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Relationship between Business Travels and Virtual Meetings

How organizations can use virtual meetings effectively to reduce business travels?

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Acknowledgements

Abstract

Climate change are starting to receive more attention, even so, transport sector is responsible for approximately 20% of energy related GHG emission, which still has increasing trend. Solutions based on using information and communication technologies are started to be used for reducing anthropogenic GHG emissions and replacing business related travels. Meetings that is held by using ICT, can save money and time as compared to its travel alternative, reduce environmental impact, as well as increase productivity. Especially during financial crisis, business organizations see the importance of managing business travels efficiently.

However, adopting VMs into an organization do not automatically reduce the business. In order to achieve the benefits of replacing VMs need to be implemented in an organization effectively by controlling negative rebound effects. The aim of this research is to investigate the ways to reduce environmental impacts of the business related travels and the role of VMs to do that. It also aimed to find the most effective way to use VMs by controlling the negative rebound effect. Other than literature review, the information is gathered through three different source; REMM Project, surveys with travel managers and in-depth interviews with the employees of a large international retail company.

According to the finding, after VM development, there are three possible scenarios for the organizations' business travel trends. For decreasing business travel trend, rebound effect need to be controlled and VMs need to implement effectively. The successful VM adaptations are investigated under five different levels; policy-maker level, organizational (upper management) level, project management level, employee level, technical level. Additionally, for the rebound effects two indicators are selected; the increase in business travel volume and the number of VMs and their durations. Based on these two indicators mitigation measures are developed.

Keywords: virtual meetings, business travels, rebound effect, substitution effect, travel management

Executive Summary

There is a recent increased emphasis on environmental issues, and particularly those related to climate change are starting to receive more attention (Räsänen et al., 2010). According to the Intergovernmental Panel on Climate Change (IPCC), the main reason behind climate change is the rise in greenhouse gas (GHG) concentration in the atmosphere, predominantly due to anthropogenic activities (IPCC, 2013). In order to control the adverse effects of climate change on the environment and humans, all sectors including governments and organizations need to work together to stabilize GHG emissions by adapting low carbon society and low-emission economy concepts (Lindeblad, 2012; Räsänen et al., 2010). For being responsible for approximately 20% of energy related GHG emission (IEA, 2006), transport sector is becoming one of the important environmental impact of the organizations and also focus area for environmental mitigation measures (Räsänen et al., 2010).

Business meetings are held for communication, and face-to-face (FTF) meetings are considered to be the most effective way of communicating in business. FTF meetings are considered to be important for number of reasons such as building social capital through socializing and networking and also can help to build trust (Roby, 2014; Denstadli et al., 2012). On the other hand, business travels consume time, transportation costs, and has environmental impacts (Räsänen et al., 2010). On the top of that, still increasing trend is observed for transport sector.

Solutions based on using information and communication technologies (ICT) are started to take attention for reducing anthropogenic GHG emissions (Coroama et al., 2012; Räsänen et al., 2010), and replacing business related travels (Lindeblad 2012; Roby, 2014; Arnfalk, 2002a). In terms of ICT, telephone, audio, video and computer networking technologies can be used to be held a meeting at a distance (Räsänen et al., 2010). With help of a different technological platform needed for that occasion, and with low cost of service usage; FTF meetings can be replaced and increase in business travel trend might be reduced (Denstadli et al., 2013). Meetings held via ICT, also known as virtual meetings (VMs), save money and time as compared to the travel alternative (Arnfalk, 2002a). So, the main drivers of using VMs are related to economic and environmental saving, as well as increase in productivity (Roby, 2014; Arnfalk & Kogg, 2003; Lindeblad, 2012). Especially during financial crisis, business organizations recognize the importance of managing business travels efficiently.

However, adopting ICT solutions into an organization do not automatically reduce the business travels (Arnfalk & Kogg, 2003). The benefits of replacing travels are dependent on how ICT is implemented in an organization (Räsänen et al., 2010); however, there are also potential drawbacks and rebound effects. For this purpose, impact of VMs needs to be carefully monitored.

The aim of the thesis is to investigate the ways to reduce environmental impacts of the business related travels and the role of VMs to do that. In this context, it was also aimed to find the most effective way to use VMs by controlling the negative rebound effect. For this purpose, other than literature review, the information is gathered through three different source; REMM Project, surveys with travel managers and in-depth interviews with the employees of a large international retail company; and these information is combined to answer the overall question of this thesis, which is "How can organizations use VMs as a means to reduce the environmental impact of business travel?".

Since, business travels trends are projected that will continue increasing due to globalization. However, this growth can be controlled by travel management and substitution of business travels with VMs. On the other hand, substitution may create rebound effects. Based on this information a formula is created to develop three possible scenarios for the organizations' business travel trends;

- Case 1; if "substitution effect + impact of travel management < rebound effects + growth of business travels", this will results with overall increase in the organization's business travel trends;

- Case 2; if "substitution effect + impact of travel management = rebound effects + growth of business travels", this will results with equilibrium situation and business travel trends will be stable;

- Case 3; if "substitution effect + impact of travel management > rebound effects + growth of business travels", this will results with overall decrease in the organization's business travel trends; which is considered as desired situation in this thesis.

In order to, identify the rebound effect in the organizations; two relatively easier to measure results of rebound effects are selected. First of all, increase in business travel volume. Although, rebound effect also has direct effect on budget of the organization, productivity and time spent, they cannot easy to differentiate from other negative factors such as due to technical and personal reasons. However, it is easier for the organizations to measure the business travel volume and it can increase as a result of some types of rebound effects. Secondly, number of VMs and their durations can be used to identify rebound effects as well.

Starting with business travel volumes, they are measureable and can be affected as a result of some types of rebound effects. The factors that can increase business travel volumes can be related to budget management, time management, getting more projects or necessity to have FTF meeting with new connections obtained via virtual communications. When transmission to virtual mobility, organizations need to make decision between dematerialization (or degrowth) and globalization (or growth). Although, it is hard to change the mentality, there are couple of actions and push mechanisms;

- Direct or indirect push from policy makers such as increase in emission taxes;

- Mandatory emission reporting;

- Company policy to reduce or limit travelling;

- Travel budget limitations.

The other options is, during transmission to VM culture, it is normal to observe increase in VMs. However, speed of the increase should be related to decrease in business travels. If there is relatively higher increase in VMs, this may indicate possible rebound effects. VMs can make communication easier and faster, with this also may bring couple of rebound effects. Overall, the actions that can increase productivity works better for this part;

- Meeting management to eliminate unnecessary meetings;

- Meeting agenda preparation for time management and to control too many people in the people by proving scope of the meeting;

- Distributing pre-meeting reads to make people prepare for the meeting;

- Proper VM tool selection;

So to answer the overall question, "How can organizations use VMs as a means to reduce the environmental impact of business travel?". Successful VM adaptation is important for organizations to get the full benefit from their usage. Based on the finding, organizations use VMs for cost management, time management, to increase productivity, reduce environmental impacts and reduce business travels. The successful VM adaptations are investigated under five different levels; policy-maker level, organizational (upper management) level, project management level, employee level, technical level.

1. Policy Maker Level: According to De Graff (2004), the externalities such as congestion and environmental impact, which have a negative impact on welfare takes policy makers attention. Policy makers can set certain limitations or put specific restrictions on activities by using regulatory instruments or can create incentives through taxes or additional fees. Also, they can change behavior through knowledge such as mandatory reporting to authorities (Arnfalk, 2002c). These instruments work as a push mechanism for organizations to move towards virtual mobility. However, one important point is especially taxes like air travel can affect the individuals as well, which can create undesired conditions. Therefore, it is important to select target group.

2. Organizational Level: According to the survey results, the main drivers for the organization to reduce travelling and move towards virtual mobility is related to cost savings and productivity (including time). Despite it is not mentioned in the surveys, organizational reputation is also another important driver (Roby, 2014). First of all, ambition of the organization is an important factor to adopt VM culture. The other factor is how VM and travel policy is developed. There are five steps that can be followed for effective adaptation; setting clear objectives, measuring, setting goals, developing policies, and monitoring.

3. Project Manager Level: From the project management perspective, it is observed that the most important driver for reducing business travels is productivity perspective. During the in-depth interviews, it is learned project managers have the power to limit business travels and encourage the employees to move towards virtual mobility direction.

4. Employee Level: When it comes to employee side, productivity as well as WLB becomes the main drivers to use VMs. Besides, the pressure from upper management, self-awareness is a very important factor to replace VMs. For this part, possible staff trainings in the organization can increase the awareness among employees.

5. Technical Level: As it is emphasis during literature review and repetitively mentioned in the interview that VM tool selection is very important. According to media richness theory, there is an ideal technology for different types of task. In order to communicate efficiently, depending on the complexity of the communication, level of ICT technology needs to be selected (Daft & Lengel, 1986). For example, the higher complexity messages should be transferred via videoconference. When the complexity gets lower emails can also be used. The other technical issue that may affect effectiveness of VMs is quality of the tools. Furthermore, line connection quality is also other important factor. Having better ICT infrastructure can both ensure better communication and increase the willingness of using VMs.

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Abbreviations

BA	business analyst
CO2	carbon dioxide
CR	corporate responsibility
DM	development manager
EU	European Union
FTF	face-to-face
GHG	Greenhouse gas
GSD	global sustainability developer
ICT	information and communication technologies
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IT	information technologies
LCA	life-cycle assessment
PM	project manager
REMM	Resfria Möten i Myndigheter or Virtual Meetings in Public Agencies
UNWTO	World Tourism Organization
USD	United States dollar
VMs	virtual meetings
WLB	work-life balance

1 Introduction

There is a recent increased emphasis on environmental issues, and particularly those related to climate change are starting to receive more attention (Räsänen et al., 2010). According to the Intergovernmental Panel on Climate Change (IPCC), the main reason behind climate change is the rise in greenhouse gas (GHG) concentration in the atmosphere, predominantly due to anthropogenic activities (IPCC, 2013). In order to control the adverse effects of climate change on the environment and humans, all sectors including governments and organizations need to work together to stabilize GHG emissions by adapting low carbon society and low-emission economy concepts (Lindeblad, 2012; Räsänen et al., 2010). In the European Union (EU) side, the climate change and energy package sets ambitious targets for 2020 including 20% reduction in EU GHG emissions from 1990 levels (European Commission, 2014). In addition, increasingly organizations are required disclose environmental information related to their activities such as carbon footprint measurement or GHG emission reporting.

Overall transport sector is responsible for approximately 20% of energy related GHG emission (IEA, 2006). Among these, according to World Tourism Organization (UNWTO), in 2013 about 14% of all international travels are reported as being for business purposes (UNWTO, 2014). Because of this, transport becomes one of the most important environmental impacts of the organization and also a focus area for environmental mitigation measures (Räsänen et al., 2010).

Business meetings are held for communication, and face-to-face (FTF) meetings are considered to be the most effective way of communicating in business. FTF meetings are considered to be important for number of reasons such as building social capital through socializing and networking and also can help to build trust (Roby, 2014; Denstadli et al., 2012). On the other hand, business travels consume time, transportation costs, and has environmental impacts (Räsänen et al., 2010).

