Why should transportation companies join Public Private Partnership (PPP) proposed by the public sector to support the implementation process of Freight Electric Vehicles (FEVs) in Copenhagen municipality?

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Executive summary:

The aim of this project is to answer the question: **'Why should transportation companies join Public Private Partnership (PPP) proposed by the public sector to support the implementation process of Freight Electric Vehicles (FEVs) in Copenhagen municipality'.** This project is conducted with motivation to find a solution to encourage transportation companies to purchase and use FEVs, in order to protect the environment. The system approach and interview method has been used to make research in this project. Both primary and secondary data were collected. The three companies interviewed are: UPS, Post Danmark A/S and Fragtmænd A/S. The interviews were conducted to gain knowledge about their challenges in urban distribution and their attitude of environment and green image of brand.

PPP is argued as a tool to create relationship between the public sector (Danish government and Copenhagen authority) and the private sectors (transportation companies). PPP model to support the implementation process of FEVs in Copenhagen municipality is illustrated with three main partners: Public sector (Danish government and Copenhagen authority), the administration department and transportation companies using FEVs. It is expected that the public sector will support the companies with subsidence and law changes so that purchase price of FEVs reduce and it bring many advantages for the company to use FEVs. The PPP is expected to encourage the transportation companies to purchase and implement FEVs, despite of many technical problems remain. It is argued that the transportation companies should join the PPP to get advantage of finance, policy, knowledge of EVs and FEVs. Through this PPP, transportation companies can promote their brand to public as 'green' companies.

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I. Introduction: background information and motivation for conducting this project

1. An overview of Electric Vehicle:

Electric Vehicle (EV) refers to vehicle that is propelled by one or more electric motors, rather than by an internal-combustion engine (Faiz et.al, 1996). The EV technology has been developed from background that the population of the world has been and will be increasing dramatically and the number of vehicles is also raising a lot (Chan & Chau, 2001). If Internal Combustion Engine Vehicles (ICEs) (diesel fueled vehicles) is the only type of vehicle that will be used permanently, we will not have enough oil and our environment will be destroyed by the emission. Therefore, many scientists have been studying and developing EV, a new technology, a new type of vehicle that can help us to cut down emission and reduce global warming. EV is developed with the goals of using renewable electric power, minimizing urban emission such as noise and pollution. '*Apart from the fact that battery-powered EVs can exploit renewable energy, they also have a very high energy efficiency so they can further reduce CO2 emissions. Electric cars also contribute to improving the urban environment with less noise and no harmful emissions into the air*' (the Danish Engergy Agency).

At the moment, the technology is not yet well developed enough so that EV can run totally with renewable electric power. However, in some countries, plans are already made to increase renewable power to reduce emission. In Germany, the electric share of solar is increasing and in Ireland, the share of wind electric is also raising up (Baster et.al, 2012). In Denmark, the government has reached the agreement of green energy and carbon reduction target for 2020. One of the main aims of this plan is to supply 35% of total energy from renewables, where half of its electricity produced by wind farms (Business green, 2012). Despite of environment benefit that EVs bring, there has been argument that batteries used for EVs is not environmental. It is a fact that manufacturing batteries requires mining and processing of various materials, which create emission anyway. However, it is proved that greenhouse warming potential and several other indicators are less severe for EVs than for ICEVs (Notter et.al, 2010).

2. Over view of Freight Electric Vehicle and its impact on the environment:

Urban freight vehicle is the vehicle that carries goods into, out of and within urban areas (DG Move, EC, 2012). Hence, Freight Electric Vehicle (FEV) is a type of EV, which is used to carry goods into, out of and within urban areas. Although their share in total traffic flow is not usually very high, according to European surveys, the share of emissions of freight vehicles is between 20% and 30% of the total urban traffic emission. On top of that, urban freight vehicles produce more pollution than long-distance vehicles. The reason is that fuel consumption increases sharply if vehicles make frequent stops because of traffic jam. Beside air pollution (CO2, NO2, SO2, etc.), greenhouse gases and noise pollution are also parts of the environmental pollution. The urban freight transport is a significant generator of greenhouse gas emissions. In the meanwhile, delivering in urban areas during the night disturbs the residents' sleep. For this reason, night delivery is banned in many cities (DG Move, EC, 2012).

As a type of EV, FEV is built to use renewable energy source, reduce emission and pollution to the cities. On the other hand, FEV is claimed as quiet vehicle, which light up the opportunity of night distribution again.

3. Overview of projects which support the development of EVs (including FEVs):

Seeing the good future of EVs, many countries have put effort to support the development and implement of EVs. The European Union (EU) is addressing better conditions to deploy EVs to the market, not only private electric cars, but also transportation freight vehicles: vans, trucks, and also passenger vehicles – electric buses. EU plans to build a competitive transport system in its member countries, so that mobility will be increased and major barriers in key areas will be removed. This plan will help EU countries to reduce greatly the amount of imported oil and cut down carbon emissions in transport by 60% by 2050 (White paper, 2011). To be more specific, EU plans that by 2050:

- *No more conventionally-fuelled cars in cities.*

- *40% use of sustainable low carbon fuels in aviation; at least 40% cut in shipping emissions.*
- *A 50% shift of medium distance intercity passenger and freight journeys from road to rail and waterborne transport.*
- *All of which will contribute to a 60% cut in transport emissions by the middle of the century* (White paper, 2011)

Furthermore, there are many projects that are funded or part-funded by EU, which aim to develop EVs technology and to supporting the process of shifting EVs in the market. One of those projects is the 'North Sea Region E-mobility network'. The project is developed under the North Sea Region (NSR Programme from 2007 to 2013. The programme aims to make NSR as a better place to live with and work in, meaning:

- *Increases the overall level of innovation taking place across the North Sea Region,*
- *Enhances the quality of the environment in the North Sea Region,*
- *Improves the accessibility of places in the North Sea Region,*
- *Delivers sustainable and competitive communities*.

(North Sea Region homepage)

The E-mobility NSR's mission is to: *'create favorable conditions to promote the common development of e-mobility in the North Sea Region. Transnational support structures in the shape of a network and virtual routes are envisaged as part of the project, striving towards improving accessibility and the wider use of e-mobility in the North Sea Region countries.'* (E-mobility NSR homepage). The E-mobility NSR is funded by EU with the total eligible budget of 6,658,732.00 € and runs from October 2011 to September 2014. Denmark is one of partner countries, including FDT- Association of Danish Transport and Logistics Centres and Høje-Taastrup Kommune.

The E-mobility NSR is divided to 7 Work Packages (WPs):

- *WP1: Management and administration (HAW Hamburg, DE)*
- *WP2: Information and communication (HAW Hamburg, DE)*
- *WP3: Inventory of state of the art and stakeholder analysis (TU Delft, NL)*
- *WP4: Development of a transnational e-mobility plan (Lindholmen Science Park, SE)*
- *WP5: Smart grid solutions - (Flanders Region represented by TransEnergy (son), BE)*

- *WP6: Set up transnational electric mobility information centres (EMIC) (Høje-Taastrup Municipality, DK)*
- *WP7: Promoting efficient and effective urban freight logistics solutions in enhancing regional accessibility (FDT - Association of Danish Transport and Logistics Centres, DK)*

(E-mobility NSR homepage)

Under WP7, activities are as followed:

- *7.1 Coordination*
- *7.2 Integration of EU policies into plans and programs*
- *7.3 Comparative analysis of European and International examples of utilizing Electric Vehicles*
- *7.4 Analysis of the freight transport sector demand for cleaner transport solutions*
- *7.5 Analysis of user needs for ICT solutions assisting the driver*
- *7.6 Promotion of Clean Urban Freight Logistics Solutions*
  (Information bullet number 3, NSR-Emobility)

The activities under WP7 are listed above because this project is conducted under activity 7.4 with the headline: 'PPP models'. The PPP model is expected to support the authorities to make an action plan that promote and implement FEVs for a cleaner transport solution in partners' area. The PPP models project is led by FDT-Association of Danish Transport and Logistics Centres- Aalborg, Denmark and cooperated with the other two partners: HAW (Hamburg University of Applied Sciences) and Province of North Holland. Each partner will contribute the 'PPP models' mainly in their own region. During the process, there will be cooperation and conversations among partners, in order to create a common structure of projects. Another reason of cooperation is also to share knowledge and information, to produce better projects. After partners finish their regional project, a joint project of 'PPP models' is potential to be produced to include and compare the studies. The joint project would make it is easier for the readers to collect information and have a better understand of 'PPP models' developed for E-mobility project in Copenhagen, Amsterdam and Hamburg. Being a team member of FDT, the author is contributing this project mainly focus in Copenhagen municipality. The result of this project is potentially used by the Copenhagen authority as a part of the action plan to support the implementation process of EVs.

4. Motivation for conducting this project:

EV is considered as a great solution to decrease the emission and pollution for a better living environment. However, there are a lot of problems to implement EVs or FEVs to practice. First of all, the purchase price of FEV is too high: approximately as double as similar Internal Combustion Engine Freight Vehicle (ICE Freight Vehicle). Second of all, range of FEVs is too limited. In Denmark, The largest range of FEVs is 3.5 tons (equal to ICE vans), while the common range of ICE Freight Vehicles used by transportation companies are between 5 to 7.5 tons and even higher in big size companies. Thirdly, the batteries weight of FEV is too big, which made the capacity of FEV is much lower than similar ICE Freight Vehicle. Fourth, technology of batteries of FEVs is not well developed enough to make it last for the whole day. FEV can only travel for short distance, more or less 100 km, depending on brands and types. After that distance, the vehicle has to be charged again. Currently, it cannot be used for travel across cities with long distance. Next, FEVs of some brands are too easy to break down. It cost a lot for companies to fix it, because the technology is complex. These disadvantages and problems on FEVs will be discussed further in this project.

It can be seen that there are too many problems of FEV which make it is so difficult to be implemented in the practice business. Concerning the environment issues and fast technology development, there is still a hope that one day very near in the future, FEV can be implemented broadly in many countries. Until then, we need to find a way to encourage private companies to implement FEVs to their fleets. It is obviously that it is not easy to do so, because of high price and there are many technical problems caused by FEVs. The most interest of private companies is to earn financial profit. Therefore, it would be very hard for them invest on FEVs. Nowaday, many companies are though trying to build green image to their brands, because they also care about the environment and they want to create a significant difference image for their companies. Thus, they might want to use FEVs as an action to show their attitude towards green environment and promote their brands. In order to match the companies' interest of profit and green environment attitude with FEVs, it is necessary to find a business model, a tool, a type of programme or anything like that, to motivate private companies to purchase and use FEVs. That is the reason why Public Private Partnerships (PPPs) is a part of action plan in E-mobility project and will be introduced and discussed in this project with the focus to promote and support the implementation of FEVs in Copenhagen municipality.

II. Problem formulation:

Research question:

Why should transportation companies join Public Private Partnership (PPP) proposed by the public sector to support the implementation process of Freight Electric Vehicles in Copenhagen municipality?

Sub-research question*: Why and how can PPPs support the implementation process of FEVs?*

The sub-research question is here because a research of PPP should be carried before the author can make arguments of why the transportation companies should join PPP. In order to sub- research question, the author has to understand the nature of PPPs: what it is about, what types of PPPs are available, who involve in PPPs, how to use PPPs, what needed to be considered when using PPPs. Then, the author combines the understanding to argue why PPPs can support the implementation process of FEVs. It is possible that the author come up with ideas of how PPP model should look like (which type of PPPs) to be used to support the implementation of FEVs in Copenhagen. The answer of sub-research question will be the base to answer the main research question. The author has to argue why private transport companies should join the PPP. In order to do that, the author needs to find out the advantages for the transport companies to join this specific PPP. Besides, it is important to point out the disadvantages and potentially suggest the solutions to reduce the risk to join in PPP.

III. Methodological chapter:

The methodological chapter is about to define methodological approach and research methods which will be applied to answer research questions. In order to do so, different methodological approaches and research methods will be presented. The author's point of view on reality of social science will be also be showed and combined with meaning of the problem formulation, in order to argue which methodological approach and research method are chosen to apply in this specific project. Reliability, validity and limitation of this project will also be included in this part.

1. The concept of reality:

First of all, it is very important to discuss reality because it is what methodological approaches make assumptions about (Arbnor and Bjerke, 1997). Reality can be understood as 'truth' – what the researcher seeks to know something about (Kuada, 2010). There are two different approaches on reality which are objectivist and subjectivist approaches. Objectivist approach has assumption that reality is hard, tangible and relatively immutable structure. Reality under objectivist approach is considered to be external to and cannot be influenced by individual human being. Thus, it is possible for a researcher to learn the truth of a specific area where he is a stranger (Kuada, 2009). The result of his study is more or less the same as results found by other researchers who study the same thing. It is because there is only one truth which does not change no matter who studies it. In the contrary, subjectivist approach assumes that there is no such a reality exits. Reality under subjectivist approach is created by each individual human being. Thus, there is no common reality but it is very different from one to the other. Although there are many researchers study the same specific areas, the result they get at the end is not the same because the reality is influenced by them.

2. Methodological approach:

2.1 Description of methodological approaches:

The following sub-chapter will describe briefly methodological approaches with their assumption of reality and how they can be applied. After that, the chosen approach for this project will be pointed out with arguments of why it is chosen.

According to Arbnor and Bjerke (1997), there are three methodological approaches, which are:

- The analytical approach
- The system approach
- The actor approach

The analytical approach is considered as the oldest among the three methodological approaches and it is common in business research. Reality under the analytical approach is assumed to be independent of its observers. It means that researchers who approach analytical method tend to be objective with the reality. They also tend to suggest explanations of certain facts and the guide in surveying others (Arbnor and Bjerke, 1997, p. 83-84). The analytical approach has assumption that reality is summative, which means '*the whole is the sum of its part'* (Arbnor and Bjerke, 1997, p. 50). Researchers who apply this approach will study all parts of the whole and put them together to get the total picture of reality.

The system approach came into business research after the analytical approach. Indeed, the system approach is critical of the analytical approach. Arbnor and Bjerke (1997) argue that '*it is no exaggeration to say that system thinking is the dominant point of view in both business practice and business theory today'*. Under the system approach, reality is objective accessible to human being. It is very important to stress that the whole of reality under the system approach is not the sum of its parts but it is created by the relationship among its parts. Thus, the reality created by the system approach is dependent on how the system is built by researchers. It can be understood that '*the system approach explains or understand parts through the characteristics of the whole*' (Arbnor and Bjerke, 1997, p. 52).

The third methodological approach is actor approach, which is the most recent of the three approaches. The significant characteristic of the actor approach is that reality is assumed to be

subjective to its observers, meaning that individual human being can create reality in his own world. The knowledge created by using the actor approach really depends on those who act in the social context. Researchers who approach the actor method are not interested in explaining but rather understanding the reality. Under the actor approach, '*the whole or reality and its parts are ambiguous and area continuously reinterpreted*' (Arbnor and Bjerke, 1997, p. 52). Therefore in most cases, the actor approach is not relevant to do business research.

Based on the assumption of reality and the way to create knowledge, the three methodological approaches are illustrated in figure 1:

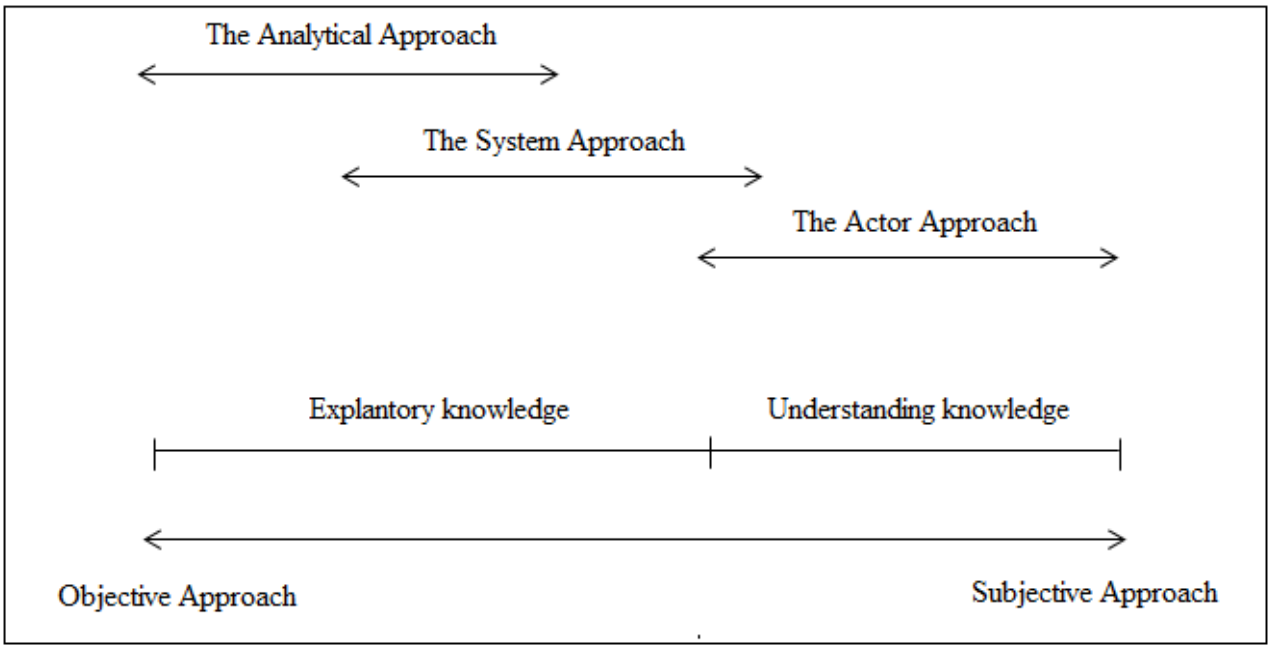

Figure 1: The boundary between explanatics and hermenerutics

Source: Adapted from Arbnor and Bjerke, 1997, p. 46

It can be seen from the figure above that the actor approach do not explain but understand knowledge. On the contrary, the analytical approach only explains knowledge. In the meanwhile, the system approach is in the between where it can be applied to explain and understand reality. Again, the analytical and system approach assume that reality is objective and it is independent of its observer. This assumption allows researchers to use developed and tested theories as starting points in future study (Arbnor and Bjerke, 1997, p. 214). Under the actor approach, reality is a social construction, a human invention. Theories in the actor approach are metatheories, because '*they are incorporated in the presumptions by which researchers orient themselves*' (Arbnor and

Bjerke, 1997, p.214). From this point, it can be stressed that it is very important for researchers who approach the analytical and the system approach to review earlier studies and their results within the study field, before the next study is undertaken. It can be understood that both the analytical and the system approach use concept of analysis, which means '*a thorough investigation of an existing situation*' (Arbnor and Bjerke, 1997, p. 94). However, the analytical approach focuses on the techniques used by the researchers or the creator of knowledge, whereas the system approach focuses on result of the research which can be used by others. Based on reality assumption and different meaning of the three methodological approaches, Arbnor and Bjerke argue that the method techniques used under each approach are also different:

For the analytical approach: Sampling and validation techniques

For the systems approach: historical and case studies

For the actors approach: dialogue and language development (Arbnor and Bjerke, 1997, p. 222).

Next, a methodological approach will be chosen, which suites to the author's view of reality, the meaning of problem statement and how the author will make research to answer the research questions.

2.2 Choice of methodological approach in this project:

Firstly, it is important to make it clear whether the reality in this project is assumed as dependent or not to the human being. The author's point of view on reality is that it is independent to human being to some extent. The author does not believe that individual can create a whole reality in his own world but he can somehow affect to the reality by his own knowledge, action and network. The reality is there already and there is only one truth about the exit reality. However, the author believes that human being can affect the current reality to change it and make it different in the future.

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It states clear in the research question that this project includes not only the understanding of it is necessary for private companies to join the PPPs programme, but also to explain the reason why they should do that. The author wants to include researches on what PPPs has been conducted earlier. Therefore, the actor approach is not suitable for this project. Besides, three companies were interviewed to hear their opinion about FEVs and their expectation of what changes should be made in order to attract the companies with FEVs. It is a strong argument for objectivist approach for this project. However, those companies who were interviewed are not all companies which can potentially switch their ICE trucks to FEVs. They are only some examples among a lot of companies in the market. Thus, the knowledge created in this project might not be the precise picture of reality but possible a part of it. Furthermore, this research is oriented to create a result: a PPP model and reasons for private sector to join PPP programme. Thus, the system approach is possibly the most suitable approach to apply in this project.

3. Research method:

3.1 Description of research methods: qualitative and quantitative methods

This sub-chapter is about to describe the nature of quantitative and qualitative research methods and point out the strength as well as weakness of each method. After that, the chosen method for this project will be made with arguments.

The quantitative research method is used when a researcher wants to test a hypothesis which he learnt or read from theories about the issues that he is about to investigate (Kuada, 2011). This method can also be applied when the researcher wishes to use accuracy rather than judgment, for example to find out how much customers are satisfied, how successful new product is. The important concept of this method is indicator which is used for measurement. There are many ways to conduct quantitative research but the main two methods are survey and interview (Kuada, 2011). The big advantage of quantitative research is that it is possible to investigate various elements and

target at the same time. However, one can claim that the quantitative method '*fail to distinguish people and social institutions form the world of nature*' (Bryman and Bell, 20003, p.85). It is due to the fact that the quantitative method is oriented to objectivist approach, where the researcher focuses only to parts of reality but ignore the relationship in social construction. Furthermore, it is claimed that the quantitative method can take large time consuming, because the survey technique requires many respondents in order to make statistical analysis.

