author of the thesis works for State of Green, data and knowledge are gathered from professional meetings with actors in the industry. Participation in the Cycling Embassy of Denmark's annual meeting and workshop, have provided the author with

valuable insight into how the industry collaborates and structure themselves. Notes and documentation from these will therefore be used as supporting data when gathering knowledge about the industry. It has furthermore been possible to gather first hand and updated information about relevant news and activities from the industry.

1.5.2. Secondary Data

To support the interview findings secondary data from relevant sources will be used and analysed. As earlier explained, secondary data is originally generated for another purpose, but may be useful for supporting another researchers finding. The main advantage of using this form of data is that it is timesaving and cost effective and will in this study be used to supply background information as well as basic knowledge about the cycling industry. It furthermore allows the researcher to commence the analysis immediately and serve as a major input for the analysis. Conversely, secondary data might not match the requirements of the research problem and it is therefore necessary to choose the relevant information from the data available (Blumberg, et al., 2011). The author recognise that the secondary data is based on study made for other purposes and therefore might be biased towards the goals and desired directions of its publishers.

In order to ensure the quality and confirm that the secondary data is regarded as reliable and objective only data from renowned institutions was used. Both the local and national government in Denmark are interested in the Danes transportation habits and quantitative studies have been conducted the last many years. Data available from these studies will therefore be included in the analysis of the research problem. The most important sources were the Danish National Travel Survey and the Bicycle Account 2014.

Quantitative data about the transportation habits in Denmark are every year documented in the Danish National Travel Survey (Technical University of Denmark, 2015), where interview surveys lay the foundation for a report on the Danish residents' travel activities. The objective of the survey is to understand how, how much, where, when, and why do people in Denmark travel. The surveys are conducted every day all year round and was in 2014 conducted by the consulting company Epinion. The sampling group is Danish residents between the age of 10 to 84 years old who have been interviewed using a combination of internet and telephone interviews (Technical University of

Denmark, 2015). The survey is relied on both credible and valid data and can therefore be used as supporting data for the findings in the interview.

The newly published Bicycle Account 2014 by the City of Copenhagen (City of Copenhagen, 2015) will be used for a more in-depth understanding of the Copenhageners' cycling habits, but also for an understanding of the attitude towards cycling in Copenhagen. Given the biennially publication of the Bicycle Account, it is possible to get an overview of how the cycling area has developed throughout the years. The City of Copenhagen uses the Bicycle Account as a tool and measurement for understanding how far they have come towards their goals and what areas they should focus on in the future in order to keep improving. The Bicycle Account will give this thesis important statistical data aiming to understand how Copenhagen has developed into the cycling city it is today and potentially provide information on how other cities can achieve the same culture. Supporting publications from the Cycling Embassy of Denmark will furthermore contribute to a thorough analysis and reliable answer to the research question.

The survey will provide the thesis with relevant data about the Danes' transportation habits and specifically information about the cycling behaviour will be in focus. These findings will support the analysis of Denmark as a cycling nation and in combination with the findings from the primary data it will be possible to draw valid conclusions.

The author of the thesis has furthermore attended a number of events and conferences in order to gain up-to-date knowledge on the industry and its supporting businesses. Data from these events have provided the author with a general knowledge about a large spectre of the industry and been part of both the basic research, but also more specifically a relevant knowledge about specific areas related to cycling.

1.5.3. A Case study

The findings in the analysis will be based on knowledge gathered from the empirical data where cases will be used as concrete examples. Such a case study analysis is appropriate to the research question that seeks to explain and understand a complex social phenomenon, where an in-depth analysis and description is required (Yin, 2009). The case study method allows the author to retain a holistic and meaningful characteristic of real-life events, such as the international competitiveness of the industry.

The thesis will therefore use both explanatory and exploratory case study methods, in order to both analyse the present situation in the industry, but also to explore recommendations for potential changes. Yin (2009) argues that in the essence of a case study, the central aspect is that it tries to illuminate a decision or set of decisions and why they were taken, how they were implemented and with what result.

The thesis will furthermore take on a multiple-case design, where more than a single case will be analysed and investigated. The selection of the cases is based on Yin's (2009) arguments where he argues that the selected cases should be believed to literally replicate the exemplary outcomes in regards to a research question. He further points out, that in order to select such cases, it requires a prior knowledge of the outcomes for the multiple cases, focusing on how and why the exemplary outcomes might have occurred and hoping for literal or direct replications of these conditions from case to case (Yin, 2009). It is furthermore argued that the analytical benefits of having two or more cases may be substantial as you with a single-case design are more vulnerable to generalising.

1.6. Source Criticism

The author acknowledges that the seven interviewed organisations are not representative for the entire cycling industry. However, the interviewees are representing different aspects of the industry and have been selected to get the broadest perspective possible in order to conduct the analysis on a reliable basis.

It has to be noted that the three company representatives all belong to companies that are members of the Cycling Embassy of Denmark. This emphasises their interest in new markets but their objectivity can also be questioned, as they all have an interest in internationalisation of their products and have a common understanding of the challenges. However, the difference in product offerings and business scope differentiates each company from the other and it is therefore still possible to get an insight into the industry and provide a valid picture of the challenges and structure. Finally it must be emphasised that the author of the thesis works for State of Green and therefore has a professional interest and relation to some of the interviewees, however an objectivity has been remained throughout the thesis. The following section will illustrate the disposition of the thesis and how the different sections will lead to the conclusion on how the cycling industry in Denmark potentially can use innovation and collaboration in the industry to increase export.

1.7. Disposition of the thesis

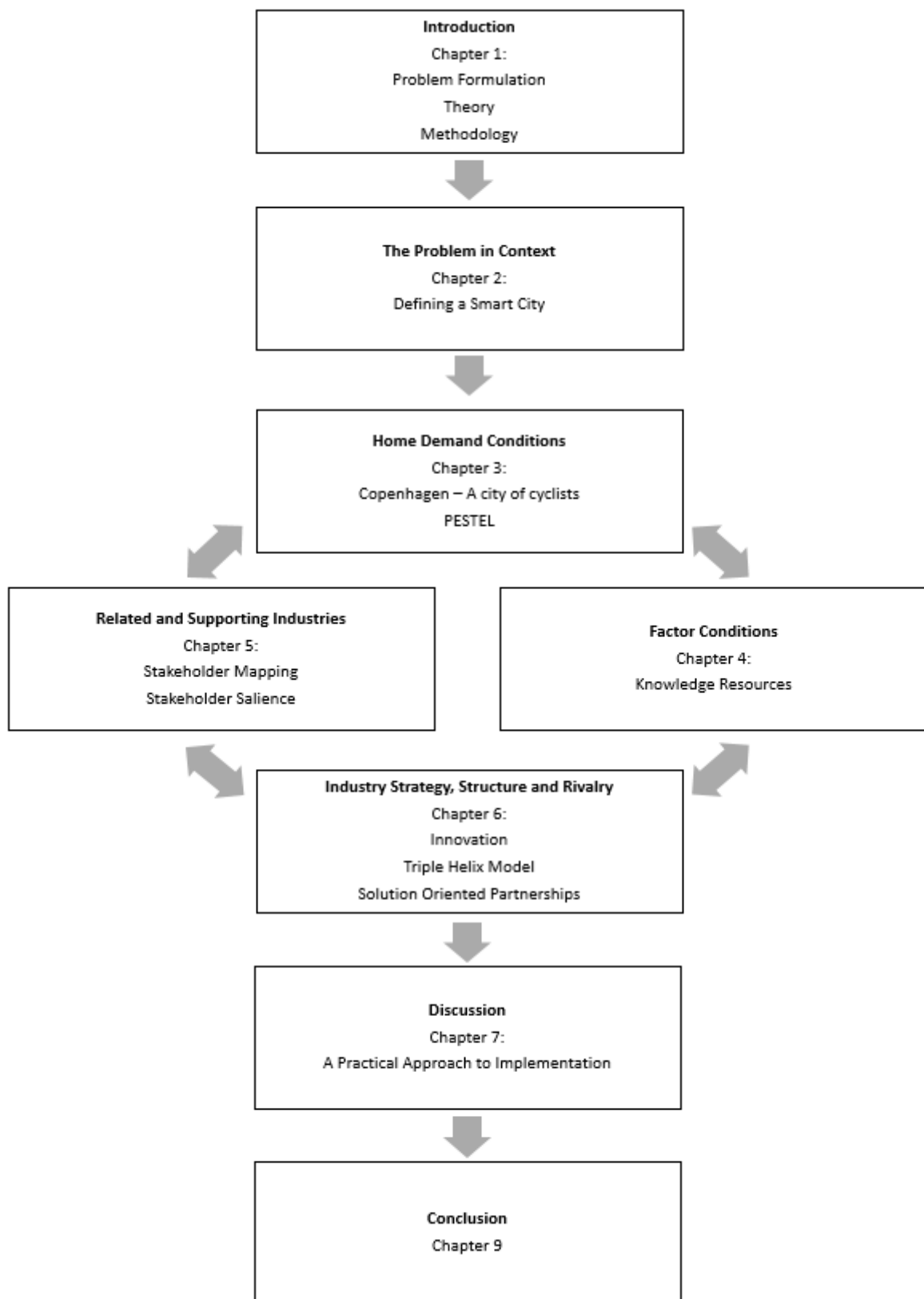


Figure 1 – Disposition of the thesis

2. A smart city – The problem in context

The continued debate about climate change and the challenges the earth faces are realised by countries all over the world. Governments have realised that they need to join forces in order to fight climate change. Current commitments on greenhouse gas emissions run out in 2020, so the COP21 in Paris is an important event, as governments of more than 190 nations will gather to discuss and potentially produce an agreement on what happens after 2020, aiming to reduce global greenhouse gas emissions and thus avoiding the threat of climate change (Climate Action, 2015).

The potential for a global agreement is looking better than in 2009 in Copenhagen at the COP15. The three biggest emitters have committed to their own targets. The EU will cut its emissions by 40% in 2030, compared with 1990 levels, the US will cut its emissions by 26% by 2025 compared with 2005 levels and China will agree that its emissions will peak by 2030 (Climate Action, 2015). However, scientists state that it is already evident that the commitments made will not by themselves be enough to hold the world to no more than the 2 degrees of warming. Therefore, different alternatives and approaches to actually meeting the targets have been suggested; more effort should be made to bring down emissions outside the UN process, for instance by engaging non-state actors such as cities, local governments and business to do more. The UN is sharpening its focus on key areas that affect cities and urban development, such as planning, governance and lately also urban mobility and energy supply.

And cities *are* acting. In recent years, cities are beginning to see the potential for the change they hold and how they can affect the development. Local governments have an increasing focus on new sustainable solutions as they are feeling the direct consequences of climate change. Flash floods, premature death due to pollution, CO₂ emissions, and disposal of waste are just some of the challenges the cities face. Different solutions and approaches are being implemented. An increasing trend for digitalisation and big data is developing world wide and cities are adapting to it. The term “smart city” is getting popular.

2.1. Defining a “Smart City”

Resilient Cities, Digital Cities, Intelligent Cities, Connected Cities, Sustainable Cities – the list of names is long and all terms are referring to the same concept of a *Smart City*.

The European Commission is defining a smart city as:

“...a place where the traditional networks and services are made more efficient with the use of digital and telecommunication technologies, for the benefit of its inhabitants and businesses.”

(European Commission, 2015)

However EU believes that the concept even goes beyond the use of ICT for better resource use and less emissions and adds to the definition:

“It means smarter urban transportation networks, upgraded water supply and waste disposal facilities, and more efficient ways to light and heat buildings. (And it also encompasses a more interactive and responsive city administration, safer public spaces and meeting the needs of an ageing population.)” (European Commission, 2015)

It seems as though cities all over the world are adapting to the smart city concept. In China alone, there are nearly 200 smart cities in development and almost all larger cities in Europe and the US are either testing or implementing smart initiatives (European Commission, 2015). However, the method for building a smart city is approached very differently from city to city.

In China, the authorities are all following a top-down approach to develop solutions that are delivered to residents. Conversely, in Stockholm, which is an early leader in delivering smart city solutions starting already in the 1990s, it has been important from the start that all of the smart city developments are citizen-centric with a large degree of user involvement (Saint, 2014).

Barcelona, that was awarded as the no. 1 smart city in the world in 2015 by Juniper Research, has implemented numerous solutions that make the city smart and liveable. Tests have been run on intelligent parking solutions, where drivers know exactly where there is a free parking space and can pay via an app on their smart phone. The waste disposal system is a network of microchips that monitors when a dumpster is full of waste and needs to be emptied, thereby reducing the number of trips for refuse lorries (City of Barcelona, 2015).

In Amsterdam the city is used as a living lab where an open and public test environment for beacons and sensors that help to navigate citizens and tourists better in the city is implemented called the “Amsterdam Beacon Mile” (Amsterdam iBeacon Living Lab, 2015).

EU does not underestimate the importance of the smart city concept and in order to speed up the deployment of smart solutions in cities in Europe, the European Commission initiated in 2012 the “European Innovation Partnership on Smart Cities and Communities”. The partnership aims to bring together cities, industry, SME’s, banks, research and other smart city actors (European Commission, 2015). It intends to improve citizens quality of life and increase the competitiveness of Europe’s industry by developing and implementing integrated smart city solutions. The partnership supports networking and partnering accumulate knowledge and facilitate exchange of information, where collaboration is the key aspect.

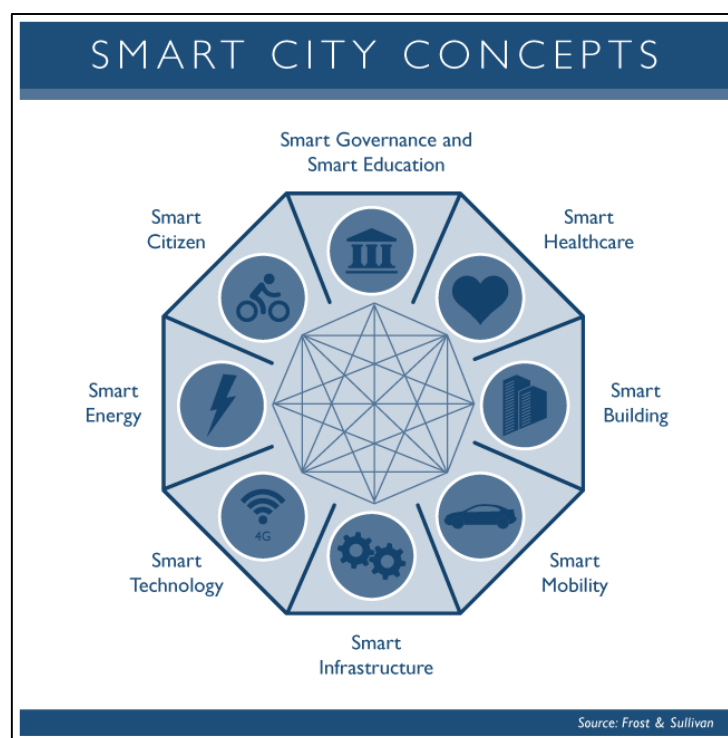


Figure 2 – Smart City Concepts (Singh, 2014)

Singh (2014) has analysed a number of smart city projects and initiatives and found some key parallels among them. He identified eight key aspects that define a smart city, illustrated in figure 2. Smart cities need to have five out of the eight parameters otherwise they can only be defined as eco-cities (Singh, 2014).