Solutions based on using information and communication technologies (ICT) are started to take attention for reducing anthropogenic GHG emissions (Coroama et al., 2012; Räsänen et al., 2010), and replacing business related travels (Lindeblad 2012; Roby, 2014; Arnfalk, 2002a). In terms of ICT, telephone, audio, video and computer networking technologies can be used to be held a meeting at a distance (Räsänen et al., 2010). With help of a different technological platform needed for that occasion, and with low cost of service usage; FTF meetings can be replaced and increase in business travel trend might be reduced (Denstadli et al., 2013). Meetings held via ICT, also known as virtual meetings (VMs), save money and time as compared to the travel alternative (Arnfalk, 2002a). So, the main drivers of using VMs are related to economic and environmental saving, as well as increase in productivity (Roby, 2014; Arnfalk & Kogg, 2003; Lindeblad, 2012). Especially during financial crisis, business organizations recognize the importance of managing business travels efficiently.

However, adopting ICT solutions into an organization do not automatically reduce the business travels (Arnfalk & Kogg, 2003). The benefits of replacing travels are dependent on how ICT is implemented in an organization (Räsänen et al., 2010). For instance, willingness of the company and behaviour change of the employees are significant factors. In addition, change in organizations' business travel policy is required (Roby, 2014; Arnfalk & Kogg, 2003). In this part, travel managers' role in the organization become very important. Additionally, according to Ruby (2014), external reporting such as carbon disclosure, carbon

reduction commitment and corporate responsibility (CR) report motives new policy developments (Roby, 2014).

It is important to reduce business related travels for transmission to low carbon society. As mentioned, there are strong benefits of using ICT such as cost and time savings, GHG emission reduction; however, there are also potential drawbacks and rebound effects. For this purpose, impact of VMs needs to be carefully monitored.

1.1 Problem Definition

As previously mentioned, 14% of all international travels are reported as being for business purposes and it is projected that travel trends will continue to increase. Additionally, the transportation sector has major environmental impacts on climate change, acidification, air pollution, noise, and loss of biodiversity. Because of this, the transportation sector has started to receive attention from different organizations to develop mitigation measures in order to reduce impacts.

From the organization side, this issue has relatively low priority since there is no legal requirement or inspection concerning it. However, increasing transportation costs are starting to represent a large portion of their budget, which incentivizes reducing travel volume. This economical perspective as well as increased pressure to reduce an organization's environmental impacts has made more organizations move towards implementing virtual mobility (Arnfalk, 2002a). Therefore, ICT has been seen as a way to substitute physical meetings (Roby, 2014; Arnfalk & Kogg, 2003). Moreover, ICT generally considered as "a clean industry" (Arnfalk, 2002b) and has a potential to support sustainable development (Hilty et al., 2006).

Aside from replacing business travels and helping to reduce environmental impacts that are related to travels, VMs lead to cost and time savings, increased organizational efficiency as well as increased employee satisfaction (Lindeblad, 2012).

On the other hand, along with benefits, there is a risk that the travels of the organization may increase (Hilty et al., 2006; Arnfalk, 2002a; Plepys, 2002; Lindeblad, 2012). For example, having long distance business connections via VMs may result in an increase in the number of face-to-face meetings (Plepys, 2002). Therefore, achieving the benefits of replacing travels are dependent on how the ICT is implemented in the organization (Räsänen et al., 2010).

1.2 Reseach Questions

The aim of the thesis is to investigate ways to reduce environmental impacts of business related travels and the role of VMs in doing this. In this context, it aims to find the most effective way to implement VMs by controlling the negative rebound effects.

In order to do so, the following questions will be researched in this thesis:

RQ1: What tools/options/approaches are used to reduce environmental impacts of traveling in an organization?

RQ2: How common is it for organizations to use VMs as a means to reduce business travel volumes?

RQ3: How can organizations use VMs as a means to reduce the environmental impact of business travel?

a) How do VMs affect travel trends in an organization?

b) What is the role of the rebound effect in virtual business meetings, and how can the effect be controlled?

c) How can an organization influence the effect of VMs on business travel volumes?

1.3 Limitation and Scope

The scope of this thesis is to investigate the substitution effect of VMs to reduce organizations' business related travels. In that context, social usage of ICT and individuals' business travels to the company that they are working are not taken into account. Additionally, in comparing the environmental impact of travelling, ICT solutions are considered relatively clean and life-cycle perspective is assumed as negligible when comparing with its travel alternative.

Although referenced literature was not specifically selected to represent one region, the data, collected surveys and interviews only belong to Swedish authorities and companies. Additionally, only seven in-depth interviews with one company were used due to time constraints.

In addition, only literature which was written or translated to English were used.

Lund University allows access to a wide range of resources, and the resources used in this thesis is limited to databases available at this university and free of charge literature accessible on the Internet.

1.4 Audience

The author is hoping that the information provided in the thesis and the conclusions might be helpful to several groups of readers. Firstly, readers that are interested in learning more about VMs and the business travel relationship as well as the rebound effect. The thesis details cases where it is useful to have FTF meeting and VMs. Additionally, it evaluates these cases by their social, economic, environmental impacts and organizational productivity aspects.

This thesis may also be interesting for organizations that want to reduce business travels and/or are interested in moving toward virtual mobility. In this sense, the thesis will be more useful for managers such as travel managers, sustainability managers and IT managers who have the power to change organization's travel policy and adopt meeting guidelines. The thesis investigates the approaches and policies to reduce travels in order to reduce environmental impacts. Additionally, it also looks into different approaches to use VMs effectively and also ways to control rebound effect during virtual mobility. The author hopes to contribute to the organizations by detailing the steps for effective VM development.

Furthermore, this thesis might be useful for academics who are researching the rebound effect. The interviews conducted are used to identify the role of the rebound effect in an organization, and based on that information, control methods are developed.

1.5 Disposition

Chapter 1 Introduction: Presents the nature of the problem addressed in this research. The content provided identifies research limitations, provides a thesis outline and describes the audience for which this research may be useful.

Chapter 2 Methodology: Describes the methodology used to collect data to address the research question.

Chapter 3 Literature Analysis: This part is a more thorough analysis of the immediate field of study and presents background information regarding VM and ICT. Based on gaps in the information, interview and survey questions are prepared.

Chapter 4 Business Travels in the Organizations: Presents the main findings related to business travels by using survey and interview results.

Chapter 5 The Role of Virtual Meetings in the Organizations: Presents the main findings related to VM usage in the organization and substitution and rebound effects by using survey and interview and REMM Project results.

Chapter 6 Analysis: Presents analysis of the research. It combines and compares the findings that are presented in Chapters 4 and 5.

Chapter 7 Discussion: This part reflects on findings, analysis and research process.

Chapter 8 Conclusion: Revisits the research questions and provides suggestions for further research.

2 Methodology

This section provides to the readers an overview of the research design and the methods that were applied throughout this thesis.

2.1 Research Design

In order to answer the research questions, the steps below were conducted:

a) Review of literature regarding reducing environmental impacts of travelling.

b) Identification of the main drivers and approaches by focusing on VMs.

c) Review the literature on VMs development, and benefits and drawbacks of VM development.

d) Analyzing the data collected under REMM project.

e) Surveys with Swedish Travel Managers in order to understand their experiences about this topic.

f) In-depth interviews with employees of a large international retail company to understand the role of the rebound effect.

After these steps, three inputs from REMM Project, survey and in-depth interviews were combined to answer the overall question of this thesis, which is "How can organizations use VMs as a means to reduce the environmental impact of business travel?"

2.2 Literature Review

For the purpose of getting initial knowledge regarding the research questions, available literature was reviewed, such as research papers, books, and articles. Other than these resources, material from private organizations and public authorities were also used to supplement the academic literature.

2.3 Data Collection

Data used, are collected under REMM project. Please note that data collected from interviews and surveys are explained in the next subheadings.

According to the information obtained from project manager of the REMM Project, in 2010, The Swedish Ministry of Enterprise and Innovation presented a Green IT agenda aimed at reducing environmental impacts in public agencies with the help of ICT. The green agenda promotes procurement of green electronics, and the running and maintaining of ICT-equipment in an environmentally and climate friendly way. Additionally, the agenda also promotes virtual meetings (VMs); the use of video-, web and teleconferencing. 19 public agencies (given in Table 2-1) were selected in 2010 to increase the use of VMs as a means to reduce environmental and climate impact from business travel. This project is named REMM: Resfria Möten i Myndigheter or Virtual Meetings in Public Agencies.

In order to evaluate these impacts a set of indicators are selected and started to be monitored in order to measure the effects of increase in the VM usage. Therefore, surveys were conducted with the employees of these 19 public agencies. The survey questions consist of travel surveys, VMs surveys as well as CO_2 emissions of these agengies due to business travels are also measured. This data is used to investigate the effectiveness of VMs usage to reduce travel impacts and its role to effect travel trends in the organization. The survey template for REMM Project is given in Appendix A.

Table 2-1 Name of the Swedish Agencies in REMM Project

Name of the Swedish Agency	Their Name in English
Arbetsförmedlingen	The Swedish Public Employment Service
Bolagsverket	Swedish Companies Registration Office
Centrala studiestödsnämnden	Swedish National Board of Student Aid
Energimyndigheten	Swedish Energy Agency
Försäkringskassan	Swedish Social Insurance Agency
Jordbruksverket	Swedish National Board of Agriculture
Kammarkollegiet	Legal Financial and Administrative Services Agency
Lantmäteriet	The Swedish mapping, cadastral and land registration authority
MSB	Swedish Civil Contingencies Agency
Naturvårdsverket	Swedish Environmental Protection Agency
Pensionsmyndigheten	Swedish Pensions Agency
Post- och telestyrelsen	Swedish Post and Telecom Authority
Riksarkivet	The National Archives
Rikspolisstyrelsen	Swedish National Police Board
Skatteverket	Swedish National Tax Board
Tillväxtverket	Swedish Agency for Economic and Regional Growth
Trafikverket	Swedish Transport Administration
Transportstyrelsen	Swedish Transport Agency
Tullverket	Swedish Customs

2.4 Surveys with Travel Managers

Addition to data from REMM Project, a survey was conducted with travel managers in Sweden. This input is important to learn the experiences of practitioners. The survey is aimed to investigate how VMs affect work and travel patterns in an organization. The information is used to determine different approaches to reduce travel impact and the role of VMs.

The survey is prepared by using survey tool of LUVIT. The survey link is distributed though Swedish Business Travel Association. The survey questions are presented in Appendix B. As a result 28 travel managers from different organizations including both public and private participated to the survey. The name of the participants and their organizations are given in Appendix C.

2.5 In-Depth Interviews

One of the important component of the thesis is identifying rebound effects related to VM usage. However, the role of the rebound in the organization is largely unknown. In order to achieve a solid knowledge about the rebound effect, a large international retail company was selected. The company is seen as an organization with high virtual maturity. Different virtual communication methods are widely used in this company, such as videoconferencing, computer mediated meetings, instant messaging, etc. These tools have been used for several years; therefore, the virtual literacy of the employees is considered high, as well.