The qualitative method is oriented to the subjective approach, which is applied to understand the social world. This method is focuses on individual interview with selected candidates rather than big number of answers. Interview is a common method used in the qualitative research. With qualitative method, the interviewees have opportunity to raise topics and issues which the researcher might not anticipate, which might be critical to the investigation. It also allows interviewees to express their thinking, feeling and perspective in their own words (Kuada, 2011). It can be understood that interviews can be used in both qualitative and quantitative research methods but there is differences. Qualitative interview seeks to gain an insight 'lived- experience' of the interviewee (Kuada, 2011). The researcher can use qualitative interview to listen what the responders say about the issues that is under investigate. The researcher can also use qualitative research as alone-standing data or combine it with other qualitative data collection technique (Kuada, 2011). The advantage of qualitative method is that the interview can be unstructured or semi-structured which gives opportunity for interviewer to skip or go deeper in specific questions, depending on how the interview goes. That is the reason why interview under the qualitative method is much more flexible than the quantitative method. Besides, the interviewer can 'read' the interviewee through body language, which is not possible with quantitative research method. However, the qualitative methods is criticized that it is too subjective, because the interviewer might involve himself too much to understand the meaning of answers. Additionally, the qualitative research method is criticized about the generalization. One can claim that the selected candidate to conduce interview cannot represent the whole world and the result found might not be the whole picture of reality.

3.2 Choice of research method in this project:

This project is conducted by using the qualitative research methods. Interviews will be conducted using semi-structured questions. The fact is that PPP is quite a new topic and it is indistinctive to understand. It will be elaborated more in the literature review part. There are only few industries where PPPs is well known as a tool or solution. In other industries including transportation and vehicle, PPP is still very new. Therefore, this project cannot be conducted using surveys but it is possible through interviews. The aim of interviews is to research on challenges in urban transportation, which might be solved by switching ICE truck to FEVs. It is expected to gain experience from the company which is using FEVs, for those who already test and use them and barriers to deploy FEVs, for those who did not use FEVs. The interviews are semi-structured, because the author expects the interviewee to raise issues about challenges on urban transportation, barriers in using FEVs and also, what they think about support from the authority and cooperate with public sector. Due to time consuming of interviewees, all interviews will be conducted on telephone. The questionnaires are sent to interviewees before the interviews. It allows the interviewees to fill in answers for some questions. It is very important to do so in this project, because the author might have to prepare additional questions based on the pre-answers, in order to understand deeply the meaning of answers. The pre-answer will also help to reduce the time of interview for some basic questions, which can be easily fill by the interviewee in before the interview. In this way, the author has more time during the interview to ask more questions in areas which she finds they are new and difficult to understand and explain. All interviews will be taped and then transcribed.

4. Data collecting method:

4.1 Description of primary and secondary data:

This part is about to explain the two type of data collecting methods: primary and secondary data. It is important to clarify in which way data will be collected, because it gives the reader a better view of how the project is conducted. It also helps the writer ensure how to use the data, because each type of data needed different way to be analyzed.

Primary data or primary information can be referred to new data (Abnor and Bjerke, 1997). It can be understood as data or information which was not analyzed earlier. Regularly, primary data is collected because the researchers need specific information for his investigation, which is not available at that moment. The most common ways to collect primary data are surveys and interviews. The primary data method gives the researcher some advantages. One of them is that it can be used for both qualitative and quantitative research method. Secondly, the researcher can address the questionnaire to the exact way he wants to make his research, so that he will get the exact information he needs. However, it might take a lot of time to conduct a survey for primary data. Sometimes, there are not enough respondents to conduct survey in the set goal to match the project's timeline. In some cases, the primary data collecting requires the development of research plan, which is much more complicated than the secondary data method.

Secondary data collecting is the other method, which can be understood as data that have been collected by other researchers earlier (Bryman and Bell, 2003). In many cases, the data was analyzed and the researcher can use it as supportive arguments to his investigation. Compared to the primary data, the secondary data does not consume a lot of time because it doesn't require a survey. Furthermore, it is possible that researcher can choose high quality secondary data from trustable resources. There are though some disadvantages about this method: it is not always that the researcher is familiar with the data. It is because the data was collected by others, under their own purpose. Although there are many trustable sources where data is high quality, the researcher can find it is hard to control the quality of information he have got. The secondary data can be collected via literatures, articles, books, webpages, etc.

4.2 How data is collected in this project:

In this project, there will be used both primary and secondary data. Interviews with companies will bring primary data to the investigation. On the other hand, secondary data will be collected by using earlier reports, article, literatures, books which are under the same topic focused in this project. The questionnaires for interview and transcription can be found in annexes, at the end of this project. It should be stressed that the interviews were conducted not only for this project but also for another activity, which is also under WP7 of the E-mobility project. Therefore, it can be seen in the transcription that there are two interviewers and not all information got from the interviews will be used in this project. To be simplified, name and position of the interviewee will not be mentioned in this project except in the transcription. Only name of the company will be used to make it is easier for the reader to follow.

5. Reliability and validity:

Reliability is defined as: '*The degree to which a measure of a concept is stable*' (Bryman and Bell, 2001, p. 718). It is about the stable of data which the researcher collects. Under primary data collecting, it should be ensured that result of the survey can be used for other study later on. It is also about the quality of data which the researcher uses to create knowledge. It is mentioned earlier under the secondary data collecting that the researcher has to control the quality of the data he collects.

Validity is '*a concern with the integrity of the conclusions that are generated from a piece of research*' (Bryman and Bell, 2001, p. 720). The researcher needs to make sure that the resuls carries integrity and that the measures of a concept really reflect the concept it is supposed to (Bryman and Bell, 2011, p. 42). Validity is very important in an academic research, especially in a project that apply the objectivist approach, because it approves that the data is trustable, testable and can be referred to, in future researches.

In this project, the reliability and validity are considered as important elements. Literature reviews are made using high quality papers from trustable sources, linked to Aalborg University Library (AUB). Books used in this project are also trustable because they are in the AUB. Some internet sources will be used, which are checked as trustable sites. There will be always time view written

down for each of the webpage used. It will be ensured that interviewee has good enough knowledge about the area where the researcher wants to investigate.

6. Limitations:

The limitation part presents what this project does not cover, due to lack of time, knowledge and data. One of the limitations of this project is that the PPP model is created with assumption that the public sector will join and make supports in finance and policies. There was a lack of information from the public sector to suggest a PPP model. In the future research, it would be great to get interviews with the public sector to see what they think about PPP and if they are willing to support the private sector with subsidence and changes in policy. Thus, the project only focuses on arguing why the private sector should join this PPP. It is lack of a complete analysis of why the public sector should join it as well. Another limitation is that the companies who were chosen to be interviewed do not present all transportation companies, which potentially can switch ICEs to FEVs. Their attitude of green environment and interest of EVs might not be the same as other transportation companies who do business in Copenhagen municipality. Further, EVs is not a familiar topic for the author so there is a lack of knowledge for detailed technical and other issues related to EVs. Also, the author has education in the International Business Economics but not Public Management. Therefore, there is lack of knowledge in Public Management which could bring a better analysis for this project.

IV. Literature review:

1. Public term:

The public term or public sector and state in PPP concept can be referred to 'set of institutions which exercise legitimate authority over populations, for the most part within a given geographical area' (Osborne, 2000, p. 37). The public sector interests falls under social responsibility and environmental awareness (Rosenau, 1999 - United nations Development Programme, 1998). The public sector is good at openness to public scrutiny, employment concern, policy management, regulation, ensuring equity, preventing discrimination or exploitation, ensuring continuity and stability of services, and ensuring social cohesion (Rosenau, 1999 – Osborne & Gaebler, 1992).

2. Private term:

The private term or private sector refers to '*all institutions other than those of the state*' (Osborne, 2000, p. 37). One can refer the private term to private business, private non-profit organization, and private non-government organization. In this project, the author will only focus to the private business sector. '*The term business refers to organizations the major aim of which is to generate profits for their owners*' (Osborne, 2000, p. 37). The profit generated by the private business is understood as financial profit or any other type of profit which brings financial profit as bottom line.

3. Partnership term:

Partnership is a term which has been discussed widely in the international business economics field. Wildridge, et.al (2004) claim that in a global society where we live now, '*it is no longer effective for organizations to work alone'*. '*Working in partnership has become central in effort to address complex environmental, social-economic, and technologic problems*' (Horton et al, 2010, p.1). In all sectors including public, private and voluntary, '*the need for partnership working, often cross-sectoral working or working beyond the boundaries, is recognized as a vital component of success*' (Wildridge et, al. 2004, p.3).

The partnership definition is various. There is no agreed definition of what exactly is meant by partnership. '*There is no universally accepted definition of partnership or that it is rare to find one*' (Wildrige et, al. 2004, p. 3). '*Authors working in different fields define partnership in different ways*' (Horton et al, 2010, p.2). From the legal point of view, partnership is '*a legal entity formed by the association of two or more person*' (Drake, 1917 - Parsons, 1893).

Another definition of partnership can be found as: '*where two or more organizations make a commitment to work together on something that concerns them both, develop a shared sense of purpose and agenda, and generate join action towards agreed target*'(Boydell, 2007, p.3 – Health Education Board, 2001). Compared with the legality definition, one can see here that this definition narrow down the meaning partnership, showing that partnership should has an agreed target. It means that partners should have a common goal to work together. One can view partnership as an organizations in which partners are members or employees somehow. In any organization, there must be a goal so that members or employees know what they need to achieve and it should be clear about how to do achieve that goal. Similarity with the partnership term, if there is no common goal the partnership cannot work efficientl, because partners do not know what the result expected.

Stern and Green (2005) provide a pragmatic definition of partnership as '*a programme that has a high level of commitment, mutual trust, equal ownership and the achievement of a common goal*' (Boydell, 2007, p. 3 – Stern and Green, 2005). With this definition, partnership is not understood as individual partners but it is a programme where all partners join in. This partnership should involve commitment, because partners have to take their responsibility for tasks that they agree to do. It is necessary to make sure that the common goal will be met at due time with high quality result. Importantly, partnership should be built from mutual trust. Not only Stern and Green (2005) include mutual trust in definition of partnership, Boydell (2007) also argues that being trusted and trustworthy is an important attribute. It is because a partnership cannot last for long if partners are too opportunistic and become kind of competitors instead of being friends to work together. On top of that, equal ownership is mentioned to emphasize that partners should receive equal benefit for equal effort they put in a partnership programme. Under partnership definition by Stern and Green (2005), partnership is different to a network, which is created only for sharing information or other resources but not for the explicit purpose of joint working (Boydell, 2007).

Another definition given by Osborne refers partnership as '*cooperative ventures that rely upon agreement between actors in return for some positive outcome for each participant, which could be*

some economic or social goal or potential for synergy' (Osborne, 2000, p. 37). This definition of partnership also mentions about commitment, in the way that there should be agreement between partners of what they should do or should not do. It can be about the finance investment and human resource arranged for joint work. Especially, the outcome of partnership should be positive for partners so that they have motivation to give their best effort to the joint work.

From above mentioned definitions from different researchers under different study purposes, one can argue that the partnership involve cooperation between actors because they have to work or act together. The partnership should be built up based on commitment, trust, equal ownership, common goal and positive outcome.

When studying partnership, it is needed to make research on type of partnership. Glendinning (2003) argue that partnership can be divided to three level: *'(1) macro level – the national level, (2) micro level – local service level and (3) individual services udders level'* (Wildridge et al, 2004, p. 5 – Glendinning, 2003). These levels can be seen as horizontal dimension of cooperation, where the activities occur on the same level of the process (Wildridge et al, 2004, p. 5). In the meanwhile, some other researchers study type of partnership by looking into behavior. Thus the partnership can be divided to: competition, co-operation, co-ordination and co-evolution (Wildridge et al, 2004, p. 5). They argue that true partnership includes parts from each behavior and movement between them. One can claim that in some cases, a partnership between some actors can even start from competitive condition. It can move to co-operation, which can be defined as informal arrangements to achieve reciprocity, to co-ordination which is a formal institutionalized relationships and finally to co-evolution stage of partnership. Partnership can start from competitive condition, because companies want to strengthen their position in the market. Since the companies as individuals are not strong enough to do so, they might cooperate to combine their strengths to compete with other competitors. This type of partnership is well-known as alliance.

Besides, some researchers choose to categories partnership according to the sectors involved. Powell and Glendinning (2002) suggest the following categories of partnership: public-private, public-public, public-voluntary and public- community partnerships (Boydell, 2007, p. 6 - Powell and Glendinning, 2002). Here, it can be noticed that the private-private partnership is not in the categories, because the main focus of Boydell, Powell and Glendinning in these papers is about public goods. The private-private partnership, in some extent, can be a supplement in process to achieve public goods. However, it is not directly relevant and in most cases the statutory sector

takes the lead in the process (Boydell, 2007). Thus, private-private partnership is excluded in the categories of partnership suggested by Powell and Glendinning.

In the international business economics, there are several areas where the author finds the present of partnership. In marketing field, Kotler (2006) mentioned partnership as a strategy of a company to connect with customers. This strategy is well-known as Customer Relationship Management (CRM). Kotler (2006)claimed that in the market where there are many customers and their unit profit margins are small, most companies simply just sells the product without a significant strategy of CRM. However, in market with few customers and high profit margins, most companies wish to create relationship to customers so that they are loyal and come back to purchase many times (Kotler, 2006, p.157). The purpose of this strategy is to build customers' loyalty to company and brand.

In the global marketing field, Hollensen (2007) discussed about partnership through the entry mode theories. He argues that when a firm goes international, it should be decided whether the firm enters foreign market directly or it should cooperate with others to do so. The decision is based on internal factors such as financial strength of the firm, experience, etc. It is also based on external factors: market size and growth, country risk, etc. If the firm is not strong internally or if it is going to enter a risky market or both, cooperation with another actor should be considered. Hollensen suggested many different type of cooperation including local agent, representative, licensing, joint venter, etc. He mentions the term '*partner mindshare*' in the entry mode theory as a '*measurement of the strength of a relationship in terms of trust, commitment and cooperation*' (Hollensen, 2007, p. 311).

To summarize, it can be argued that a partnership in any areas includes cooperation, interaction between partners. It means that partners should work together towards a common goal and positive outcomes. Commitment and trust are considered as key element to create a strong partnership, where partners agree what to do, what partners expect from each other and give their best effort for a mutual benefit.

Based on knowledge of public term, private term and partnership, PPPs will be described in the following part, including its types. The types of PPP including here might not be the exact way of how to create PPP model to support the implementation of FEVs in Copenhagen municipality. However, the author expects that the review of PPPs will give the reader and also, the author, a better view of PPPs, how it is used in some industries and what the strengths and weaknesses of it.

4. Public private partnerships (PPPs)

4.1 Over view:

The concept PPPs became fashionable over 25 years ago and it has been strongly contested (Bovaird, 2004). Traditionally, projects for community such as dams, highways, bridge, schools are made by publicly funding. Since the 1980s, more infrastructure projects have begun to have private sector participant in processes. '*The PPP has become a valuable asset for communities to revitalize their economic marketability and aid with needed social, housing, infrastructure and employment programs*' (Jacobson and Choi, 2008 – Nikkamp et al., 2002; Shatkin, 2007).

The same as partnership term, PPPs does not have any exact definition. One can understand PPPs as '*cooperative institutional arrangements between public and private sector actors*' (Hodge and Greve, 2007, p. 545). One can connect this definition of PPPs to the legality definition of partnership, where partnership is considered as '*a legal entity formed by the association of two or more person*' (Draken, 1917 - Parsons, 1893). It can be argued that the legality definition of partnership does not give any idea of how the partners should work together but it just simply state that the partnership should be legal formed. Giving definition of PPPs, Hodge and Greve (2007) state clearly that there should be cooperative arrangements, meaning that partners of PPPs should cooperate to work together. Similarity, Osborne (2000) claims that '*PPPs are agreed, cooperative ventures that involve at least one public and one private sector institution as partners*' (Osborne, 2000, p.37). He argues that this definition is broad enough to cover all types of partnership between public and private sector and circumstances in which they arise (Osborne, 2000).

Under the view of public management perspective, PPP is understood as '*the formation of cooperative relationships between government, profit-making firms, and non-profit private organizations to fulfill a policy function*'(Linder and Rosenau 2000, p.5). Here, the cooperation is also mentioned, but with a better explanation of who involve in the partnership. One can claim that under this definition, the public sector is the leader of the partnership and it seems like the public sector will get the most benefit. It is because the policy function is emphasized, which the partnership's work has to fulfill.

Commenting on PPPs' definition by Linder and Rosenau (2000), some researchers state that *'this understanding of PPPs covers a wide variety of potential cooperative arrangements' (*Borzel and

Risse, 2002, p.4). There is possibility of variety of potential cooperation, because only type of sectors is mentioned. The degree of involvement of different sectors is missing here. Depends on the nature of joint work and agreement between partners, the role of partners in a partnership will be created variously. Therefore, many types of partnerships can be assumed to appear under the definition stated by Linder and Rosenau (2000).

Under infrastructure field, PPPs can be defined as '*a range of possible relationships among public and private entities in the context of infrastructure and other services*' (Felsinger et al., 2008, p.7) Again, one can see the possibility of various connections between public and private sector are mentioned here. Compared with Linder and Rosenau (2000), Felsinger et al., (2008) understand PPPs as relationships rather than arrangements. It means that partners should be kind of friends, understand and trust each other, rather than working together because there is a written-down-contract. With emphasis on relationship, one can claim that definition of PPPs stated by Felsinger et al., 2008 gives researchers an understanding that PPPs should be a long term period where partners create a connection and upgrade it to relationship. This relationship is the base factor, which possibly gives partners motivations and encouragements to work together to archive a common goal. Anyway, it should be clear that this understanding of PPPs is elaborated in PPP Handbook which is designed for the staff of the Asian Development Bank and its developing member countries clients. Although the handbook is made with special focus in infrastructure area, it can be seen as one of the most complete document of PPPs because there is description and explanation of what PPPs is, who involves in PPPs, what types of PPPs are, requirement of PPP projects, etc. Thus, this handbook will be used in this project specially to understand types of PPPs and stakeholders involved. Based on that, a PPP model can be designed to be used under cooperation between private and public sector to promote and support the implementation of FEVs in Copenhagen.

Following to the uses of PPPs in the infrastructure area, many researchers defines PPPs as a new way to handle infrastructure projects, such as building tunnels and renewing harbors (Hodge and Greve, 2007 – Savas 2000). In the infrastructure industry, PPPs are financial models that '*enable the public sector to make use of private finance capital in a way that enhances the possibilities of both the elected government and the the private company* (Hodge and Greve, 2007, p. 546). Recently, PPPs has been used in many other sectors than infrastructure i.e public health, power generation and distribution, transportation, etc. (Felsinger et al., 2008). Thus, many researchers

have seen PPPs as '*a new way of managing governing organizations that produce public services*' (Hodge and Greve, 2007, p. 545). In the process of making public service, history has shown that '*there has always been some degree of cooperation between the public sector and the private sector*' (Hodge and Greve, 2007 – Wettenhall 2003, 2005). Hodge and Greve (2007) emphasize that government nowadays starts to involve in long-term business relationship with private sector '*under more sophisticated and far-reaching contracts than ever before*' (Hodge and Greve, 2007, p. 546). The reason why PPPs are becoming more and more well known is that they can benefit both the public and private sectors. '*They have specific qualities, and if those qualities are combined, the end result will be better for all'* (Hodge and Greve, 2007 – Vaillancourt Rosenau, 2000).

Despite the fact that PPPs have been using the most in infrastructure projects, Grimsey and Lewis (2002) claim that it can potentially be used in many type of services, which are created to benefit the citizens. Considering service as core, it is argued that '*there are no core functions that cannot be undertaken by the private sector and no activities for which public provision is infeasible. Not all public services provide to the community are necessarily core in the sense that government needs to provide these services itself*' (Grimsey and Lewis, 2002, p. 249). This argument opens opportunities for PPP to be used in many other industries than infrastructure, covering technology, power, transportation, environmental policy, education, health, welfare law enforcement and community activities (Grimsey and Lewis, 2002 – Rosenau, 2000). The same as Felsinger et al., 2008, Grimsey and Lewis also argue that PPP should be long-term contracts and trust relationship is a key element to make PPP works. '*A short-term contract for the provision of goods or service is presumably not a partnership'. 'Partnership is a trust relationship*.' (Grimsey and Lewis, 2002, p.247). Furthers, they argue that PPP is a risk-sharing relationship that public and private sectors have something to lose if the partnership underperforms. The risks and uncertainties under PPPs will be discussed further in the criticism part.

4.2 Stakeholders in the PPP process:

Stakeholders in PPPs are about to be explained and discussed in this project as an important part when studying PPPs. It is because they are the main players and one of the main causes for successful or failure of PPPs projects.

There are obviously two types of stakeholders in a PPP contract: public and private partners. However, it is not simply just public authority and private company who exits in PPP process. Stakeholders in PPP can be named as: political decision makers or government/ public authority, company management and staff, consumers, investors and strategic consultants (Felsinger et al.,2008).

The policy makers can be understood as the authority, community, government. It is clear that the policy makers are representatives for public sector. They establish goals, objectives and quality standard for the project. They also approve recommendation PPP option, regulatory and legal framework. Their interests are to improve public welfare, attract investors, promote fair competition in different industries and maximize revenue (Felsinger et al.,2008). One can claim that in most cases, the policy maker is the lead partner in PPPs projects. It is because they have the power to decide whether or not the project should start or how it should work. Though, it is not to deny the involvement of the private sector in the process of PPP projects. They can be investors or the company management and staff, which will be described in the following.