Campbell (2012) argues that in order to become a smart city the conditions for continues learning and innovation has to be in place and emphasises the importance of understanding what is below the surface and examine the mechanisms which affect the way cities learn and then connect (Campbell,

2012). Campbell further argues that a smart city is all about learning and refers to a recent presentation about New York's city plan PlaNYC where former Mayor Bloomberg stated that his team of city planners:

"...drew on the experience of Berlin for our renewable energy and green-roof policies; from Hong Kong, Shanghai and Delhi for our transition improvements; from Copenhagen for our pedestrian and cycling upgrades; from Bogota for our plans for Bus Rapid Transit; and from Los Angeles and Chicago for our plan to plant one million trees." (United Cities and Local Governments, 2010)

It is evident that cities have to learn from each other in future urban planning and take the best practice from cities that have good experience within specific areas. Copenhagen is by many cities considered as a frontrunner within urban sustainable mobility and cycling is increasingly considered a mean of transportation in order to meet the challenges of the future.

EU also considers cycling as an aspect in the smart city context and at the first EU Cycling Summit held on the 7th of October 2015, EU's Transport Ministers gathered to discuss a collaboration among the member states on cycling (European Cyclists Federation, 2015). It resulted in the "Declaration of Luxembourg", which acknowledge the benefits of cycling and calls for the EU to develop an EU level strategic document on cycling. The declaration emphasise the importance of integrating cycling into multimodal transport policy, including smart mobility.

The City of Copenhagen has taken the direct consequence in the quest of becoming a smart city. It has realised, that a smart city thinking challenges the normal ways of city management. It requires political courage and a holistic approach to public management to create efficiencies and sustainable growth. In November 2014, Copenhagen won the World Smart City Award as the Best Project for the Copenhagen Connecting project, where the city utilise the collection of digital data to create a green city, improve quality of life and make the city more attractive to investments (Copenhagen Connecting, 2015).

The factor conditions for an export potential will in the following chapters be analysed. The home demand conditions will commence the analysis and be investigated through a PESTEL analysis. The international competitive advantage is a combination of the home country's conditions, the company strategy, resources and actions. Porter argues that it is often not a coincidence that some companies

and industries group, by doing so, they can take advantage of each other's resources, knowledge and experience (Porter, 1990).

3. Demand Conditions

In this chapter, the external business environment will be analysed by emphasising the key influential elements that affect and constitute Copenhagen as a cycling city. According to Porter, the home demand conditions for a company's products are decisive for its success. Highly demanding consumers force the company to an ongoing improvement and development of products and services. It is not necessarily the size of the local demand, but the characteristic that makes the companies continuously innovate and compete. It is therefore of great relevance to undertake an analysis of the macro environment in the cycling industry of Denmark in order to understand how the Danish companies can develop solutions for new markets and provide an understanding of the nature of cycling as a commercial concept.

Beyond Porter, many scholars have through time specified the importance of the conditions in a company's home country in regards to internationalisation. Wells (1968) noted that the export success of US MNE's were to a large extent determined by country-specific-advantages (Wells, 1968) and Rugman (1981) stated that internationalisation theory considers firm-specific-advantages and country-specific-advantages as the two main building blocks to analyse competitiveness. Rugman et al. (2012) later argued that international competitiveness depends upon the linkages between a firm's capabilities and its home country assets. It is therefore relevant to analyse the macro-environment and understanding how Copenhagen has developed into a city of cyclists and what factors that have affected the development. The following PESTEL analysis will shed light on the home demand conditions for the cycling industry in Denmark.

3.1. The home demand conditions – PESTEL

In this thesis, the PESTEL analysis will be applied on the cycling industry, unlike a normal PESTEL analysis that analyse from a company view. This will enable an analysis of the home demand conditions for the complete industry and give an insight into the characteristics of the macro environment that has formed the culture and shaped Copenhagen into a city of cyclists. The PESTEL analysis will be limited to only looking at Copenhagen and the different factors in the external environment that directly or indirectly affects the conditions for the cycling industry.

3.1.1. Political

The political environment on both a national and local level has a major influence on the conditions for cycling. From 1982 to 2001, every national budget contained funds allocated to the construction of cycle paths and improvements of conditions for cyclists. After 2001, the focus and funds minimised at the national level, but has in recent years changed to an increased focus on green and urban mobility and political initiatives have affected the cycling culture in Denmark. In 2009 a five year “cycling pool” was agreed upon by a broad majority by seven parties across the Danish parliament and 1 billion DKK was allocated to the area in order to promote cycling and make cycling an attractive and safe mode of transportation (Vejdirektoratet, 2014). Projects that either improved the physical conditions for cyclists or created awareness about cycling could receive funding from the pool. The different project types were defined in the agreement as “cycling city projects”, “traffic safety projects”, and “innovation projects”. Municipalities, public and private institutions, companies, and organisations could apply.

A total number of 338 projects received funding from the pool, out of 1013 applications (Vejdirektoratet, 2014). The large number of applications indicate a great interest in promoting cycling in the municipalities across Denmark, as it was primarily cities who applied. The contribution from the pool was typically 40% and therefore the own financial contribution from municipalities 60%. The pool funded projects for 717 million DKK and the cycling pool has therefore resulted in investments for more than 2 billion DKK within the cycling area in the five year period.

A number of interest organisations have after the termination of the cycling pool called for new investments and actions from the national government. All parties, except for the present government, believe that new investments in the cycling area should be made (Faber, 2015). However, the government parties are more reluctant towards investing funds in a new pool for actions. The Minister for Transport and Building Hans Christian Schmidt (V) declared in an interview with the Danish Cyclist’s Federation that the municipalities, regions and interest organisations have an important role when developing Denmark as a cycling nation, however adds in the interview that national funding is yet to be decided upon in the coming negotiations of the national budget (Faber, 2015).

On a local level, the political influence is even greater. The number of cities that focus on cycling with a specific strategy or plan is increasing as almost all cities are allocating a larger or smaller budget towards increasing conditions for cyclists.

In Denmark, there is a general tradition for collaboration between public and private actors and across sectors and departments. Collaboration across municipalities has in recent years given room for new solutions for better cycling conditions, such as the cycling super highways. Such solutions are not possible without a common understanding and agreement from all municipalities along the route as the first “Cycle Super Highway” that opened in 2012 goes through Copenhagen, Frederiksberg, Albertslund, and Rødovre. Until today 28 new routes are planned and three have opened up so far. 22 municipalities have collaborated with the Capital Region of Denmark and more are expected to join.

The Danish approach to collaboration with both public and private parties is rooted in the Danish history where collaboration has been widespread within a number of sectors and across municipalities.

3.1.2. Economical

The hesitation in new investments from political side influences the economic factors in the industry. Since it is often the cities who are the main drivers for development in the industry, lack of political willingness to invest in the area can harm the development of new solutions and innovations. The high ambitions within the cycling area are not cheap. As stated above, more than 2 billion DKK has been invested in new initiatives over the past five years – here only considering projects related to the cycling pool. The actual investments and cost are even higher since investments in development and improvements in infrastructure have a high price. As noted above, the economical factor is highly affected and related to the political factor.

3.1.2.1 The Bicycle Snake

The “Bicycle Snake” in Copenhagen is a great example of a costly but effective cycling solution in Copenhagen. The project had a cost of 38 million DKK and was partly funded by the bicycle pool and City of Copenhagen. The new bridge was inaugurated in 2014 and made up the final link between Vesterbro and Islands Brygge. Before it was built, cyclists had to stop and haul their bicycle down

two sets of stairs in order to reach the little older (from 2006) bicycle and pedestrian bridge “Bryggebroen”. A 2014 count shows that there are more than 11,500 cycle journeys across the Bicycle Snake every day – 15% more than expected by the City of Copenhagen. The bridge makes up the missing link in the network of cycling routes in Copenhagen. Every cyclist saves 1 minute by not having to use the stairs, which amounts to 14,700 DKK a day – more than 5.25 million DKK a year in socio-economic benefits. That gives a payback time of 7 years and is therefore a huge benefit to society (City of Copenhagen, 2015).

3.1.2.2. Socio-economic benefits

Studies show, that there is in general a high socio-economic benefit of residents in a city cycling. A cost-benefit analysis of a cycle journey of 1 km in Copenhagen in rush hour shows that there is a socio-economic benefit of 1.62 DKK/km in relation to the journey not having taken place (figure 1). In comparison, there is a socio-economic loss of 5.64 DKK/km driven by car (figure 2). The figures illustrate that the health benefits and time saved are the most significant factors.

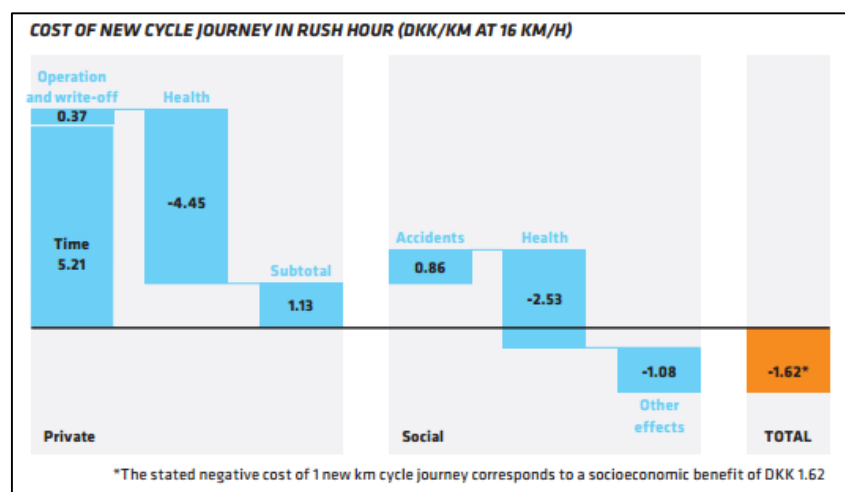


Figure 3 – Cost-benefit analysis of cycling (City of Copenhagen, 2015)

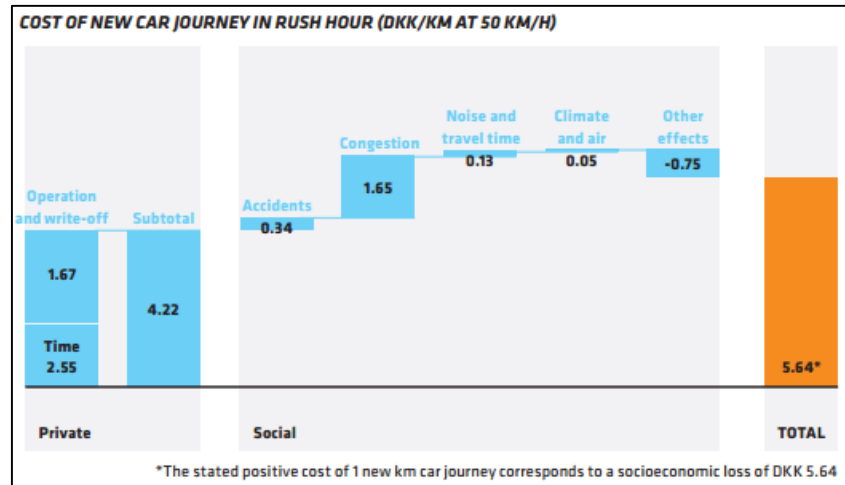


Figure 4 – Cost-benefit analysis of driving (City of Copenhagen, 2015)

The bicycle account published every second year estimates that the construction of a new cycle track increase the number of cycle journeys by 15-20% (City of Copenhagen, 2015). The 28 cycle super highways will result in 34,000 less sick days a year and have a return of 19% compared to investment. In comparison, the new Metro Cityring will give 3.1% ROI and the highway between Herning and Holstebro has an estimated ROI of 8.2% (Supercykelstier.dk, 2015).

3.1.3. Social

Cycling is greatly rooted in the Danish culture and has been for many years. The social aspects of cycling has helped shape the cycling industry in Copenhagen from early on. In the beginning, cycling was seen as a sport and recreation, however in the late 1800s more practical types of bicycles were invented and the general public who otherwise had a poor access to transport, quickly adopted them (Denmark.dk, 2014). The bicycles gave the people freedom and were the mean to get away from the cramped houses in the city into the clean air. People from all social classes cycled on a large scale. The tendency stopped when cars were introduced to the market. In the 1960s Copenhagen cars filled the streets and there was a growing concern for the pollution. It led to numerous protests against city planning favouring the cars over bicycles, e.g. a highway following the lakes in the centre of the city was abandoned after the protests. Citizens of Copenhagen simply demanded their city back, leading again to a greater focus on conditions for cyclists. This movement is believed to have been a big part of the development into the cycling city that Copenhagen is today (Denmark.dk, 2014).

Today more than 60% of the people in Copenhagen bike to work or school every day (City of Copenhagen, 2015) which combined corresponds to travelling more than 31 times around the world a day. When asked about their cycling habits, 49% of the Copenhageners say they cycle because it is faster, 50% also believe it is easier and 42% also cycle because of the health benefits (City of Copenhagen, 2015). This emphasise the focus that new solutions and a continued development is necessary in order to meet the sophisticated demands from the cyclists.

3.1.4. Technological

The nature of cycling is rooted in bicycles as an old traditional transportation mode. The development with the cycles has been limited to innovations such as cargo bikes and electric bikes. Technology has up until now not played a major role and the development in the industry has been driven by advancement in infrastructure, knowledge, and awareness among citizens (campaigns). However, there is a strong tendency that the industry is focusing more and more on data gathered from projects and initiatives in order to measure the results and effects. A Bicycle Account introduced by City of Copenhagen is becoming increasingly popular among municipalities who wish to monitor the development and effect of investments in the area, collecting data about modal splits, infrastructure, bicycle parking, accessibility, safety, and the citizens' level of satisfaction with the solutions. Thereby the decision makers have a greater foundation for creating strategies, politics and goals in the future and decide what actions and instruments should be implemented in order to get there.

The cycling aspect of a smart city has in recent years been more and more included in the area of smart mobility. The cities have increasingly introduced new alternative aspects to the challenges, where cycling is said to play an important part. Thus, there is a potential for integrating smarter solutions in the new cycling solutions being developed.

3.1.5. Environmental

When analysing the culture of cycling an inevitable factor is the environment. The energy crisis in the 1970s led to growing environmental awareness in the public. The car-free Sundays introduced by the politicians further added to traffic switching from cars to bicycles, with an increasing demand for improved cycling conditions.

Today, the environmental effect of cycling is a major political factor for focusing on new cycling projects and initiatives. More cyclists means fewer cars, which means less noise and cleaner air, that results in reduced CO₂ emissions and increasing public health improvements. The City of Copenhagen's great focus on cycling is part of the city's Climate Plan 2025. 22% of the city's total CO₂ emissions comes from transportation. (City of Copenhagen, 2012). Furthermore, Copenhagen is expecting an increase of 110,000 inhabitants from now until 2025, which means that more congestion and pollution will be created and greener alternatives to individual transportation has and must be prioritised.

However, the great concern for the environment by the politicians, companies and organisations, is not as explicable among the actual cyclists. The 2014 Copenhagen Bicycle Account shows that only 7% of the cyclists in Copenhagen cycle because they are environmentally friendly (City of Copenhagen, 2015). Other factors are more important such as convenience, speed and exercise as mentioned above. This is an interesting factor, which should be considered in the approach to cycling and the marketing efforts from the industry. However, it should be considered that the environment possibly play a larger role for other cities and markets, where the air pollution is more advanced compared to Copenhagen where the cycling culture has had a positive effect through many years.