In-depth interviews were conducted with project managers (PM1 and PM2), business analysts (BA1 and BA2), sustainability managers (GSD, DM) and an IT manager (IT) in the company to identify positive and negative experiences that they face related to VMs. This was to identify the main reasons for the rebound effect in an organization. The information was collected to determine the role of the rebound effects in VMs, and the collected information is used to develop measures to control the rebound effect.

The interview template is given in Appendix D. Since interviews were conducted anonymously, abbreviations based on the employees' position in the organization are given. Date of the interviews, job title of the employees and the abbreviations are given at the end of the reference section.

3 Literature Analysis

This chapter aims to give a theoretical background of VMs and their positive and negative impacts. The main focus is using VMs to reduce travel impacts by looking to different approaches in the literature. Existing literature is analyzed to supplement Chapter 6 – Analysis section.

3.1 Reducing Business Travels and Moving Towards Virtual Mobility

Oxford dictionary defines business travel as "a visit made to a place for work purposes, typically one involving a journey of some distance" (Oxford English Dictionary, 2015). Customer visits, internal organization meetings, trainings, conferences and trade shows are some of the reasons for business trips (Aguiléra & Proulhac, 2015). According to the World Tourism Organization (UNWTO), in 2013 about 14% of all international travels were reported as being for business purposes (UNWTO, 2014) and it is projected that travel trends will continue to increase. The underlying factors of this trend are mostly globalization and geographically expanding markets, and networking and outsourcing are also push factors (Aguiléra, 2008; Gustafson, 2012). Furthermore, according to The World Travel and Tourism Council (2010), global business related travel expenditures are more than USD 800 billion. Additionally, the transportation sector has major environmental impacts such as climate change, acidification, air pollution, noise, loss of biodiversity.

There are different research areas investigating how business travel affects organizations, work productivity, and the personal life of the travelers (Gustafson, 2009; Gustafson, 2012; Arnfalk, 2002a; Lindeblad, 2012; Holley et al., 2008). On the top of that, some researchers such as Salomon claims that, the humans are "mobile animal", so it is a necessity to travel for us (Salomon, 1985). Mokhtarian and Salomon have identified three positive functions of travelling;

a) "the activities conducted at the destination;

b) activities that can be conducted while travelling;

c) the activity of travelling itself" (Mokhtarian & Salomon, 2001)

Furthermore, some people consider business trips prestigious because there are some personal advantages of business travels such as travel allowances, tax-free shopping and possibility of combining the trip with a holiday (Arnfalk, 2002a). That's why most people like traveling. Furthermore, travel time can be made valuable by being used to prepare for the activities in the destination or being used for social pressures such as reading or listening music (Lyons et al., 2007). On the other hand, it is found out that apart from financial aspect to the organization, business travels may cause stress and family problems for the employees (Derudder & Faulconbridge, 2010).

From organizational perspective, economic, environmental and productivity aspects are the most important points of business travels (Roby, 2014; Arnfalk, 2002a; Aguiléra, 2008; Räsänen et al., 2010; Lindeblad 2012). Starting from productivity, there are different point of views about how traveling impact productivity. Although, the majority of the researchers see travel time as unproductive, some of them show that there is a social aspect as mentioned previously; as well as ways to increase productivity. Improving productivity is an important driver for organizations. Roby (2014) points out that there are two ways to increase productivity, and reduce cost and environmental impacts;

    a) Change the mode of travelling; or

    b) Reduce the need of travelling (Roby, 2014).

Changing the mode of travelling not only helps to improve productivity, it may also result in cost savings and reduction in environmental impacts. For example, encouraging employees to use train instead of air travel allows them to work during journey (Roby, 2014).

When it comes to reducing the need of travelling, there are several options. However, the biggest barrier against this reduction is behavior change of the individuals. People especially older people, who are used to having FTF meetings, may be less willing to adopt different options to reduce travelling. In order to pass this barrier, it is found out that using hard mandatory and soft policy mixture may encourage behavior change (Roby, 2014).

One of the options to reduce travelling and saving money is to reduce the travel costs in an organization. This will result in either reduction in travelling or finding less expensive ways to travel such as moving from business class to economy class or railway travels. In the case of moving, lower transportation class will encourage people to look for other alternatives to replace travelling (Roby, 2014). The other option is to optimize travelling, and several travel management concepts introduced by travel managers were used in some organizations. According to Gustafson (2012), travel managers have mainly six tasks to control organization's travel behavior and travel costs:

    a) "Developing and implementing a travel policy.

    b) Cooperating with a travel agency.

    c) Making agreements with suppliers.

    d) Standardizing payment routines.

    e) Using travel statistics.

    f) Communicating and gaining support within the organization." (Gustafson, 2012).

Additionally, according to Ruby (2014), external reporting such as carbon disclosure, carbon reduction commitment and corporate responsibility (CR) reports motives new policy developments. Developing travel policy can be also beneficiary for carbon emission reduction. This also positively affects the organization's reputation to customers and employees. (Roby, 2014).

Another option to reduce travel save time, money, and reduce GHG emissions is to transition to virtual mobility. "Virtual mobility is the movement of knowledge without physical movement ('moving brains without bodies')" (Derudder & Faulconbridge, 2010). However, substituting business travels with VM works only in certain conditions. There are some external constraints set by the organization and an individual's internal disincentives of the employees; as well, there are several incentives to using VM (see Table 3-1)

Table 3-1 Factors influences VM

Constraints & Disincentives	Incentives
External Constraints	• Work related (more productive)
• Awareness • Organization (monitoring costs, hubris) • Job constraints	• Family related (more flexible, more time with family)
Disincentives	• Leisure related (more time for self)
• Lack of discipline	• Travel related (no commuting costs)
• Utility from commuting • Psychosocial factors • Risk constraints • Cost constraints	• Ideology (saving energy, reducing GHG emissions)

Source: De Graaff, 2004

There are three types of external constraints: awareness, organizational and job related constraints. Awareness constraints are the ones easier to overcome by training the workers and raising awareness. Organizational constraints, however, are harder to tackle. In some cases, organizations are not willing to pay for ICT development in the organization or one of the meeting sites is lacking in VM infrastructure. Lastly, in the case of job related constraints, the job may not be suitable for teleworking (De Graaff, 2004) such as jobs like auditing a facility or fixing an engine that require to be on-site. Furthermore, personal disincentives also plays a role in using VM; examples of this include employees who may working better on-site, or who continue to travel due to its previously mentioned advantages, or higher networking possibility etc. On the other hand, there are some personal incentives to use VM, such as being more productive, saving time and money and also reducing GHG emissions.

3.2 Green ICT

ICT is general term that used to describe both physical devices, hardware, as well as software. The purpose of ICT is to "provide services that fulfil the users' needs for, among other things, information gathering, analyzing and storing, education and entertainment, and synchronous or asynchronous written, oral or visual communication" (Lindeblad, 2012). Green ICT is defined by Murugesan in 2008 as "study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems […] efficiently and effectively with minimal or no impact on the environment". "Using IT for environmental sustainability" is one of the aspects of Green ICT (Murugesan, 2008). Although there is not much political attention being paid to this aspect, it plays important role for sustainable development (Hilty et al., 2011).

However, according to Hilty & Aebischer (2015) the overall impact of ICT on the environment is relatively small. Although there is positive aspects such as dematerializing goods and reducing demand for some materials; there is also negative impacts such as with ICT applications making services more efficient, which results with cheaper prices and increase in demand (Hilty & Aebischer, 2015). Still, effectiveness of ICT depends on how to use it. If it used correctly and supported by policies and regulation, there is a great potential to decrease the environmental impact in some areas.

There are four environment and environmental sustainability dimensions that Green ICT can contribute:

- Reducing energy consumption & carbon footprint during production and usage to reach low carbon economy;

- Raising environmental awareness;

- Sustainable environmental governance;

- Increasing communication for environmental projects (Andreopoulou, 2012).

Among these dimensions, the travelling aspect can be placed under first dimension; carbon reduction. Travelling can be reduced by using ICT solutions and conducting business meetings remotely. This is also referred as virtual meetings. Arnfalk defines VMs as "synchronous communication mediated by ICT, making it possible for two or more geographically remote people to interact" (Arnfalk, 2002a). Based on the different technology usage, VMs can be referred as audio conference, videoconference or computer mediated meeting (see Table 3-2).

Table 3-2 Characterization of different virtual meeting technologies

Mode	Defining characteristics	Examples
Videoconference	Useful real-time images and voices of other participants; may include other shared images /text.	Group videoconferencing in dedicated rooms; desktop videoconferencing
Audio conference	Voice communication, but no real-time video images of other participants; may include other shared images, data, and text.	Phone calls, conference calls, or conference calls where people are also sharing views of images or documents.
Computer mediated communication	Text, images, and other data received via computer, without effective real-time voice images of other participants.	E-mail, chat rooms, discussion boards, text messaging, instant messaging, shared databases, application specific groupware.

Source: Davis, Wainfan (2004)

Since 1960s, travel substitution via VMs has started to be discussed. This issue recently became more popular due to an increase in air traffic and GHG emissions concerns (Denstadli et al., 2013). VMs have a direct positive effect on environmental protection and GHG emissions reduction due to possibility of reducing transportation needs. According to Andreopoulou (2012) VMs can prevent the approximately 540000 ton CO_2 emission per year, which is emitted via air transportation.

3.3 Impact of ICT and Virtual Meetings

In general, there are three main types of environmental impact of ICT as summarized in Figure 3-1;

- Direct impacts: There is an environmental impact due to the production, use and disposal of ICT, which is also refereed as Life-Cycle Assessment (LCA) such as, resource use and pollution generation.

- Indirect impacts: This is related to the effect of ICTs on "production processes, products and distribution systems". These effects may be positive or negative. According to Hilty & Aebischer, there are four type of indirect effect of ICT;

  o Induction effect: "ICT stimulates the consumption of another resource". For example, instead of typewriter using, printer stimulates paper consumption.

  o Obsolescence effect: "ICT can shorten the useful life of another resource due to incompatibility".

  o Substitution effect: "The use of ICT replaces the use of another resource". Travel and VMs relationship can be given as an example.

○ Optimization effect: "The use of ICT reduces the use of another resource" (Hilty & Aebischer, 2015).