Investors can be private or public partners, because both sectors can invest financial capital to PPP projects. The public investor belongs to the public sector who can also be the policy makers and are interested in create social benefit and public welfare; whereas the private investors are private companies who find PPPs projects as promising and interesting projects to invest and earn money. Both public and private investors provide feedback to recommend options of PPPs. The private sector follows the rules to bid for project that they are interested in. They want to win the bidding process to invest to a specific project which they found there is opportunity to earn credit according to their interest. Besides, both sectors want to improve their employees and management ability by working across sectors.

The company management and staff, who can be understood as employees/human resource involve in operating and management of PPP project. In some cases, they are both public and private sector

who works under a joint venture company. This joint venture company can be established for some special PPP projects to ensure fair treatment of present employees, provide career opportunity, improve productivity, efficiency and morale (Felsinger et al., 2008, p. 22).

Consumers are regularly the citizens. They are users of public goods and service, which is create by PPPs. They express their needs of using services, giving recommendation of quality and level of services. They also evaluate the strengths and weaknesses of the services after uses. They are representative of services' users who can complain of low quality or high price of public services. It is because their interests are having fair pricing of public services and high public welfare.

Strategic consultants are those, who do not involve directly in doing project but gives recommendations to public and private sector to choose a most suitable PPP option and give their opinions on how the project should be designed and be implemented. They also involve in the bidding regulation and help public sector to find the best companies and experts to do projects. On the other words, they are external expert who act as middle man to support the project in general and support the cooperation among other stakeholders in particular.

4.3 Type of PPPs:

There are not universal types of PPPs shown in literatures reviews. In different industries, there might be different way to create PPP. One of the reasons is that the stakeholders involved are different, even though they are mainly from public and private sector. Sometimes, non-profit private sector can also involve in PPP. One might claim that type of PPP can be found easiest and more complete in infrastructure industry. In Public-Private Partnership handbook made by Asian Development Bank, Felsinger et al. claims that there are six PPP options available for consideration and each of them present different characteristics to be assessed against the sector reform objectives (Felsinger et al., 2008). The six PPP options are:

- Service contract
- Management contract
- Afterimage or lease contract
- Concessions

- Build-operate-transfer (BOT) and similar arrangements
- Joint Ventures

The PPPs' option characteristics are presented in the table below:

	SERVICE CONTRACTS	MANAGEMENT CONTRACTS	LEASE CONTRACTS	CONCESSIONS	BOT
Scope	Multiple contracts for a variety of support services such as meter reading, billing, etc.	Management of entire operation or a major component	Responsibility for management, operations, and specific renewals	Responsibility for all operations and for financing and execution of specific investments	Investment in and operation of a specific major component, such as a treatment plant
Asset Ownership	Public	Public	Public	Public/Private	Public/Private
Duration	1–3 years	2–5 years	10–15 years	25–30 years	Varies
O&M Responsibility	Public	Private	Private	Private	Private
Capital Investment	Public	Public	Public	Private	Private
Commercial Risk	Public	Public	Shared	Private	Private
Overall Level of Risk Assumed by Private Sector	Minimal	Minimal/moderate	Moderate	High	High
Compensation Terms	Unit prices	Fixed fee, preferably with performance incentives	Portion of tariff revenues	All or part of tariff revenues	Mostly fixed, part variable related to production parameters
Competition	Intense and ongoing	One time only; contracts not usually renewed	Initial contract only; subsequent contracts usually negotiated	Initial contract only; subsequent contracts usually negotiated	One time only; often negotiated without direct competition
Special Features	Useful as part of strategy for improving efficiency of public company; Promotes local private sector development	Interim solution during preparation for more intense private participation	Improves operational and commercial efficiency; Develops local staff	Improves operational and commercial efficiency; Mobilizes investment finance; Develops local staff	Mobilizes investment finance; Develops local staff
Problems and Challenges	Requires ability to administer multiple contracts and strong enforcement of contract laws	Management may not have adequate control over key elements, such as budgetary resources, staff policy, etc.	Potential conflicts between public body which is responsible for investments and the private operator	How to compensate investments and ensure good maintenance during last 5–10 years of contract	Does not necessarily improve efficiency of ongoing operations; May require guarantees

BOT = build–operate–transfer, O&M = operation and maintenance.
Source: Heather Skilling and Kathleen Booth. 2007.

Table number 1: Summary of key features of the basic forms of PPP

Source: Felsinger et al., 2008, p. 28

One can see in table nr.1 That private sector invests in the partnership the least in service contract and the most in BOT option. It means that private partner takes more risk if they involve in PPP type in the right side of the table. The year of partnership also increase towards BOT type of PPPs. The table also presents competition level of all PPPs option, special features to consider as well as problems and challenges that researcher need to be noticed. In the following, the author will describe each type of PPP shown in table nr.1.

4.3.1 Service contract:

Service contract is a type in which the private sector invest the least in, compared to others PPPs types. Under service contract, public sector/authority simply hires a private company to carry out one or more specific tasks for a short period, typically one to three years. The private company has to perform the task with agreed price and standard that set by public sector. In this type, public sector would normally open a bid to choose a private company, who can show that it is able to do the job best with the most reasonable price. We can see the service contract a lot in infrastructure areas and technical assistants in all sectors i.e. social development, health, civil society, etc. Applying service contract, the public authority will pay a predetermined amount of fee for the private company to do tasks that has to meet required standard. So if the company can reduce operating cost, it will increase profit (Felsinger et al, 2008). In this case, the private company does not interact with consumers. When the agreed task is done and be accepted by the public authority, the private partner does not involve any more on further expansion or improvement of product or service.

The advantage of this option is that private sector does not need to invest financial capital in the project. In most cases, the public authority invests 100% of financial capital by paying service fee for chosen company from bidding. The task that falls under service contract is clearly defined in the contract and quality standard is also clarified. It makes it is easy for the private company to understand what exactly it has to do and how to do, in order to meet standard requirements. Moreover, duration job cooperation under service contract is rather short which '*allows for repeated competition in the sector'* (Felsinger et al, p. 29). It means that private companies in the same field have to increase their quality of work and reduce fee all the time to compete to each other. This is a big advantage for public authority to make good public goods with reasonable price. With the international business economics point of view, one can understand the service contract in the way that public authority is consumer who buys service from seller – private company. Looking at the value chain (Porter, 1985), a researcher may argue that the public authority outsource the operation process to private company who is more specialize in manufacturing, in order to get better product in cheaper price.

There are though several disadvantage of this PPP option that researcher should notice. One of them is that service contact is '*unsuitable if the main objective is to attract capital investment*' (Felsinger

et al. 2008, p.30). In many cases, the public authority does not have enough financial capital to invest to a potential project. Thus, the public authority needs to call for investment from private companies. Because the nature of the service contract type is that the public authority invests 100% on the service made by private partner, it would not be a choice for public authority to get external investment from private sector.

4.3.2 Management contract:

Management contract in PPPs is an expanded version of service contract. Under this type, private partner does not only make the task which is agreed with public authority, but it also involves in the management. It means that daily working process during contracting period has to be transfer between public and private partners. Alternatively, the public authority may require the private sector to manage and operate the public services which are used by the citizens. Figure nr.2 shows typical structure of a management contract:

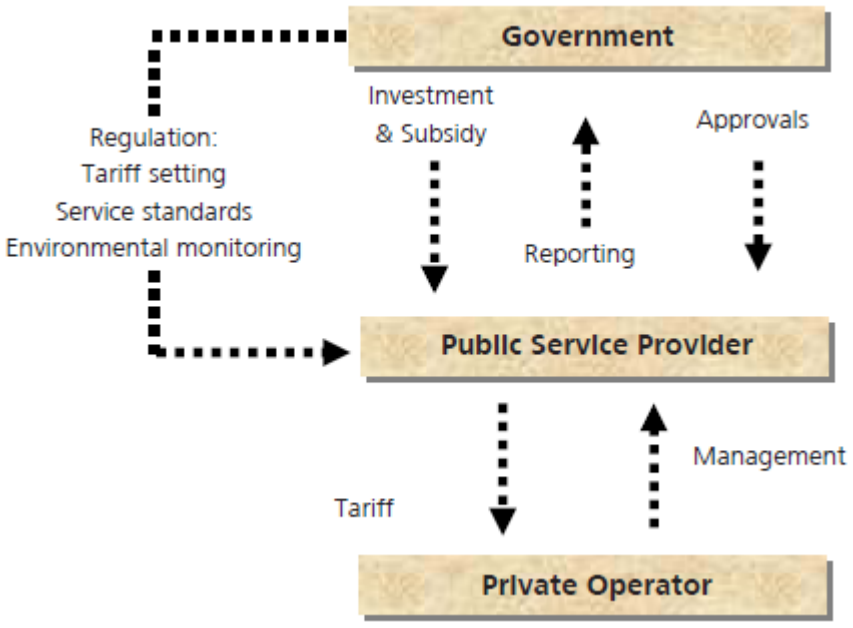

Figure number 2: Structure of management contract

Source: Felsinger et al., 2008, p. 31

One can see from the figure above that there are links between government, public service provider and private operator. The public service provider is owned by public authority but receive management support from private sector. Labour rate will be paid out to private company from

public sector. In some cases, a part of profit can be shared to private company because it interacts directly with customers.

Felsinger claims the key advantage of this option is that public sector can gain a great result with the present of the private sector, without transferring the assets to them. Human resource for management project is took care by the private sector with approval from public sector, which save time and might be able to reduce cost for public sector.

Potential weakness of this option is that it can be tricky to split between the obligation for service, management and expansion planning. The reason is that private sector only do the management work but does not have authority to expand or improve the project in financial aspect to achieve deep and lasting changes. The project extension has to be discussed and agreed with public sector, which might take longer time and more difficult to start. As mentioned, the private sector can get a share of profit or given an incentive payment to encourage them get involve to the management. If it is the case, the public sector needs to have precautions for inflation of reported achievements to increase profit from the private sector (Felsinger et al 2008).

4.3.3 Affermage or lease contracts:

Under a lease contract, private sector is responsible for all services and takes obligation related to service and quality standard (Felsinger et al 2008). It means the public sector will only invest for new and replacement project. Any other type of fees such as reparations, improvements have to be took care by the lessee or the private sector. By this way, the private sector takes all risk related to operation and maintenance the project. If the project cannot gain any profit or the consumers are not able pay their debts, the private sector take responsibility for this and offsets loss. The duration for this type of contract is from 10 to 20 years. Figure nr.3 show how the lease contracts looks like:

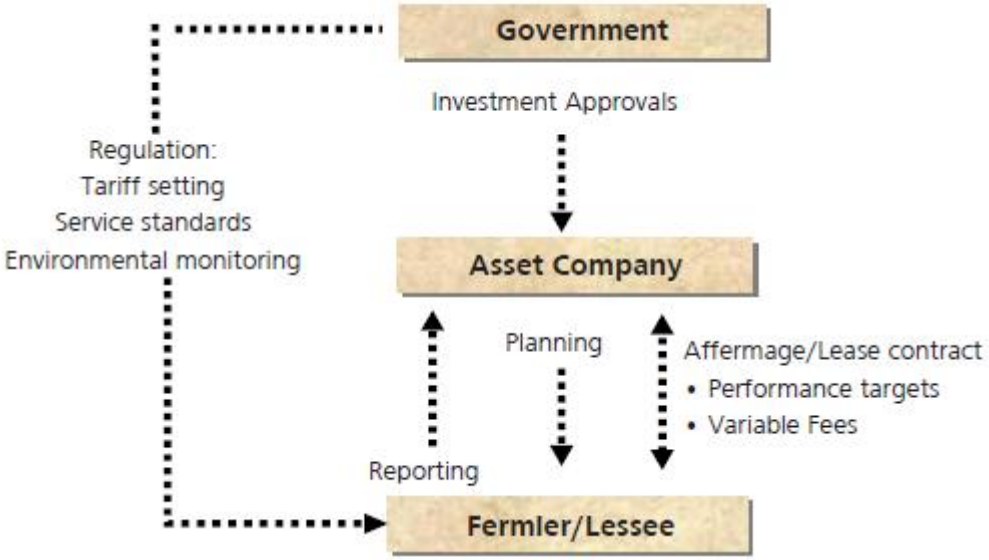

Figure number 3: Structure of lease contract

Source: Felsinger et al., 2008, p. 33

An affermage is similar as lease contract but not the same. Under lessee contract, the private sector retains revenue collected from customers and makes a specific lease payment to the public sector. Under affermage contract, the private sector collects turnover from operating and management of the service and pay a specific lease fee to the authority. Then, the private sector keeps the remaining revenue after it pays an affermage fee to the public sector. '*An affermage allows the private sector to collect revenue from the customers, pays the contracting authority an afferimage fee, and retains the remaining revenue*' (Felsinger et al 2008, p.33). This type of PPPs could be more interesting for the private sector than the lease contract type, because it carries less risk. The private sector is able to use revenue from customers pays to recovery operation and management fee. The lease fee paid to public authority is typically an agreed rate per every unit sold (Felsinger et al 2008, p.33).

Affermage and lease contract have some positive elements. Firstly, the private partner's profit depends on the sales and cost on operation and managing projects. Thus, the private partner has to do its best to make good service and reduce cost. Therefore the consumers, mostly the citizens will get very good service with reasonable price. By this way, the public sector can be sure that the private sector works effectively and efficiently. Further, the public sector receives a certain amount of money to recover the cost of using the infrastructure and asset from the private sector, even though the private sector does not involve in financial investment at the beginning of the project.

However, the weakness of this PPPs options is that private sector might not be interesting in this because they have to pay leasing fee to the public authority no matter if they are earning profit or not. The leasing fee is though also very difficult for both sectors to agree on. On the other hand, the investment capital to start up project still remains on the public sector but not yet mobilized from the private sector.

4.3.4 Concessions:

Figure nr 5. Show the concessions PPPs option.

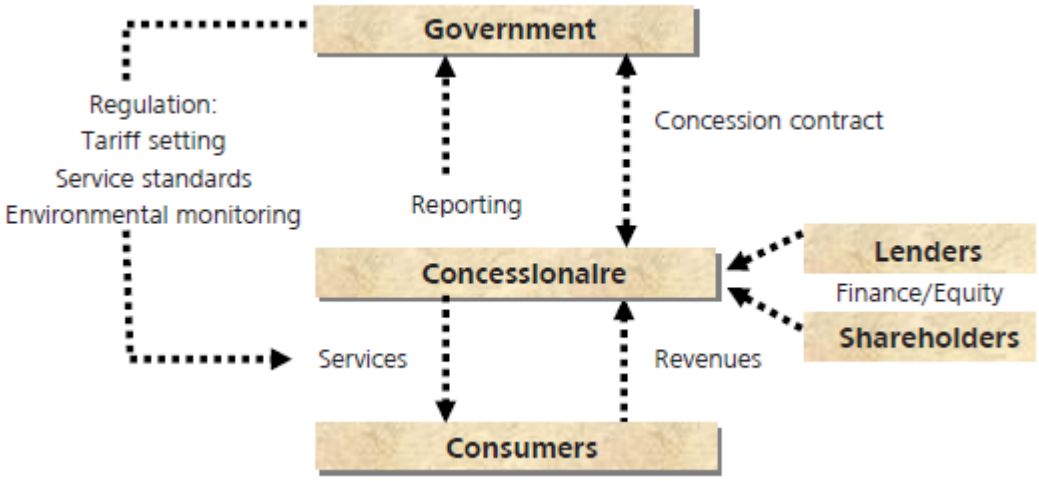

Figure number 4: Structure of concession contract

Source: Felsinger et al., 2008, p. 36

First of all, it needs to be noticed that under concession, the private sector is now responsible for all financial investments. Besides, the private sector also works in full delivery of service, operation, maintenance, collection, management and construction and rehabilitation of the system (Felsinger et al 2008, p.34). Although the private sector invest fully in the project, it is important to emphasize that in most cases, the assets are still owned by the public sector. The public sector takes responsibility to establish performance and quality standard of assets and services. The concessionaire or the private sector earns from fees of service paid by users. The fee rate is agreed with the public sector in the concession contract. This type of PPPs model is normally from 25 to 30 years. Therefore, the fee rate can be agreed to be adjust after a certain years during the concession period. In a few cases when the concessionaire is not able to invest during process, the public sector

may give financial support. Otherwise the private sector has to take responsibility for any type of investment for building assets, maintenances, improvements and expansions of the project. The long period of concession contract gives opportunity for private sector to have enough time to recover investment capital and earn profit on the project.

It is pointed out that the advantage of concession is about private investment capital. With this type of PPPs, the public sector mobilized a great amount of money from the private sector toe build public assets. The private sector involves a lot in the project, which give them opportunity to have a better understanding and controlling the project. This help the private sector to make its own decision on any change or improvement of the project, where they find it is needed.

The disadvantage of concession is that the contract requires defining the operator's activities (Felsinger et al 2008, p.36). It may happen that the private sector only invests and focuses on some parts of the project where they find opportunity to earn profit. However, public goods are contracted not only for profit but also for bringing benefit to the citizens. Thus, a detailed contract has to be agreed between public authority and private sector to point out what the private sector is responsible for. However, it is difficult to design a contract under concession because the period of project under this option is from 25 to 30 years. Many things can happen and change during the contract period such as changes economics, politics, environment, etc. Thus, the contract might has to be reviewed once or more times during the concession period. Another disadvantage of concession is that it does not create a great competition between companies because normally there are only a few big companies will fulfill requirements to bid such a big and long term project.

4.3.5 Build-Operate-Transfer (BOT) and similar arrangements

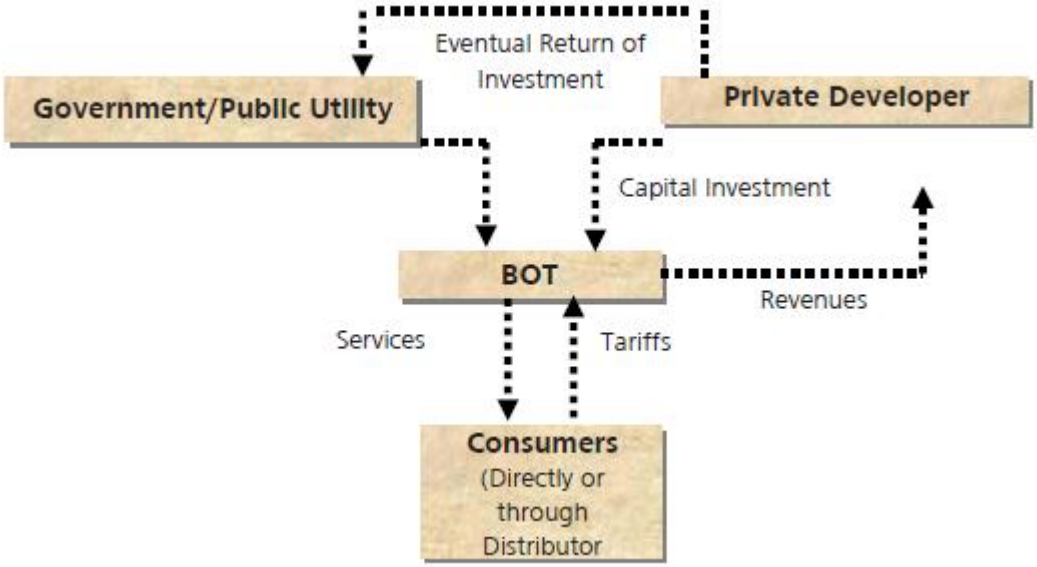

Figure number 5: Structure of a BOT contract

Source: Felsinger et al., 2008, p. 37

'*BOT and similar arrangement are a kind of specialized concession in which a private firm or consortium finances and develops a new infrastructure project or a major component according to performance standards set by the government'* (Felsinger et. al, 2008, p.37).

Under BOT, the private sector invests fully financial capital needed for the project from starting i.e building, new equipment and facility. Felsinger et. al emphasize that under BOT, the private sector might own the assets for a period set by contact. It is an opportunity for private sector to invest in infrastructure and services so that they can recover cost through fees paid by users. Besides, the public sector might consider purchasing some outputs produced so that the private sector can recover a part of financial investment during the BOT contract. At the end of the BOT contract, the public sector have choices to either take over ownership and operate itself, or contract the operating responsibility to private sector.

The main different between BOT and concession option is that concession contract mostly involves extensions and operation of exiting system, while BOT involves a much larger investment because the project start with totally new facilities and assets. Therefore, it is very important and necessary that the public sector can mobilize financial capital from the private sector. The time of transfer

asset under BOT type from the private sector to the public sector depends on local law as well as financial issues.

With BOT contract, the public sector is able to call of investment from private sector to the construction or renovation of infrastructure. Felsinger claims that BOT reduces the commercial risk for the private sector because there is only customer who buys the project at the end: the government, although the citizens are the end-users of services. As mentioned, the private sector has to invest a lot to this type of contract. The main source to recover cost is servies's fee paid by users. A part of cost can be also recovered from government support. From the public sector point of view, BOT is a difficult PPP type because they have to design a very long term contract, which needs to be reviewed during the contract time.