3.1.6. Legal

The legal framework for cycling has to a large degree been inserted by the national government in order to create safety for both the cyclists and other transportation modes. The local government work together with the local law enforcement. The police have bicycle raids and stop all cyclists for minor violations and during the same period, the City of Copenhagen runs campaigns with a purpose to teach good behaviour when cycling. The close collaboration between the police and municipality has played a role in the decrease in traffic accidents involving cyclists (City of Copenhagen, 2015).

However, the lack of regulation within the cycling area is also a driver for cycling. Bicycle helmets are not mandatory in Denmark. Researchers and interest organisations agree that bicycle helmets have a positive effect on the safety for cyclists, however a consensus is yet to be found on whether it should be illegal not to wear a helmet. An early analysis calculated that the benefits of cycling outweighed the risk by a ratio of 20:1 (Hillman, 1994). Many factors such as the cyclists' attitudes and costs of enforcing the law should be considered before deciding on whether other initiatives would either

improve traffic safety or *prevent* more people from cycling. Research in USA and Australia have shown that less people tend to bike after it has become mandatory to wear a helmet and even the Danish Road Safety Council does not support that similar laws should be implemented in Denmark. Instead, “safe traffic”-campaigns have over the years had an effect on the Copenhageners’ attitude and habits when cycling. In 2006 people wearing helmets in the city was only at 6%, compared to 2014 it has increased to 27% (Rådet for Sikker Trafik, 2014).

3.2. Sub-conclusion

The factors in the PESTEL framework all have an effect on the cycling industry in Denmark and on the competitive advantage the Danish actors have internationally. The factors are interlinked and affected by actions from a variety of stakeholders, which will be evident in the stakeholder map in Chapter 5. The political influence on the cycling industry is clearly depicted through the analysis where the socio-economic benefits play an important role. It is also evident that the industry is end-user driven. If the Copenhageners back in the 1960s had not demanded better conditions for cyclists, the industry would not have developed to where it is today. It is further clear that the cyclists demand great conditions to maintain the convenience and speed of cycling.

Taken all the factors into consideration the demand from the home market is very sophisticated and a key driver for a competitive advantage. The industry must develop and innovate their products and services in order to keep up with society’s demand for innovative solutions. The importance of the home demand conditions will later be combined with the structure of the industry in the stakeholder mapping to investigate whether the existence of a cluster or partnerships can foster this innovation.

The sophisticated home demand conditions play a crucial role for a competitive industry. However, the international demand must be understood in order to determine whether parallels can be drawn to other markets and cities. The following section will therefore examine how the Danish cycling industry understand and categorise the international demand for cycling solutions.

3.3. International demand

The home demand conditions play an important role according to Porter. However, in order to identify how development and innovation in the industry can exploit the export potential, it is necessary to

examine and understand the international demand for alternative transportation such as the Danish cycling culture. Two of the most important actors in Denmark, acting as a the first stop entry when coming to Denmark to look at new solutions, have been interviewed; State of Green and the Cycling Embassy of Denmark. It is evident from the interviews that there is a great interest for the Danish cycling culture from international cities and nations. State of Green covers all green sectors in Denmark and receives more than 150 delegations every year, however the cycling area is still lacking:

“We do not have any delegations that only focus on cycling, but we have delegations that are here to look at sustainable transportation in a broader sense, where focus 80% of the times often ends up on cycling and how we have succeeded. But it is not what they demand when they get here.” (appendix 4 – Interview State of Green)

However, this small demand from delegations can potentially be due to the role of the Cycling Embassy who welcomes more than 100 delegations every year and is therefore the direct entry to Denmark as a cycling nation. The City of Copenhagen furthermore welcomes delegates through their mobility office. It is therefore evident that the number of delegations in Denmark being introduced to the cycling culture is very high. Both State of Green and the Cycling Embassy agree on where the demand comes from and what they are demanding:

“It is to a very large extend city planners who visit us. I don’t think I can remember any buyers of bike racks or other products. It is city planners and municipalities who are here to look at planning.” (appendix 4 – State of Green)

Also the municipalities can feel the attention on Danish cycling solutions but emphasise the importance of the work the City of Copenhagen and the Cycling Embassy does:

“Foreign delegations contact Copenhagen first, they do not know the rest of us. Or the Cycling Embassy, those are the two possibilities. And as we would like to share the spotlight with others, I have actually been invited to make a couple of presentations.” (appendix 5 – Interview Gladsaxe Municipality)

State of Green argue that only some actors will be able to exploit the export potential:

“Where I see the biggest potential is actually on the consulting side in relation to infrastructure and planning. So first and foremost the architects. It is consultants such as COWI and Rambøll that first and foremost have a huge export potential.” (appendix 4 – State of Green)

The Cycling Embassy emphasise that the Danish cycling industry consists of more than solutions in the Copenhagen area and points to the fact how the Danish cities are perfect showcases of the solutions in a user context:

“The cities are our showcases. One thing is that Copenhagen is interesting, but it would often be better for some delegations to go to another city, such as Aarhus or Odense, because they cannot relate to Copenhagen. Maybe it is better to go to Aarhus where there are hills or Odense where the scale is a lot smaller.” (appendix 1 – Interview Cycling Embassy)

From the interviews conducted, it is evident that the international demand and interest comes primarily from municipalities and city planners who want solutions. It is therefore important that the industry is structured to fit and meet this demand, whether it is in Copenhagen or another city. The following section will identify the factor conditions within the cycling industry that drives competitive advantage.

4. Factor Conditions

Porter define factor conditions as human resources, physical resources, knowledge resources, capital resources and infrastructure (Porter, 1990). Specialised resources are often specific for an industry and important for its competitiveness. Specific resources can be created to compensate for factor disadvantages. The cycling industry does not comprise advantages within for example low cost resources, however the advantage lies within factor conditions that are more knowledge and culture based.

4.1. Knowledge resources

A country create its own important factors such as skilled resources and technological base. The stock of factors at a given time is less important than the extent to which they are upgraded and deployed. Local disadvantages in factors of production force innovation. Adverse conditions such as expensive labour or scarce raw materials force firms to develop new methods, and this innovation often leads to a national comparative advantage. VEKSØ emphasise the importance of the cultural aspect as a valuable resource:

“It is a gift that VEKSØ comes from Denmark and has more than 65 years of history with roots in the Danish cycling culture. VEKSØ is founded on the old “claw rack” and that history contributes to sell our products. We can say we have been part of the development of the Danish cycling culture.” (appendix 1 – Interview VEKSØ)

It is evident that the cycling industry in Denmark consists not so much of producers of e.g. bicycles, but relies more heavily on knowledge intensive firms and institutions. As State of Green notes, Denmark cannot compete with other nations, on the production side:

“We cannot produce bicycles or bike racks at the same low cost as other places, so that is secondary.” (appendix 4 – Interview State of Green)

However, Denmark can compete in regards to the knowledge side of infrastructure and solutions for bicycles, where research and development have been a large part of the capacity building. The emphasis on monitoring and data collection from research institutions and municipalities about the cycling culture is an example of the great focus on gathering knowledge about cycling, e.g. the Danish National Travel Survey and the Bicycle Accounts which were invented in Copenhagen.

The number of consultants within urban mobility and cycling is also evident in the great knowledge, professionals possess on the industry in Denmark. The long tradition for cycling identified in the PESTEL analysis has enabled and equipped a high number of people to specialise with knowledge resources on cycling that is hard to imitate elsewhere. The cycling industry is comprised of a variety of different companies, where consultants play an important role. Larger consulting companies such as COWI, Rambøll, Atkins and MOE have acquired specialised knowledge from employees, devoting attention to the area by dedicating departments in the companies to only focus on cycling and the solutions herein. Companies with a sole focus on consulting in bicycle planning and solutions can also be identified – a large number of one-man companies such as HOE360 Consulting, Urban Cycle Planning, Copenhagen Lanes, and Kjærgaard Advice, but also larger companies such as Copenhagenize and VEKSØ Mobility are to be found in the industry. Common to all companies is the extended knowledge resources they possess within cycling and the culture behind. HOE360 Consulting explains how he started working with mobility and through the large focus on cycling in Denmark it has become a knowledge resource for the company (appendix 3 – interview HOE360 Consulting).

Furthermore, not only consultant companies see the potential in the knowledge resources available in Denmark. Architectural companies such as Gehl Architects, Gottlieb Paludan, Dissing+Weitling, and Schønherr either focus or specialise also on implementing cycling solutions in their projects. Some of them see the value and use it as part of their differentiation and marketing strategy.

The culture has also fostered new initiatives resulting in both voluntary and non-for-profit organisations where the benefits of cycling is the main objective. The initiative Cycling without Age is aiming to maintain and transfer the joys of cycling through generations by enabling elders to go on rickshaw trips with youngsters around the city. The Bicycle Innovation Lab is also a partly voluntary initiative initiated to increase knowledge about different bicycle forms and alternatives.

4.2. Sub-conclusion

It is evident that the products and services offered from the industry is to a large extend intangible services where the outcome often results in more tangible and physical solutions. The consultant and architectural companies provide a service where other actors carry out the actual construction and finished project. However, Porter argues that the scale of the knowledge can lead to demand for manufactured goods as well, such as intelligent lighting, urban furniture and bicycle counters.

The analysis of the related and supporting industry will identify the relationship among these actors. The following chapter will provide a stakeholder mapping, where the different actors both in the cycling industry but also related and supporting industries are identified and analysed.

5. Related and Supporting Industries

As identified in the PESTEL analysis the cycling industry has a long tradition in the Danish society and many different actors contribute to the culture and development. This makes the industry very complex with numerous relations and interactions between stakeholders across the sector and firms, challenging the potential for export. In order to understand what and how actors can benefit from internationalisation it is therefore relevant to identify the stakeholders in the industry and how they are linked.

Porter's diamond model emphasise the importance of the related and supporting industries in relation to innovation and internationalisation as they can produce inputs, upgrade the process and thus stimulate other companies in the chain to innovate. The cycling industry in Denmark consists of a number of actors, but not only directly related to cycling. Other industries have in recent years seized the opportunity for business in the developing cycling industry and have entered with alternative and innovative solutions.

Through the stakeholder analysis it will be possible to gain an insight into the industry and provide an understanding of the different players in the market that directly or indirectly affect the conditions for a competitive advantage. Creating value for stakeholders is about understanding and satisfying stakeholders' needs and concerns. It is therefore important to understand each stakeholder's behaviour, cooperative potential and its competitive threat.

When local supporting industries are competitive, firms enjoy more cost effective and innovative inputs. This effect is strengthened when suppliers themselves are strong global competitors. Related and supporting industries are of great importance for a company. Competitive suppliers create lower cost. Innovative inputs can support the development as being related industry and enable increased exchange of products, services, and information/knowledge.

5.1. Definition of Stakeholders

Within stakeholder theory, one can divide it in to three; The *normative*, the *descriptive* and the *instrumental* stakeholder theory (Friedman, et al., 2002). The normative approach is a set of rules that guides managers and in some situations stakeholders in what direction the organisation should act and develop and how they view their roles and actions. Freeman's approach to stakeholder theory is of normative character where the company should act from a set of ethical principles that consider and create value for the companies' stakeholders, though Freemans work with stakeholder theory has changed over the years.

According to Freeman, doing business is complex and consists of mutual related networks of customers, suppliers, organisations, employees and financial stakeholders, that are all vital for the success and survival of the companies. Freeman argues that the companies that manage and focus on one group of stakeholders at the expense of another group of stakeholders will experience difficulty

maintaining the results and performances. This change in capitalistic thinking from Friedman's (1970) "*the social responsibility of business is to increase its profits*", to Freeman's (2008) "*the very nature of capitalism itself is putting together a deal, a contract or a set of relationships among stakeholders so that all can win continuously over a long period of time*" exemplifies that the thought of only handling one group of stakeholders – the shareholders' interests are lacking if you want to build and maintain a successful business.

The definitions of stakeholders vary from being very broad to very narrow. The earlier definition of stakeholders provided by Freeman (1984) is broad in nature as it includes any group or individual who are affected by the companies' activities. Mitchell et al. (1997) argue that it is the view taken about the existence and nature of the stake that should be the basis for the decision of who actually counts as stakeholders (Mitchell, et al., 1997). The analysis of the Danish cycling industry will adapt to this thinking, as a broad set of benefits appear from the cycling as identified in the previous PESTEL analysis, thereby affecting a large number of groups and individuals. A broad picture of the industry is necessary for a complete understanding of the actors affecting the drivers for innovation and internationalisation.

5.2. Stakeholder mapping

In 2008, Freeman et al. introduced a new thinking to stakeholder management. They suggested that business can be understood as a set of relationships among groups that have a stake in the activities that make up the business. Business is about how customers, suppliers, employees, financiers, communities and managers interact and create value. He argued that to understand business is to understand how these relations work (Freeman, et al., 2008). Who is a primary stakeholder and who is a secondary stakeholder depends mainly on the company's overall purpose. It is further argued, that businesses need to find solutions to issues that satisfy multiple stakeholders simultaneously in order to create value.

A stakeholder framework must capture specific groups as stakeholders and must allow for the adoption of an action orientation. The framework suggested by Freeman et al. in *Managing for Stakeholders* (2008) is based on one single company and its stakeholders. The analysis of the stakeholders in the Danish cycling industry will comprise the actors in the industry and therefore be seen from an overall perspective in order to get a clearer understanding of the industry and structural

relations. The cycling culture identified in the PESTEL analysis will provide the basis for the stakeholder mapping, taking into consideration all the actors in the industry.

The interviews has identified a number of different actors within the cycling industry and through the interview questions, attention was focused on gaining an understanding of the relationship the different actors have with each other and thereby how the industry is linked. All interviewees were asked about their collaboration partners, and challenges in the process were identified through questions related either to specific projects or to products/services.

A number of scholars have criticized Freeman's 1984 stakeholder theory, arguing that it was too static and did not consider the multiple roles a stakeholder could have. The adapted theory presented by Freeman et al. in 2008 consider the dynamics of a company and the industry. Figure 5 below illustrates Freeman's new basic idea of managing for stakeholders adapted to fit the cycling industry. The groups in the inner circle is the primary stakeholders that defines the industry and they should be carefully considered and understood. The interests of these groups define whether or not a company – or in this case an industry – is built to last and achieve a successful international performance. The outer ring shows another set of groups that can affect or be affected by the business as they all influence the relationship with the primary stakeholder. These groups are defined as the secondary stakeholders.

The model has been adapted to fit the industry structure, attempting to illustrate the matching roles with each other as they in certain cases are highly related. See appendix 6 for the original model suggested by Freeman et al. (2007).