• Structural/Behavioral impacts: This impact occur "through the stimulation of structural change and growth in the economy by ICTs, and through impacts on life styles and value systems". Again, these effects can be both positive and negative. On the positive side, ICT has the potential to support transition towards sustainable consumption and production, and also supports behavior change with greening the products and services. On the other hand, rebound effect could offset those gains by stimulating additional consumption or creating new risks (Berkhout & Hertin, 2004; Hilty & Aebischer, 2015).
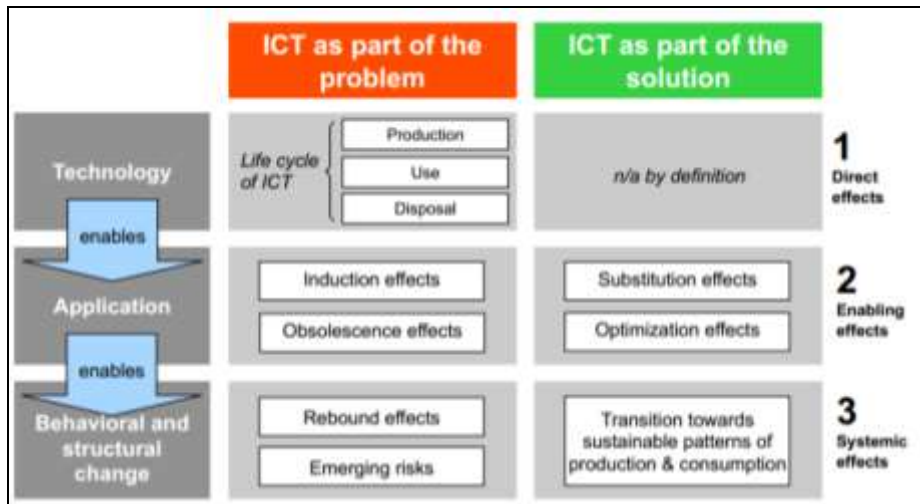
Figure 3-1 Environmental Impact of ICT

Source: Hilty & Aebischer, 2015

When it comes to the relationship between travel and ICT, there are mainly three effects described in the literature;

• Substitution (also referred to as replacement or elimination); implies that replacing travels or location based activity with an ICT solutions. Using VMs to reduce business related travels can be given as an example.

• Complementarity (also referred to as stimulation or generation); described as using one communication type resulting in the increase in the other one. For example, use of ICT can create more FTF meeting requirement, which is also referred to as the rebound effect.

• Neutrality; implies the situations that use of ICT has no impact on travel or vice versa. (Mokhtarian, 1990; Salomon, 1986; Mokhtarian, 2002; Denstadli et al., 2013).

In this thesis, substitution and rebound effect are selected as a focus point.

3.3.1 Replacing Business Related Travels with Virtual Meetings

As mentioned before, 540000 ton $CO2$ emission per year can be prevented by replacing business travels with VMs. That's why, virtual meetings are considered as a service for sustainable development. Although many organizations believe that some of their business travel is replaceable by VMs; they are willing to do that only in the case that there is an increase in green taxes or airfare. In other words, cost is the main driver for substitution in most of the cases (Denstadli et al., 2013; Derudder & Faulconbridge, 2010). The predictions based on economic theory shows that when the price of one good "travel" increases corresponding to its substitute, the demand for the substitute good "VMs" also increases (Mokhtarian, 2002).

In the same time, VMs are accused of weakening social relationships by reducing FTF meetings (Aguiléra et al., 2012). Addition to that, some studies shows that regular FTF is required to build trust (Greenberg et al., 2007; Denstadli et al., 2013; Nardi, & Whittaker, 2002; Nohri & Eccles, 2000). Additionally, increase in the level of virtualization of the meetings created fear among travel agencies, hoteliers, transportation companies, etc. that earn from travelers. To eliminate this threat, the Convention Industry Council launched a campaign "Face Time, It Matters" to promote usage of FTF meetings (Convention Industry Council, 2010). Jones' study (2007) found out that there are five cases where using FTF is important;

- To establish new businesses and complete the projects;

- To persuade others to implement strategic plans;

- To share and expand the knowledge;

- To develop new services and implement different ways of working;

- To promote organizational culture (Jones, 2007).

Similar to Jones, Arnfalk and Kogg (2003) found out that FTF meetings are more suitable for "kick-off" and "kick-out" meetings. On the other hand, VMs are better alternative for follow-up and information sharing purposes, as well as for short and repetitive meetings (Arnfalk & Kogg, 2003). However, also with development in ICT solutions, there is an ideal technology for different types of tasks, which is also referred as "media richness theory". Basically, this theory discusses that in order to communicate efficiently, depending on the complexity of the communication, level of ICT technology needs to be selected (Daft & Lengel, 1986). For example, the higher complexity messages should be transferred via videoconference. When the complexity gets lower emails can also be used.

Different researches are proved that using VMs can reduce business travels in the organization, most of the time. For instance, Arnfalk (2002a) found out that 64% VMs users experienced that the use of VMs substituted either their organization's business travels (45%) or travels to their organization (19%). At the same time 33% of the users had experienced little or no change on their travels. On the other hand approximately 3% of them found that VMs had actually generated more business travel. From the cost perspective, Tetra Pak has managed to reduce their travel costs by 10% by using VMs in 1998 (Arnfalk, 2002a). Furthermore, research by Derudder & Faulconbridge (2010) found that there are companies which halved their business travel expenses by using VMs.

Many organizations do believe travel replacement is feasible, and successful substitution depends on how the ICT is implemented in the organization (Räsänen et al., 2010). There are some policies which can be adopted, which is discussed under Section 2.4. As well as proving adequate technology also increases the potential for substitution of business related travels (Arnfalk, 2002a; Julsrud et al., 2012).

In addition to these, the success in implementing VMs will develop as the organization matures. According to Lindeblad (2012), there are three stages of maturity of use of virtual technologies;

- Substitution stage: in the first stage, VMs are seen as a quick solution to replace FTF meetings. However, business is continued to run as before without using VMs tools or policy adaptations.

- Diffusion stage: in this stage, the organization acknowledges the benefits of VMs and the use of VMs are promoted. Although, work methods are still unchanged, the organization starts to develop tools.

- Integration stage: in the last stage, the VMs tools and work methods are fully integrated into the organization. Other than, emission reduction and cost saving, productivity becomes the main focus point (Lindeblad, 2012).

As it is seen with increase in the virtual maturity, VMs become part of the organizational culture and to get full benefits from this, policy and tools need to be adopted.

3.3.2 Rebound Effects

As mentioned before, virtual mobility can reduce business travels, save time and cost and lead to efficiency improvements. On the other hand, there is a generation or complementarity effect which was discussed, especially, by Salomon (1986) and Mokhtarian, (1990; 2002). Mokhtarian (1990) explains this effect as "communication breeds communication". Increase in the usage of one of the communication methods may results with increase in other communication methods. In other words, increase in VMs usage may lead to increase in business travels. In general, the concept of rebound effect can be used to describe some of the reasons behind complementarity effect of using ICT applications and VMs (Plepys, 2001).

Rebound effect or sometimes referred as "Jeavons' paradox" can be described as the increase in resource or energy efficiency that do not result in corresponding decrease in material and energy consumption (Binswanger, 2001; Khazzoom, 1980; Berkhout et al., 2000). If technological developments makes certain product or service more energy efficient, less energy will be used to produce these products; as a result, cost will decrease and demand will increase. As a basic example, shifting to fuel efficient car will result with less fuel consumption and therefore cost savings. Thus, people may use this saved cost to drive longer distances and spend more time driving. The same effect is also found in ICT sector (Plepys, 2001).

There are different types of rebound effects discussed in the literature;

- Direct effects or pure price effects: Increase in efficiency in the use of a resource or energy is result with less resource or energy need, which will leads to decrease in the final price and increase in the consumption of the resource and energy;

- Substitution or income effects: Cost saving from lowering the price of the resource can be spent for consuming more of that resource or another resources;

- Economy-wide effects: This effect considers the interrelationship of the price and quality in different markets;

- Transformational effects: technology changes can result in changes in preference of the customers, social institutions, and organization of production (Greening et al., 2000; Plepys, 2002; Arnfalk, 2002a).

From ICT point of view, more and more people and organizations started to use ICT solutions to work remotely and to employ VMs. This allowed organizations to save money, energy, time and reduce transport congestion and GHG emissions, which provides opportunity for new demand (Berkhout & Hertin, 2004). This saved money and time may use for other activities that have environmental impact. For example, with VMs more long distance business connections can be built, thus this may lead to an increase in need to have FTF meetings, which means increase in business travels (Plepys, 2002).

Overall, net gains of VMs will depend on the balance between substitution effects and rebound effects (Berkhout & Hertin, 2004). Even in some cases rebound effect may cancel out the potential savings. In that case, there will be possible increase in the business travels (Arnfalk, 2002a). Therefore, it is important for the organizations to control rebound effects (Räsänen et al., 2010).

3.4 Policies to Reduce Travelling and Shift Mechanism to Virtual Mobility

In the literature review the importance of reducing business travel and increasing the use of VM was discussed. The fact that VMs may not reduce business travels automatically was also discussed. There are different policies and approaches that can be implemented to give a higher chance of successful use of ICT. Although some of these ideas have been discussed in different sections in the literature review, this section aims to give general knowledge and summarize the options regarding various policies and approaches.

There are three main actors that can influence travel trends of the organizations; government as a policy maker, voluntary initiatives and the organization itself. Starting from the policy maker's point of view, they are interested in organizations' business travels due to corresponding externalities. These externalities are congestion and environmental impact, which have a negative impact on welfare (De Graff, 2004). Policy instruments to control travelling can include:

- Regulatory instruments or command and control instruments;

- Market – based instruments; and

- Informative instruments.

Regulatory instruments are the strictest of the instruments. Policy makers can set certain limitations or put specific restrictions on activities. Market – based instruments creates incentives through taxes or additional fees. In the context of reducing business travels, this can be direct or indirect. For example, introducing taxes for travel allowance can directly affect the organization (Arnfalk, 2002c) or by increasing air travel tax, there will be increase in flight ticket cost and correspondingly overall business travel spending will increase. Lastly, informative instruments aim to change behavior by spreading knowledge. Informative instruments can be either mandatory such as mandatory reporting to authorities (Arnfalk, 2002c) or voluntary such as external carbon disclosure reports. This also may be positively effect the organization's reputation to customers and employees. (Roby, 2014).

From an organizational point of view, developing and implementing organizational travel policy is the most effective way to reduce business travel (Roby, 2014; De Graff, 2004; Arnfalk, 2002c). This can contain routines, control systems and decision-making systems regarding the organization's business travels (Arnfalk, 2002c) as well as travel class policy (e.g., economy or business class) (De Graff, 2004). Additionally, an organization can set rules such as pre-trip approval requirement and travel expense reporting systems. Based on the organization's aim for travel policy (e.g. productivity increase, cost decrease, environmental reasons), priorities in the policy can vary. Table 3-3, summarizes the main approaches that discussed in the literature review to reduce impacts of business travels.