4.3.6 Joint venture:

This type of PPPs is not listed in the table nr1, because it is quite different compared to other PPPs type which were discussed earlier in this project. Under joint venture, the public and private sector seems to be more equal. The assets are owned and operated by both sectors. Public and private sector can form a joint venture company together to work with a specific project and this company may be listed on the stock exchange. One of key elements for success in this PPP type is good corporate governance. Especially, the private sector must have ability to maintain the jobs independently because the public sector might enroll to the company's business to achieve political goals. The structure of joint venture PPP form is illustrated as figure below:

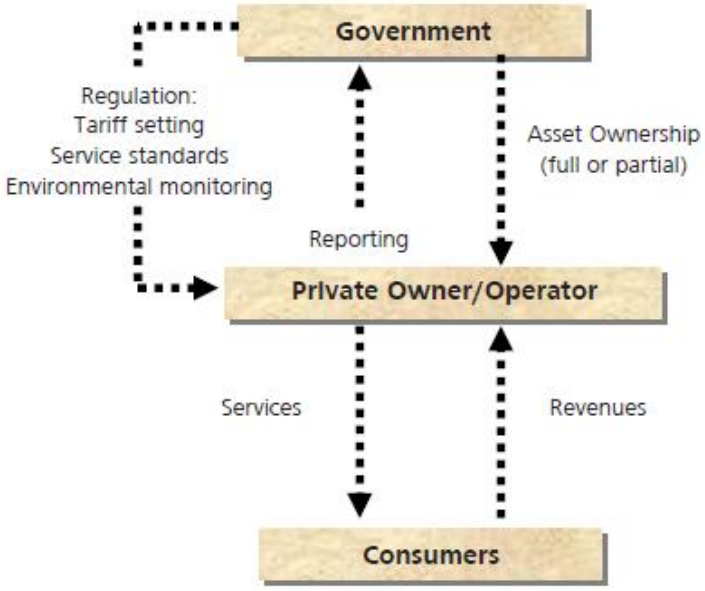

Figure number 6: Structure of joint venture contract

Source: Felsinger et al., 2008, p. 42

Joint venture type of PPP is considered as '*real partnership of the public and private sectors that match the advantages of the private sector with the social concerns and local knowledge of the public sector*' (Felsinger et al., 2008, p. 42). Under joint venture, both public and private sector share investing capital, ownership and responsibility to make the project works efficiency. However, researchers need to know that the equal role of government with the private sector can lead to conflict of interest.

To summary, typical types of PPPs presented above are just suggestion by Felsinger et al (2008). under the infrastructure industry. They argue that the public and private sector can combine those options and adjust the structure to fit specific project. It is important to consider elements of specific market, requirement of the sector based on characteristics of the system, commercial, financial factors, as well as legal and regulation.

4.4 Criticism:

Despite many definitions and explanations can be found, many researchers still claim that it is difficult to understand what PPPs really is. One of the reasons is that theoretical reviews on the relationship between public and private sector seem too broad and too uncritical (Jacobson and Choi, 2008). As mentioned earlier that some authors claim themselves that their definitions are broad and it can cover all type of possible arrangements between public and private sector. On one hand, it is good that definition is broad so that researcher can have an overview of what PPPs possibly is. On the other hand, when researchers want to learn deeply about PPPs, they find it is hard to have a clear picture of PPPs, because PPPs is still something new and very disputable. Nowadays, PPPs is mainly used in the infrastructure so the understanding of PPPs in this industry seems to be clearer. There has been some fine literature review on PPPs used in other sectors, such as health, education, etc., but a category of universal types of PPP is still missing. Researchers, who want to learn about PPPs and apply it to specific cases, have to be flexible to use broad understanding of PPPs to create their own model of PPP, which possibly suit to their cases.

It can be seen that besides the advantage of combining qualities of partners, risk under PPPs is mentioned in literature reviews. Risk sharing is a major consideration for both sectors when they involve in PPPs (Hodge and Greve, 2007). Uncertainty can be understood as a part of risk because of the '*difficulty of obtaining full information about the present and the past, as well as the impossibility of having any certain knowledge about future events* '(Grimsey and Lewis, 2002, p. 247). Zhang (2005) argues that PPPs involve various kinds of risks in different stage of PPPs projects. Economic viability or economic uncertainty is one of them (Zang, 2005). PPPs theory suggests that PPP projects are typically created to improve civil welfare but it also has to bring economic benefit, especially for the private sector. As discussed before, some types of PPPs last for over 10 years, which is very difficult to ensure the possibility to recover cost and bring economic profit to the public authority and private companies. In some special projects, the government can support the private sector by giving foreign exchange guarantee, arrangements against high inflations and interest rate, tax reduction, suitable payment adjustment mechanism, etc. (Zang, 2005, p.7).

With similar understanding of economic uncertainty but in a broader view, Jin and Doloi (2010) write about environmental uncertainty including micro and macro business environment. They refers environmental uncertainty as a 'multidimensional concept and its effects on organizations are

context-specific (Jin and Doloi 2010 – Bourgeois, 1980s; Milliken, 1987). They categorize environment uncertainty of PPPs project into five groups Institutional, Social and industrial, Economic, Organizational, Project-specify. The environment uncertainty under each group is showed in Table nr. 2

Institutional	• Political system stability • Legislative system stability • Approval process
Social and Industrial	• Community attitude • Stability of related industry • Logistics infrastructure availability • Public involvement
Economic	• National economy condition • Financial market maturity • Insurance market maturity • Raw material supply • Workforce supply
Organizational	• Public partners' general experience in similar projects • Public partners' risk attitude • Designer's general experience in similar projects • Operator's general experience in similar projects • etc.
Project – specific	• Project similarity with market precedents • Design flexibility • Project concession duration • etc.

Table number 2: Classification of RM environment uncertainty in PPP projects

Source: Adopted from Jin and Doloi, 2010, p. 712

It can be seen from the table above that there are many factors under each group of environmental uncertainty needed to be considered when designing a PPP programme. Actually, most of these

factors can be studied to measure the level of uncertainty. For example, partners' general experience on similar projects can be learnt by researching if they have ever join similar type of PPP projects before. Logistics infrastructure availability can also be studied through primary and secondary data. What researcher might not be able to study is how these factors change in the future. Logistics infrastructure availability can be low today but technology developments can make it grow very fast in the near future. Policy and regulation can also be changed which might be or might not be positive for PPP's partners. So, the uncertainties can be studied in some extend to define what could be the biggest risk in a specific PPP project. Some factors can be forecast of how it is going to happened or developed in the future in order to define the potential advantages or risks of PPP.

Beside environmental uncertainty, Jin and Doloi (2010) also mention about behavioral uncertainty. They argue that partnership deals with commitment and opportunism, where commitment can serve as a brake to opportunism. '*Organizational commitment is a willingness of partners to make short-term sacrifices to realize long-term benefits in the relationship'* (Jin and Doloi, 2010 – Dwyer et al., 1987; Anderson and Weitz, 1992; Holm et al., 1987). The reason to mention opportunism as a criticism of PPPs is that: *'not everything can be written in to a detailed contract'* (Hodge and Greve, 2007 – Williamson 1985). In international business economics, the behavior uncertainty can be studied under the theory of transaction cost economics (TCE). TCE theory assumes that human agents are given to opportunism, which is a condition of self-interest seeking with guile. It is similar here in the partnership between the public and private sector (Jin and Doloi, 2010, p.709 – Williamson, 1985). The opportunism assumed under the TCE theory is relevant to criticize PPP theory because the public and private partners have different purposes and interests to join PPP. On one hand, the private sector might be opportunism to earn financial profit for their organization. On the other hand, the public sector might be opportunism to achieve political goals. Moreover, one can argue that there is such a big gap between public and private sector in their expectation for a successful project, managing style, investment process, etc. It is not easy for both sectors to agree on all project elements such as project design, term of payment, investment cost, fee rate, labour rate, etc. Even though they have agreed on signed contracts, it can happen opportunisms and environment risks as discussed above.

With organizational view, Osborne (2000) criticize that PPPs contain uncertainty of managing and structure. He argues that it might be hard for partners to manage language and culture. It is not about different languages between countries but it is difference between the organizations or

professional groups. '*Significant misunderstandings can happen between business organizations, between public organizations and between not-for-profit organizations because of the different professional languages and associated values that they work with'* (Osborne, 2000, p. 297). It can be claimed that uncertainty of managing is a similar to uncertainty of different goal between partners, because it also mention about the difference of organizational value. The public sector's value is benefit for the citizen and the environment, while the private sector's value is financial profit. The cultural difference between the two sectors can be understood as the way they work in their own organization. It can be referred to group/individual working, the degree of pressure on time and goal, leadership, etc. It would be hard for the two sectors with two different working style to join a programme that they have to cooperate and create strong relationship there. Osbonre (2000) also mentions about managing trust and power which is already discussed earlier as opportunism factor. Under structure uncertainty, Osbonre (2000) claims that PPPs contain risk of ambiguity, complexity and dynamics. Risk of ambiguity is listed because partners might not understand clearly what PPPs are. Indeed, it is difficult to understand PPPs as the literature views claim that there is no clear definition of PPP, it is rather a new term and there are many way to understand it. The consequence of that is the lack of clarify about who the PPP's members are. The literature reviews on PPP does not show exactly which members should involve in PPP in general. As showed earlier in this project, there are quite clear about partners under PPP in the infrastructure industry but it is very hard to find something like that in other areas. Hence, PPP models should be illustrated with strong knowledge of the industry, knowledge of managing and culture different between partners. Furthers, complexity is an uncertainty under the partnership structure because PPP project can involve many actors and members, which creates a complex network between partners. This network can bring advantage resources for partners but it can create problem if the network is not managed well. So again, the complexity uncertainty is related to the ability of managing organization of PPP partners. On top of that, dynamics is claimed as the cause of challenge magnified. The government policy changes can make some private partners want to leave the PPP but it can be attractive to new partners to join. Changing in members makes changes in PPP organizational structure as well. Thus, PPP structure becomes dynamics. The risks arises that if PPPs partners will be able to manage the new PPP structure and changing in the network.

5. Gap of knowledge:

After review different literatures on partnership in general and in PPPs in particular, the author understand that there have been many literature reviews on this topic. There are not such universal definitions of Partnership and PPPs. They are defined and explained in different ways but there are common thoughts and assumption behind. Both partnership in general and PPP in particular has to have a common goal among partners. They should have mutual trust, cooperation attitude and motivation to archive the common goal. Both partnership and PPP literature reviews assume that there are risks during the cooperation period. These risks can come from partners' behavior, internal organizations of the partnership and external environmental uncertainty. The author claims that the PPPs literature reviews focus mostly on the infrastructure and construction fields. Besides, there are also some literature reviews on PPPs within the health and education sector. It is because the PPPs have been used the most on these areas. However, the author has learnt that PPPs has begun to use in other sectors also, such as health, education, transportation, etc. There is a lack of literature review on PPPs used in these sectors to gain deeper understanding of PPPs. Furthermore, types of PPPs have not been discussed so much in literature reviews. It seems like in each specific PPPs projects, partners would have their own way to design project structure to fit with their needs, expectation and environmental issue.

V. Other frameworks consideration in this project:

1. PESTEL framework:

The PESTEL framework is about to described here as a tool to argue why PPP can support the implementation process of FEVs in Copenhagen municipality.

PESTEL stands for Political, Economic, Social, Technological, Environmental and Legal factors (Henry, 2008). Originally, the Environment and Legal factors were not included but later on, they are added to extend the theory. Regularly, this framework is used to analyze external factors i.e. market analysis, where company wants to introduce a new product there. It can also be used as a tool to help company to define its strategic planning and decision making in a specific market. In this project, PESTEL analysis is used to analyze briefly the Danish market, in order to understand in which extent the market is ready to take the implementation of FEVs. Based on that, it is possible to

consider a strategy to make it is easier for FEVs to be implemented in the Danish market, particular in the Copenhagen municipality. In the following, each factors of PESTEL framework will be described.

The Political factor is referred to government policy through law and regulations. It is also referred to the stability of a government (Henry, 2008). One can claim that in some Western countries, the issue of government's stability is not relevant. In some other countries, where the government and its political system are changing all the time, it is really important to take consideration if it is safe to send people there to work and if it is worth to invest for new products there. Furthermore, law and regulation of a government are relevant to discuss in the Political factor, because it can encourage foreign firm to invest to the country. For some products, the government might give special law, such as tax exemption to make it is easier to enter to the market. Regularly, these products are friendly with the environment or products that the country is lack of, due to low technology or low material resource.

The Economic factor includes everything related to a country's economic situation, such as GDP, inflation, unemployment rate, export and import, etc. It is necessary to scan the Economic factor, before making decision deploying a new product to a country. It is because the economy of a country is not always strong enough to purchase new products, especially those which are very expensive, due to new and high technology. In some cases, the economy of a country is good enough so that the government can make financial support to some sectors or some products which they are beneficial for the country in the future.

The Social factor can be understood as culture and social trend of a country. It is included in the framework, because the society is the end-users of most products. If the society is not open to accept a product, it will be out of the market very fast. In some countries, their culture would not accept products which are not in line with their religion and beliefs. However, it is not always the traditional culture that decides to accept a new product or not. In some cases, it is possible that a global trend of user behavior affects traditional habit of society and makes changes on that.

The Technological factor is the level of technological development of a country. It is about how well the country adopts new technology and makes it as advantage in the industry. Regularly, a very high technological product would not be able to survive in a country with very low technology development. It is because the country is not able to give technical support and therefore it is very

expensive for the firm to bring it forth and back to another country to repair. It is also cheaper to purchase a high technical product in a country where the technology is well developed because it allows the firm to make services and reparation in the same market.

The Environmental factor is added to the traditional PEST analysis, because people in the world start to care more and more for the environment. It can be argued that any product in the market should be made with consideration of protecting the environment. Nowadays many companies are building their green images by making their value chain more and more environmental friend. On the other hand, more and more consumers start to require their suppliers the ability of protecting environment in their producing processes.

The Legal factor is actually subsumed within the Political factor, because it also referred to law and regulations. The difference is that the Legal factor is emphasized the legal or illegal to do something in a country, for example some products are legal to sell in one country but might be illegal to sell in others. The Legal factor can also appear in one or more processes of the value chain, such as marketing activities. In some countries, there are special regulations of how the advertisement should be. If the company does not follow that, the government will make judgment that the marketing activity is illegal. Thus, it is necessary to scan for legal factors before adopting new product to a country.

All factors in the PESTEL framework were just been describe individually but one can argue that there are connections between them. The Social and Environment factor has strong connection to each other because a few persons cannot make effort to protect the environment but there should be a big part or the whole society to do so. To make it happen, the government might want to change some regulations to push the society to take more care of the environment. Furthermore, financial support for particular industries or products cannot be applied if there is no change in the political factor. As pointed out, the Political factor also involves in the Legal factor to make something from legal become illegal and other way around.

This framework is argued as a great tool to apply before a product should be introduced in a new market or country. However, there are some limitations of this theory. One of them is that the PESTEL analysis is not such a shopping- list for what a company should consider all factors individually before going to a new market (Henry, 2008). In fact, it should be looked into the connections and relationship between those factors. Besides, it is not always the truth data of

Economics can be found because some governments might try to hide it to make their economics look good, to attract foreign investors. The Society or culture factor cannot be learnt through papers and documents but it needs a period of time to live in the country, to understand it deeply. It is always a risk in the Political and Legal factors because no one knows if the government will change it tomorrow. In summary, it is fine to use this theory as starting point to scan the most important factors in new market or country where product is supposed to be introduced there. Though, the researchers should not stop looking at it once the product is in the market. The PESTEL analysis should be carried often to catch the news in order to be flexible in strategies.

2. The SWOT method:

The SWOT (Strengths, Weaknesses, Opportunities and Threats) is a tool to evaluate the internal and external marketing environment of a company. The theory is well-known for its simplicity and practicality (Pickton and Wright, 1998). It can be used by business managers to define strategy formulation, managerial decision making and action.

Strengths and Weakness are the two factors including in the internal environment of a company. Strengths of a company are what the company is good at, which give the company advantages over others. In the contrary, Weaknesses are the limitation of a company, what they are not good at. The Strengths and Weaknesses cover all internal factors of a company such as finance, human resource, material resource, equipment, products, places, business model, etc. Obviously, the more strength the company has, the stronger it is in the market place, and another way around. It is argued that each business needs to evaluate its internal strengths and weakness (Kotler and Keller, 2006). Then, the business should try to increase its strength and use it as its advantage to compete with others. At the meanwhile, the weakness factors needs to be reduced as much as possible. In fact, a company does not only analyze its own Strengths and Weaknesses but also use this tool to analyze its competitors. The purpose is to find the competitors' Weaknesses to make it as the advantage for itself, and find the Strengths of the competitors to learn from it.

The external factors of the SWOT analysis are Opportunities and Threats. These are key '*macro environmental forces (demographic – economic, natural, technological, political – legal and social – cultural) and significant micro environment actors (customers, competitors, suppliers, distrutors,*

dealers)', which affect its ability to earn profits (Kotler and Keller, 2006, p. 52). The Opportunities can be defined as trends, forces, events or ideas that the company or unit can capitalize on (Pahl and Richter, 2009). On the other hand, the Threats can be understood as risks and forces which are out of the company's control. Both macro and micro factors mentioned above can be opportunities or threats to a company. The external factors which can be used as advantages for the company are Opportunities. On the contrary, Threats are those external factors which may harm the company and increase its weaknesses.

Although SWOT is used common because of its simplicity, users should consider the criticisms of this method. One of the most important criticisms is that the SWOT '*tends to persuade companies to compile lists rather than think about what is really important to their businesses'* (Pickton and Wright, 1998). On the other words, the theory only presets the list of factors but ignore the relationship between factors (Pahl and Richter, 2009). It means that the company lists all factors under the SWOT theory but forget to analyze and find the relationship between them. In fact, the Strengths and Opportunities of a company have a strong relationship to each other. It is because Opportunities bring advantages to the company. The company then makes these advantages as its Strengths to compete with others. In another way around, Strengths make it is easier for the company to obtain the Opportunities. Similarity, the company who has many weaknesses is more afraid of threats because they will not be able to handle it. Furthers, threats bring disadvantages to the company and make it weaker. The SWOT is also criticized that' *it presents the resulting lists uncritically, without clear prioritization, for example weak opportunities may appear to balance strong threats'* (Pickton and Wright, 1998). Thus, the manager or marketing person who makes SWOT analysis should have knowledge to define whether a factor is important to consider or not.

VI. Introduction of companies interviewed:

1. Post Danmark A/S:

Post Danmark A/S is a logistics and distribution company. It was established in 1995. Post Danmark delivers Letters, parcels and pallets to customers in Denmark. The service provided by Post Danmark is estimated as the best in Europa measured on service level, quality and Price (Post Danmark homepage). The Post law "Postloven", which was established by the Danish government in 2010 with start in 2011, is securing free competition which then secure that all post services which cost money, should take place within Post Danmark, not a third party. The company works from Monday to Saturday, gathering and sorting about 7 million letters and packages every week, these will then be delivered to about 2.7 million houses and 225.000 companies. The company has 15.000 workers, spread out on 700 posthouses and/or post stores. The company is a very important partner to companies, because of it being able to deliver light-weight goods, as business packages, which are a big part of what business normally, use in Denmark. Post Danmark owns 300 lorries, 300 small lorries (4 pallets), 1200 big vans (13 m3), 2000 small vans (3-5 m3). In 2011, three electric vans were purchased by self-financed of Post Danmark and tested in Bornholm, Denmark. The test was to examine the functions of the e- vans for mail delivery purpose. It was a successful test, which brought bright future of EVs in the company. Until 2013, the company owns 50 electric cars, vans and trucks. It also owns 1000 e-scooters and 1800 e-bicycles. Post Danmark is the company that owns the most EVs in Denmark (CPH Post).

2. UPS (United Parcel Service Inc.):

Since the establishment as Delivery Company in USA, 1907, UPS has grown into a Multi-Billion company, which focus on providing the global world with packages to companies, shops and private customers. The company delivers any non-restricted goods, business to business, business to customers (i.e. internet shopping). Today UPS is one of the biggest and most well-known brands in the world. The company operates every day in more than 200 countries all over the world. UPS started with delivery by cars, then small planes, to bigger planes and continuing into the globalized IT network. In 1975, UPS grew internationally, starting with their neibour market in Toronto (Canada). Hereafter, the company moved into Germany to do activities there, before in the mid of the 80's, the company really started to take off into becoming a global market mover. UPS is

committed to operate their business in a socially, environmentally and economically responsible manner (UPS homepage). In the greater Copenhagen area, UPS has 60 package cars and vans operating and delivery 11.000 – 12.000 packages every day. UPS is using EVs in the US and some countries in EU: England, Germany and Amsterdam but not in Denmark yet.

3. Danske Fragtænd A/S:

Danske Fragtmænd is known that an effective distribution of goods to companies, is one of the ways the companies can differ from one another in competition, it is not without reason, that more than 40.000 customers has chosen the logistical system of Fragtmand for the delivery of their goods.What Danske Fragtmand can offer is a complete area of logistical solutions to mainly the Danish Business area. Danske Fragtmand has: 3.000 Workers, 1.600 Trucks, 9.1 Million Deliveries Yearly, 25 Terminals, 20 Stock-Hotels and 40.000 Business Customers. The ground stone to the business that developed into being Danske Fragtmænd was laid more than 100 years ago. It was when in these years the first fruit routes was established in Denmark, which went from store to store. It should be mentioned that in this period of time, all transportation went with either horse wagon or train. Then the company started growing bigger and bigger, and in the late 1980's, they started expanding into three main areas for doing business, which where: Sealand, Fyn and Jutland. The company has been looking into EVs in the past 10 years but it did not purchase EVs because of high price.