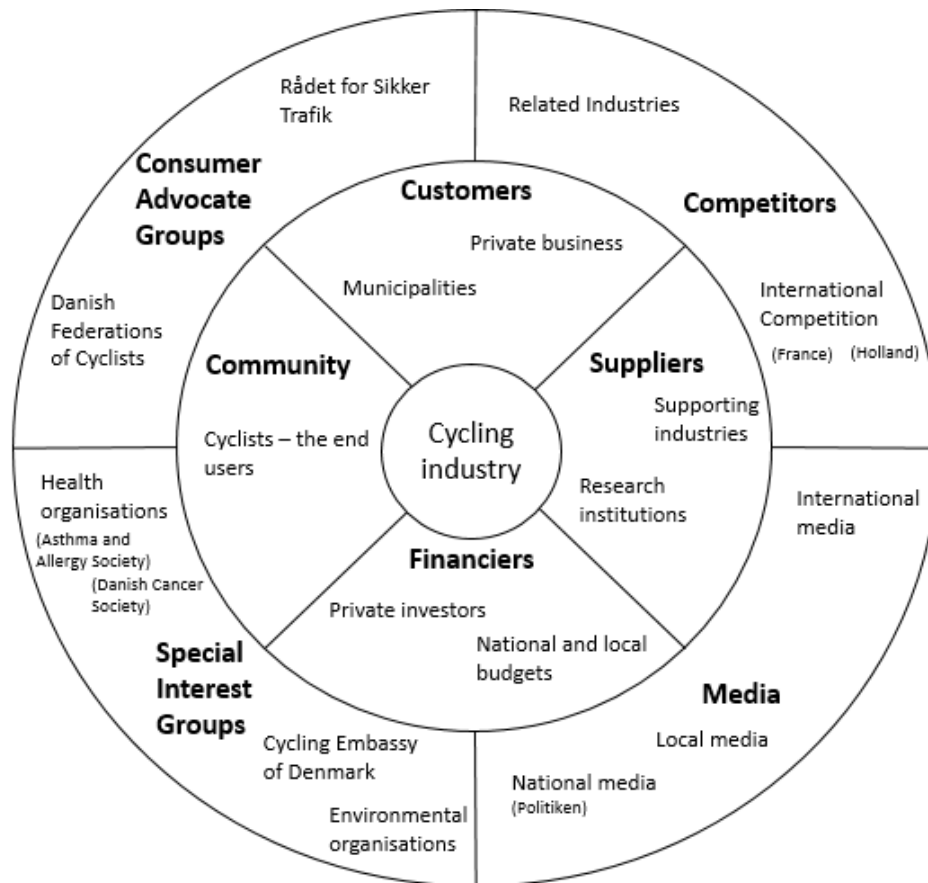


Figure 5 – Stakeholder map of the Danish cycling industry

An analysis of the employees as a stakeholder group, will not be included in this analysis. The importance of human resources have been analysed in the previous chapter as an important factor condition. Including the employees in the stakeholder analysis in the industry is not relevant as their values are highly individual from company to company and can therefore not be determined in a general industry mapping

The analysis have segmented the stakeholders according to groups, where specific actors only are mentioned in their relevance for the rest of the thesis and based on the findings in the interview. It is therefore not all actors who are mentioned by name, but instead considered as a group with similar actors.

Freeman acknowledge that the values and purposes of the primary stakeholders must be understood as it to a large degree can explain whether a company – or in this case an industry – is built to last, achieve, and sustain extraordinary performance. The figure illustrates the multiple roles a stakeholder

in the Danish cycling industry can have, revealing the municipalities' role as customers, government, financiers, and project organisation. The interviews clearly identify the roles of the municipalities.

Due to the importance of the municipalities as stakeholders, the model have been adapted to the cycling industry and does therefore not show government as a secondary stakeholder as the municipalities are included as customers, and the importance goes beyond the scope of secondary stakeholders.

Due to the role of public government acting as customers in many situations, the nature of the products and services offered is highly affected. The companies cannot sell their products in the same manner as to regular customers, since the projects often has to be put out to tender. Companies therefore need to place a bid demanding a degree of creativity and innovation in the process in order to win.

The industry for cycling solutions and products is consisting of a variety of companies, counting everything from mobility consultants and architects to bike rack producers and local bike shops. A significant number of companies working with cycling solutions does not have it as a primary competence, but more as an additional service or attribute to their other offerings. For instance, consultant companies such as COWI work with consultancy in many sectors and on many levels and has among others advised the city of Johannesburg in South Africa on how to develop into a cycling city and also turn the citizens of Randers into electrical cyclists. Similarly for many of these companies, the cycling aspect is only part of a more comprehensive solution. Gehl Architects have made it part of their trademark to incorporate good cycling conditions into their city planning projects, however only making bike lanes are not part of their portfolio. Gehl Architects “...*focus on working with our clients to create mutual beneficial relationships between people's quality of life and their built environment.*” (Gehl Architects, 2015) Cycling is thereby just a mean in their primary product offerings.

This diversity and distinction between the actors in the industry and their activities is an important aspect in relation to the organisation of the cycling industry and will therefore be examined later in this chapter.

5.3. Stakeholder salience

In order to identify the most important stakeholders and create another level of dynamics Mitchell et al.'s salience framework will in the following section be applied to the stakeholders identified in the stakeholder map. Mitchell et al. believe that the salience of a stakeholder for managers is based on whether a stakeholder possess one or more of the three attributes; power, urgency, and legitimacy and argue:

“Managers must know about entities in their environment that hold power and have the intent to impose their will upon the firm. Power and urgency must be attended to if managers are to serve the legal and moral interests of legitimate stakeholders.” (Mitchell, et al., 1997 p. 882)

Mitchell et al.'s definition of the three attributes will therefore be ascribed to the stakeholders in the industry.

Definition of the three attributes

Power is defined as to the extent one party of a relationship can gain access to coercive, utilitarian or normative means to impose its own will in the relationship. Notably, power is transitory, it can be acquired as well as lost. (Mitchell, et al., 1997)

Mitchell et al. (1997) use Suchman (1995) definition of *legitimacy*: *“A generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.”* (Suchman, 1995)

The final attribute, *urgency*, helps to overcome the problem of a static analysis to a more dynamic model. Mitchell et al. believe that urgency is synonym to compelling, driving and imperative, and is based on the following two attributes: *“time sensitivity – the degree to which managerial delay in attending to the claim or relationship is unacceptable to the stakeholder, and – criticality – the importance of the claim or the relationship with the stakeholder”*. (Mitchell, et al., 1997)

The following schema gives a comprehensive overview and understanding of the stakeholders and their relations in the Danish cycling industry, identified after completing the interviews and knowledge gained from here. The stakeholders have been given the attributes that correspond to their

relation with the industry and according to Mitchell et al., who points out that the most important stakeholders to an industry are the ones that possess all three attributes, why these stakeholders therefore have been highlighted (see appendix 7 for Mitchell et al.'s (1997) stakeholder salience model).

Primary stakeholders

Primary Stakeholders	Identity	Attributes
Financiers		
Private Investors	Private investors in the companies in the cycling industry are important for the single company. Private investments in projects in the industry as a whole are very limited, while it is normal to see public investments in cycling related projects.	Power
Local and national budgets	The financial contributions from the public sector is through public budgets decided by decision makers in either local or national governments. <i>“Cycling is highly prioritised and funding has been earmarked to advance cycling. Our project Gladsaxe Cykler is running from 2014 to 2018 where we have 34.5 million DKK at disposal allocated over the years and to different projects.”</i> (appendix 5 – Interview Gladsaxe Municipality)	Power, Legitimacy
Customers		
Public bodies	Municipalities (and to some degree the Danish Road Directorate) are the primary customers for the cycling industry as they are responsible for respectively the locally owned and state-owned roads in Denmark. As illustrated in the stakeholder map, municipalities take up multiple roles in the cycling industry and can thereby have all three attributes. <i>“99% of the customers are public bodies – municipalities, regions. Because, basically they are the ones that have the economy and right to use the public domain.”</i> (appendix 3 – Interview HOE360)	Power, Legitimacy, Urgency

Larger businesses	<p>Large private companies are in a higher degree looking for ways to improve the conditions for their employees in relation to both health and convenience and they therefore also see a business opportunity in the cycling culture:</p> <p><i>“I have one private customer at the moment. As an owner of the land, they can plan it to fit their needs.”</i> (appendix 3 – Interview HOE350)</p>	Power, Legitimacy
Suppliers/Supporting industries		
Supporting industries	<p>Due to the nature of the solutions comprising the cycling industry, the supporting industries are numerous. They supply everything from lighting solutions to knowledge about rainwater drainage on roads and thereby cycle paths.</p>	Power, Urgency, (Legitimacy)
Suppliers of knowledge	<p>Research institutions can provide technical innovations for the cycling industry through research and development. The Technical University of Denmark and Aalborg University collaborate with players in the industry for new solutions:</p> <p><i>“Technical University of Denmark has been interested in the project from the beginning and we have had meetings with them. They are working on an area around campus to develop joint traffic solutions and want us to join.”</i> (appendix 2 – Interview Gobike)</p>	Legitimacy
Community		
Cyclists – the end users	<p>In other industries, it is argued whether community play a vital role for the businesses. In the cycling industry, the support from community is very important. The community is the end users of the solutions/products from business and the behaviour is closely monitored by the municipalities in order to see the effect of investments made in the area:</p> <p><i>“There has on average been a 50% increase in cycle traffic [...] There has been invested 3.5 million DKK in Gladsaxe on the project and that is not a big investment. It is actually an</i></p>	Power, Legitimacy

	<i>appropriate small investment compared to the large effect.”</i> (Appendix 5 – Interview Gladsaxe Municipality)	
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The schema summarises the primary stakeholders in the cycling industry and recognizes their attributes and thereby the importance for the companies. The customers and supporting industries have been identified as the most important stakeholders and their characteristics will be looked upon in the following.

5.3.1. Customers

After conducting the interviews, it is evident that the customers for many of the companies in the cycling industry are the municipalities. The municipalities therefore take on multiple roles where they are providing the funding, the framework conditions and acting as customers – buyers of the solutions that are implemented in the society. The Danish Road Directorate is also identified as a customer, as the state network represents 5% of the entire road network but 45% of the entire road traffic run on these roads (Danish Road Directorate, 2015). However, as this traffic is primarily from cars and trucks on larger highways the Danish Road Directorate cannot be perceived as a primary stakeholder.

Freeman et al. (2008) argue that the actors identified as the primary stakeholders depend to a large degree on the overall purpose of the industry. The cycling industry aims to provide cycling solutions that will increase the number of cyclists, a purpose supported by the municipalities who therefore play an important role for the industry. In the cases of the new city bikes in Copenhagen and the project with cycle super highways, the municipality has initiated both projects as they see the socio-economic benefits in relation to the highways, but also a branding perspective in the city bikes in the quest towards being the world’s best city for bikes. The respondent from City of Copenhagen explains the selection process of the projects:

“We select them on the basis of the municipality’s own focus areas. If we have a strategy that supports an increase in cyclists towards our 2020 climate plan – which sets the frameworks for what kind of strategies and focus areas we should have – then we can see a multiple purpose.”
(appendix 8 – Interview City of Copenhagen)

The municipalities have all the distinct attributes and combined they create a very distinguished authority for the companies. The municipalities are therefore very salience and important for the

companies in the cycling industry. It is further argued, that businesses need to find solutions to issues that satisfy multiple stakeholders simultaneously in order to create value.

The municipalities can choose to priorities funding for alternative transportation modes over cycling and the competitors of the cycling industry therefore harm the industry. Here it is important for the industry to communicate the benefits of cycling identified in the PESTEL analysis. The municipalities have also recognised this and in the increasingly popular Bicycle Account format, the effects of the cycling initiatives are measured and monitored.

5.3.2. Supporting industries

In order to identify the supporting companies and industries it is necessary to look upstream in the value chain. Porter argues that if internationally competitive, supporting industries are present, they can mutually strengthen the industry in general and can therefore be potentially extremely important for an industry. However, as the Danish cycling industry is highly knowledge driven, suppliers to the companies are relative and therefore more on a local level where entrepreneurs carry out the final work of the actual construction of the projects, which is hard to transfer to an international context where local entrepreneurs would be preferable for the foreign market as well.

Only companies such as Gobike, Relight, VEKSØ, and Falco have direct suppliers in the manufacturing of their products, that potentially can be a very complex network of supporting industries, depending on the level of technological elements in the product.

“If we talk about the overall solution, then it consists of several constituent parts. [...] When you dig into it, then it is much more complex than what it looks.” (appendix 2 – Interview Gobike).

Supporting industries for the knowledge-based companies can on the other hand be identified as research institutions that support the companies with new knowledge and ideas e.g. the Technical University of Denmark performs a major research and development programmes within a number of sectors. The potential for the research institutions as suppliers is big, in regards to knowledge within product and service development as setting the cycling industry into the smart city context can potentially be supported by knowledge from technical researchers.

It is evident that the cycling industry has not yet paid the full attention to the supporting industries as it should, when looking at the level of attributes for the companies within the cycling industry. However, the lack of international competitiveness among the supporting industries can be a decisive factor for not getting involved, and further it can affect the competitive advantage for the cycling industry. A larger involvement of supporting industries will be suggested in the discussion, examining potential new partnerships for the companies in the cycling industry.

Secondary stakeholders

Secondary Stakeholders	Identity	Attributes
Competitors		
Related industries	Related industries with similar customers and activities see a potential in the benefits of cycling. These industries include sectors such as climate adaptation, transportation, and city planning.	Urgency, Legitimacy, (Power)
International competition – Nations	Other nations are to an increasing degree focusing on cycling and increase the initiatives for cycling export: <i>“The Dutch are our biggest competitor. They have a three year subsidy from the state on 100,000 Euro a year.”</i> (appendix 1 – Cycling Embassy) The public authorities’ will to focus on and financially support the Dutch Cycling Embassy is considered a threat by the Cycling Embassy of Denmark: <i>“Nobody believes they have to pay for anything. When I am out doing presentation, they offer to pay my ticket. But what about my time? They argue that they can get a Dutchman for free – then they have to take a Dutchman, they get financial subsidy.”</i> (appendix 1 – Cycling Embassy)	Urgency
Media		
Local media	Local newspapers are a useful tool for the municipalities to communicate the efforts within the cycling area:	Urgency

	<p><i>“We work with the visibility out in the urban space, but also to feed the local newspapers and get some attention. It is often where the municipalities see the greatest benefit, that there is a mayor or someone else that can shine in the positive attention. We help the municipalities with this.”</i> (appendix 9 – Interview Cycle Super Highways)</p>	
International media/Social media	<p>The attention from international media is strengthening the perception of Denmark as a cycling nation. Many of the new innovative solutions have received international attention, such as the Cycle Super Highways, the Bicycle Snake or the new city bikes in Copenhagen.</p> <p>Social media are also an important aspect here:</p> <p><i>“If we do a post about cycling, Christiania bikes, bike trailers, biking in the snow etc. then it beats almost all the other green sectors on the social media. It is really popular and gets the attention and interest from stakeholders that follow us.”</i> (appendix 4 – Interview State of Green)</p>	Legitimacy, Urgency
National media	<p>The effect from media is self-enforcing. International attention gets the national media’s attention.</p> <p><i>“It is like there has been created an interest about it [Cycle Super Highways]. So even though we do not initiate many new things at the moment, then it still has an effect that New York Times have been here at some point.”</i> (appendix 9 – Interview Cycle Super Highways)</p> <p>Media collaborations such as the collaboration between the Secretariat for Cycle Super Highways and Politiken creates positive attention about the cycling initiatives and can lead more people to consider commuting on bikes (appendix 9 - Interview Cycle Super Highways).</p>	Urgency

Special interest groups		
Industry associations	In the attempt to gather all leading players within the industry, the Cycling Embassy of Denmark was created. The organisation is purely voluntary with no funding and thereby no power, however the joint efforts from the leading players in the industry can affect other stakeholders in the environment.	Legitimacy (Power, Urgency)
Environmental organisations	Environmental groups have not played a significant role in the cycling industry in Denmark where there has been no involvement. It might be due to the existing culture, when cycling is the norm and therefore not a focus area in Denmark. In other countries, it is potentially another story. This corresponds well to the reasons for why people bike, where only 8% say it is because of care for the environment.	Legitimacy
Health organisations	Health interest organisations such as the Danish Cancer Society and the Diabetes Foundation play an active role in the industry. E.g. Danish Cancer Society is part of CED and participate in campaigning for cycling in order to prevent lifestyle cancer diseases.	Legitimacy, Urgency
Consumer advocate groups		
NGO's	As the only transport organisation in Denmark that speaks the cyclists' cause through contact with politicians in both the parliament and municipalities, the Danish Cyclists' Federation is an important consumer advocate group with strong lobbying skills.	Legitimacy

The secondary stakeholders are identified in the schema above and it is evident that none of the actors have the power to directly influence the cycling industry. However, the importance of both national and international media must not be neglected as these are important actors as they have a large degree of urgency in their claim for the municipalities in order to legitimate the investments made within cycling. Furthermore, the related industries and the Cycling Embassy have the potential to possess all three attributes and must therefore be considered.