Table 3-3 Summary of main approaches to reduce impacts of business travels

Approaches	Impacts
Develop and implement travel policy	Optimizes travel expenses and controls environmental impacts from travelling
Reduce class of travel	Reduces carbon emissions by using less space on the plane. Makes flying less comfortable, encouraging modal shift
Replace FTF meetings with VMs	Reduces GHG emissions and cost by reducing travel and improves work-life balance (WLB).
Recession reducing business activity	By reducing business activity, there will be less need to travel, and business travel expenses will decrease.
Renegotiate contract with travel management company	Optimizes the business travel costs by getting better traveling deals. However, there will be little or no impact on actual travel volume.
Reduce need to travel	Reduces time out of the office, improving WLB and cuts costs and carbon emissions
Change mode of travel	Changing from car or plane to train gives opportunity to work or relax on journey. This may lengthen the journey time, which may impact WLB.
Reduce distance travelled	Reduces the journey time, cuts carbon emissions if mode is not changed, and improves WLB. However, this may not be applicable due to the stable meeting locations.
Improve meeting management	Reduces wasted time in meetings improving productivity and WLB

Carbon reduction commitment	The cases that also includes business travel's emission reduction, to reach the targets there will be strict company policies need to be developed; which may reduce travel costs or change the mode of travel.
Carbon disclosure project	External reporting drives internal change to maintain a good reputation with customers. To have a good reputation, company will try to lower its GHG emissions.
Corporate responsibility (CR) reports	Higher level of external accountability for corporate responsibility and carbon emissions can reduce by auditing and managing the carbon emissions of the organization
New methods of communications such as smart phones	Gives flexibility to employees and improves productivity. They can able to work anywhere and anytime, gives greater worker empowerment, but this may not be good for WLB
Staff training and raising awareness	Understanding the environmental impact of travels can make employees reduce their travels or change to more environmental friendly communication methods

Source: Modified from Roby, 2014; De Graff, 2004

As a way to replace travelling and one of the focuses of this thesis, VMs usage strategies are also important for organizations to ensure higher gains. Firstly, travel management policies can directly support VM usage or indirectly guide their employees to limit travel volumes. In that case, management and project leader support of VMs is strongly linked to the success of the policy implementation. The other factor for effective use of VMs is related to ICT tools and infrastructure. Having better ICT infrastructure can both ensure better communication and increase the willingness of using VMs; quality ICT infrastructures includes good audio and video quality, video conference rooms and web meeting tools, etc. Furthermore, selecting an ideal ICT solution depends on the complexity of the communication and is also another important issue, called the media richness theory. For this purpose, staff trainings become a crucial component of VMs strategy. Raising awareness, training employees about how and when to use ICT solutions, and strategic decisions regarding which VMs technologies to implement are needed for successful shift to virtual mobility (Arnfalk, 2002c; Roby, 2014).

4 Business Travels in the Organizations

In general, many organizations have started to give higher importance to their travel impacts. As a first step, survey responses of 28 different Swedish organizations and in-depth interviews with 7 employees of a large international retail company employees are summarized in this chapter. The chapter also consists of findings that are related to business travels within the organizations.

4.1 Reducing Environmental Impact of Business Travels

In order to understand the ambition of the organizations about reducing environmental impact of their travels, they were asked what kind of solid actions they have been implementing. The first step towards controlling the environmental impact of the business travels is measuring indicators to understand what an organization needs to deal with. Therefore, it the travel managers were asked if their organizations are monitoring the level of carbon emissions generated from work related travels. The most of them told that they are monitoring CO_2 emissions of their travels, but five out of 28 of the travel managers stated that currently they are not monitoring their CO_2 emissions related to organization's travels. According to the results that can be seen in Figure 4-1, approximately 78% of the organizations are monitoring their emissions from flight journeys, and monitoring the emission related to their train journey, which is placed second.
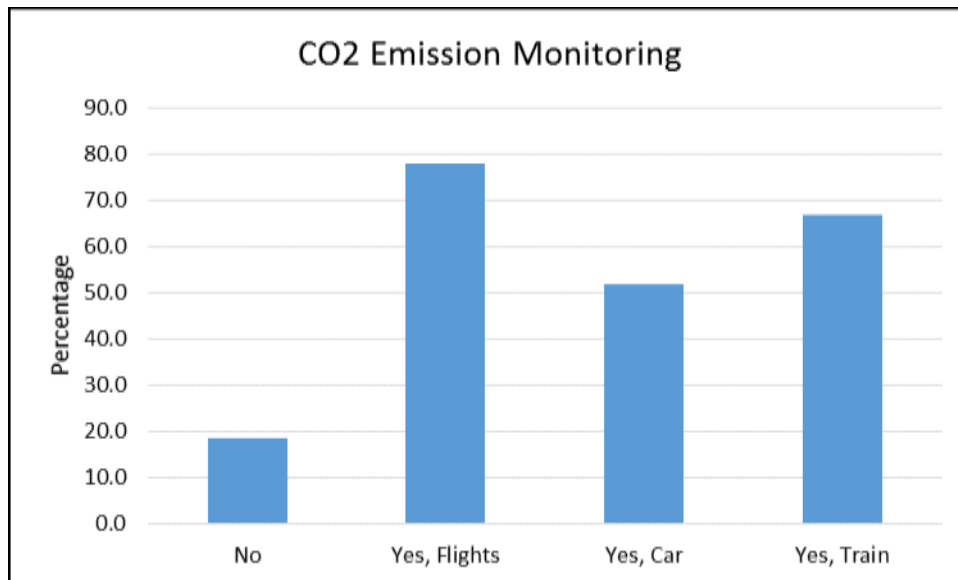
Figure 4-1 Percentage of CO2 Emission Monitoring

The second step, after measuring the indicators is setting the goals. Before taking any action to reduce business travels, it is better for the organizations to set SMART[1] goals. In order to understand if the organization set goal and targets, is asked. As it can be seen from the Table 4-1, more than half of the participants (60.7%) said they have reduction goals. However, only 5 of the organizations stated that they have quantified goals. Furthermore, among one of "yes, but not quantified" group mentioned their achievements in this subject reported and disclosed in their annual corporate sustainability reports. It can be interpreted that the organization uses public disclosure to increase the company's reputation. Additionally, although one organization replied as currently they do not have reduction goals, they just started monitoring and are planning to set targets starting from next year onwards.

Table 4-1 Number and percentage of organizations have emission reduction goals

Emission Reduction Goals	Number of organization (out of 28)	Percentage
Yes, quantified emission goals	5	17.9
Yes, but not quantified	9	32.1
Yes, but not concerning emission (e.g. volume, costs)	3	10.7
No	11	39.3

4.2 Approaches to Reduce Negative Impacts of Business Travels

Knowing that it is important to develop and implement company policies to achieve the goals, it is asked to the 28 survey participants "what ways they are using to manage or reduce the negative impacts of business travels". These negative impacts includes environmental impacts as well as productivity and cost aspects. As a result, it is seen that the most popular approach is encouraging VMs usage, which is used by 25 organizations. It is followed by having relevant travel and meeting policy. Little more than half of the organizations indicated that they have "travel guidelines, routines and/or restrictions" and / or they are "using alternative fuels for cars (e.g. biofuels, electricity)" to manage the negative impacts of business travels.

Surprisingly, travel budget limitations are not widely applied. On the other hand, although not many organizations are known for using "allowing telework" and "encouraging bicycling and walking", organizations that are using these two are considered as doing beyond business travel reduction because the way employees choose to commute to their work place, is not considered as organizations responsibility in most of the cases. Additionally, these transportation methods neither affect organizations budget nor affect their environmental emissions. That's why, these approaches might be adopted to raise awareness of the staffs, increase the company reputation or do beyond reducing business travels.

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[1] SMART is a mnemonic acronym of criteria from setting the goals that first used by George Doran (1981); which are Specific, Measureable, Assignable, Realistic and Time-related.

Table 4-2 Different approaches used by organizations to reduce their business travels

Approaches / tools to reduce business travels	Number of organizations (out of 28)	Percentage
"It's stated in our travel and/or meeting policy"	20	71.4
"Through travel guidelines, routines and/or restrictions"	15	53.6
"Travel budget limitations/cuts"	5	17.9
"By moving towards more environmentally friendly means of transport (e.g. flights-train)"	11	39.3
"By using alternative fuels for cars (e.g. biofuels, electricity)"	15	53.6
"By encouraging bicycling and walking"	4	14.3
"By encouraging VMs alternatives"	25	89.3
"By allowing/encouraging telework"	8	28.6

Additionally, one organization stated that when they need to use air traffic, they select direct flights instead of connecting flights even if it is more expensive. Also, they use a tool that visually displays comparative CO_2 emission levels for other travel alternatives during the booking.

When it comes to employee side, during the in-depth interviews, only one interviewee said that it has been told to consider the use of virtual tools to complement the business travels (BA2, 2015). The exact opposite took place to another employee. DM (2015) stated that it is asked to increase her business travels. The others said that they have not experienced any guidance from upper management (or their project managers in some cases) to reduce their physical travels. Therefore, self-awareness seems to be one of the key components of adopting CO_2 reductions into the project (e.g. PM1, 2015; GSD, 2015). The employees with higher environmental awareness tend to optimize their travels. However, according to the interviewees the main drivers to reduce business travels are mostly concentrated around time management and productivity for employee and project manager level rather than environmental perspectives.

5 The Role of Virtual Meetings in the Organizations

This chapter investigates the role of VMs and its effect on business travel in the organization by using data from REMM Project, surveys and in-depth interviews.

5.1 The Use of Virtual Meetings

The surveys with travel managers showed that all 28 organizations are using VMs. In order to identify which mode of virtual communication; videoconference, audio conference, computer mediated communication (please see Table 3-2 in literature for further information about these technologies), is more commonly used, relevant question is added into the survey. As it is presented in Table 5-1 with approximately 93%, computer mediated meeting has higher number of organizational usage.

Table 5-1 The use of different VMs methods

VM Methods	Number of organizations (Out of 28)	Percentage
Videoconferencing	23	82.1
Computer mediated meeting	26	92.9
Audio conference	21	75

The REMM project was also investigated the use of VMs in the selected 19 agencies. During the project in order to get quantitative results, the survey asked the REMM agencies' employees to record their business trips and VMs including videoconferences, computer mediated meetings and audio conferences during a given period of time (two weeks' time). It is learned from the results obtained in 2011 that among overall VMs, usage of audio conference is 50%, computer mediated meeting is 21% and videoconference is 33%. In general, for REMM agencies, we can conclude that audio conference methods are the most preferred as VMs technology. However, from the survey result of travel managers showed that audio conference method is the least used among 28 participated organizations. Possible reason behind this difference is the misunderstanding of audio conferencing by travel managers. According to Table 3-2 in literature review, even phone calls can be categorized as audio conference, which could be easily forgotten due to the regular usage in the organization that becomes part of their routine. So, it is expected to see audio conference in the first place.

During the surveys with travel managers, their employees' VM communication frequency is also asked. The most received answers are "most employees use VMs often" and "some employees use VMs often". Since VMs usage frequency is measured in interviews with travel managers in relativistic terms, for more numerical representation, those business trip numbers and VMs frequency collected from REMM agencies, their share of VMs could be calculated for 12 of the agencies. In order to calculate it, the share of VMs in individual agencies, the sum of all VMs are divided to the sum of all VMs plus all business trips, during the specified time period. As it is given in the Table 5-2. there is a significant difference between 12 agencies when it comes to the share of VMs. However, the average is calculated as 52%, which means that half of the meetings are conducted by using ICT technologies.

$$\text{Share of virtual meetings} = \frac{\text{virtual meetings}}{\text{virtual meetings} + \text{business trips}}$$

Table 5-2 The share of virtual meetings in 12 REMM agencies in 2011

Public Agency	Share of virtual meetings
The Swedish mapping, cadastral and land registration authority	24 %
Swedish Post and Telecom Authority	29 %
Swedish Customs	43 %
The National Archives	43 %
Swedish Companies Registration Office	49 %
Swedish Pensions Agency	51 %
Swedish Agency for Economic and Regional Growth	57 %
Swedish Transport Agency	59 %
Swedish Civil Contingencies Agency	61 %
Swedish Transport Administration	62 %
Swedish National Board of Agriculture	65 %
Swedish National Board of Student Aid	82 %

So, what are the incentives for the organizations to use VMs? For that purpose, this question asked to the travel managers. According to the travel managers, the main incentives for using VMs are listed from the most popular to the least;

- Cost management / saving;

- Time management / saving;

- Increase productivity / job efficiency;

- Reduce environmental impacts;

- Reduce business travels / create alternatives to FTF meetings;

- Work-life balance;

- Employee happiness; and

- Easiness.