VII. Analysis chapter:

1. PESTEL analysis:

As pointed out, the PESTEL framework is regularly used to analyze a new market in other to shape up a strategy for a new product coming in to that market. In this project, it will not be used as traditional way as a concept but rather as a context to analyze the possibility of faster market uptake for the product. The context of PESTEL analysis is also used to argue why it should be a relationship and working together between the public and private sector. In fact, FEVs are already in the Danish market. They are not totally new so that researcher should look up on the PESTEL analysis on the country level to decide if it is good or not to bring FEVs to the market. Problem is that even though the product is on the market, the technology and its concept is still quite new to people, not just in Denmark but also in other countries. Hence, it is needed to use the context of PESTEL theory to exam how much the market is aware of this product. It means that the PESTEL analysis will be carried by using data that is most relevant to FEVs. Based on that, it is possible to define a kind of generic strategy to help on implementation process on FEVs.

Firstly, the Political factor should be discussed. In this case, the focuses are current laws and regulations of the Danish governments and Copenhagen Authority for EVs and FEVs, as well as general strategy on protecting environment. Laws and regulations for EVs are also mentioned here because FEV is a part of EV. One of the Danish government supports for EVs and FEVs is that there is register-fee exemption for EVs. In Denmark, all vehicles purchased have to be registered with fees. For vans, the fee is 50% of the purchase value above 16.900 DKK. For trucks it is 30% of purchase value above 34.100 DKK (Skat, Denmark). The register-fee exemption for EVs will be available, at least until 2015, in order to encourage people to purchase EVs (Daniel Bergsagel, 2010). It can be claim that taxes in Denmark is very high compared to other countries. Thus, register fee exemption on purchasing price of FEVs is a great help for companies, since the price of FEVs is already very high (almost double as ICE Freight Vehicles). Moreover, a few Danish cities among Odense and Frederiksebirg municipality allow EVs to park free (FDT, 2012). Copenhagen city also exempted EVs from parking fee until December 2011. Unfortunately, the exemption is no longer available, because there is no such a legal for exempting electric cars from payment within the payment area (København kummune). Besides, the Danish government and Copenhagen Authority have launched several projects to support EVs and FEVs. One of them is the City logistik

projekt – København (The City Logistic Project in Copenhagen). There are 17 participants in this project, including the Copenhagen authority, committee, shipping and freight associations, universities, etc. The aim of this project is to 'create an innovative and green transportation and logistics services that reduce noise pollution, greenhouse gas emissions and air pollution, as well as improve road safety and create a better urban environment by reducing the heavy traffic in the inner city' (City Logistik KBH). Regarding to EVs, the City Logistik Projekt focuses on optimizing the distribution planning of the EV resources. It is one of the ways to create a sustainable solution for green city distribution.

The Economical factor is usually discussed based on GDP, inflation, currency exchanges, etc. of a country. In spite of that, in this project, the Economical factor is referred to how much the government has put out for projects which aims on protecting environment in general, and to support EVs in particular. The climate plan for 2025 is already published, which contains overall plans and strategies to save energy, reduce CO2, in order to make Copenhagen as a green and smart city (City of Copenhagen homepage). The needed financial invest for this plan up to 2025 is expected around 2.7 billion DKK (Copenhagen Climate plan). This amount will be divided in many different areas such as energy, green mobility (including EVs), city administration initiative, etc. The Danish government has been putting effort on testing EVs by giving financial support for companies and private users to use and test EVs. There were totally about 35 million DKK from 2008 to 2012 to do this test. EVs tested includes cars, vans, minibus, a and lorries. This support is not only for purchasing the vehicles but also for additional cost to operating EVs such as charging, consultancy fees for analysis, monitoring, documentation and general knowledge – building. On one hand, The test is expected to find out advantage and disadvantage to use EVs in practice. On the other hand, it is to gain knowledge and experience of driving EVs. (Danish energy agency).The companies involved in these projects were Peter Skafte Aps (1.000.000 DKK subsidence), SEAS-NVE (169.000 DKK subsidence), TRE-FOR A/S (339.907 DKK subsidence). In line with environment area, the Low Emission Zone were establish in some big cities in Denmark: Copenhagen, Frederiksberg, Aarhus, Aalborg and Odense. In these zones, it is required particulate filters on diesel vehicles which are over 3 tons. These vehicles have to be fitted with an environmental zone mark before they can run in the zone. Exemption of particulate filters is applied for vehicles from the defense, police and rescue service, where these vehicles usually do not enter this zone. To control this law, police is required to keep an eye on whether the vehicles over 3 tons have a valid green zone mark while they are running in the environmental zones (miljozone.dk).

The Social factor in this project can be referred to the society's thinking towards the importance of protecting the environment. Specifically, it is referred to the social trend towards EVs or other type of vehicles, which run by more natural power and produce less pollution and noise. Thus, the Environmental factor is included here together with the Social factor. In fact, Denmark is one of the most active countries in protecting environment. In December 2009, the 2009 United Nations Climate Change Conference was held in Copenhagen. In this conference, it is underlined that climate change is one of the great challenges of our time. Everyone needs to give a hand to protect the environment and rich countries should provide funds to help developing countries to cut down CO2 emission. As one of results of the conference, Climate Consortium Denmark was established, as a Public Private Partnership programme to promote the Danish clean-tech solutions to the climate challenges. Moreover, The Environmental Protection Agency is established under the Danish Ministry of Environment. The missions of this agency are: advising the government on environment initiatives, developing and administering rules nationally and internationally, dialogue with public and companies concerning environment protection, and finally collating and disseminating knowledge about the environment (The Danish Ministry of the Environment/ Environmental Protection Agency homepage). As mentioned, the Climate plan Copenhagen 2025 is a clear evidence for serious consideration of protecting the environment in Denmark and Copenhagen. According to the plan, Copenhagen will be carbon neutral by 2025. The total CO2 reductions will be 1.2 million tons, as result of the Climate plan. Energy production is planned to be the biggest area to drop down CO2 produced – 74% of the total CO2 reduction. At the meanwhile, CO2 reduction in the green mobility (including EVs) is planned to cover 11% of the total and followed by energy consumption, new initiatives and city administration initiatives. Concerning the green mobility area, it is planned to continue developing Copenhagen as City of Cyclists, using new fuels in the transport sector, developing public transport and implementing Intelligent Traffic Systems and traffic information. The detailed goals for 2025 within the Green mobility in Copenhagen are: 75% of journeys are done on foot, by bike or by public transport, 50% of all journeys to work or education are done by bike, 20% more passengers using public transport compare to 2009, public transport is carbon neutral, 20-30% of all light vehicles and 30-40% of all heavy vehicles using new fuels (power, hydrogen, biofuels) (Copenhagen Climate plan). From the private sector point of view, all 3 companies whom were interviewed said that environment is a very important element to consider nowadays. According to UPS's acknowledge, green and sustainable profile of a company is necessary in today's market place. A lot of customers have environmental strategy and they are

looking for partners who can support their own initiatives in the field. UPS expresses that EVs is very important for the company and it is becoming bigger part of their organization. UPS believes that 20% of their overall routes can be carried out by EVs. Likewise, Post Danmark plans that it should be a reduction of CO2 produced by the company of 40% until 2020. The company puts a lot of effort on testing FEVs, even without financial support from the government. Until 2012, Post Danmark owns 50 FEVs, 1000 e-scooters and 1800 e-bicycles. Fragtmænd has been looking into EVs for 10 years now to find the way to reduce their CO2 but they did not purchase any EVs due to high price. So, it looks like not only the public sector – the government and city authority but also the companies and probably the citizen in Denmark/Copenhagen have been thinking toward the importance of protecting environment nowadays.

Technological factor can be understood as the technological development, which can support to the green growth of the country/city and especially to support EVs. One can claim that the green growth of Copenhagen city is rising dramatically. As mentioned earlier, it is planned to make Copenhagen as the world's first carbon neutral city. This plan will be done will strong support from green solution technologies, for example wind power, which Denmark is well known for. Concerning EVs, the development of EVs technology in Denmark started in 1985, where an engineer, Steen V. Jensen presented the very first electric car in this country to the public. After that, an electric car factory was established in Randers, Denmark under a continuous project on EVs with the investment of private sector of approximately 90 million DKK (Danish Electronic Cars Committee). Unfortunately the factory has been moved to Germany now. However, it cannot be denied that the EVs' technology in Denmark begun long time ago. Nowadays, Denmark is still very active in research and development in EVs technology via different projects and programme both in national level and international level, for example ERA-NET Electro mobility, the Interreg IVB North Sea Region Programme, etc. It should be stress out that the EVs technology is not only the technology that used to produce EVs but also to support the development and implementation of EVs such as charging infrastructure. There are already several companies that invest in this area and one of them is Better Place. The biggest European launch of Battery Swap Station took place in Denmark (FDT, 2013). There are 30 biggest cities in Denmark has been chosen by Better Place to install charging points. They are in the most attraction place such as shopping centers, parks, zoos, hotels, etc.

In summary, green environment is considered seriously in Denmark. Many plans, projects, investments have been making to promote and develop green technology solutions, to reduce CO2 and to increase awareness to the citizen about the importance of protecting environment. There are concrete laws and regulations supporting the climate change plan and specifically to support EVs. The EVs' technology in Denmark is not one of the best in the world, but the country has great advantage in clean technology solution, for instance wind power. The high attitude towards green environment of Denmark is a very strong motivation for investors to bring their ideas, knowledge, technology and capital to invest in this country. This is a good strategy to boost up the process to archive goals of climate change plan. It is important to note that the government and city authorities are not the only players in this process. The private sectors/investors who are business companies and citizen are also involved in almost all factors of the PESTEL theory. Therefore, it is necessary that all players work together to archive a common goal: a green and smart city. As a part of green mobility, the implementation of EVs also needs a cooperation/partnership between public and private sector to contribute a faster market uptake. This is argument for why PPP has been chosen as a main topic to discuss in this project, as a part of the implementation FEVs in Copenhagen.

2. Risks of using FEVs and difficulties to implement FEVs:

In order to answer the question: 'How can PPP support the implementation process of FEVs in Copenhagen', the risks of using FEVs and difficulties to implement FEVs to practice will be elaborated. This is the basis to design a PPP model which can help to reduce those risks and difficulty. A PPP model will be illustrated and explained. The construct of this model is also based on types of PPPs discussed in the literature review.

Risk and difficulty of finance:

It has been mentioned several times in this project that purchase cost of FEVs is very high, approximately double price as ICE vehicles. It can be claimed as the most difficult barrier for company to purchase FEVs. Not just that, cost of repairing FEVs is also very high because EVs technique is not as developed as ICEs. It gives consequence that price of company's services or products will be increased, in order to balance with investment cost. This is problem for company because its customers would not be satisfied to pay more for the same service's quality, even

though it is more ‘green’. Elaborating about this, Fragtmænd said that they have been looking into EVs over the past 10 years but they did not buy because it is too expensive. About 98% of their customers are looking at the price and delivery service. So if price is a bit higher because the company is driving FEVs, very few customers would be interested in this. In the interview, UPS also express their concern about high price of FEVs. It is mentioned that UPS owns about 2000 electric vehicles but none of them were purchased and used in Denmark. The reason is that the Danish government did not really have a financial support for companies. UPS receives funding in London and Amsterdam so that they can afford to purchase EVs. The same as Fragmænd, UPS elaborate that the company does not want to increase the service cost because they know the customer would not want to pay for this extra cost. For UPS, it would not be a good idea to share investment cost to customer by increase the service price. Thus, the company hopes for financial support from the Danish government.

In fact, there are several companies in Denmark who have strong attitude on protecting the environment and has strong financial enough to purchase FEVs on their own such as Post Danmark, because the company see FEVs as promising vehicles to invest in to be the first runner. Others might be interested in if there is financial subsidence to support them, meaning that they want to share risk on financial to the government.

Risk on technique issues:

As mentioned, the FEVs concept is great but the technology of batteries, ranges and weight of the vehicles is not the best at the moment. It is claimed that the battery cannot last the whole working day. Additionally, the average operating range is only 130-150 km (FDT, 2012). For transportation companies, this range is not visible to drive between cities so FEVs can only be used inside the inner city. In order to do this, the company has to unload goods from ICE trucks at a loading center and then transfer goods to FEVs. From that, FEVs can be used to distribute in the inner city. Beside the time consuming to unload and re-load goods, problem might occur that the company does not have enough volume to get benefit from switching to FEVs to the inner city. It means that FEVs can be used very little, compared to how much money the company has to invest on this, even if there is a subsidence. For big companies who has to travel in and out the city many times a day, the FEVs’ operating range is not possible for them to make all trips using the same FEVs because the vehicles cannot be drove more than 150km and the battery cannot last the whole day. Another problem is referred to the heating system of the FEVs. It is not all type of FEVs which has criticism that the

heating system does not work well, but it happens at least to Mercedes-Benz (FDT, 2012). It is a disadvantage for transportation companies because the winter in Denmark is very cold. The low temperature can also increase the consuming of battery capacity which gives an extra risk for companies in the winter. Concerning general technology of FEVs, it normally takes long time to repair FEVs because there are only some garages where they know technical specification of FEVs in order to fix them. The time consuming to repair FEVs is claimed up to 4 months in a test in Copenhagen with Fiat van. It is obviously too much for transportation companies, especially if there is not just one truck broke down. Due to the limited of technology, cost of fixing FEVs is believed very high, which can be added in financial risk. Not just that, it happened in a test in Frederiksberg that technical error of battery was not corrected satisfactory. In some cases, technical error reparation fee is covered by the manufacturers but sometimes it is very hard to define in the contract that who pays for which type of technical problems, since FEVs is also new product for the manufacturers. Thus, they are not well prepared for potential technique might occur. Moreover, the infrastructure for EVs as well as FEVs is not developed fast enough so that a huge amount of FEVs can be deployed right now. The public charging points are invested and has been installed in the most 30 biggest cities in Denmark but they are not yet everywhere so that it is convenient for user to charge. In case that company wants to use many FEVs, it is probably more convenient to own charger so that the vehicles can be charged in the night or any time where it is not used, for example lunch break. Then, it again create problem about cost of installing charger, which companies probably do not to pay for. Another difficulty to drive in FEVs, which can fall under the technique factor, is that FEVs is very heavy. It means that it is not possible to put many heavy parcels on that. If it is over 12 tons, the vehicle cannot enter to Copenhagen city area (interview with Fragtmænd). Even if parcels are not heavy, the size of FEVs is quite smaller compared to ICE vehicles. In the Danish market, typical size of FEVs is less than 4 tons. With that small size, transportation companies might have to travel more rounds in a day, meaning that labour cost will increase. In some companies, FEVs might fit well with their business because they deliver small parcels and the company use small ICE vans anyway. Then, it would not be a very big problem for them to switch to FEVs with the same size. For very big companies which transport huge amount of goods every day to the inner city, it would be hard for them to pay more for labour cost in order to switch to smaller vehicles.

It can be seen that there are barriers about finance and there are a lot of technical issues which make FEVs become really difficult to be used in practice. However, FEVs or EVs in general is claimed as

promising vehicles because it is expected that in the future, cost of EVs will be cheaper than ICE vehicles, even without any subsidence. The technical is also expected to be improved so that FEVs are comfortable to use as much as ICE vehicles. Until then, EVs including FEVs are should be implemented broadly, at least it is planned to be in Copenhagen municipality so that companies and society is aware of the benefit it can give to the environment. It is not easy to convince the private sector to invest in such a new type of vehicles, as it contains many risks for them at the moment. Thus, the PPP should be designed so that the government can share risks with the companies. The PPP model should bring mutual benefit for both sectors so that they can work together to archive a common goal: reduce CO2 to protect the environment.

3. PPP model suggestion:

As described in the literature review, there should be a products, service or assets created under a PPP programme. However, PPP is applied in this project differently. FEVs are already in the market so they do not need to be built. The 'task' has to be made in this PPP is to encourage the transportation companies to purchase more FEVs to use in their fleets. This task is in line with the plan from the Copenhagen Authority in the climate change, to increase the number of green fuels vehicles in this city. An illustration of PPP model suggested to support the implementation of FEVs in Copenhagen is showed in figure xx

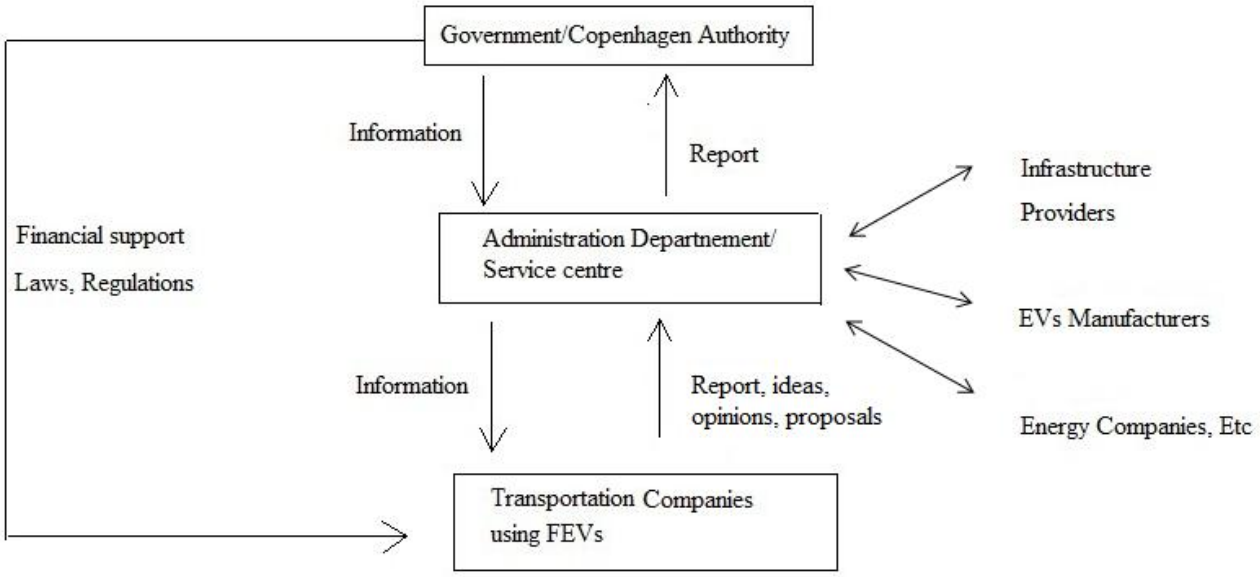

Figure number 7: PPP model, own creation

From the figure above, it can be seen that there are three mains partners involved in the PPP. They are the government/authority, administration and transportation companies (users). The government and authority are from the public sector. On one hand, they are the policy maker who can change laws and regulations so that they give opportunity and advantage for FEVs and the companies who use FEVs. There are several potential regulations which can increase the interesting of FEVs from companies, for instance FEVs can run in bus lane, free parking in the city, FEVs delivering in the night or very early in the morning, urban consolidation center for FEVs, etc. On the other hand, they are also the investors in this PPP. The reason is that FEVs are about double price as ICE Vehicles. During the interviews with three transportation companies and also from the secondary data researched, it seems like price of FEVs is the biggest issue when a company wants to invest in that. Therefore there is a need of financial support from the government on the purchase price of FEVs. As mentioned earlier, the Danish government gives free register fee for EVs but it would be better if there is a fund to support purchase price as well. In this sense, the government/ authority become investors. As investors, there is an option that the government purchases many FEVs and rent it out to companies. However this method gives too much risk to the government. The meaning of this project tends to encourage the company to purchase and own the vehicles. In this way, the financial risk is share between the public and private sector.

The next partner who stays between the government and the user is the administrative department. It is established only for this PPP programme. It can be understood as 'a bridge' or the middle man to help the government and the users to work better together in this PPP. This department can be established under public sector or a combination of public and private sector. In the administrative department, information of FEVs and potentially other type of EVs is collected. It is the place where companies and private users can ask questions about EVs, for example how long it can drive, how long it take to charge, special function of the vehicles, the price, the technical issue, etc. All relevant information of EVs should be able to gather in one department. Potentially, this department can hold information day of EVs in exhibitions. It is necessary to do at the beginning of the implementation process of FEVs. It is because not all companies and people are aware of EVs and its benefit. Obviously, they can come to the producers or sellers to ask this kind of questions. However, an information department as such can help to create better awareness of EVs to the society. This is to promote EVs and that EVs/FEVs are on the process to be implemented in the market. Beside the general information of FEVs, this department is responsible for choosing companies to join this PPP with the public sector. It is a bit similar as bidding process for a regular

PPP project. The difference is that there will be more than one company chosen. It is because the meaning of this PPP is not that there will be only one company purchase FEVs but many should do that to increase the number of FEVs driven in the stress, to reduce CO2 and gas consumed. If the fund for this PPP programme is big enough, all companies who interested in purchasing FEVs can receive financial support from the government, as they all receive free registration fee now. In case the fund is not big enough, there should be some criteria to choose companies to give financial support. One of potential criteria can be that the company has to make report and give feedback about FEVs. The report might contain analysis of total ownership cost (TOC) of FEVs, problems during using and advantages. This report can be used by the public sector to promote for FEVs, for example if the TOC of FEVs is lower compared to ICE Vehicles, or there are many advantages of FEVs tested by practice uses. On the other hand, problems of using FEVs can be collected from reports so that both public and private sector can work together to find solution to solve or to improve barriers of using FEVs. In this way, it can be ensure that the company does not just take the financial support and purchase FEVs on the purpose of brands promotion. The company has to implement FEVs to their fleet and make report as described. The quality of report can be evaluated by the administration department. This department is also responsible to report to the government all detailed issues during PPP period. It can be the feedback and report from the company about FEVs, technical barriers, infrastructure issues, bidding process to choose company to receive financial support, etc.