5.3.3. Related industries

Even though the related industries does not hold all three attributes, they are still a noticeable and relevant actor for the cycling industry to pay attention to, as Freeman et al. (2008) argue that managers should pay attention to stakeholders with the same purpose. Similarly, Porter believes that equally to the supporting industries, the related industries can possess competences that are important for innovation and a competitive advantage.

The presence in a nation of competitive industries that are related often leads to new competitive industries (Porter, 1990). The cycling culture and cyclists in Denmark have created a high demand for solutions and companies in other industries have seized the opportunity. E.g. architects and consultants working with climate adaptation or city planning have to a large degree embraced the importance of the cycling culture. They can therefore both be identified as related industries, but also as part of the industry as some companies have specialised so much in the area that their operations are related and based on knowledge about cycling, as described in previous chapters. These new entrants bring a new approach to competing, where cycling is only part of the solution to a larger more complex challenge.

Evident from the stakeholder mapping, the related industries to the cycling industry are numerous. They include those industries that can coordinate and share activities in the value chain with the actual companies in the industry. Architects and consultants often work closely with the city planners in the municipalities and are thereby trying to achieve the same benefits from the urban space as is achieved with cycling solutions – a green and liveable city. The related industries are part of a larger structure of sectors in Denmark. E.g. the successful industries of climate adaptation, sustainable transportation, and city planning are linked through a horizontal relationship sharing the same customers, technology and channels. These relationships and the interconnections are illustrated in the figure below.

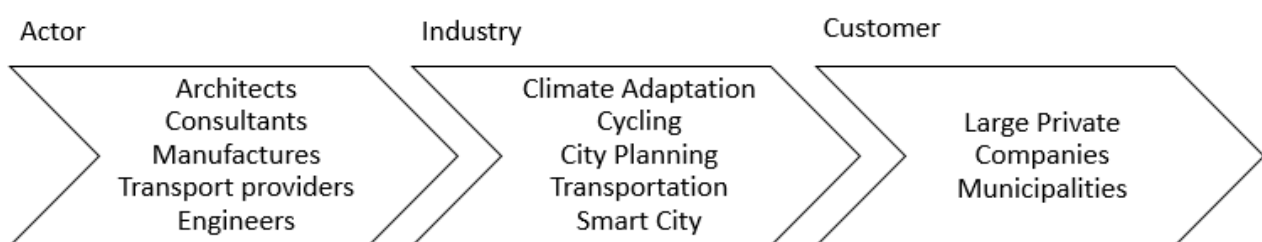


Figure 6 – The connections with related industries

As Porter argues, international demand for one industry can also pull through demand for complementary products and services. The demand for sustainable solutions around the world and the strong Danish expertise within the area affect all industries with similar common value propositions. State of Green points to the fact that cycling is almost always part of the telling when delegations visit Denmark, no matter what area within the green sector they are interested in (appendix 4). Denmark as a frontrunner within the green transition is therefore pulling the companies in the cycling industry along:

“Often we discuss the role of cycling, even within areas that do not normally include cycling. So if we for example are talking about climate adaptation to a delegation, it only makes sense to involve elements of cycling, as often the major construction projects are being made in the context of climate adaptation. So the focus is on complete integrated solutions and here is cycling a very big part of what we do, even if they are not 100 % focused on just that.”

(appendix 4 – interview State of Green)

The delegations visiting Denmark through State of Green to be inspired by the Danish solutions within the green areas, do not necessarily come due to a specific interest in cycling, but are attracted by the competitiveness of the related industries. State of Green notes that architecture and design is a successful factor of which Denmark for many years have been known for. Industries working for instance with city planning and climate adaptation have adjusted to this and develop projects that are not only functional but also architecturally significant and consider the elements of a liveable city. The related industries identified in the figure above should therefore in theory be able to support each other for a competitive advantage. It is evident from the major international attention that there is an interest and awareness of the knowledge possessed by the Danish companies, but many companies are struggling to overcome the barriers to exploit the export potential.

The following figure illustrates the actors in the cycling industry including a specification of the members of the Cycling Embassy of Denmark. From here it is evident that a number of the related industries/actors working within the cycling sectors are large international companies who have actually succeeded in the international market, such as Gehl Architects, COWI, and Rambøll, but not managed to transfer it to other companies in the industry. Porter argues that it is the same case with the supporting industries, where a high level of international competitive service companies can

create a mutual demand for manufactured goods from the nation, however within the cycling industry this does not seem to have been the case.

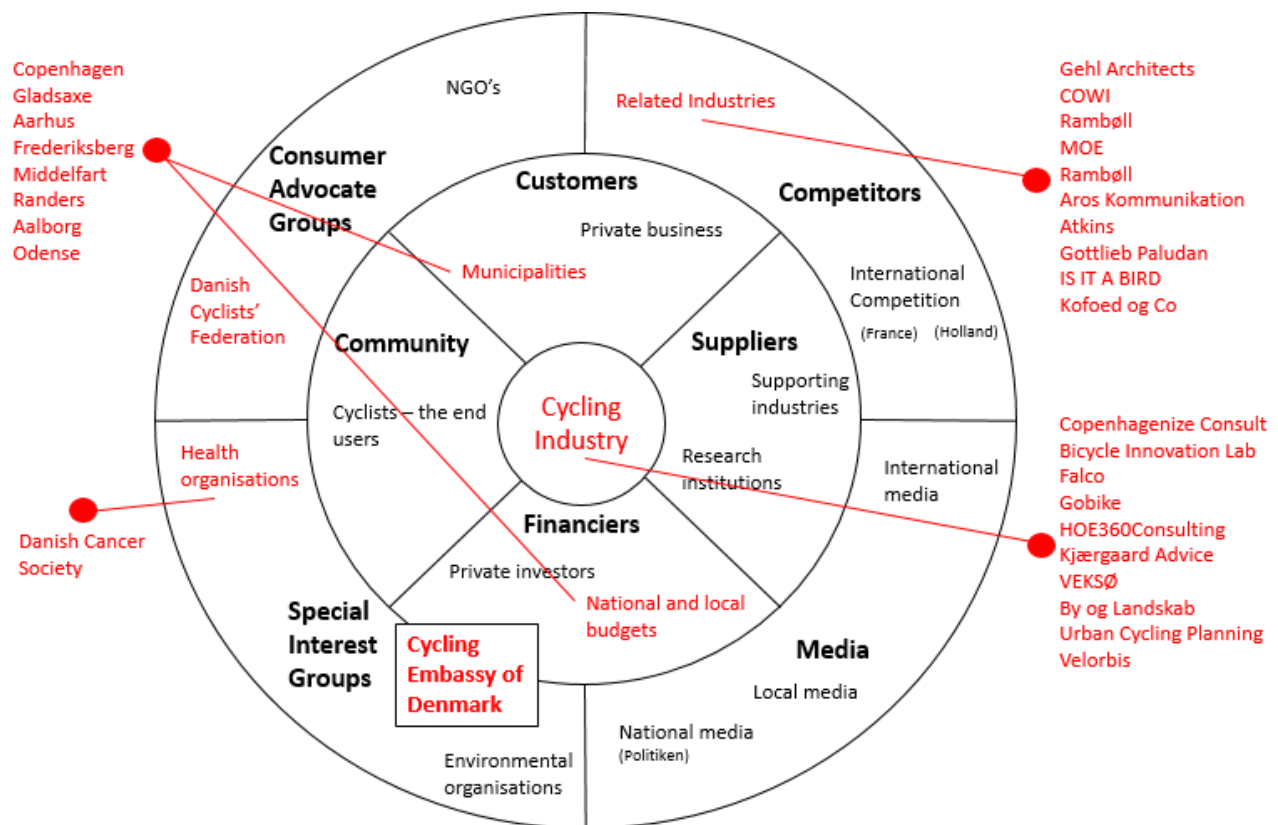


Figure 7 – Stakeholder map: Members of Cycling Embassy of Denmark

The figure above illustrates the stakeholders in the cycling industry, however where Cycling Embassy members are highlighted and grouped on the basis of Freeman's framework in order to show the variety of actors that work with cycling and that are interested in an internationalisation. The potential for related and supporting actors is larger than what is presently involved in the Cycling Embassy. Furthermore, often related industries involve products that are complementary, such as computers and software, however, in the cycling industry, it is complementary products such as the urban space and alternative modes of transportation that makes up the output. There is a potential for adapting products used in other context, in a new connection to the cycling solutions.

From the figure, it is also evident that the actors who can benefit from an internationalisation of the Danish cycling culture and solutions are many with a broad variety, both in activities but more

apparent, the nature of the benefits. The interviews reveal that the municipalities have different international agendas for being a member as they are looking more towards the branding perspectives, in comparison to the companies, who see the export potentials. Porter argues that firms from entire groups of interconnected industries all invest in specialised but related technologies, information, infrastructure and human resources, and thereby numerous of spill overs occur. The following section will examine the potential for a distinct cluster development within the cycling industry to gain advantage of the shared benefits and spill over effects.

5.4. Clustering as a pull-factor

Porter (1990) argues that the systemic nature of the diamond model promotes the clustering of competitive industries. The concept of the Cycling Embassy is however not based on the cluster idea when it was initiated:

“We were talking about how we could help each other to get something out of all these visits to Copenhagen. In the beginning, we talked about making a business cluster, but then we decided we wanted to gather people, not just from Copenhagen, but also private actors. Open up to all stakeholders, competences and knowledge across sectors and cycling traffic.” (appendix 1 – Cycling Embassy)

However, it can be argued that an industry cluster already exists owing to the small size of Denmark as a market and the great knowledge possessed by multiple actors. Porter (1990) points out that the reasons for clustering grow directly out of the determinants of national competitive advantage. Once a cluster forms, the whole group of industries becomes mutually supporting. Entry from other industries within the cluster seems to spur upgrading by stimulating diversity in R&D approaches and providing a means for introducing new strategies and skills. Information flows freely and innovations diffuse rapidly through suppliers of customers who have contact with multiple competitors. Porter (1990) argues that the intensity of interaction is enhanced if the firms are interlinked geographically or clustered, which has a positive effect on the location in general and act as a pull-factor.

Such a pull factor is evident in the cycling industry as the direction of expanding the industry is profound widened horizontally, as related industries have entered the cycling industry and offer solutions for cyclists as part of their services. Demand for solutions that combine efforts within a variety of areas is increasing, which is evident from the interest of visiting delegations. The

combination of new people and ideas in a new industry can create innovative solutions and spill over effects resulting in partnerships that increase competitiveness.

“Creating a bicycle culture is not only one product, it is the entire spectra, which also makes the Cycling Embassy so interesting because we have the many different actors that are needed. From community building NGO’s to the consultants and architects, even us who deliver the equipment to the city. But it is extremely difficult to combine and make a joint product, which is a big challenge for us.” (appendix 1 – Cycling Embassy)

It is evident from the interviews that the holistic thinking is existent in the industry, but the execution is more difficult to handle. The innovation and development aspect of the solutions for exporting can attempt to meet and handle this challenge.

5.4.1. Potential stakeholders

When defining and identifying stakeholders, scholars argue whether an entity can be a stakeholder without being in actual relationship with the firm. Mitchell et al. argues yes and points out that potential relationships can be as relevant as the actual ones and suggest that a stakeholder identification should somehow account for latent stakeholders. Potential stakeholders to the cycling industry can be found in related industries where actors in the ITC and smart city sector can provide solutions to be implemented in the cycling industry with a new purpose. This can potentially lead to new products and innovations towards a more effective and strategic cycling infrastructure increasing the convenience for the cyclists. This potential involvement from new stakeholders will be examined in Chapter 6.3. concerning service oriented partnerships.

5.5. Sub-conclusion

It is evident that the industry consists of a number of actors interacting on different levels depending on the project and solution. From the analysis three stakeholders have been identified as salient, the municipalities, the supporting industries, and the related industries as these stakeholders possess (or have the potential to possess) all three distinct attributes, power, legitimacy, and urgency. The public bodies have multiple roles in the industry where value is created on a social and on a branding level. The supporting actors are, due to the nature of a knowledge based industry, research institutions. This stakeholder, has only to a limited degree been involved in the industry and the support for an international competitive advantage is therefore not present. The related industries are highly present

in the cycling industry through a horizontal similarity in the value chain, but more collaboration is needed in order to capitalise on the knowledge gained from the long history of cycling culture. Interestingly, actors from many of the important stakeholder groups are represented as members in the Cycling Embassy and it thereby holds the potential for a more dominant role in regards to facilitating collaboration.

The following chapter will identify to what extent the actors in the cycling industry can collaborate on concrete products or services, creating new partnerships through the triple helix concept and solution oriented partnerships, to meet the demand from international actors.

6. Industry Strategy, Structure, and Rivalry

The fourth broad determinant of competitive advantage for an industry is the context of which firms are created, organised and managed as well as the nature of the domestic rivalry. Porter argues that if the level of domestic rivalry is high, the companies have to fight harder and faster to develop better products by which international competitiveness increases. Rivalry at home also has a profound role to play in the process of innovation and thereby the ultimate prospects for international success (Porter, 1990). Domestic rivalry not only creates pressure to innovate but to innovate in ways that upgrade the competitive advantage of a nation's firms.

As determined in the stakeholder analysis, the local competition is from the related industries. Rivalry has therefore been analysed in the previous chapter and this section will instead focus on the structure of the industry and the related companies and how it could be changed in order to meet the demand from international customers through collaboration and innovation.

The first part of the analysis has identified the municipalities as important actors in the Danish cycling industry and the following part of the thesis will therefore examine how the existing collaboration with municipalities and involvement can foster innovation. Hereafter a triple helix model will be analysed by drawing parallels to the case of the Cycle Super Highways as a mean to examine the possibilities for collaboration among a broad variety of actors. The subsequent analysis will place the cycling industry in a larger holistic context of the smart city where Gobike and their product offerings will be analysed through a Solution Oriented Partnership framework approach. These cases will be the starting points for the discussion.