When it comes to providing incentives for individual employees in order to promote VMs, 17 participants (among 21 responds for the question) stated that they do not provide additional benefits. However, two of them pointed out that reducing travels have positive impact on work-life balance. Additionally, one of them also mentioned that reducing the stress associated with travels as a result. On the other hand, according to one of the organization, there is a possibility that the saved money from business travel reductions can be spent for employees' benefits such as organizing events or trainings.

5.2 Replacing Business Travels with Virtual Meetings

As it is previously presented in the approaches to reduce negative impacts of travelling part, from the surveys with travel managers, it is obtained that the most supported approach was encouraging VMs usage. It is also asked that whether they are considering VMs to reduce the organization's business travels.

Table 5-3 Whether VMs used to reduce business travels of the organization or not

VMs used as means to reduce travels	Number of organizations (out of 28)	Percentage
Yes, it is clearly stated	17	60.7
Yes, it's not clearly stated but commonly understood	7	25
Yes, it's a factor but not so important	3	10.7
No	1	3.6

As it is seen from the Table 5-3 that except one of the organization, the rest of the 27 organizations are taken into account of VMs to reduce business travels. On the other hand, two of the organizations admitted in the comment section that although they are using VMs to reduce business travels, reduction is not their main goals. Their main goal is either reducing the cost or creating alternative ways of communication.

However, replacing FTF meetings with VMs is another issue. During the in-depth interviews, when discussed the "kind of meetings they preferred or obligated to travel" and " kind of meetings they can have virtually or have been conducting virtually". Table 5-4 below presents FTF meeting types vs. VMs types.

Table 5-4 FTF Meeting *vs. VMs Types*

FTF Meeting	VMs
To introduce yourself at the beginning of the project (PM1, 2015; PM2, 2015; BA1, 2015) and lessons learned at the end of the project (PM2, 2015)	For follow-up meetings after project started (PM1, 2015)
To attend steering committee meetings (PM2, 2015) or For some team member meetings (GSD, 2015; BA1, 2015)	To share information (PM1, 2015; PM2, 2015; GSD, 2015; BA1, 2015; BA2, 2015)
During the crisis or emergency situations in the project sites	To update your team members regularly (PM1, 2015; PM2, 2015; GSD, 2015; BA1, 2015; BA2, 2015)
To audit different facilities (GSD, 2015)	
To attend a conference, training or workshop (GSD, 2015; BA1, 2015) or give training to large number of people (PM1, 2015)	

Similar to the discussion in the literature review, and confirmed in the survey is that that replacing business trips with VMs is possible. However, employees found the types of meeting mentioned in Table 5-4, FTF meeting part, easier and more productive if they held FTF. So, even replacing business travels with VMs is possible, 100% replacements may not be achieved.

For more numerical result, during the REMM project, employees of 11 REMM agencies were asked how many business trips they managed to replace via VMs. As it is seen in Figure 5-1, in average organizations have similar replacement percentage predictions. When it comes to the National Achieves (the highest) and Swedish National Board for Student Aid (the lowest), they have different stories than the others. It was learned from the project manager of the REMM Project that, National Achieves started working with VMs with starting of the project. However, Swedish National Board for Student Aid case is quite opposite. This organization has higher virtual maturity and they have been using VMs for a long time. That's why, it is hard for them to achieve higher percentage replacement like others.

Share of VM replacing business trips
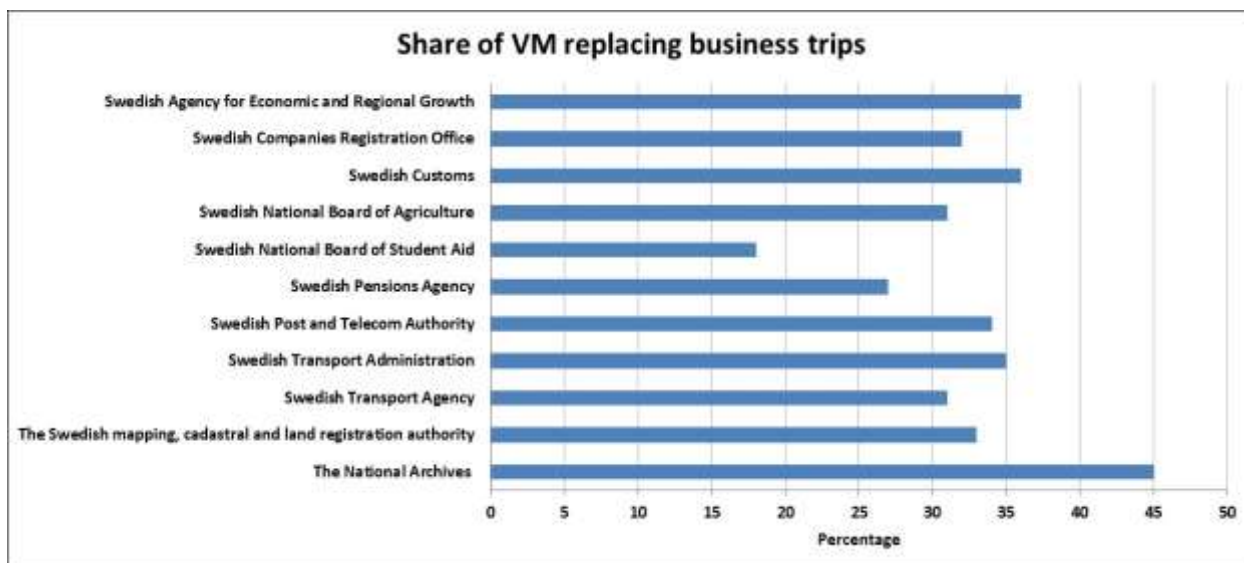
Figure 5-1 Share of VM replacing business trips

5.3 The Impacts of Virtual Meetings

As a result of the previous chapter, replacing the business travels are possible; however, "what are the impacts of VMs", which is subject to investigation. According to the travel managers, top five incentives of adapting VMs culture to the organization was cost management, time management, increase productivity, reduce environmental impacts and reduce business travels. In order to investigate the impact of VMs on organization's budget, productivity, travel trends and environmental impacts, related questions asked during in-depth interview with employees and, surveys with travel managers and also REMM project also looked into environmental perspective. However, from the organizational perspective, only the organizations that monitor the effect of their VMs can make input to this part. That's why, it is asked to the travel managers whether they monitor the effectiveness of VMs or not. Only 11 out of 28 stated that they do monitor their VMs. Therefore, these 11 organizations' comments included in this section.

5.3.1 The Impacts on Organization's Budget

Cost savings' relationship with VMs and business travels are rather complex than straightforward. Both seen in the literature and in the data that replacing business travels with VMs is possible. That means, initially there will be some money saved due to this travel volume reduction. However, where this money is going to be invested instead becomes an important issue. For example, as one of the travel manager mentioned that saved money can be spent for employees' benefits such as organizing events or trainings. This can have a positive impact on employee satisfaction and job quality. On the other hand, the saved money can be spent to hire more employees or expand the business, which may result with more projects and more business travels. This concept is also referred as rebound effect as suggested by literature.

Starting with the survey, three of the travel managers specifically mentioned that they are monitoring business travels and its relationship with VMs in terms of business travel costs. As a result, they found out that there is a clear relationship between VMs and business travels. They observed that the increase in VMs results with decrease in travel expenses.

Additionally, in order to understand, how budgeting of the project works, and in case of saving money by reducing business travels, how this money to be used; the issue was brought up during the in-depth interviews. PM1 (2015) explained that, in general, project budget needs to be prepared by project manager and approved by upper management. However, in PM1's cases, the resource is the real cost rather than the business travel. In other words, business travels do not become the main focus during the budgeting process, and if there were savings, the savings were either so little that cannot be easily identified or spent to add more resources. The second option is what creates rebound effect.

Furthermore, during the in-depth interviews, two employees who are not in project manager positions stated that "because project managers control the budget, they also directly controls the business travels under the project, which they are responsible" (GSD, 2015; BA1, 2015). Therefore, it is possible for the project managers to ask their staffs to reduce their business travels to save money. Other than these, it is told that the organization has travel guidelines, which only allow the employees to pick best price available for both transport and accommodations with the help of travel agency (GSD, 2015). Although it is not directly related to VMs, this is also another measure to control travel budget in the organization.

5.3.2 The Impacts on Productivity

The productivity is also complex issue in line with cost savings. However, in this case, complexity comes from the time component of the productivity. In basic terms, productivity depends on work load and the time. Same as cost, by travelling less and using VMs, people can save time as well, when it is compared to the time spend during the journey. Yet, how this saved time spent is also important aspect. For example, organization can select to get more jobs since the employees now have more time to work or can increase the quality of their work outcomes by spending more time in business. In addition, because of the easiness, VMs can create more meetings than usual, or since there is no travel cost involved, more people can enter the meeting, which may slow down the process. These negative impacts are the ones referred as rebound effect in the literature.

As an overall, during the in-depth interviews, necessity of being efficient while working was mentioned by every interviewee. On the positive side, using VMs are more efficient when compared to its travel option (PM1, 2015; PM2, 2015; GSD, 2015). It is also admitted that it is hard to work while travelling. Less time that spend on the road that can be used for the projects, so that the work load can automatically decrease (GSD, 2015); and also for meetings that is effective to use VMs (please see Table 5-4), VMs are the easiest and fastest way to communicate. That's why, the most of the time there is a decrease in the work load. However, it is also mentioned that VMs are sometimes not the best way to communicate situations such as emergency or crises on the site.

On the other hand, VMs can create too many meetings including some unnecessary meetings to attend since it is easier. In order to be more efficient, meeting management is required (PM1, 2015). The other issue is again because of the easiness, it may allow more people to attend than required. For this part, PM1 (2015) told that she attends to the meetings that she can contribute and requests the same thing from the other participants.

The other possible negative aspect is related to technology selection. First of all, it brought the author's attention in couple of interviews that interviewees complained about the audio quality of the system used in the organizations. Additionally, the author is also tested the system and found out that sometimes it is hard to hear the voice of the other side due to the audio quality and background noise. Some employees also mentioned that the situation can even be worse especially during the big meetings with a lot of participants (PM1, 2015; IT, 2015). Furthermore, line connection quality is also other important factor. It is told that due to bad connections, some points would be skipped, which could affect the job quality at the end (BA2, 2015; IT, 2015).