The reason why the administration department is mentioned as a combination of public and private sector is that many areas and tasks under this department can be carried by both sectors: collecting information about FEVs, check the quality of report, etc. However, some tasks are believed to be done better by the private sector such as technical support. Public sector is also better to involve in other task such as introduce list of criteria used to choose companies to receive the fund. Furthers, an administration department where both public and private sector involve can present and ensure the benefit for both sectors. Through this department, information about changes in laws and regulation related to EVs and FEVs is transferred to the private sectors. In the meantime, the administration department can help private partners to bring their proposing in financial support, opinions on law changed to the public sector. Moreover, administration department can help to build relationship between the two sectors so that they cooperate better not just in this PPP programme designed for FEVs in Copenhagen, but also other PPP projects in the future.

The last partner involved in this PPP programme is the users. In this case, the users are not the citizens but the transport companies who do business in the city. The companies might transport good to business consumers or private customers or both. These companies can be categorized under the private sector. Although there are some transport companies which is partly owned by the government, they are still under the private sector if their bottom line is financial profit. The size of companies is not important to include here because any transportation company use trucks/van, which is possible to switch to FEVs. The main concern about these companies is that they should be interested in protecting environment and give a hand in create a green and smart city. On the other hand, their financial issue should be good enough so that they are able to invest in FEVs, which is very expensive, even with financial support from the public sector. These companies apply for financial fund, implement FEVs to their fleet and potentially make report to the administration department. Besides, they can join exhibitions and events with the administration department, where they give information to public about EVs. In this way, the company does not just promote its brand but also help the public sector to promote EVs to the society.

Beside those three main partners, it can be seen in the illustrative figure that there are other actors who involve in the EVs sector such as infrastructure providers, shops, EVs manufacturers. In this project, these actors are not considered as main players in PPP. However, they support to increase the quality of PPP. So, the administration department have an extra function is to connect these relevant actors to the public and private sector so that they can exchange information to create a better network in PPP.

In summary, the PPP model suggested in this project looks quite similar as the management contract type of PPP from the literature review. The point is that there are three main players involved which are the government, administration department and private sector. The administration department can be understood as service providers somehow, because they give information about EVs to the society and provide reports and feedback to the government. From the management contract type of PPP showed earlier, it can be seen that the government gives regulation and investment. In this project, the government investment is revised so that the government only gives partly investment of the product (FEVs) and the private sector invests the rest of it. In this project, there is also included management activity between the private sector (users) and service provider (administration provider). However, it has to be stressed the meaning of PPP in this project is not the same as the management contract, although the model looks similar.

Asset under the management contract is owned by the public sector, while FEVs in this project is owned by the private sector (transportation companies). With the suggested form of PPP in this project, it is expected that the FEVs will be promoted to the society through information center under the administration department. It will be easier for everyone or companies to learn about EVs and its benefit to the environment. The PPP is expected to get financial and policy support from the public sector. Under this PPP framework, FEVs has more opportunity to be implemented in the market because the companies get financial support from the government. It is also expected that under this PPP, the government get feedback from the companies about policies which can create more advantage for the one who uses FEVs.

4. SWOT analysis on companies who join PPP proposed by public sector to support the implementation process of EVs in Copenhagen municipality:

In order to answer question: 'Why should transportation companies join the PPP proposed by the public authority to support the implementation process of FEVs in Copenhagen', the context of SWOT method will be used. As pointed out in the theory description, the SWOT analysis is used to evaluate the internal and external environment of a company. It can be seen that in this project, there is no company is used as a case study. The three companies were interviewed to get information and gain knowledge about urban challenges, their attitude towards green image and environment. It is not a focus to analyze any of these companies individually. The SWOT method is going to be applied to evaluate potential Strengths, Weaknesses, Opportunities and Threats, when a company joins the PPP proposed by the public authority to support the implementation process of FEVs' in Copenhagen. It should be understood as a broad and general evaluation, because it does not focus to any specific case. In practice, there are many more factors related to a specific company which can affect to the evaluation but at least in this project, the evaluation is carried in order to convince all type of transportation companies to join the PPP programme proposed. This PPP model is only a suggested idea for this project and it is not yet deployed in practice. Thus, it can be assumed that Strengths and Opportunities is the same, because Strengths are potential factors which can be understood as opportunities in the future. Similarity, Weaknesses and Threats will be discussed together, because potential Weaknesses are Threats.

Strengths or Opportunities are the potential advantages which a company gets, when it joins this PPP. As mentioned, the partnership with the public sector will give resource advantage to the private company. Resource is one of the key factors, which create competitive advantage for a company. In the PPP model proposed for implementation FEVs, there are three types of resources the company can get: finance, policy and knowledge. It is clear that the company get financial advantage if it receives financial support for purchase price of FEVs. As it is now, all companies who purchase new FEVs do not pay the registration fee, which is already an advantage. The financial support in purchase price would be an additional factor to make them more interested in FEVs. In case the financial fund is not for support all companies to buy FEVs, the one who fulfill criteria to join the PPP has financial advantage over the others, because purchase price is lower.

Policy support from the government is also what the company can take as resource advantage. Potential laws to encourage uses of FEVs could be that FEVs can park free in the inner city, drive in bus lanes and they are allowed to drive to the city in the night time (typically from 10pm to 7am), etc. The night time delivery is a promising idea to benefit the city and the transportation company. It decreases congestion because of fewer vehicles driven in the streets. Also, it decrease the emission produced in the day time. The night time delivery reduces delays of logistics providers, because it can use free roads' capacity in the night (NICHES Consortium). Thus, transportation companies reduce time consuming in their business. Moreover, the road safety will be increased by this method because there will be less vehicles running on the road in the day. One of the problems to deploy night delivery to real life is that it requires the transportation companies to have quite vehicles and loading equipment (NICHES Consortium). However, FEV is claimed as a quiet vehicle (FDT, 2012), so it can be used for night delivering. Transportation companies who join PPP have opportunities to bring their suggestions on how regulations should be changed to give more support to FEVs. Night distribution or city logistics center is what transportation companies under this PPP programme might be able to affect the public sector to implement. It is because companies get close to each other and try to solve common problems which all face with such as traffic jam, parking places, delivery windows, etc. The administration department can hold meeting where relevant actors have chance to meet up and talk about current situation of FEVs to find solutions. It would be more efficient than each individual actor try to solve problems which others have the same. They should be gathered under one organization, in this case it is the administration department of PPP, to improve FEVs and bring it more benefit to use.

Furthermore, knowledge of FEVs is what companies can gain in this PPP programme. This knowledge is also referred to experience by using FEVs by the companies. Even though information about FEVs is available on Internet and other sources, it would be easier and more convenience that the company get knowledge through the administration department of PPP programme. According to the climate change plan, the goal of Copenhagen is to switch diesel vehicles to new fuels vehicles (EVs is a type of new fuels vehicles). It seems like sooner or later in the future, new fuels vehicles will be forced to use by everyone. Therefore the company will gain knowledge advantage if they really put effort to FEVs from now to learn and get experience with it. By implementation FEVs already from now, the company will be first runner not just in knowledge, but also in experience and technology of the future vehicles in the logistics industry. Under this PPP, information and knowledge is expected to transfer between transportation companies, government and other actors who involve in technique and infrastructure support to FEVs.

Another advantage which company benefit from joining this PPP is that FEVs can support to promote the company's brand. As we all know, the green image of a company, how much it care for the environment, the planet and people has become a marketing trend for a lot of companies. The theory Cooperate Social Responsibility is mentioned in many companies' year report as an evidence of how important it is that the company has to take care of the environment in their business. The triple bottom line theory also supports this trend that beside profit, companies is responsible for planet and people. Hence, it can be seen that more and more companies nowadays are trying to build green image for their brands and products. Since FEVs is built based as friendly to the environment, it can be used to support the company's marketing campaign to promote that it put effort to protect the environment. In some cases, customers are the one who care a lot about the environment. Thus, the suppliers or the companies have to be able to show that they do care about the environment, too. It is one of the ways to create a sustainable business, which is encouraged strongly in many countries nowadays. The transportation companies who join PPP programme have opportunities to participate in conference or exhibitions which can be held by the public sector to promote EVs and FEVs. By this way, the company also promote themselves to the society.

As discussed earlier, financial risk is the most concern of company to buy FEVs. That is the reason why financial support from the government is included in PPP model to share financial risk with the private sector. It is absolutely a great advantage for companies to join the PPP to reduce the investment cost. However, it is not sure about how big that support is. If it does not make FEVs has

equal price as ICE trucks, transportation companies still have to pay an additional amount when they switch from ICE to FEVs. This additional amount can be a potential threat for them, especially for those who do not have big financial capital. For companies, who have exuberant capital and prepared to invest in FEVs, the additional cost for buying FEVs should not be a big risk. For those small companies, investing in FEVs can harm its capital if it does not prepare well for this investment. So, concern the financial aspect, the PPP can bring both Strength and Threat for companies.

As mentioned, EVs technology and the infrastructure support for EVs are not very developed now. Technical problem occurs not just in Denmark but also other countries in the world. Technical problems are operating range, size, battery, heating and other technical errors which are causes for the vehicle broke down. In order to improve these problems, the administration department is included in PPP model. On one hand, this department is not just to give information of FEVs to potential users of FEVs. On the other hand, it is used to connect the transportation companies with the government and other actors who are potentially involve in FEVs industry, for example: investors of charging points, manufacturers of FEVs, the Danish energy agency, etc. The transportation companies get closer to the manufacturers or dealers of FEVs, in order to make it is easier, faster and cheaper to solve technical problems. There are potentially trainings of technical problem shooting on FEVs held by the manufacturers.

Besides benefit transportation companies get from this PPP, potential weaknesses and threats should be discussed so that the companies get better view of PPP and be aware of problems they might face with.

As pointed out, financial factor can be risk if financial support from the government is not big enough and if the companies' capital is not ready for this investment. Technical risk can be improved by the cooperation between sectors under the PPP programme as well as supportive actors who involve in the EV sector: EV manufactures, infrastructure providers, etc. Also, price of FEVs is expected to drop down because technology of EVs will be developed. However, we don't know yet how fast the EVs technology will be developed, concerning Denmark and other markets. Thus, it is uncertainty of technology risk and price in the future.

Beside the risk concerning FEVs, risk of being partnership with the public sector should be discussed as well. In the literature review, one of the PPP risk is that partners have different interest

and purpose to join the programme. In this project, both public and private sector try to archive a goal, is to deploy FEVs. In spite of that, the purpose behind that effort might be different between the public and private sectors. For public sector, the most output of the PPP is to protect environment, because FEVs produce less emissions: CO2, noise and other pollutions. In the meanwhile, the private sector focuses the most on financial profit. As mentioned, Fragtmand has been researching about EVs for 10 years now but they still did not purchase it. The reason is that it would make its service become more expensive and it might get risk of losing customers, because price of service is the most concern of the customers. Fragtmænd expresses that it is very fine to have a green image of the brand. It is for sure customers will be happy for that as well. But the final concern is still the price, and of courses, the quality of service. If companies think in this way, PPP will only work if the subsidence makes price of FEVs more or less the same as ICE trucks/van. Concerning the political factors, this PPP model suggests several ideas to support FEVs, for instance night distribution, urban logistics centers, free parking place for FEVs, etc. It is also suggested that the companies work together to affect the law changes. However, the changes in laws still depend mostly in the government and city authority plans. It means that the public sector has much stronger power than the private sector in political factors. As it looks now in the climate change plan that the government and Copenhagen authority has made serious plan to increase new fuels vehicles using. Thus, it can be argued that there is still risk on political factor but the companies can look forward in regulation changing to support FEVs in the near future.

Looking at the structure of PPP model suggested in this project, there are only three main partners in the illustrative. In fact, the structure of PPP would be more complex than that. It is because the administration department could connect to other actors in FEVs industry, for instance infrastructure producers, FEVs manufacturers, etc. It is simplified in this project because the main purpose is to encourage transportation companies purchase FEVs and convince them to join PPP. Therefore, the involvement of other actors has not been discussed a lot here but they exist in FEVs industry. Hence, a bigger PPP model can be potentially designed to involve all relevant actors. So the companies have to be aware that a PPP programme would be much more complexity than the one designed in this project. The complexity of PPP would create more risks of opportunism, different interests, powers and the ability of managing the programme from the public sector and the administration department.

From the literature review of PPP, it is showed that this concept is quite new and ambiguity. It only has been used mostly in the infrastructure industry. The application of PPP in this project is already a risk for both public and private sectors. This risk includes lack of knowledge and experience of PPP, ability of managing complexity. In Denmark, there are already projects where the government give financial support for some companies to test FEVs. However, this kind of project is not yet a PPP. A true PPP project involves more relationship between the public and private sector. If PPP is implemented in real life, it probably last until 2025, the same as Copenhagen Climate Change plan. It would make it is easier to evaluate the success of PPP programme, to see if goal of reducing CO2 in green mobility is reached and draw lessons about PPPs.

To conclude in this sub chapter, context of SWOT theory has been used to point out potential Strengths/Opportunities and potential Weakness/Threats when transportation companies join PPP designed in this project. What companies get from this PPP are competitive resources of finance, policy and knowledge. It is a great advantage for them to build green image and promote for their brand through the use of FEVs. The advertising of brands can also be done in the way that companies join activities to promote FEVs, which are arranged by the public sector or the administration department of the PPP. This will bring the companies brand to the society and be recognized by the customers as first runners in FEVs with the purpose to protect the environment. In PPP programme, the companies have opportunity to receive financial support, to propose needed policy to support EVs, to create network to connect with other actor who involve in the FEV industry such as FEVs infrastructures investors, FEVs manufactures. Besides, there are risks that the transportation companies have to be aware before they join this PPP. These are: conflict interest of partners, the complexity of the programme and lack of knowledge as well as experience in PPP in a national and industry level. Despite of these risks, it can be seen that more and more companies in the market nowadays has strong attitude in protecting environment so the conflict of interests can be reduced. According to the Climate change plan, reducing CO2 is considered seriously from the government. Thus, it is expected that the public sector will give support in one or another way to encourage companies to use FEVs. As it is a promising vehicle in the future, transportation companies should also consider about it seriously. Since PPP is a cooperate programme that is proposed by the public sector to give support to transportation company to purchase and use FEVs, the companies should take this opportunity to be first runners in this area.

VIII. Conclusion:

From the current situation that the environment becomes such a hot topic to discuss nowadays in many forums, conferences and in the society, this project is conducted to find a way to support the implementation process of FEVs in Copenhagen municipality. EV or FEV bring great benefit to the environment because it is quiet and produces less emission than ICE vehicle. Thus, is a new promising vehicle' type to be used by everyone in the future. However, there are many problems regarding high purchase price and technical problems of FEVs which make it is so difficult for private transportation companies to implement FEVs in practice. Therefore it is necessary to create a programme which can encourage the companies to purchase FEVs and also, to create awareness of EVs and FEVs in the society.

Why can PPP support the implementation process of FEVs in Copenhagen Municipality?

It has been discussed about the Political, Economic, Social, Technological, Environmental and Legal factors in Copenhagen, Denmark towards attitude of protecting the environment and uses of EVs. It shows that the Danish government and Copenhagen Authority are very active in protecting the environment. The Danish clean tech- solution is promoted in the country as a solution to the climate change issue. The Danish Environment Protection Agency is established to focus on the environment protection activities, to make the country more and more active in this area. The Copenhagen Climate plan is made with the goal is to make Copenhagen as a green, smart and carbon neutral city. There have been some part-funded projects by the Danish government to test EVs in order to find out the advantages and disadvantage of EVs in practice uses. The general technology of EVs in Denmark is not well developed compared to other countries but it is very good at renewable energy technology, which can support a part of EVs' technology in clean energy. Many companies in Denmark have strong attitude in protecting environments. Some of them have been testing FEVs with their own financial capital. It means that the government and a part of the Danish society have serious consideration of using EVs in order to reduce CO2 and other emissions. Therefore, it is important to connect the public and private sector and create relationship between them to increase the uses of EVs or FEVs in practice. PPP is suggested in this project as a solution to do so, because the PPP concept is to create partnership between the public and private sectors. It is to increase the attitude of the private companies in the environmental protection. The PPP is expected to bring great benefit to the private sector to encourage them to purchase and use FEVs in their business.

How can PPP support the implementation process of FEVs in Copenhagen Municipality?

A PPP model is illustrated in this project in order to support the implementation process of FEVs in Copenhagen Municipality. There are three main partners in this model:

- The Danish government and the Copenhagen Authority
- The Administration department
- The transportation companies that use FEVs

It was explained that the Danish government and the Copenhagen Authority are under the public sector. They are the policy makers and also the investors. They are policy makers, because they have the power to change laws and regulations in the way so that EVs get greater advantages than ICE vehicles, for example free parking place, driving in bus lane, night delivery, etc. Also, it is expected that the public sector will make financial support to companies who purchase FEVs to implement in their fleets. In this way, the public sector is also the investor in this PPP model.

The Administration department is created in this PPP model in order to connect the public and private sector together. It was explained there is big gap between the two sectors due to different interest and bottom goal. Hence, the administration department is expected to bring proposing about laws changes and financial support from the companies to the public sector. On the other hand, the information and regulations about EVs from the public sector can be transferred to the private sector through the administration department as well. This department can also act as an information center to give information of EVs to everyone to create awareness of EVs and promote this new type of vehicle in the society. Furthers, the administration department is expect to connect the public sector and transportation companies with other actors who are relevant in the EVs industry such as infrastructure investors, EVs manufacture, etc.

The transportation companies in this PPP are those companies who purchase EVs either by their own financial capital of with subsidence from the public sector. They are expected to make report about FEVs, potentially Total Cost of Ownership, advantages and disadvantage of special FEVs that they are using. This report can be used by the administration department and the public sector to promote for FEVs and to find further strategies to encourage more companies to purchase FEVs.

Why should private transportation companies join PPP proposed by the public sector to support implementation process of FEVs in Copenhagen municipality?

By joining the PPP model suggested in this project, the transportation companies have opportunity to increase their advantages in finance, policy and knowledge. Potentially, the companies get financial support from the public sector to purchase and maintain FEVs. It is also expected that changing in laws will be made so that the users of FEVs have more advantages to overcome some current urban distribution challenges for example traffic jams, limited in delivery window, etc. By joining the PPP programme, the companies stays closer to the public sector, which create opportunity for them to propose policy changes to support FEVs even more. Besides, the companies gain the best knowledge of FEVs through the administration department, not only general information of FEVs but also technical issues and the development of infrastructures to support the development of EVs and FEVs. Moreover, the transport companies in PPP have chances to join exhibitions and conferences where the EVs are promoted. In this way, the companies can also promote their brands by showing to the customers that they are using EVs to be more responsible to the environment and the living standard of the citizens. Despite of those advantages, there are risks and uncertainty when transportation companies join this PPP. There is still financial risk even though the companies get subsidence from the government. There is also risk about technical issues because the EVs technology is not well developed yet. The risk remains for managing ability of partners in the PPP, to make sure that the programme achieves the common goal. However, it can be seen that the climate changes has become an urgent issue in the whole world. It is very important that 'green' products such as EVs or FEVs are used by the society to reduce pollution and emission. It is clearly stated in the Copenhagen Climate Plan that in the future, new fuel vehicles will replace ICE vehicles. Therefore, transportation companies should really consider joining the PPP proposed by the public sector, in order to be the first runners in this area.

IX. Reflection:

In this part, the difficulty and challenges during the project's process will be presented. There will be also lessons to be draw after finish this project and suggestions for future research.

At first, it was quite difficult to define an academic research question based on a reality issue under an EU project. It becomes even harder, because the topic PPPs is not familiar with the author, who is educated in the international business economics and business administration. Moreover, PPP is claimed as a disputable concept which is only common in the infrastructure sector until now. Thus, it was very hard to argue why this model can be used in the transportation and to convince the transportation companies to join this. However, the author has learnt that there are many theories and framework under her education can be applied to study and explain issues in PPPs. The author also learnt that The PESTEL and SWOT framework can be used flexibility to analyze reality issues

The second difficulty is that the author did not have any knowledge of EVs and urban distribution before conducting this project. Thus, there was a big challenge to get deep understanding of this sector in order to suggest a PPP model to use for implementation process of FEVs in Copenhagen municipality.

For future research, the author would like to approach the PPP models from the public sector. In this project, there have been interviews and researches on what the companies expect from the public sector under PPP. It would be interesting to learn more on what the public sector to get from the private sector. It would require interviews with the persons who work in the Copenhagen authority, the Danish Environment Agency or Danish Energy Agency, etc. It would be great to know what the public sector think about PPP and how much of financial support can be proved to support the companies. Also, it would be helpful to learn which kind of laws and regulations the public sector think can really implemented to support faster market uptake of EVs and FEVs.