6.1. Innovations in the cycling industry

Identical for many of the new initiatives and innovations in the industry is the role of public institutions. The interviews reveal a great variation in public interfering for testing and demonstration of new projects. Evident from the analysis of related stakeholders, the industry possess a great potential for innovation as there is a strong link between the industries and the multiple purposes the solutions can be applied to. However, looking at innovations in the cycling industry, it is not a new concept. Innovation has been part of the cycling development in Copenhagen and Denmark in general for many years. Some of the earliest developments for cyclists has been within infrastructure where the usage of existing products have been adapted and extended to the needs for cyclists.

Improvements such as the “green waves” for cyclists in Copenhagen or the tilted rubbish bins that suits the cyclists more are both examples of innovation. As the famous economist Schumpeter points out, companies should continuously look for better ways to satisfy their customers with improved quality, durability, service, and price and defined economic innovation as the introduction of a new good which consumers are not yet familiar with, or a new quality of a good (Schumpeter, 2007).

The “green waves” and bins were not unfamiliar solutions, they were known products that existed in the market however implemented in a different context or with an extended usage. Both examples have been developed by consultants for the City of Copenhagen towards the goal of becoming the world’s best cycling city. The solutions are evidence for that innovations does not necessarily have to be complex technological products, but can also be simple products implemented in the society. The “green waves” have resulted in a more convenient and faster transportation through the city for cyclists.

When thinking about innovation it is important to remember not only to focus on innovation in technology. In an article with the Danish daily paper Information, Etzkowitz argue that innovation is implicit in every aspect of life, not only the hard technological sciences (Richter, 2012). VEKSØ emphasised this point when asked about innovation in their products and services:

“When you say innovation, then I think a lot about smart city and technologies. But we also develop out products all the time. [...] Smart cities does not necessarily have to be a lot of technology in things. A smart city might also be the green city and a city where there is room for people to live, work and move around in.” (appendix 1 – Interview VEKSØ)

Innovation in the cycling industry is therefore not only relied on engineers inventing new technologies, but can also include new thoughts of thinking about marketing or campaigning to increase cycling and can occur in services and process. The discussion will identify new aspects and ideas for innovation in the industry. The importance for development in the industry is the holistic thinking and approach to challenges, where cycling is not the focus but a building brick towards a larger more integrated solution.

6.2. Municipal strategy and demand for integrated solutions

Porter argues that nations will tend to succeed in industries where the management practices and modes of organisations favoured by the national environment are well suited to the industries' sources of competitive advantage. A number of scholars have argued that the type of business model possessed by a company is directly related to the ability to innovate. Chesbrough (2010) commence with arguing that companies commercialise new ideas and technologies through their business models. Therefore, it makes good business sense for companies to develop the capability to innovate their business models. The cycling industry needs to restructure their business model in order to meet the demand from new potential markets. The interest from foreign cities is not on single products, but on larger integrated solutions that satisfy multiple purposes. This demand is also evident on the Danish market as Gladsaxe Municipality explains the thoughts behind the investment in the cycle super highways where he specifically highlights one of the routes:

“We always try to combine the pieces and it is not certain that we would have invested such a large amount if it had only been a cycle super highway. So it has been combined with the process and implementation of a safe school road. This is how we combine the things. Vandledningsruten is in truth a combination project. It is a bike path project, a nature project, a climate project and a recreational project.” (appendix 5 – Interview Gladsaxe Municipality)

Gladsaxe Municipality highlights the importance of a long term planning in order to facilitate new initiatives in the industry. The strategy “Gladsaxe Cykler” is a five year plan with funding. This enables the municipality to adjust its activities to new circumstances and support sudden initiatives. Many different actors have contributed with knowledge and services in the different projects in the plan. The solutions offered for the international demand therefore also needs to be integrated solutions

where multitudes of actors are involved in the creation. The need for long-term planning must further be emphasised to the foreign municipal players.

The importance of the municipalities in the innovation process is clear. However, it can be argued whether the municipalities actually have the competences and resources necessary for fostering such a collaboration. Gladsaxe Municipality admits that it was not their own idea with the testing of new lightning in a tunnel project (the tunnel project will be analysed in the following chapter), but they just showed an interest in it and Sekretariat for Cycle Super Highways facilitated the project to them. Gobike also question whether the City of Copenhagen have the capabilities to advance progress of the projects:

“We are the driving force behind the collaborations. This is of course related to the fact that we are an entrepreneurial organisation, so the people are entrepreneurs and proactive. The people employed in the municipality is maybe more reactive.” (Appendix 1 – Interview Gobike)

He further adds an example of how operations in relation to the project could be better executed by their own company and not the municipality:

“We are not allowed to market the solution which is not optimal. There sits a lawyer in there with the task, which is probably not the best solutions for marketing something. It is a challenge that they have not started the marketing yet.” (Appendix 2 – Interview Gobike)

It is also evident that the cities demand solutions that are customised to their environment and situation in each city. The solutions from the cycling industry therefore have to be customised with multiple actors involved. Solution oriented partnerships can be a necessary concept in order to take advantage of the competitive advantage the Danish cycling industry potentially obtain. The following section will place the solutions in service oriented partnerships where the possibilities of a different structure of the industry is evident.

This can be transferred to the industry in general where HOE360 Consulting as a smaller company talk about the challenges in an international environment:

“Every time you take one step in Denmark, you have to take ten steps in a foreign market.”
(Appendix 3 – Interview HOE360)

A unifying body is necessary to coordinate the collaboration and the actors involved. Through data gathered from the interviews it is evident that there at the moment is no institution or actor who take on such a responsibility for the overall cycling industry. However, the Cycling Embassy has the potential to actively play a part in the facilitation of the collaborations as described in the quotes above, which will be further examined in the discussion. Such necessary partnerships can be executed through a better triple helix cooperation or as Solutions Oriented Partnerships, which are collaborations between companies and other stakeholder, including final users. Both approaches for increased innovation will be analysed in the following sections using the case examples of Cycle Super Highways and Gobike respectively.

6.3. A Triple Helix model for innovation – Case example: Cycle Super Highways

Government (in the form of the municipalities) has been identified as a very important actor in relation to the cycling industry in agreement with various scholars who acknowledge the importance of collaboration between public bodies, private companies and research institutions. The triple helix model introduced by Etzkowitz outlines how the interconnectedness and collaboration among the three bodies affect the success of innovation in an industry (Etzkowitz, et al., 2000).

The Cycle Super Highways works towards a triple helix model, where the municipalities provides the framework conditions for innovation so research institutions and companies in collaboration can develop new solutions. The Secretariat for Cycle Super Highways emphasises the importance of this collaboration through the entire project with the cycle super highways:

“The cycle super highways is a project that focuses on development, innovation and demonstration. We believe in the idea of inviting others to join, so it's not just us in the secretariat and municipalities trying to develop something, but we simply can collaborate with others.” (appendix 9 – Interview Cycle Super Highways)

A concrete example of such projects for innovation is the tunnel lightning on the cycle super highways, where a group of students from Aalborg University focused on the challenge of bad lightning for the cyclists. The students worked to create innovative solutions and the secretariat facilitated contact to the lightning company ÅF Lightning who became responsible for an actual execution and making sure that the concept developed by the students was realisable also on a larger scale to be implemented on all tunnels in the network of cycle super highways (appendix 9 – Cycle

Super Highways). The project was a cost effective innovation process because the students developed the concept as part of their university course and the lightning company was able to exploit their findings in their own product development. Etzkowitz et al. argue that the largest barriers for innovation are the missing connection between research and companies (Etzkowitz, et al., 2000). Gladsaxe Municipality was the governing body for the test project, but explains:

“It was not our idea and I actually do not know who’s idea it was. I just know that we quickly volunteered when we heard about the idea with a dynamic (intelligent) solution that turned on and off when someone drove past.” (Appendix 5 – Interview Gladsaxe Municipality)

However, the secretariat was able to facilitate the collaboration as they had the appropriate framework conditions in place and more importantly, they were able to handle the will of multiple actors with the same purpose. The secretariat thereby increased the conditions for cycling and at the same time facilitated new innovations in technology where the results and concepts potentially can be transferred to other contexts:

“Every time we go out and test something new it is with an eye to whether we can turn the thumbs down or maybe change it a little bit and thereby be applied by all municipalities in the collaboration. This is something we to a large extend focus on.” (Appendix 9 – Interview Cycle Super Highways)

It is important to note that the example of collaboration on the cycle super highways is not directly involving the municipalities, but managed by the secretariat on behalf of the municipalities. Such an entity can facilitate the framework necessary for collaboration, also emphasised by the secretariat:

“Where we make a difference is when we think about merging what happens in the single municipality with the other municipalities. The completely holistic thinking, coordination and collaboration is the most important part of the secretariat.” (appendix 9 – Interview Cycle Super Highways)

Unfortunately, such an example is the exception more than the norm. None of the other interviewees were able to identify collaboration through a triple helix model. There were a number of examples of projects where companies had joined forces with either other companies or municipalities to create new products or develop innovative solutions where the municipalities collaborated with research institutions. The company Gobike have collaboration with the Technical University of Denmark

(DTU) around the smart city bikes using the campus as testing facility. The project is purely research driven due to interest from DTU in the bikes with no public involvement. Even though Gobike have entered into collaboration, it was on the research institutions initiative and not facilitated from a public body. However, collaboration does exist in the industry, without direct intervention from public bodies.

“An example of such a development process is that City of Copenhagen, Gottlieb Paludan and VEKSØ together has developed a cargo bike parking system. The City of Copenhagen had a demand and then made a competition where there was a development procedure. We were two companies at the end. So that is an example of how members of the Cycling Embassy have collaborated and created a product that is now in production and commercialised.” (Appendix 1 – Interview VEKSØ)

The City of Copenhagen only facilitated a competition for a demand which they have discovered in the city to fit a new trend. The networking aspect of the Cycling Embassy was a major influence for the two companies. The companies need to be innovative, not only on product design and development, but through more intelligent and smart solutions in order to fit multiple purposes and solve multiple challenges.

A true triple helix model involves all three types of actors, including a high involvement from the public body. It is thereby not enough for the municipalities to act as facilitators. They need to take on a more leading role in the development of the cycling industry. Etzkowitz et al. (2000) argue that the public institutional layer can be considered as the retention mechanisms of a developing system and the *“national organisation of the system of innovation”* has historically been important in determining competition (Etzkowitz, et al., 2000). They also suggest that a reorganisation across industrial sectors and nation states are induced by new technologies such as ICT.

It is evident that the collaboration in the projects concerning the cycle super highways has fostered a level of innovation through the integrated solutions. The secretariat played a big role in this, facilitating the framework conditions and planning for the actors involved.

“Our strength is to gather all the tasks, even the little ones in one place. Because for the municipalities, it might be seen as an immense job among loads of other work, but for us who do it every day it can be easier.” (Appendix 9 – Interview Cycle Super Highways)

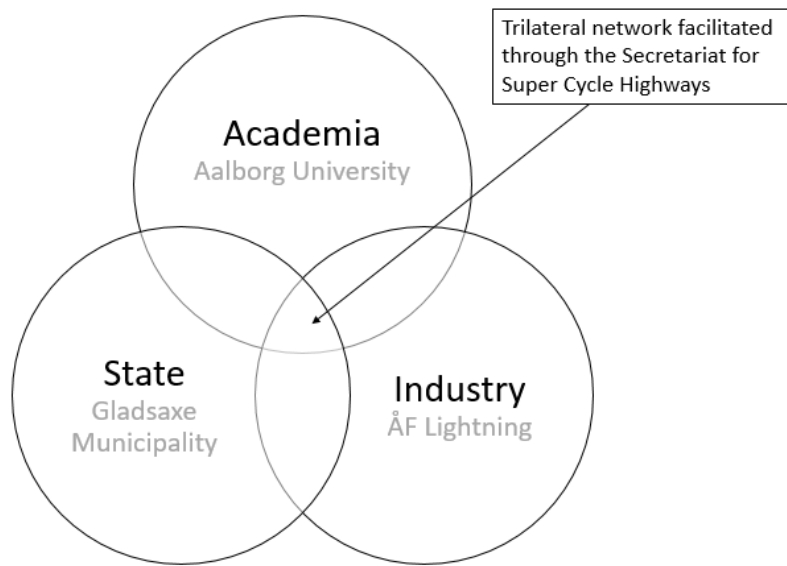


Figure 8 – The Triple Helix Model of University-Industry-Government Relations

An implication with the triple helix concept is that often the driving force of the interactions can often be specified as the expectation of profits. However, profit can have a different meaning among the various actors involved (Etzkowitz, et al., 2000). The companies want to see a clear economic profit from a collaboration, whereas the public body to a larger degree focus on the social benefits of an increase in cyclists, and finally the research institutions expect a profit in terms of new knowledge and data gathered as important resources for new product development. The expectation of the profit from a collaboration can thus harm the project, and expectations from all actors must be clear and evident from the beginning of the collaboration. Each actor should also use the competences they possess in the most suitable and intelligent way. Lessons can be learned from some of the other cases where the companies have not been able to contribute to the project with all their capabilities.

6.4. Solution Oriented Partnerships – Case example: City Bikes

The solution oriented partnerships framework helps plan and implement partner-based solutions.

The approach focuses on four key-objectives that this framework aims at achieving:

- *“SOP’s combining stakeholders that would normally not work together like profit and non-profit organisations, multinationals and SME’s, global and local players.*
- *Industrialised solutions based on a global platform of products, services and knowledge combined with specific local solution elements.*
- *Contextualised solutions that are focused on a specific user in a specific context, and can be adapted to fit other related contexts of user.*
- *Sustainable solutions that are both profitable for companies and beneficial for the society.”*

(Jégou, et al., 2004, page 10)

As identified in the earlier analysis, collaboration among the industry actors is necessary for the industry to meet the demand from customers with highly integrated innovative solutions. However, such a collaboration is an evident challenge among the players in the industry. The Cycling Embassy believes that the actors in the industry have the capabilities for creating the integrated solutions, but do not have the resources for actually implementing it:

“We can actually do it with the members that we have. The problem is to sit down and do it as it takes time and because the Cycling Embassy is on a voluntary basis then everyone has to say that they want to invest the time in it. And actually, we never get to that. We can simply not manage this job alone.” (Appendix 1 – Interview Cycling Embassy)

And adds:

“If we really want to increase the export and create growth and jobs, then we must focus on integrated solutions – instead as today, where every company within cycling, mobility and urbanisation acts individually on the export market.” (Appendix 1 – Interview Cycling Embassy)

Through the research, it has not been possible to identify any collaboration on integrated solutions within the cycling industry.

“Creating a cycling culture is not one product, it is simply all the way around, which is also why it is so interesting that we have so many different actors in the Cycling Embassy – all who are needed. Whether it is from community building with NGO’s, or if it is the consultants and the architects, yes even us who deliver equipment to the city. But it is just so hard to package and make into a product and that is a huge challenge for us.” (Appendix 1 – Interview Cycling Embassy)

A solution oriented partnership could in combination with a triple helix model be part of the solution for the industry which will be discussed in the following chapter. The innovative aim of a solution oriented partnership is to gain advantages of globalisation with the advantages of localisation, and with the advantages of industrialisation. Even though structured solutions oriented partnerships are not an integrated part of the Danish cycling industry, examples of such partnerships are still apparent. The case examples of city bikes and commuting will be examined as Gobike has managed to take advantage of the local advantages in Denmark through industrialisation and use it on a global scale.