The other technology related issue that affects productivity is about VM tool selection. Interviewees mentioned that in most of the cases, they are using audio conferencing, but videoconferencing or other tools that create visual connection are not widely used in the organization. That's why, people complained that they cannot get instant confirmation or read others body language; which makes it harder to understand whether everyone gets the information or not (GSD, 2015; PM1, 2015, PM2, 2015). Also, it sometimes results with misunderstanding each other due to lack of visual communication (BA2, 2015). As a result, these negative impacts increases the work load and decreases the productivity.

Another negative aspect is related to personal reasons. Due to less effort put to into VMs, people tend to be more unprepared, which decreases the efficiency of the meeting (BA2, 2015). Moreover, it is observed that effectiveness of VMs usage is depending on the training of the employee (BA1, 2015). Thus, employees with no VMs training can use VMs less effectively, which will result with decrease in their productivity.

5.3.3 The impacts on Environment

VMs usage also have environmental aspects. As it is discussed throughout this thesis that travelling has environmental impacts such as GHG emissions and CO_2 emissions, which are relatively easy way to measure. There are different tools available taking into account the distance and the mode of transport to measure CO_2 emission of the trip. So, CO_2 emissions of the business travels are depended on the mode of transport and distance of the journey. This is also important because the increase in the travel volume can easily be spotted. Thus, the possible rebound effect that higher that benefits can be identified. From the results of the survey, it is seen that one organization commented that they are disclosing their carbon foot print annually, and also monitors their CO_2 emission from their business travels in order to cite to their annual reports.

In quantitative terms, REMM Project also investigated this issue. They collected the CO_2 emissions per employee from 19 public agencies from start of the project in 2010 to 2013 while adapting VMs to organization culture via REMM Project. As it is seen from Figure 5-2, with increasing VMs, there is a decrease in emissions.
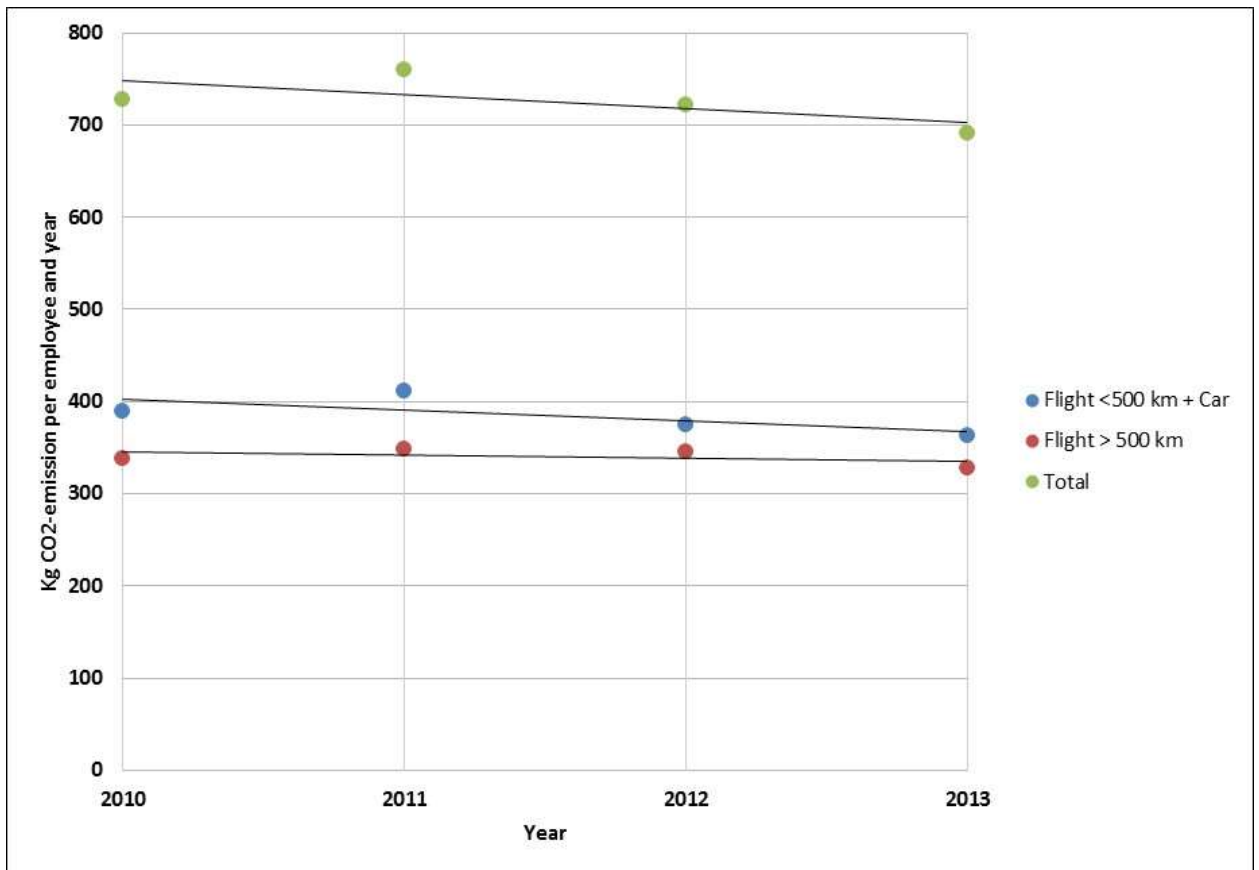

Figure 5-2 Annual CO2 emission from business travels per employee in REMM

5.3.4 The Impacts on Organization's Business Travel Trends

Assuming that there is a direct relationship between business travel trends and CO2 emission, Figure 5-2 also indicates that VM increase decreases the travel volume. As previously mentioned, rebound effect can result with increase in the business travels. That's why, it is important to identify the main reasons in order to control these negative effects.

In the surveys, one travel managers mentioned that in their organization they are using a lot of VMs as well as there are still a lot of business travels. They could not see any strong relationship between these two. Based on the literature and the thesis finding, this organization might be experiencing the rebound effect. The other organizations that measure their number of VMs and business travels indicated that they found there is a relationship between travel volumes and VMs. As they mentioned the surveys, they experienced that the increase in the VMs are resulted with decrease in the business travels. At the same time, one organization also mentioned that there is an increase in their VMs; however, the travel manager did not specify how it affected their business trips. Also, one travel manager also agreed with the interview findings that some meetings still needs to be FTF.

5.4 Efficiency of Virtual Meetings

Before starting to analyse and discuss how to use VMs more effectively, it is asked to the travel managers that what kind of measure they are using to increase effectiveness of VMs in their organization. The major of the measured used by travel managers are briefly explained as;

- Travel policy; as it is mentioned before, majority of the participants were using travel policies to manage their organization's business travels. They also use these to encourage the employees to use VMs.

- Information leaflets /user guides; some of the travel managers indicated that there are user guides available in their internal system and also one travel manager mentioned that there are tips and tricks about how to increase efficiency of VMs are provided for their employees.

- Meeting guideline; some stated that they are using guidelines to encourage VMs.

- IT support; there are technical problems may occur when VMs tools are used. That's why, some organizations mentioned that they have 7/24 online support or their IT department gives support in this area.

- Staff trainings; the importance of the training is mentioned a couple of time in this thesis, and during the surveys, it is found out that some organizations train their staff about VM tools. One organization mentioned that they are training their employees via e-learning. Also, another organization stated that they train their staff when they introduce new VM tools.

- Updating the equipment / using better meeting tools; equipment quality and meeting tools are important components for VMs. As it was complained from a large international retail company employees that audio quality of their meeting tool was low, which resulted that decrease in productivity. During the survey, buying new equipment and using better meeting tools to increase efficiency were another input from travel managers.

- More conference rooms; another input from interviewees was about necessity of using visual communication in some cases. They claimed that seeing other person can allow them to read their body language, which also allows them to read subtexts in the meeting. Survey results revealed that one of the ways to increase effectiveness of the VMs is having more videoconference rooms in the organizations, which is used by some organizations.

- Projects to increase meeting efficiency; another method that used by travel managers was adopting projects to identify the ways to increase the VMs quality in the organization.

In addition to these, during the in-depth interviews, it was identified that meeting management is one of the ways to be make VMs more efficient (PM1, 2015). This concept includes selecting relevant meetings as well as scheduling beginning and end time for the meeting (GSD, 2015). Moreover, some meetings need meeting agenda preparation (IT, 2015; BA2, 2015), which is consist of goal of the meeting and expectations. In this way, it might naturally select the relevant people to attend the meeting and it also might result with preparation for the meeting by the attendees.

6 Analysis

This chapter presents the analysis of the findings by mainly focusing on rebound effect aspect, effective VM usage and how these two can affect business travel trends.

6.1 Business Travel Trends

Business travels trends are projected that will continue increasing due to globalization. However, this growth can be controlled by travel management and substitution of business travels with VMs. On the other hand, substitution may create rebound effects. Based on this information a formula is created to develop three possible scenarios for the organizations' business travel trends;

- Case 1; if "substitution effect + impact of travel management < rebound effects + growth of business travels", this will results with overall increase in the organization's business travel trends;

- Case 2; if "substitution effect + impact of travel management = rebound effects + growth of business travels", this will results with equilibrium situation and business travel trends will be stable;

- Case 3; if "substitution effect + impact of travel management > rebound effects + growth of business travels", this will results with overall decrease in the organization's business travel trends; which is considered as desired situation in this thesis.

In order to reach the situation in case 3, VMs need to be used effectively, business travels need to be properly managed and rebound effects need to be controlled. Other than VM usage, during the data collection; in order to manage the business travels that travel policy, guidelines and budget restrictions can be used. Additionally, effective VM adaptation is discussed in details under Section 6.3 and methods to control rebound effects are given under Section 6.2. However, the amount of reduction in travel volumes can vary in different sectors and also depends on the success of these recommended measures.

6.2 Rebound Effects

In the literature review, four different rebound effect types are mentioned; direct effects, income effects, economy-wide effect and transformational effects (Greening et al., 2000). Although, the information about what rebound effect means , there is no extensive research about how to identify rebound effects due to VM culture development in the organization. From what is explained in the literature, rebound effects' relationship with VMs are tried to be found. By using VMs, there will be cost and time saving. In other words, the same amount of work can be done with less money and time, therefore, possibility of getting more projects will be arises. This is also known as direct rebound effect. Secondly, this saving can be spent for more travelling for new projects taken as well as for old project. This is the one referred as income effect. In the context of VM development, economy-wide effect can be explained as ICT allows organizations to contact with wider range of businesses. This may result with increase in the work load or increase in business travels. Lastly, since VM makes communication easier and faster, organizations may end up using VMs more than it is required, which will consume time and increase the work load.

Based on this understanding, four main rebound effect indicators are selected; cost, time, productivity (or work load) and business travel volumes. In the likely event of using VMs properly, it is expected that there will be cost and time saving, productivity increase and business travel volume decrease. On the other hand, rebound effect will affect these indicators oppositely. However, it is not easy to identify the rebound effect in the organizations. Since, it is hard to measure the rebound effect in quantitative terms, during the in-depth interviews and travel manager surveys the main reasons and the results of the rebound effect are tried to be identified based on this indicators. Questions related to budget management, work load change and productivity due to VM usage is asked to the employees of a large international retail company's employees. Other than that, in spite of there were no direct questions asked to identify rebound effect in the surveys, in some answers possible rebound effects are observed.