X. Annexes:

Annex 1: Questionnaire and interview transcription with Post Danmark

Questionnaire with answers to some questions:

Company profile (description of current business)

1. Type of business: Logistic & Distribution
2. Type of goods: Letters, parcels and pallets
3. Size: transport performance (shipments/tonnes) 200.000 letters per day, 150.000 parcels per day
4. Fleet characteristics (own vs. lease, type and size of vehicles)

300 lorry, 300 small lorry (4 pallets), 1200 big vans (13 m3), 2000 small vans (3-5 m3) . We own the vehicles. We also own 1.000 scooters and 1800 e-bicycles

5. Typical distance ranges in Copenhagen Municipality/Denmark (most preferably in Copenhagen Municipality if data available) In inner city (Copenhagen K) 1.2 mio. Km per year (vehicles)
6. Type of customers and their requirements, e.g. frequency and time of deliveries, in Copenhagen Municipality/Denmark. Day to day delivery and pick-up. Larger costumers pay for early delivery and late pick-up
7. Logistic chain processes in Copenhagen Municipality/Denmark: characteristics of freight bundling (direct vs. Urban Consolidation Centres), indication of number of shipments/stops in tours, etc. Letters and parcels are distributed from 2 Consolidation Centres (one for letters and one for parcels) to distributioncentres (in lorry) and from there to the costumers in vans (or bikes)

Company challenges and strategies:

1. What are the company challenges regarding urban freight distribution?
    - To decrease CO2
    - To decrease number of vehicles in the City (why it is a challenge)
    - The time frame for delivering parcels in inner city is very short (Strøget)
2. What are the company strategies regarding urban freight distribution?
    - Decrease CO2 with 40 % before 2020
    - become the costumers preferred “green” distributor

3. Are you potentially interested in night distribution solution? What are the conditions? The conditions are not good. If just one complains to the Municipality (noise) we will not be allowed to drive into the area before 8 in the morning.
4. Are you potentially interested in urban consolidation centres solution? What are the conditions? All wants to be green – but at the time being no one wants to pay for it. Reload goods is a extra cost – and to consolidation you need a lot of costumers before the extra cost is paid. We aim for setting up a e-platform in the inner City (all vehicles in Copenhagen K). First we will consolidate our own distribution and then build up city logistic according to the increasing development in the city logistic market. Challenges reflect the (changing) conditions the company is faced with regarding its transport and logistical operations. They can relate to the regulatory framework, but also to increasing operational costs of deliveries (.e.g. fuel or labour costs) or changing customer requirements (e.g. growth of home delivery market).

Possible role of green business and EVs

1. Did you consider building a green image of your company? Yes – we want to be the preferred "green" choice for the costumers
2. If you did, then what was the purpose to build a green image of your company? See 1.
3. Which types of environmental friendly vehicles have been considered?
4. If it did not, can you think about potential reasons for that?

Interview transcription with Post Danmark A/S:

Interviewers: Phuong Ninh and Hanna Baster from FDT

Interviewee: Mr. Jim Dudmish, Project Management

Saying hello and greeting

Hanna: So in the answers you sent to us, you mentioned the challenges including traffic jams, and you say short times in delivery windows, can you think about more challenges, which are very important for you?

PD: Yeah, with the light distribution, that is a challenge at the moment, we are not allowed to drive in the morning or night, so we, this is maybe the most hard challenge.

Hanna: Okay so to deliver in the late night.

PD: Yes, because if we could deliver in the night and mornings, there would be no challenges like traffic jams. But of course in the first question, there is also a challenge to console all of deliveries, and then number of vehicles.

1.38 Minutes

Hanna: yes it is like your structure of creating green energy

PD: yes

Hanna: Or it is also that you can see profit in consolidate with this, because yes it cost a lot to consolidate with it, but maybe you can see some profit maybe in the long term.

PD: Yeah Yeah, yes that's right.

Hanna: Is it because of lower fuel cost, you will use less fuel for it?

PD: Yes it is more the salary, because we would like with the same km,

Hanna: Yes okay, so the labor cost is more important in here, okay thank you very much.

Hanna: And if we go, now we are talking about labor cost, if you can think which cost factors is the most important to decrease like?

PD: Yes its labor cost.

Hanna: Okay its labor cost, when it comes to EV's, fuel cost, etc. then labor cost is the most important?

PD: Yes, if you look at it this way, we pay like 200 DKK pr. Hour, the fee cost is about 30.000 per year, plus we pay 3 DKK per KM.

Hanna: Okay in fuel.

PD: Yes, Fuel and all the maintenance for the vehicles.

Hanna: yes okay yeah, yeah, I was looking into it in Copenhagen, and it was also labor cost yes yes.

Hanna: And then when you can think about strategies, so point 2 in section 2, we have already talked about that decreasing in cost, can be labor cost, and then yeah, do you have a timeframe for each distribution, so you will fuel all the strategies.

Phuong: How about traffic jams, is that the only possibility that you could see with the distribution, or you were thinking about some less, yeah some other solutions. To deal with traffic jams.

PD: There is only one way, is solidation and cross with competitors.

Hanna: Yes so we think we will move to the third question in the second section, yes.

PD: Yes.

Hanna: It is also about night distribution. Okay big part of your activities can be used in night, or not?

PD: No, but I believe if we can ex. Deliver to all the retailers, in the night, and then it would be very interesting.

Hanna: Do you think it is majority that you can hand in to box, or more face to face?

PD: If we talk about sitting statistics, it is about 90 % we could move to the Night Boxes, and then 10 % we have to deliver during the day, to supply.

6.49 Minutes:

Hanna: And when it comes to urban deliveries, section 4 in question 2, you said about E-Platform, is it something like Mobile Platform, you have a big truck, and then you are coming next to the place you need to deliver, and then electric bikes come to the truck and taking the goods from it, and deliver directly to the customers, or is it something else you through about?

PD: yes we think it is mobile consolidation, we have consoled a bit before we drive into the cities, and then we drive to the point, and they just deliver with the smaller cars, or bicycles or whatever.

Hanna: yes but you said, now you are not considering this urban loading center, because the loading cost is high, so I was wondering what is the difference in cost in mobile and standard, is it only because of storage Houses?

PD: Yes it is.

Hanna: Yes so it is only because the cost in the bigger cities is too big, yes?

PD: Yeah, yeah.

Hanna: Okay, moving to the third part about Green Business, models, yeah em, I wanted to ask about the third question, which way do you build green image, and precisely for Copenhagen areas, because I know you deliver goods with electric vehicles, bikes, scooters, etc. which mode do use in Copenhagen, which of them?

PD: It's a lead, but all bikes are electrical now. But it won't be a leads, it is a matter of how many kg you have to deliver to a area, else you would have to use a vehicle.

Hanna: So it doesn't matter, you don't prefer using electric bikes or vehicles, in the inner cities, it is more about the weight, right?.

PD: Yes it is really a matter of how close are the deliveries, if it is only 50 meter between every deliver, then you would take a bike, if its 500 meters, then you would take a care, it is a matter of labor cost and time.

10.12 Minutes:

Phuong: Yeah but when you, ex. When you take a bike, is it only for shop, or do you prefer also for private customers?

PD: Yes it's Both

Phuong: Yes it's both, (laugh)

Hanna: Eeem, and the last question, in this section, I know it is hard to ask about it now, but with the EV's I know they are expensive right now, but maybe in the future they will be cheaper, but what about the profit behind creation of green image, for now, and in the near future, can you see now, profit of it? That customers choose your delivery, because you are green, or it doesn't really matter because you are so big, so they would choose you anyway? Is it plain equal, because you are public owned business right, so is it more because of this, that you are concentrating on it, or is it something about increasing profit?

PD: It is about increasing profit, but we have to wait until the market is ready, because eem, of course we have a lot of place in our business around the cities, we have a big place out in Amager

and we have to big places out in eem, I mean inside Copenhagen, that we could use for storing and consulting all of the goods, eeem, but perhaps we need to let the market develop.

Hanna: So is it more about now that you have bought the EV's that it is more for the future?

PD: Yes it is. We want to be after the Electric Platform, and then let the market develop slowly towards it, because the only thing that can pay for it, is that we save all the store areas, in the retail, Business, and it is a long term,

Phuong: Yeah but can it also, in the way be that because in all of the articles they say that PD is the biggest, I mean the one that owns the most EV's in Denmark, and in that way you are actually promoting your brand, right?

PD: Yes, but you have to wait until we get there.

Hanna: But why aren't you waiting until it becomes cheaper, why do it now? To be the first, front runner?

14.27 Minutes:

PD: Yes it is part of our plan to build the importer plant, that is one of it, but it is not that expensive, to have rental cars, we only need 70.000 kr. Extra pr. Year, so that is not very much, but we have to develop a market that would give that extra 70.000 pr. Year. That are, so it is not a lack.

Hanna: is it likes now Mercedes Vitel, or other electric vehicles of Mercedes, is it like it is now 50 % or 100 % more expensive, with tax exemptions, in DK?,

PD: It's not that, 15 %, more expensive, not 50 or 100, it is not that big of a deal.

Hanna: okay but I have read that it is 3 times as expensive to buy a car here in DK but then you have these tax exemptions, but they are only 15 or 30 %, of price, so when I calculate it is like 50 % more. So did you get some discount, or is it my math?

PD: Yes we got a very good deal from Mercedes.

Hanna, Phuong: yes Okay, so it is because you bought a lot of them.

PD: Yes.

Hanna: okay moving to the last, because we have 7 minutes left of what I can see, of your precious time, how did you understand questions in this questionnaire, do you think of it as, ex. If we take fuel cost, that we ask, is it important to decrease fuel cost, in this way, not in general.

PD: Yes we thought about discount in fuel cost, but also because powder is cheaper.

Hanna: And from your bond home experience with EV's, you said in many newspapers, etc., that drivers have great experiences with driving in EV's, and I was just wondering if it can somehow, eeem, how to say, have influence in cost of labor, that they could be paid less, or how does it benefit the business, that the driving experience of drivers Is better?

PD: Yes we are proved of the vehicles, but I don't think it matters that they become more happy with them, or, eeem, it makes absence from work, maybe it would make it less.

Hanna: Maybe that's and interesting point.

PD: Yes maybe you don't need to get new people as often as normal, because they are more comforting with these vehicles.

Hanna: Okay

PD: Yes maybe they would stay longer.

Hanna: Do you use public traffic infrastructure, or do you use your own traffic infrastructure, as your premises?

PD: It is cheaper to own it ourselves, but maybe we will make a partnership with other companies, so that we can charge from it between two persons.

Hanna: okay so something likes Semi Private Infrastructure between more parties.

PD: Yes but we would never, use better place or anyone else, it is too expensive.

Hanna: Okay so it is only about the monthly fee, because I was also thinking about it would be better for you, more feasible, if you had your own infrastructure charges at your own premises, and you don't have to look for a point, or a free point?

PD: Yes it is a general matter of Labor differences.

Hanna: Okay so you would prefer to have it your selves.

PD: Yes

23.00 Minutes:

Hanna: And the last question is about, yes Phuong also have one, but first me, I wanted to ask if Copenhagen, I don't know if you know, but in the restricted pedestrian areas, would it be possible to use E-Bikes in these areas, or not?

PD: Yes we could do that

Hanna: But electric scooters not, right?

PD: No.

Hanna: Okay good. So Phuong,

Phuong: Yes I have my last question is that, because we are doing this project to support texit plans for public authorities, so I want to ask you, do you think, what can public authorities do more to support EV's, because now, they already have tax exemptions, and they want to make it into night distribution, but is there something more they can do for EV's do you think?

PD: For night distribution?

Phuong: Yeah just in general?

PD: Yes it will all be in the public affairs, because if there is just a little bit of noise in the night, then they will complain, and then the politicians will listen, because they, eem, it is the people that work for them?

Hanna: yes I have one extra question when you talk about in the night, have you heard about this the peak project in NL, yes it is because of this noise reduction in the Nederland's, so that the trucks, can deliver in the night. Then the trailers can be electrified to create less noise, and you can use the bikes, but for the trucks you would have to electrify you trailers, to reduce noise. Would you consider it?

PD: Yes. Of course we would.

Phuong: I read that the Icicle EV's you were testing in Bornholm, they were very quiet.

PD: Yes, Mhm.

Phuong: Do you think it is possible to use there.

PD: Yes they are quite, but in the nighttime you also have people working in the streets, if you have to go backward, it says beep, beep, beep, so that is enough that people would complain.

Hanna, Phuong: Yes okay, yes.

PD: so we have to find, a really quite and secure distribution to use at night. (Laughter)

Hanna: Okay so it is not only about the vehicles, but also about the whole system around delivering around night.

PD: Yes.

Hanna: Okay well, thank you so much for the interview

Phuong: Yes thank you very much.

PD: No problem

Hanna:Yes when the action plan is ready, we will of course sent it to you, and we hope we can help your company, and we can help to decrease your labor cost, and all that, we hope we can help, but thank you.

Phuong: Yes Thank You

PD: Okay bye bye.

27.09 Minutes

Annex 2: Questionnaire and interview transcription with UPS

Questionnaire with answers to some questions:

COMPANY PROFILE (description of current business)

1. Type of business

Small parcel distribution – to companies, shops and private individuals

2. Type of goods

Any non-perishable / non restricted goods , business to business, business to consumer (e.g. internet shopping) – normally in the weight range 0,5 – 30 kgs per piece

3. Size: transport performance (shipments/tonnes), fleet size

UPS has roughly 60 package cars and smaller trucks operating in the greater Copenhagen area. Average daily delivery and pick-up volume is 11-12.000 packages per day.

4. Fleet characteristics (own vs. lease, type and size of vehicles)

All vehicles wholly owned by UPS. Purpose built package distribution vehicles, mostly Mercedes, but also Iveco. 1/3 of these below 3,5 tonnes and 2/3 above 3,5 tonnes.

5. Typical distance ranges in Copenhagen Municipality/Denmark (most preferably in Copenhagen Municipality if data available)

Average km per package car is 115 km – with a delivery area from, roughly, Roskilde to Helsingør.

6. Type of customers and their requirements, e.g. frequency and time of deliveries, in Copenhagen Municipality/Denmark

Our customers include all types of businesses including retail, manufacturing, professional services as well as educational and public institutions and private individuals.

UPS offers the following services:

DELIVERIES:

Pre 09:00 UPS Express Plus

Pre 10:30 or 12:00 UPS Express

Pre 17:00, UPS Express saver & Standard services

COLLECTIONS / PICK-UPS:

All of the above being picked up between approximately 10:00-18:00

7. Logistic chain processes in Copenhagen Municipality/Denmark: characteristics of freight bundling (direct vs. Urban Consolidation Centres), indication of number of shipments/stops in tours, etc.

Copenhagen area is served directly from Glostrup center with an average volume of 150 packages per vehicle which are delivered with an average of 75 stops per vehicle.

UPS customers are either served at their location or may choose to pick-up or deliver at our facility in Glostrup. The vast majority is door-to-door. UPS offers 3 delivery attempts even to private addresses.

UPS is uses Sturup Airport in Malmoe for sending and receiving our premium express products which are carried by air.

The facility in Glostrup also serves as a hub for sorting Standard Service (i.e ground transportation) packages between centers in Scandinavia and Northern Europe. A total of 40.000 packages pass through the facility daily.

COMPANY CHALLENGES AND STRATEGIES

1. What are the company challenges regarding urban freight distribution?

   Urban deliveries are challenged by driving restrictions such as pedestrian streets being access restricted from 11.00 and environmental zone regulations which restrict our fleet utilization flexibility.

   The increasing number of private deliveries due to internet shopping is a challenge, as UPS delivers door-to-door. Private receivers are often not at home during the work day when we deliver, and as UPS does not have customer locations for pick up outside of its Glostrup facility, we must either retrieve new delivery locations from dialogue with the customer, or rely on delivery to neighbours and similar. UPS offers three delivery attempts as a standard which increases volume to private addresses when first delivery attempts fail.

2. What are the company strategies regarding urban freight distribution?

   We are currently investigating opportunities for partnership with retail locations to implement so-called 'Package shops' in strategic locations. We need better flexibility for private customers to retrieve packages during hours which suit them.

   UP also continuously work to improve route planning.

3. Are you potentially interested in night distribution solution? What are the conditions?

   No. All packages are delivered on the day of arrival to the UPS facility. Our business customers are generally open during normal work hours.

4. Are you potentially interested in urban consolidation centres solution? What are the conditions?

   Possibly if it would fit into our business model.

Challenges reflect the (changing) conditions the company is faced with regarding its transport and logistical operations. They can relate to the regulatory framework, but also to increasing operational costs of deliveries (.e.g. fuel or labour costs) or changing customer requirements (e.g. growth of home delivery market).

Strategies reflect the way the company is (going to) dealing with these challenges. They may include night hour deliveries, urban consolidation centres, but also other distribution concepts.

POSSIBLE ROLE OF GREEN BUSINESS

1. Did you consider building a green image of your company?

   UPS is a green leader within the industry. We have a dedicated platform for our sustainability efforts and are committed to reach our goals.

   Please see our latest Sustainability Report here: http://www.responsibility.ups.com/Sustainability

2. If you did, then what was the purpose to build a green image of your company?

   UPS acknowledged early on that a green and sustainable profile is a necessity in todays market place. Customers request and environmental strategy and are looking for partners who can support their own initiatives in the field.

3. Which way do you build a green image?

We offer carbon neutral services and set our own goals within the company to reduce carbon emissions. We offer paperless shipping solutions and other paper saving tools. We promote various forms of recycling within our facilities around the world. Route planning and telematics are also tools employed to reduce emissions.

4. Which types of environmental friendly vehicles have been considered?

Globally we employ about 2500 alternative fuel vehicles including electric, hybrid and LNG trucks. Only a small number of these within the EU and as yet none in the Nordics.

5. Did it give you a competitive advantage/ a positive effect on your profit to have a green image?

UPS' green image is part of our brand promise and differentiates us from our competitors on the global market.

6. If it did not, can you think about potential reasons for that?

PERCEIVED BARRIERS FOR USING ELECTRIC VEHICLES

1. Did you consider buying electric vehicles for your business?
   Electric vehicles are deployed internationally but not in Denmark. Electric vehicle markets include USA, UK and Germany
2. Why the company did not deploy EVs yet?

Interview transcription with UPS:

Interviewers: Phuong Ninh and Hanna Baster from FDT

Interviewee: Mr. Peter Harris, Director of Sustainability, UPS Europe.

Peter: Hello

Phuong: Hi Peter its Phuong again, I am sorry about the hours,

Peter: Well don't worry; I deliberately set it to your time.

Phuong: Okay Thank you, do you have the questionnaire next to you?

Peter: I only have 30 Minutes of time.

Phuong: Okay I am doing the interview with my college Hanna.

Peter: Okay Hi Hanna

Hanna: Hello

Phuong: Okay the first question we would like to ask you, I from the first section, question number 4

Peter: Yeah

Phuong: Yes, because you say that all vehicles are owned by UPS, so we would like to know if you own the EV's as well.

Peter: Yes we do

Phuong: as we know it is very expensive to buy them, so why don't you list them?

Peter: Well we put them on lease, but the kind of EV's we are pursuing at the moment is a convert version of our own vehicles

Phuong, Hanna: Okay then

Peter: EV is not available for leasing right now.

Peter: But if we able to lease the existing EV on the market right now, we would do it.

Phuong, Hanna: Okay.

2.01Minutes

Phuong: Okay the next question number 5, we are thinking that the EV right now have a smaller capacity than regular vehicle.

Peter: Yes

Phuong: So do you think you will use an EV for a smaller distance instead of diesel vehicles for example 150 km. or would you use it for a conventional route.

Peter: We would use the EV's for the smaller route, routes that goes up to around 80 Km.

Hanna: Is it because that the vehicles that you currently use, and the range of those vehicles.

Peter: Yes that's right. We are pursuing any vehicles that are suitable for our business. 80 Km is the best receivable range, but we do have a lot of routes, which are longer. Therefore as things progress, we want to start recruiting longer routes. So we are working with a partner, which will help out with engines going for a longer route.

Hanna: okay thank you for this.

Phuong: We are moving now to the second section, question number 3. We want to ask if customers would like to receive packages doing the night.

Peter: We know that they don't, that is not our business, we don't deliver at the backdoor or the garage, we go at the front door, and customers don't like to get waked up in the middle of the night to get their packages. It is better to be delivered at the front door in the day.

5.39 Minutes

Hanna: okay when we talked to Copenhagen management, we also learned that a section of UPS, it is a problem, for customers to receive packages in day time working hours, but did you think about this other possibility, it is like a big closets, with a lot of small closets, in train stations and so on. So it could be delivered there at night, and private customers could pick it up from there. Did you consider such an option?

Peter: Yes we are deploying it right now, not in Denmark right now, but we are certainly deploying it right now, setting up UPS access point, and it works in the way you say, so instead of going to a person who might not be home, then yes we are going to a train station, or wherever the place the access point is. The organizations we are having business with, we are discussing it, but at the same time, our business has been successful in delivering packages in the day time, but yes that could fit in with the rest of our day time operations. But other means could also be used to secure that we are not knocking on doors with customers not at home I guess.

Hanna: But you mean when you deliver the package before, then it takes up too much space?

Peter: Well yes that is not what we want to do; we are doing all of our global distribution in all countries over night, so the customers can send something, or receive it as early as the next day.

Hanna: So just in time, that's why this distribution is not possible for you, thank you.

Phuong: Yes we are now moving to third section, possible growth of green business, and the third question, which way do you build a green image, and we have received the answers from you, but we have some additional questions

Hanna: Yes we do. We know your strategy of decreasing environmental waste, from reducing km used with normal vehicles. Fuel consumptions and so on, but how big a role can these EV's build towards your strategies of getting a green strategy, I mean can you say: like 1% or 20%, how important is these EV's for you to be green.