The resulting solutions of SOPs is by a number of scholars defined as Product Service Systems where products and services are combined in a system to deliver required user functionality in a way that reduces the impact on the environment (Goedkoop, et al., 1999 and Mont, 2002). Other scholars have defined the solutions as Partner Based Solutions (PBS) as the direct outcome of SOP’s (Manzini, et al., 2004).

If companies want to integrate their solutions multiple stakeholders must be involved. Even stakeholders who might not be closely related to the industry in context, should be considered as a partner in a solution oriented partnership.

Gobike has realised this through a partnership with the City of Copenhagen, Frederiksberg and DSB. The case with Gobike and the solution they offer was first based on an idea of a new more intelligent city bike, that changed the traditional way of thinking about commuting on a bike:

“This is what you would call a disruptive business model, because it is the first electric city bike which enables business men to park your car and cycle to a meeting without getting sweaty.

That is an advantage in itself. [...] And finally, it is a digital city bike with a tablet, GPS and computer, which means we can track it everywhere and see if it is broken. [...] You do not have to drive around and look for it. You thereby save a lot of money on service and operations.”
(Appendix 2 – Interview Gobike)

To achieve sustainability it is necessary to change the traditional way of thinking of products and consumption. With a change towards product service systems the companies no longer only sell products, but by adding services to the product, companies start to emphasise the provision of function, not the product itself (Morelli, 2006). Gobike have managed to provide more than a bike. They provide a service for people getting around in the city, where added features to the technology adds to the service and experience consumers get.

The offering from Gobike is highly solution based, where the product is adapted to each market with a certain degree of customisation. However, Gobike is at the same time able to maintain a consistency in their solution, and thereby benefit from economies of scale. The company fits well into the concept of the solutions oriented partnership that propose an architecture that:

“Structures solutions to be made up of product and service elements (that can be produced in multiple locations and integrated) such that it is possible to seek global cost-efficiencies with local-delivery.” (Manzini, et al., 2004)

Gobike customises their solution to each new market they place a tender bid. It is explained in the interview how they can customise the level of service. In Zurich Gobike only provides the tablet, not the bike, and is therefore only provider of a smart box in a cloud solution. In London, the city have asked for a different bike, than the one the company have in Copenhagen. In Barcelona they work with the local tourism operator, in Stavanger a business park, and in Lyngby Taarbæk they are considering a research project about joint traffic solutions with Technical University of Denmark (appendix 2 – Interview Gobike). The great variance in user groups, application and level of service is one of the strengths in the Gobike solution. This ability to adapt the same solution to new contexts is a strong added value, that may increase market share even though the company is facing a segmented demand.

6.4.1. Local presence and local collaboration

An important aspect of a product service system is the service and operation of the product when installed in a given market. The companies in the Danish cycling industry identify this as one of their challenges. E.g., VEKSØ argues that they do not have the necessary setup and operations to service the solutions abroad:

“Even if there is an interest and someone willing to pay, then we can in the end be left with it: “Yes, you want to buy some bicycle counters? Yes, but you do not have a setup.” We can send the products over, but what if they break or needs service. That is not an area we have focused on and we will not start to use a lot of resources on it.” (Appendix 1 – Interview VEKSØ)

Gobike has the same challenges regarding service on solutions abroad, however they have managed to overcome the barriers by partnering up with local service providers. Copenhagen is the only city where they are handling the service of the bikes themselves (appendix 2 – Interview Gobike). The Gobike system is a solution that enables collaboration with local players in the markets where the solution are implemented. This means that related industries in the market are involved and actually strengthening the service offering.

Solutions based on collaboration between social players and companies give rise to highly contextualised services (services that are sensitive and appropriate to the specific characteristics of the context in which they are provided), which are also equally effective and efficient (able to offer high quality results while minimising economic and environmental costs) (Manzini, et al., 2004). Figure 9 below illustrates the potential link and relations to actors in the service network of Gobike, which is mentioned in the interview. Some of the links to certain actors are not established yet, but is only discussed and suggested as potential stakeholders which the company can establish relations to in the future in order to strengthen the service offering. In this regard, the solution is still in its developing phase, however has a great potential for collaboration as a mean to increase value.

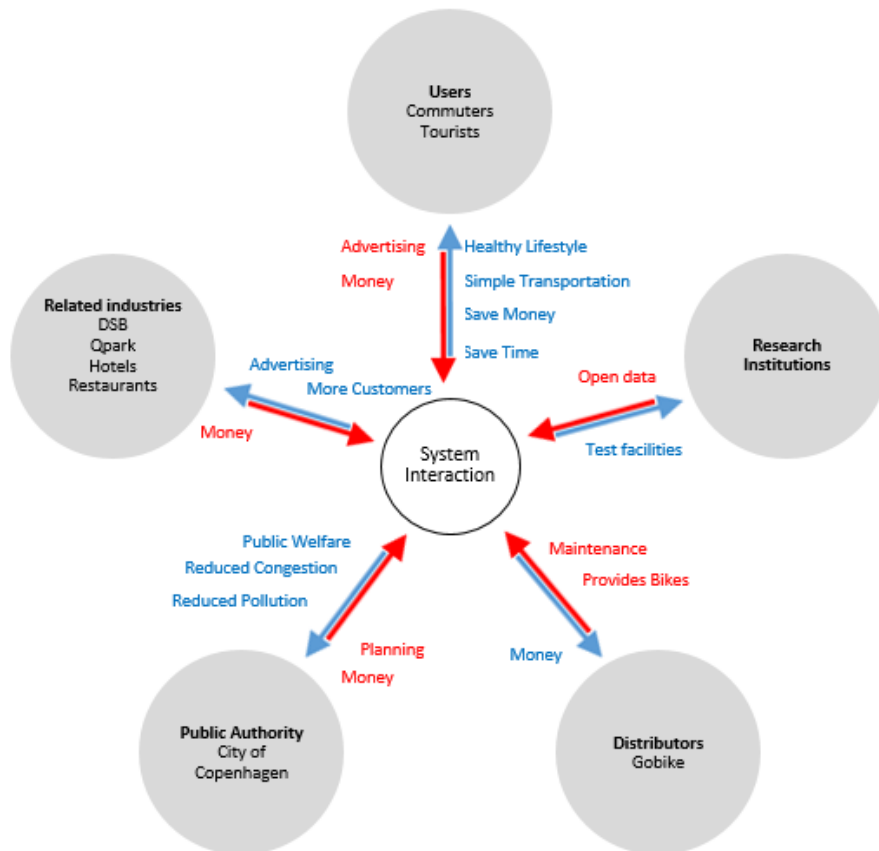


Figure 9 – System Concept of the Gobike solution in Copenhagen
(adapted model from Morelli, 2006)

Partnering up with related and supporting industries such as DSB and QPark was mentioned in the interview. Gobike sees a potential in integrating the system of city bikes into the system of “Rejsekortet” and a collaboration with QPark where commuters e.g. park their car further outside the city centre and get a discount going on the city bikes the last way to a meeting. Such collaborative integrated thinking adds to the value of the service offering. Collaboration with Copenhagen tourist attractions, hotels, and restaurants, could furthermore increase the value for the end-users e.g. when driving past restaurants the deal of the day could pop-up on the tablet. The Gobike tablet already has the technological capabilities of giving directions on the fastest and safest route for cyclists to tourist attractions. The bikes are therefore attractive for hotels in Copenhagen, who normally have regular bikes they lend to guests. A collaboration with Gobike on subscription for their guests could increase the value offering from the hotels to the guests, as they get an added value as a tourist in Copenhagen.

The Gobike solution benefits an even broader variety of actors in Copenhagen, than previously included, as it relates to an extended line of both related and supporting industries. Gobike explain

that they are constantly thinking on further development of their solution and have already prepared the software for such developments and they are in contact with a number of potential partners.

Such networks are not the norm in the cycling industry, however it gives Gobike a competitive advantage as they are able to customise the solution to different markets, by collaborating with different local actors affected by the end users and their wants and needs. The importance of the related and supporting industries is evident, as these can strengthen the service offering by adding more value to the experience and the overall product.

Gobike has further realised that they are not capable of maintaining the bikes themselves in foreign markets and have therefore found partners in the respective markets who can operate the bikes. The same dilemma is VEKSØ facing:

“The single pinprick sales end up being too expensive. So we have started to limit our focus in order to create a profitable business. Having a bike counter in Barcelona or one in Australia will not happen in the future. We have realised that we need to have a proper setup, otherwise it is just too expensive in the long run.” (Appendix 1 – Interview VEKSØ)

Collaboration with local partners, similar to Gobike’s approach, could open up to new markets for VEKSØ. With the Gobike solution, the city bike is thereby a part of an integrated transportation system, where a number of stakeholders benefit from the spill over effects. It makes it possible to combine both public and private transportation and benefitting the related industries with a larger audience. This thereby corresponds to Manzini et al.’s belief that solution oriented partnerships are products and services delivered in a highly effective way by a network of local and global partners and able to address specifically each given user in its given context (Manzini, et al., 2004).

6.5. Collaborative marketing efforts - Denmark as endorser brand

The collaborative and holistic effort is not only a potential mean in relation to the development of solutions. From the interviews, it is evident that the cycling industry does not make a combined effort to market the solutions from Denmark in an integrated manner. Creating integrated solutions opens for an integrated approach to marketing as well. The Cycling Embassy uses a collective approach, with two purposes:

- To brand and market Denmark as the world's leading cycling country in relation to knowledge, knowhow and solutions.
 - To develop Denmark as a cycling country in order to maintain the leading position.
- (Appendix 1 – Cycling Embassy)

The companies acknowledge the importance of being a Danish company in an international setting. As Gobike argues, winning the tender in Copenhagen was a deal breaker to them:

“There is no doubt that without Copenhagen it would have been difficult. Obviously, when you have the world's number one cycling city, it makes everything a little easier. There are coming a lot of delegations to Copenhagen, where the City of Copenhagen talk about the bikes.”

(Appendix 2 – Interview Gobike)

VEKSØ also points out the value of using Denmark as an endorser brand:

“It is simply a seal of approval when you are working with cycling and coming from Denmark. It is completely burned into people's minds, that cycling and Denmark is inextricable linked and we are good at it. It is paradise.” (Appendix 1 – Interview VEKSØ)

HOE360 are more questionable about the advantage:

“I really don't know. It can also be scary. As we talked about before, they come here and think that they cannot live up to this. And then they maybe hire a local who is more down at their own level concerning bikes, where they can better live up to it. So maybe it actually backfires.”

(Appendix 3 – Interview HOE360)

However, the general opinion in the industry is that the Danish companies see it as an advantage to come from Denmark and can thereby use Denmark as endorser brand, when marketing the solutions internationally. The marketing efforts should therefore be structured similar to the integrated solutions.

6.6. Sub-conclusion

The industry structure is by literature argued to play an important role for the competitive advantage in the industry. However, as identified in the stakeholder analysis, the surrounding industries and companies play a vital role for the competitiveness, and the cycling industry should therefore structure

their activities accordingly in order to increase the innovation in new solutions to meet the demand from customers. A triple helix approach has been adapted in the case of the Cycle Super Highways, where a secretariat has facilitated the trilateral network between public, private, and academia in the development of a tunnel lightning project. A new innovative solution has been developed with a potential for commercialisation and scalable implementation, and thereby all the actors in the network benefit from the collaboration. Integrated solutions are the outcome of solution oriented partnership and can serve multiple purposes. The case example of Gobike illustrates how the company has collaborated with actors horizontally in the value chain thereby increasing the value of the service for the end users.

The industry should try to structure the activities more accordingly to the two cases in order to create innovation and increase the competitive advantage. It will be argued in the discussion how the industry on a practical level can obtain the collaboration that has been possible through a triple helix model in the case of the Cycle Super Highways and solution oriented partnership initiated by Gobike and their stakeholders.

7. Discussion

The literature review emphasises the importance of the cycling industry to consider competitive drivers in the environment in order to gain an advantage in an international market. Different strengths and weaknesses in the business environment have been identified in the analysis where the importance of stakeholders such as end-users and municipalities and the collaboration across industries and sectors is crucial. Two case examples from the industry has been highlighted to examine how collaboration for an increased value can be achieved. The following discussion will elaborate on how industry can take advantage of this in a broader context.

Firstly it will be discussed how the triple helix model can be integrated throughout the entire industry and not only in the case of the Cycle Super Highways (cf. Chapter 7.1.) and what changes in the industry structure that should be implemented in order to facilitate larger collaboration across public bodies, private companies, and research institutions. Secondly, the solution oriented partnership approach for collaboration on integrated solutions and the potential in the industry in general will be discussed (cf. Chapter 7.2.). The spill over effects and benefits will conclusively be discussed as well as the means to use the competitive advantage in a global context.

7.1. Implementing a Triple Helix approach

The example of the triple helix collaboration between the municipalities, the ÅF Lightning company and Aalborg University as research institution is a relative simple system of multiple players working together. However, the triple helix model can also be applied to national systems of innovation in order to be more systemic. The dynamic system of innovation may consist of increasingly complex collaborations. As shown in the analysis of the cycling industry, the municipalities play an important role in the development of new solutions as they are the customers and providers of the framework conditions. However, it is evident that the municipalities are not able to fulfil all the tasks satisfactory as they do not hold the competences. In the case of the Cycle Super Highways the municipalities have been able to form a secretariat that handles the collaboration across municipal borders and between private companies and research institutions. It is argued that such a body is necessary if the industry shall be able to maintain a leading position through innovative new solutions to the challenges in shaping a cycling culture. The City of Copenhagen has attempted to create a department where collaboration is facilitated and projects to be funded are chosen on the basis of the project's relations to the overall Climate Plan 2025 and the goals of becoming the first CO₂ neutral capital. Smaller companies have been invited to come up with suggestions for projects, however involvement from research institutions have been more challenging. The holistic thinking to the climate challenges is an advantage, as it has been discovered in the analysis that the supporting and related industries to a large degree are part of the cycling culture and that markets demand the integrated solutions. However, a greater market focus would be necessary for solutions where an export potential is in focus in addition to solutions to meet the needs in Copenhagen.

The literature argues that the triple helix model is generating a knowledge infrastructure in terms of overlapping institutional spheres, with each taking the role of the other and where hybrid organisations emerge at the interfaces (Etzkowitz, et al., 2000). The Cycling Embassy could potentially be such a hybrid organisation. The broad variety in the members, covering both municipalities and private companies across sectors is laying the foundation for the Cycling Embassy to facilitate the collaboration among the actors in the industry.

As identified, the purpose of the Cycling Embassy is both to market Denmark as cycling nation but also to develop the solutions in Denmark to maintain the leading position as a cycling nation. It is

therefore within their scope to facilitate the collaboration between the different actors. However, this demands the Cycling Embassy to be more than a voluntary collection of companies and organisations. More resources are necessary for a focused effort towards innovation and development. The Secretariat for Cycle Super Highways is initiated by the City of Copenhagen and supported by the remaining municipalities. The municipalities could play a larger role in the Cycling Embassy and support both financially but also with facilitating the space needed for testing and demonstration.

It is evident from the interviews that the industry has a very narrow focus in terms of other business aspects. Even though the industry is aware that international cities demand integrated holistic solutions, the Cycling Embassy and the companies do not seem to focus on this in the marketing and communication efforts, where it is solely cycling which is in focus. In most cases the private consulting and architecture companies even offer services across industries and thereby actually focus on it, however not in relation to the cycling solutions. By allowing the Cycling Embassy to play a larger role in facilitating collaboration on integrated solutions, the organisation would be able to communicate the entire means necessary for creating a cycling culture and include new actors in the network. Furthermore, not only would the organisation achieve the last two attributes of power and urgency, which would make it a very important stakeholder, but it would also be able to attract attention from cities that might not have been solely interested in a cycling city, but in general a more liveable city, making it attractive to look towards Denmark.

All the members of the Cycling Embassy emphasise the importance of the networking possibilities of the organisation, which can be further expanded if the Cycling Embassy adopted to a larger holistic approach, where more stakeholders could be included. The conditions for innovation would thereby be further enhanced. However, it is important to note that the role of the organisation would not be static, but to a larger degree dynamic towards a supplier role of the networking possibilities. The literature argues that the sources of innovation in a triple helix configuration are no necessarily synchronised, but appear more randomly where they do not fit together in a pre-given order but they generate puzzles to solve for participants, analysts, and policymakers (Etzkowitz, et al., 2000). Such a network of relations, which the Cycling Embassy could provide, generates a reflexive dynamics of intentions, strategies, and projects that can add value by reorganising them according to the stakeholders' competences and goals for profit.

A disadvantage of the Cycling Embassy adopting more roles in the industry is that it can take attention away from their core competence of branding and marketing. It is important that the organisation remains this focus and only expand the current portfolio of activities, where the development of Denmark as a cycling nation becomes a larger integrated activity.

7.1.1. The cities as living labs

It is explained how the cities are the perfect showcase examples of the cycling solutions implemented. The cities in Denmark such as Copenhagen, Odense and Aarhus could be used to get the international attention by creating a living lab where both research institutions, private companies and the municipality collaborate to develop new innovative solutions in all areas. Even the smaller municipalities can thereby be used as live examples of which solutions to implement and how it is possible to have a cycling city on a smaller scale, where the infrastructure is less developed. The weaknesses in using Denmark as endorser brand can thereby be overcome, showing the foreign delegations coming to Denmark what is actually possible with little means and how simple solutions can have a great effect.

From the analysis, it is evident that all stakeholders have to gain a profit from the collaborations and these are not always same and can be financial as well as non-financial. By combining the industry around the cities and living labs, there will be multiple benefits for all actors where the spill over effects increase the value from the solutions. The branding effect of using the cities as showcase examples corresponds to the value the municipalities want to achieve from both their membership in the Cycling Embassy and from their general efforts in the cycling area.

The data and information gathered from the experimental solutions in a living lab can be used by many stakeholders. The companies can understand how the users adapt and experience new initiatives and thereby decide what future developments to implement. The importance of end-users in the developing and innovation process is evident throughout the analysis and in both case-examples of innovation. Users as context-of-use which targets people who commute to job or school is an important aspect when attempting to export the culture of the Danish cyclists to new cities around the world.

It is important to keep in mind that not all cities are technologically on the same level as the Danish cities. Here a more simple approach is needed in order to fit the technological development in the country. An example of the difference in development can be seen by the popular “Giv et praj”-app, that enables the citizens to inform the municipality when there is a hole in the asphalt that needs to be fixed. Such an app would not be valuable or relevant in undeveloped cities, where the infrastructure is so bad, that a completely different level of resources are necessary. It is therefore necessary to develop and adapt the solutions to the local environment in each given market. Local competences can be part of the integrated solution created by a solution oriented partnership.

7.2. Implementing Solution Oriented Partnerships

The literature review emphasises how design research suggests more innovative and sustainable solutions require integration of multiple stakeholders with an expansive array of knowledge and expertise, and where the lone ingenious designer in a company is becoming history (Coley, et al., 2009). The importance of collaborations and partnerships across the industry and fields is increasing simultaneously with the demand for integrated solutions from the cities. Designers, planners, engineers, technicians, architects, researchers, customers, and end-users are all stakeholders that have the necessary competences and can contribute in a partnership. Evident from the analysis, all the direct stakeholders involved in the development of cycling solutions are members of the Cycling Embassy. However, it is necessary in a larger extend to include the actors in the related and supporting industries in the process from early stage in order to develop solutions that meet both the needs in the local environment but also the specific end-users needs.

The nature of the demand in the industry where the public body have to send out tenders for new projects creates an advantage for partnerships to be formed between multiple stakeholders. The project specifications will be outlined in advance which will enable companies to offer their competences in a given area, thereby integrating multiple players in a solution, solving multiple challenges which the city faces. For a practical approach to integrated solutions on the basis of the established solution oriented partnerships, the literature suggests a “solutions elements brief” where the solution is broken down in elements that can be recomposed for different purposes. This can help to systemise and communicate the complex projects, where a multitude of different competences and functions are necessary (Manzini, et al., 2004).

The project will in most cases be initiated by the municipalities as they are the owners of the street and urban space. A simplified example of such a brief is illustrated below, showing how a Cycle Super Highway is a combination of different contributing partners. It must be noted that the figure is an illustrating fictive example.

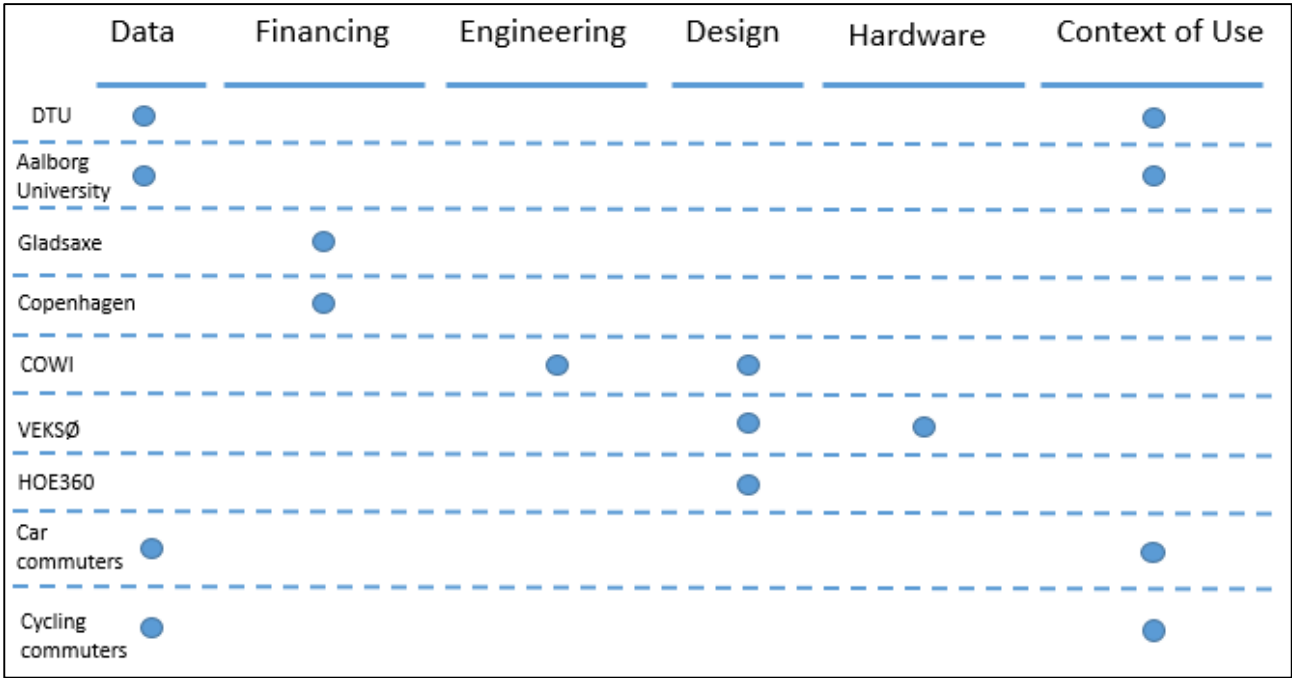


Figure 10 – Solution Element Brief

Figure 10 illustrates how the different stakeholders contribute with competences, services or products to a given solution. In this example, the users (car and cycling commuters) provide input for the development collected and interpreted by the research institutions, who potentially also could engage in the further development. The research institutions maintain monitoring of the effect of the solution in the context of use. See appendix 10 for a detailed example of a Solution Element Brief, as described by Manzini, et al. (2004).

Ideally the projects should be gathered on a collective platform where companies easily can make a bid on the function and task they can perform and thereby develop collaborative solutions where multiple purposes and benefits are met. The platform would also be able to serve as an inspirational tool for stakeholders. Furthermore, such an approach can create opportunities for smaller companies. Evident from the interviews, the small consulting companies struggle to gain market share and by

opening projects up in partnerships, the smaller firms would be able to contribute with their own level of competences.

A greater holistic approach in the industry would furthermore enable a holistic approach in the innovation process, where cycling can solve challenges that would normally not be associated with bicycles. The smart city aspect should be a more dominant feature of the new solutions created in the cycling industry to match the tendencies on a global scale. Smart city components can add to an increased efficiency in the industry, combining solutions for multiple purposes through the innovative usage of the concepts.

7.2.1. Involvement of end users

The collaboration between the companies has to happen on the home market, but on the conditions of the new market in order to meet the needs and adapt the solutions to the specific culture. Local forces and stakeholders can thereby be involved in the process.

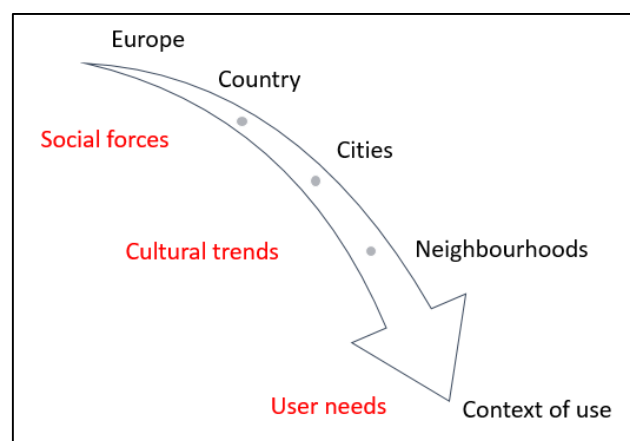


Figure 11 – Integrating solutions to the market

Figure 11 illustrates how the companies can integrate the overall culture of a market to the user needs, from a country perspective to a context of use perspective, thereby creating solutions to fit the needs of the users and with a local involvement.

The involvement of end-users throughout the development process is essential in order to create a solution that fits their needs. Involvement can include monitoring of cyclists to examine their travelling behaviour or even directly questioning the future potential users of a solution. In the case of “Vandafledningsruten” in Gladsaxe, the municipality wanted to increase the level of young girls

using the facilities and therefore questioned the local 7th and 8th graders on what ideas they had. Such involvement in the development process is opening up for innovations and new ideas. The early and ongoing participation encourage future involvement and usage.

8. Further perspectives – the cultural challenges

The importance of the end-users in the industry is evident throughout the analysis, where the context of use is the primary driver for innovation and development of new solutions. The cyclists are a great contributor to the solutions and must therefore be in focus. Consecutively, a deeper examination of why people bike and potentially what actions that would increase the number of cyclists could provide insights into a new market and which solutions to develop.

Teaching a child how to ride a bike at a very young age is part of many children's childhood. However, the culture of why you ride a bike is not taught in the same manner. The Danish stakeholders in the cycling industry acknowledge this aspect and try to teach the children through sustainable education and cycling games for motivation in order to maintain the cycling habits. Such initiatives are necessary and though it can seem as a simple mean, the effect can be fruitful. The Danish cycling industry has gained a wide array of competences and knowledge resources, that can inspire new cycling cities.

In many countries, the challenge will not only be on the tangible challenges that companies and municipalities need to solve in order to make people bike. It will to a large degree be on the cultural side, influencing the people to new traditions and changing the perception of biking from being low status, to high status as it is in Copenhagen. An examination of to what extend the social aspects of creating a cycling culture affects the possibilities for changing a city's transportation habits would be of great interest and very valuable to the industry.

9. Conclusion

The main drivers for a competitive advantage of the Danish cycling industry in an international setting can be found in several elements of the diamond model. The analysis combined with the literature review implies that there are certain drivers that are supporting the competitive advantage, but also drivers that are lacking and that must be improved if the industry shall be able to exploit the export potential.

The high level of sophisticated home demand where the culture of cycling among the Danish people is deeply rooted in the industry and the focus on the multiple benefits for both the users and the public bodies is expressed by the positive socio-economic benefits and the macro-environment of cyclists. The sophisticated home demand, demands and creates a high level of knowledge resources in order to develop innovative solutions to meet the dynamically changing needs and challenges. The high level of existing knowledge resources due to the culture can potentially increase the demand for manufactured goods, however the industry has not been able to exploit this potential and has almost solely exported knowledge and services.

The importance of the related and supporting industries is further acknowledged in the continued analysis where these actors together with the local governments, are identified as the most important stakeholders through the stakeholder salience framework as they possess all three attributes; urgency, power, and legitimacy. The municipalities have multiple roles and demand integrated solutions to serve multiple purposes. A larger collaboration horizontally in the value chain with related and supporting industries are therefore necessary to create such integrated solutions. Industries such as climate adaptation, public transportation, and urban planning are important aspects to the cycling industry, but also collaboration across functions will increase innovation and usage of solutions.

The example of the triple helix approach with the Cycle Super Highways illustrates that collaboration between private companies, public bodies, and research institutions is possible with the presence of an actor facilitating the trilateral network. The municipalities do not have the skills or resources but with the initiation of the secretariat, this role has been fulfilled and performed satisfactory to all actors. It is further discussed how such an approach can be implemented throughout the entire industry and here it is argued that the Cycling Embassy has the potential to fulfil a larger role, facilitating the partnerships between the actors, as the current members represent the industry actors that are necessary for creating the integrated solutions. With more resources, the Cycling Embassy could take on a larger responsibility and also move away from the sole focus on cycling solutions.

Evident from the analysis of the solution oriented partnership by Gobike and the supporting industries, such a collaboration increases the value of the solutions for the end-users and thereby creates a greater competitive advantage. Solution oriented partnerships enables a horizontal

integration with stakeholders across functions and industries. In order to implement it throughout the industry a platform should be available where stakeholders can illustrate their competences in a solution element brief. Thereby the stakeholders can see what competences are demanded and it further enables smaller companies to contribute and engage in larger projects. Due to the nature of the industry, where the public bodies put out tenders for projects, the specific requirements are described beforehand.

The analysis indicates how important it is that the national actors maintain the focus on Denmark as a cycling nation, both in relation to development of the industry but also from a branding perspective. The Danish actors acknowledge the value of being a Danish company, however the municipalities could play a larger role in marketing the solutions. As the municipalities in most cases own the urban space, these could to a larger extend be used as showcase examples. Not only Copenhagen, but also smaller cities that can serve as inspiration to cities with different levels of infrastructure and environments, showing the competences of the companies in a living lab, where test and demonstration is the everyday life of the cyclists, and where the end-users are directly involved in the design of new solutions.

It is evident that the cycling industry has not focused sufficient on the developments towards smart cities and the role cycling can play. A greater holistic approach should be acquired by the industry in all activities, to a perspective where smart and liveable cities are in focus, and where cycling is a building block in the overall plan and part of solutions, solving multiple challenges.

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