Peter: They are crucially important; already we have about, 2000 electric vehicles, so it is a big part of over overall strategy of becoming moreclean. It is a small percentage of our total 110.000 vehicles, but it is growing every year. And within that, let's look close on a very important goal, look at what we do, yes we have a lot of full length routes in our current situation, where vehicles come back to base and be recharged overnight, so about 20 % of our overall routes can be used with the perception of our EV's.

So to sum up, electric vehicles is very important for us, because they become a bigger and bigger part of our overall organization. We won't disguise it up, it I not about lack of information or awareness, it is more about steady chancing and getting involved with different parties, so that we can evolve.

Hanna: Eeem, with the EV's do you think your customers could take part of the cost, if your using EV's, and this way they will build their green image because they will say; Yes our transport is green.. But because we partially support this part of EV's. Did you consider sharing cost of this green image with your customers?

Peter: That is a very good question, and yes we are working on that right now, and we are thinking that we can use the method that you are describing right now, we have not done that yet, because we have been too focusing on getting the EV's to work, but that will be our next stage, so I think you are quite right. The only thing which is hard is that customers tend to don't want to pay too much for getting delivered their packages. So they will not like the idea, to work with us to become more green, since they don't want to pay too much money for it. So most cost would have to come from us, but we hope that we will get some support from governments.

11.18 Minutes

Hanna: Yes so it is more about marketing that you are environmental friendly, and therefore they should choose you to get their packages delivered.

Peter: yes that I the way, you are right about that, because we can make ourselves more attractive, but what we are doing is that we actually pay more to become more green, and then later it could become a real opportunity for us.

Hanna: yes Thank you.

Phuong: Yes we move to the next question, which environmental friendly vehicles, have been considered, you have answered that you are using electric hybrid and mild truck, and we want to know if why you are using each of these 3 vehicles and not just focusing on using one of them, is there any reason for this?

Peter: Right. So if you look at the way our business is operating, we really have 3 types of trucks, one for urban distribution, that's where the E-Trucks is working well, then we have rural distribution, the EV at this point doesn't have the range, so here the hybrid cars works better, and then the third type is that we have the largest MLD's to use on routes on the highway or similar, and it is not going very well, but it is something we are working on, right now. To use gas or even bio-gas.

Phuong: So actually you are implementing each of these 3 types at the same time.

Peter: Yes we have all 3 types in use.

Hanna: Okay you are using them for 3 different activities.

Phuong: yeah and why is it that ev's and other types is implemented mostly in US but not so much in EU and especially not in Denmark, what is the reason?,

Peter: Well actually we had EV's in Europe even before we had them in the US.

Phuong: Okay

Peter: So we actually came into Europe very quick, in Germany, England and so on. We would be very happy to introduce our EV's to Denmark, we would love to do that, the only problem is that at the moment, the government doesn't exactly support this business, so that is a problem for us, if you look at the UK, we have 0 conjunction charge, we also work through the EU, and getting some

support in the UK, and so on, so we are trying to get to the point where we can introduce them into bigger parts of EU, but we have not quite reached the point yet.

Phuong, Hanna: okay then

Peter: The cost is higher than our earnings so far, so we need to upgrade the overall engines, and so on, so we need more support, so we are ready to take the country with our EV's, but we are not sure if the country is ready for it as of yet.

Phuong: Eeem we are moving now to the next question, the fifth question, just a minute.

16.09 Minutes

Hanna: We have additional question, and it is almost the last one, we know that, and yeah you set that, EV are not that profitable now, and they also need more support from government, but do you see EV's solving some of your logistical problems? As a technology as such, can you see it as a better technology to transfer goods, to deliver goods, especially in the city?

Peter: I think E-Mobility, will happen in the logistic industry, in fact there is a data synergy between electric mobility and logistics, because we operate in short range route, so this is all about getting EV's to work in these routes, and getting better in the market, getting new customers, better air quality and such things will help us to improve, and gain more customers. So we have to understand that, we are working on that, but the problem is that we are not a charity, we have to spend unlimited amount on this, so for this to work out, we would need the government support.

Hanna: Yes but this what you are talking about, is yes, EV's are better for the environment, the range is not the biggest problem, in the cities, but I was more thinking in the question, maybe I didn't ask it correctly, I was more thinking, it was more like, could you see some opportunities for your company in this industry, for your logistic network, where EV's can help your more than regular V's. to increase profit of your business, or getting better products.

Peter: I think there is no current advantage, other than it is more quiet and pollute less, it is not in the need for getting the job done in logistics, it is the need to reduce noise and pollution. So I wouldn't say that EV's work any better, to get the job done, but it is a better solution, to reach the harder questions we get upon us, that we need to think more about the environment.

19.37 Minutes

Phuong: Other than that, do you find any barriers or problems, of EV's doing the time you used it.

Peter: There are some technical issues regarding liability, but we can fix those, there are also some problems to deliver to construction companies, but we are working on it. (fix those), the biggest and most essential problem right now is the High up-Front Cost, of getting the Vehicles, we are working to bring those down, but reduction of the light cost of the EV's, like 0 something or 0 something else, is something we need some support from the government to help with this, so that the industry gets these skills, and that these skills can help the industry to evolve.

Peter: But these skills need to be met.

Phuong: This is the questions from the questionnaire, but I have just some questions about PP, because I found that UPS is working through PPP with some governments around the world. And I would like to ask, if you know, that the company has joined with governments in Denmark and Sweden, or if it is more in UK and US?

Peter: What sort of PPP are you referring to?

Phuong: em. Public Private Partnership

Peter: Yes but example what?

Phuong: Yes like you just mentioned before the government, support financial, to purchase or.

Peter: yes it is right, we are currently connected to many countries, but the one we are most connected with at this time is EU, preview FRU, in relation to EV's, we are working with them who come from London and Amsterdam.

Phuong: Okay

Peter: So yes we aren't just making any PPP's, for this part but we hope to get down this road, so that in the end the industry doesn't need any more support.

Phuong: Yes and normally the government support you in Fix the EV's or Purchase the EV's or do they chance any laws and regulations, so that it becomes easier for you to implement EV's?

Peter: it's a mixture, so initial capital revived, sometimes they help in the cost of operating, such as 0 conjunction charge, for EV's, either of those help, what we do is just collect the numbers into the

spreadsheet, it does not matter to us which or what cost it is, what matters to us is what the sum of the cost are, when we can get to a point where the cost of the EV is compared to regular Vehicles, then we are happy to start employing ev's. But if the EV's has a higher cost, then it becomes harder for us to do that, because we are a business, we need to make profit.

Phuong: Yes and it was actually your point that you are not using EV's in Denmark, because you haven't yet got any official support.

Peter: That's correct so far, you are narrowing anything that we are missing, but that we would be very interesting in using EV's in Copenhagen and bringing them there, if we weren't missing or having a lack of support from the government.

24.30 Minutes:

The rest is just finishing Talks, thank you, etc

Annex 3: Interview transcription with Danske Fragtmænd A/S

The answer of questionnaire is not available for Fragtmænd. The interview was conducted without pre-answer of the questionnaire.

Interviewers: Phuong Ninh and Hanna Baster from FDT

Interviewee: Mr. John Steinmejer, City Distributionschef and Techniquechef

The interviewee is called as 'FM' (Fragtmænd) in this transcription

Hanna and Phuong: Hello, we call you from FDT

FM: Yes hello to you

Hanna: Thank you for your time for this interview. I hope you have some times today to answer our questions.

FM: Yes I have

Hanna: Ok then we just start. As I know, you have many types of customers, like for example, you deliver cargos, currier express services, and so on, you have various services when it comes to.

FM: Yes yes, that's correct; Danske Fragtmænd provides day to day delivery all over the country. Because small parcels, steel, pallets, you name it we transport it. Eem Then we also have the currier express services, so we have all of the request from our customers, so they don't have to shop anywhere else than with Danske Fragtmænd. Primary in Denmark we are working, we do a little bit Sweden, Norwegian, Germany and Finland, but main business is in Denmark.

Phuong: Okay

Hanna: Okay Yes, when it comes to types of the goods you deliver, there comes some interesting part to us, because Copenhagen management, 200 tons per day. Is it correct? In the environmental part of Copenhagen.

FM: In the driving zone, just one moment, we have about, we got shipment, just one moment..

Phuong, Hanna: Yes of course.

FM: Im going to my programme, to give the updated.

Hanna: You are having about 20 wans in the Copenhagen area.

FM: Yes we have more than 20 wans, to eem, do the environment zone, about 50 trucks, and smaller trucks there. Small trucks I 3.5, and the greater are up to 18 tons. We do also have bigger

trucks with trailers running in Copenhagen, because we do deliver many pallets, that's why we need the bigger trucks for this.

FM: If you just give me one moment. Yes. Eeem, Yes, If we go to environment zone, we delivered about 2.300 shipment yesterday, in 24 hours. And if we take tons, it is about 350 tons, delivered yesterday. And that is a normal amount of shipments in a day in the Copenhagen area. And if we look at how we are delivering it, 99 % of delivery in Copenhagen is going out into the terminal in Taastrup; we store everything here, and sort it out to delivery in the most effective way. Only bigger shipments are delivered directly, its only 1 % which is delivered directly from customer to customer, there are not so many of these with our customers, if the shipment is more than 4-5 tons, we deliver directly. And the main shipments are less in weight.

Hanna: So the 99 % of shipments is deliveries below 4 tons.

FM: Yes, that's true.

Hanna: And one more question is I know Fragtmand is a very big company, but how big a part of the overall market do you have, do you have that kind of information's?

07.24 Minutes:

FM: Yes one more time.

Hanna: What is the percentage of the Danish Market do you have.

FM: Honest I do not know that.

Hanna: Is it 15 % or 50 %, or something.

FM: I really don't know, because it is very hard to say. We are more in bigger goods, more than partial services, so it is very hard to say.

Hanna: But what you are saying is that your distribution does not deliver a lot of smaller parcels, and so on, right?
FM: Yes smaller parts, and little pallets, we are delivering to shops or hotels, and so on, but the weight of our averages services in this in Copenhagen is about 140 Kilo grams. So that's just a middle of the shipment we make.

Hanna: Just one more question, I was just thinking about, maybe you know more about the Copenhagen of the percentages delivered, because you say it is 99 % of delivered goods is between 0 and 4 tons, the lower end, but do you know how big part of the overall delivery is being delivered by you in the Copenhagen area. Do you have a deep part or a smaller?

FM: I really do have no clue, sorry.

Hanna: In the section one, there is a question about distance range.

FM: Yes over biggest challenge in, okay we are going 12 – 20 km in the city , and Taastrup is about 30 KM, outside of Copenhagen, so in normal day, our truck is running about 80 km. sometimes more, or less, but the normal distance, and yes.

Hanna: Yes so 80 km is outside, and inside it is 30 km, ex. If you deliver from taastrup to customers.

FM: Yes that is the average we go, that's 30 km. but 80 km, in a day, because we need to go back as well. In the center between 12 and 20 km. Nørreport or Valby the km is more than 20 or 21 km. Also many times we are, I mean our drivers is going into the center two times a day, then we are running 160 KM, because we have to go there to times, fourth and bag. Two trips.

Hanna: Okay thank you very much for this. So section 2, what are your challenges when you deliver packages or goods in Copenhagen, just the main ones?

FM: Yes just the main ones, of course traffic is very heavy, and that is one of our major problems, the reasons for this, is that many times there is roads closed, and they are building the metro right now, because they closing roads, which makes it harder for us, because they have to build the metro, so there are certain roads like Nørreport, we can't drive, which makes it harder for us, because we have to drive other ways, which cost more gas, time, etc. and all the way around Copenhagen the metro is building, other constructions is also going on, and our main problem is that no one decide who should buy where and when, and therefore sometimes they build 3 things the same place, and nobody is working with us. And therefore we can't deliver that easy.

Phuong, Hanna: Yeah

14.29 Minutes:

FM: and if you take the electric in Copenhagen, they decide if they need to dig a big hole in the road, no one says they should wait 2 weeks, to do it, because other things is going around in the area, they are not informing to do or do what. They do what they want to do, and no one is making a plan, which is a big problem for us, because no one is taking a responsibility to secure that the traffic can go smoothly. No one is making a law against this.

FM: And then we also got a problem about how the city is constructed, in CPH there is a lot of bicycles but no one is considering what or how we can park our trucks where we can park to unload our trucks.

Hanna: So you don't have any loading zones?

FM: Yes we had a few loading zones, but they had, this is not working, because they are very small, and often small cars are parking in the zones as well, it is forbidden, but they just do it anyway. We need more zones to park, the number is very small, and that is not newer going to work. We have many of these problems every day, also the material of the road, is also very difficult, sometimes it is very beautiful, but when we comes with our pallets, it is very hard, because of all the bricks or

stones in the city, because with this, we have to go very slow, and it is shaking a lot when we go with the pallets.

Hanna: And about the conjunction and traffic, I know you said that the majority is with roads, but if you think about I know you are also delivering until 22. So just it helps you when you deliver a little bit outside the harsh time.

FM: Yes but the problem is that our customers are not, ready or interested in receiving the goods on that times of the day. The trucks haven't got the facilities to receive the goods at 9 O'clock in the evening, there is no delivery services ready, to deliver to are just opening at 10 O'clock in the morning, and have to be finished around 11. This means we only have 1 hour to deliver in, and the trucks can't get people to open at 9, so the main problem here is that we only have 1 hour to deliver. If we could deliver at 9 or even 8, it would be better, but it might be too expensive for them to open so early.

Hanna: Yes I have some examples from Europe, that is in smaller cities, but they have persuade the stores to get delivery earlier, before opening hours, because then when the customers come, they don't need to do both things at ones, they can take care about the customers, instead. And I was also thinking about, maybe you can ask the stores, to pay a little bit less to get delivered not in the conjunction hours, because there would be less traffic, as well as you pay less gas money, because you use less of it, I don't know if that is a solution?

21.56 Minutes:

FM: But if you are saying this, we do not save much of fuel, the distance is very short, but when we do distribution in the center of Copenhagen, it is hard to find a place to park, so. Actually when he have parked, then he goes 3-500 meters, to deliver so he don't have to park again, so he is running around all the time, and taking maybe 12 deliveries at one time, before moving to the next place, so saving fuels, is not one of the point, eem.

Hanna: but when you go from Høje Taastrup to the City?

FM: The fuel save is not so much for us, we do have night distributions, but we do not have many receivers in the Copenhagen city areas, because they are close, it is most in construction works, and I would say that if we are looking at the customers in the city, we could probably deliver about 5 % of the overall in the night, because our customers is not so interested in giving us the keys to the stores, they do not have the space and room for it. It has to be bigger companies, like H&M or other bigger shops, they can have their own delivery chain, Eem Netto for instance, and they are concerned, they are taking all the goods in the night. We do not have Netto, we newer deliver to Netto, we deliver to mainly small customers, and they are not interested in giving us a key, so we can deliver in the night.

Hanna: So what is the benefit from doing delivery in the night?

FM: Well we got 2 very big customers, who would like their shipment done in the night, the one is

Stainless Steel and AU Johansson, that is primary with construction, and they would like their goods before 7 in the morning. Then they are ready to do what they need to do, here we got some special customers, there are also their shops, so you can call it a small customer area.

Hanna: Okay let us move quickly to the third section, about building a green image in your company, I have read some information on your web side, ex. That you want to use the latest and best solution for the environment in your businesses, and of course we are interested in EV's, so.

FM: Yes.

Hanna: Would you consider it, and what are your questions or concerns about it?

FM: Okay I can tell you that I have been looking into EV's over the last 10 years, to see what is going on, and some of our problems is that it is very expensive, our customers would like us to be green, but the most important is the price of the customers. 98 % of our customers is looking at Price, then they would say okay how old are your trucks and green image, but when it comes to if they want to pay a little bit more that we are driving EV's, the interest in this is very few customers interested in this.

FM: And then if the price is okay, then let us say okay, the things they are asking, nobody has yet asked for EV's, its more about price and delivery. Of course if someone is asking for it, and if they would pay that extra, then we would consider it, but the biggest problem is the price, it is very expensive, also the range of the vehicles, if we have a truck going into the center of Copenhagen two times a day, we even got someone who goes 3 times a day, it gets difficult, because there Is not enough battery to take those other, to take trip number 2 or trip number 3.

Hannah: I was just thinking, like you talked about in the beginning, because 30 km, can be travelled, with EV's, but if you have longer distances then it can be harder.

FM: Yes just talking about one trip is between 60 and 80 KM.

31.07 Minutes:

FM: Then it could work out, that would be okay for one trip, but often we do have to take two or three trips, and sometimes we send a truck, to Copenhagen, and after this we might send him to a trip to Køge, which is about 30 KM from here and back to Copenhagen again, so to be, so we are not only driving in the area of Copenhagen, but also in other parts of Sealand.

Hanna: so It is going directly to currier.

FM: Yes exactly, so it does not have any time to charge, another problem is that the EV's in it selves is very heavy, and that means that you cannot put that many pallets on the truck, because if you go over 12 Tons, which is the max weight of trucks in Copenhagen area.

Phuong, Hanna: Yes, yes, we have heard about that problem.

FM: So if we do it this way, we can only have like 3 or 4 tons, to drive with, and that is a very expensive way, they have to drive 2 trips, to deliver the same amount of delivery, and that is too expensive.

Hanna: So the distance you are travelling every day? Is it 100 km, or.

FM: if we had to buy a EV, or E-Truck, they need to have the range between 200 or 250 km. the reason for that high number, it is because I want to make sure that we got enough range, because if they stop in the middle, so we can't drive home, or something.

Hanna: Also with cold wheatear, etc.

FM: Yes in CPH area it does not work so well, because when we go down to -20 degrees, the capacity of the battery would go very much, so the main problems are that they are too heavy and their range is not big enough.

Hanna: Okay so for now you won't consider EV's? at least for deliveries, like, I mean do you have some small visits, like 30 km. that you can switch a small part of the business into it?

FM: Yes well if our customers decided on it, yes we could do it, but we are looking at a economy and we have to be very flexible, it is very important, and this EV, you can't use it too much, and that is the problem if the truck is broking down, it would be very difficult with new EV's. Maybe in other places, but it is hard.

Hanna: Yes I know that you have Høje Taastrup, but I also read that you have terminals, are they located around Denmark, or is it inside CPH City? I have read two names, one is in Høje Taastrup, Distribution Center, and Terminal, is it the same?

FM: Yes it is a synonym.

Hanna: So you don't have any other places or facilities?

FM: No, no one else.

Hanna: Have you considered a terminal closer to CPH City?

FM: I would say if you had to have a facility in CPH Center or nearby, eem. I would say that it would be an extra cost in our distribution, it would be very expensive to have another terminal, we have discussed it, and thought about it, but in over world, the center of Copenhagen, the amount of shipments, and so on, is not high enough to be interesting enough to have a terminal near the center of Copenhagen.

Hanna, Phuong: Okay yes.

FM: In my world I know there are many terminals, like in Valby, but all the big worries have to go to Valby, then we have a big packages go to that terminal, and there is much more traffic in that area, and that is not very good to have too much more going to that terminal, not even EV's, I think

could work there. But to have so many trucks to go in by the main street is a very bad idea, we are putting much more traffic to Valby, so it is a very bad idea.

FM: You have to make a city terminal, it could be ex. In Hvidovre, but putting it in Valby, it is very wrong in my opinion.

Hanna: What could be the benefit from this?

FM: We already got a city terminal in Taastrup, PostNord have the same opinion about it, we already have this place, we don't take anything to other areas, only goods to the center.

Hanna: So it's a big place.

FM: Yes we are many ones here, we already have it, I think a city terminal closer to CPH, and it has to be a very high number of deliveries going to there.

42.38 Minutes:

FM: Who would take the responsibilities, is it us, or those, it is very hard things to consider about, it is very important, because if you have not sorted out these things, someone would say okay this is broken, who have to pay for this.

Hanna: Did city logistic project talk to you about these things?

FM: They are not telling too much about it, but we did consider, or look into it, when it was given as a opportunity, because we thought it would be a bad idea for us, but even if I would start a city terminal, it should be a very high number of shipments before the economy would be good.

FM: I do not know how they do there math, I can't see it, to make it run, to get money enough, I look forward to seeing it, to see how they can use EV's.

44 – 46 Minutes: Not very relevant.

46.01 Minutes:

Phuong: Okay I have the last question, because you are saying EV's is too expensive to purchase, but let's say there is kind of a corporation between companies and the governments, and that the government would pay part of the purchasing part, do you think it would be possible to motive a company like you or others, DHL, and so on, to use some of your flied with EV's, if the price was reduced.

FM: If the price is as it is today, EV's is double of Normal Truck.

Hanna: But in the future?

FM: If the economy is the same, then I have no problem using EV's, I do love EV's.

Laughs on both Sides

FM: But the economy is very important, and flexibility as well, but if the price is the same, EV's do have some advantages of course, I am very convinced that one day we are also using this in the center of CPH, and also in other cities.

Hanna: But both range and purchase power is important.

FM: Yes, and the weight of the battery is very much, so it is important to get it much lighter, because many of the streets in Copenhagen, and Amsterdam and other places, there is a problem if the trucks is too heavy. So they have to in CPH, make the streets a little bit better, then that would solve the problem, they have thought about heavier, but some places like on strøget, the highest wait is 3.5 Tons, so it is very hard.

If I had to go to strøget, it would weight about 5-6 tons, so it is a problem.

Hanna: in the recommendation, we can now recommend, that the weight has to be lighter, because the roads are looking nice, but not to heavy vehicles.

Laughter on Both Sides:

50.00 Minutes

Hanna: Okay Phuong is it all?

Phuong: Yes, I think it is all.

Thank you and say goodbye.

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