In order to, identify the rebound effect in the organizations; two relatively easier to measure results of rebound effects are selected. First of all, increase in business travel volume. Although, rebound effect also has direct effect on budget of the organization, productivity and time spent, they cannot easy to differentiate from other negative factors such as due to technical and personal reasons. However, it is easier for the organizations to measure the business travel volume and it can increase as a result of some types of rebound effects. Secondly, number of VMs and their durations can be used to identify rebound effects as well.

6.2.1 Business Travel Increase

As it is mentioned, business travel volumes are measureable and can be affected as a result of some types of rebound effects. The factors that can increase business travel volumes can be related to budget management, time management, getting more projects or necessity to have FTF meeting with new connections obtained via virtual communications. Starting with the budget management, PM1 (2015) explained that in general project budget needs to be prepared by project manager and approved by upper management. However, in the selected company, the resource is the bigger cost in the project budget rather than the business travels. In other words, business travels doesn't become the main focus during the budgeting process and if there were savings, the savings were either so little that cannot be easily identified or spent in the resource part. If it is spent for more resource that means, there is a rebound effect. The other possible rebound effect is identified in the travel manager surveys that one

organization mentioned that even they are using VMs, they still have too many business travels and they couldn't manage to reduce their travel volumes. Although, the main reason of that is not mentioned, this may be also because of mismanagement of business travels. In that case, approaches to manage business travel volumes are discussed under business travel volumes section.

When transmission to virtual mobility, organizations need to make decision between dematerialization (or degrowth) and globalization (or growth). As first option, which is also explained by Hilty & Aebischer (2015), the overall impact of ICT on the environment was relatively small and by using ICT instead of travelling, they can select dematerializing or degrowth. Basically, these saved time and cost can be spent to increase the quality of work or decrease number of employees since the required job can be done by fewer people etc. On the hand, there is a globalization and geographically expanding the markets factor (Aguiléra, 2008). The most of the organizations try to grow by taking more jobs. Although, it is hard to change the mentality, there are couple of actions and push mechanisms;

- Direct or indirect push from policy makers such as increase in emission taxes;

- Mandatory emission reporting;

- Company policy to reduce or limit travelling;

- Travel budget limitations.

In general, the actions related to budget and reputation of the organization can reduce the rebound effects for this part.

6.2.2 Increase in Virtual Meetings

During transmission to VM culture, it is normal to observe increase in VMs. However, speed of the increase should be related to decrease in business travels. If there is relatively higher increase in VMs, this may indicate possible rebound effects. VMs can make communication easier and faster, with this also may bring couple of rebound effects. Since, it is much cheaper than travelling, a virtual meeting can attract more people in the organization than should be (PM1, 2015). Having too many people in the people can slow the meeting speed and decrease the meeting efficiency. This may result with more meetings or longer meetings. Additionally, since there is little effort put to connect with others, people tend to be more unprepared, which also decreases the efficiency of the meeting (BA2, 2015). The other complains about VMs that received during in-depth interviews that having too many meetings that as a result there is hardly no time to do other work than meetings (DM, 2015). In other words, there is an increase in work load.

As a result, the increase in VMs may indicate the rebound effects related to job quality, productivity, and work load. Effective VM management is the key to control in this case, which is discussed in detail under effective virtual meeting adaptation section. However, there are some actions can be taken;

- Meeting management to eliminate unnecessary meetings;

- Meeting agenda preparation for time management and to control too many people in the people by proving scope of the meeting;

- Distributing pre-meeting reads to make people prepare for the meeting;

- Proper VM tool selection;

Overall, the actions that can increase productivity works better for this part.

6.3 Effective Virtual Meeting Adaptation

Successful VM adaptation is important for organizations to get the full benefit from their usage. Based on the finding, organizations use VMs for cost management, time management, to increase productivity, reduce environmental impacts and reduce business travels. In this part, the approaches to increase efficiency of VMs are investigated under five different levels; policy-maker level, organizational (upper management) level, project management level, employee level, technical level. Addition to these, uncontrolled events is also briefly discussed.

6.3.1 Policy Maker Level

According to De Graff (2004), the externalities such as congestion and environmental impact, which have a negative impact on welfare gaining policy makers attention Policy makers can set certain limitations or put specific restrictions on activities by using regulatory instruments or can create incentives through taxes or additional fees. For example, introducing taxes for travel allowance can directly affect the organization (Arnfalk, 2002c) or by increasing air travel tax, there will be increase in flight ticket cost correspondingly overall business travel spending will increase. Also, they can change behavior through knowledge such as mandatory reporting to authorities (Arnfalk, 2002c). These instruments work as a push mechanism for organizations to move towards virtual mobility. However, one important point is especially taxes like air travel can affect the individuals as well, which can create undesired conditions. Therefore, it is important to select target group.

Although, there are currently few policies about ICT, the topic started to take attention. In 2009, the European Commission is adopted the recommendations that provides the policy framework to support ICT development. The commission aims that these developments to contribute sustainable growth by focusing on energy efficiency, water management and climate change adaptation. Although, there is no specific emphasis on VMs, this policy framework supports energy savings through ICT in transport sector (European Commission, n.d.). Another example to ICT policy is Swedish Government's Green IT Agenda 2010 – 2015. The agenda is aiming to reduce environmental impacts of public agencies via ICT solutions. There are three part of this agenda; promoting procurement of green electronics, running and maintaining ICT-equipment in an environmentally and climate friendly way as well as promoting VMs (Naturvårdsverket, 2015). For VM development, the project called REMM (Resfria Möten i Myndigheter or Virtual Meetings in Public Agencies) was development and some of the finding of the project is also given in Chapter 4.

6.3.2 Organizational Level

According to the survey results, the main drivers for the organization to reduce travelling and move towards virtual mobility is related to cost savings and productivity (including time). Despite it is not mentioned in the surveys, organizational reputation is also another important driver (Roby, 2014). First of all, ambition of the organization is an important factor to adopt VM culture. The other factor is how VM and travel policy is developed. There are five steps that can be followed for effective adaptation; setting clear objectives, measuring, setting goals, developing policies, and monitoring.

- Setting objectives; during the surveys, different organizations stated that they prioritise different aspects of business travels as a focus to for reduction or different aspects of VMs to use. Based on these priorities the objective needs to be set.

- Measuring the selected indicators to set relevant targets. In this thesis, it is asked to the travel managers whether they are measuring the emissions of their business travels or not. It is seen that the most of the organizations are measuring their business travels, although, different organisations measure different transportation types. It is obtained from the surveys that emissions of flight are the most monitored transportation type among participants.

- Setting SMART goals; setting measurable and realistic goals can make organizations to develop more effective policy measures and allow them to observe the effect of the policy measures.

- Policy development is the most important element among these steps; however, cannot be effective without other steps. Based on the surveys with travel managers, development of travel policy, informative instruments as well increasing technical and technological support are used. These policies are listed as;

- o Travel policy;

- o Information leaflets /user guides;

- o Meeting guidelines;

- o IT support;

- o Staff trainings;

- o Updating the equipment / using better meeting tools;

- o More conference rooms;

- o Projects to increase meeting efficiency.

- • <u>Monitoring</u>; is the last step which allows organizations to observe the effectiveness of their policies to meet the established goals. Based on the monitoring results, revision in the policy or goals are possible. During the surveys with travel managers, it is observed that monitoring of VMs have not started yet in majority of the organizations.

6.3.3 Project Manager Level

From the project management perspective, it is observed that the most important driver for reducing business travels is from a productivity perspective.

During the in-depth interviews, it was learned that although it is needed to be approved by upper management, project managers are responsible about project budget development, which also includes business travel expenses. Therefore, project managers have the power to limit business travels and encourage the employees to move towards virtual mobility direction.

Additionally, it is project manager's responsibility to prepare meeting agenda and provide pre-meeting reads to the other meeting attendees in order to allow them to be prepared for the meeting. This also can control number of attendees in the meetings or project managers can be selective about attendees to the meeting in order to increase meeting efficiency.

6.3.4 Employee Level

When it comes to employee side, productivity as well as WLB becomes the main drivers to use VMs. Besides, the pressure from upper management, self-awareness is a very important factor to replace VMs. For this part, possible staff trainings in the organization can increase the awareness among employees.

The other important factor to increase VM effectiveness is being prepared for the meeting beforehand. Therefore, provided pre-meeting reads need to be studied. This allows all the attendees to have at least minimum level of information about the meeting. Therefore, background information does not need to be repeated and this results with shorter and more effective meetings.

6.3.5 Technical Level

As it is emphasised during the literature review and repeatedly mentioned in the interview that VM tool selection is very important, the media richness theory, there is an ideal technology for different types of task. In order to communicate efficiently, depending on the complexity of the communication, level of ICT technology needs to be selected (Daft & Lengel, 1986). For example, the higher complexity messages should be transferred via videoconference. When the complexity gets lower emails can also be used.

This issue was also one of the complaints during the interviews, interviewees are mentioned that they cannot get instant confirmation or read others body language; which makes it harder to understand whether everyone gets the information or not (GSD, 2015; PM1, 2015, PM2, 2015). Also, it sometimes results with misunderstanding each other due to lack of visual communication (BA2, 2015). As a result, these negative impacts increases the work load and decreases the productivity. Thus, proper VM tool needs to be selected by taking into account of complexity of the meetings.

The other technical issue that may affect effectiveness of VMs is quality of the tools. It was brought to the author's attention in couple of interviews that interviewees complained about the audio quality of the system used in the organizations. Some employees also mentioned that the situation can even be worse especially during the big meetings with a lot of participants (PM1, 2015; IT, 2015). Furthermore, line connection quality is also other important factor. It is told that due to bad connections, some points would be skipped, which could affect the job quality at the end (BA2, 2015; IT, 2015). Having better ICT infrastructure can both ensure better communication and increase the willingness of using VMs

The last but not the least, in some situations technical support is needed to solve the issue or guide the employee. Having IT support department or online support mechanism can allows organizations to quickly fix the issue. In this way, VMs can be used with minimum time loss.

6.3.6 Uncontrolable Events

In chapter 6.3, possible solutions for the problems may arise as a result of VM usage and the ways to increase efficiency of VMs are discussed. However, there are also some uncontrollable event. First of all, some meetings require FTF interactions such as creative workshops, kick-off of the projects or introduction with new business contact. In some cases, although, it can be replaceable by VMs, doing that for these kind of meetings might be less effective and more time consuming. In other cases that require site visits cannot be replaced by VMs.

The other issue is related to ICT tools and infrastructure in other side of the line. As it is stated that more effective VMs, quality of ICT tools and infrastructure is important factor. However, it is not possible to ensure the quality in the other side of the connection. Thus, in the cases of negative situation, FTF meetings might become more effective way to communicate.

Additionally, it is mentioned during the in-depth interviews that some people like travelling. In that case, these members are likely to be resistant to reduction of business travels without any strict policies.

7 Discussion

This chapter discusses and reflects on the findings, analysis and research process.

7.1 Reflection upon methodology selection

In this thesis, in addition to the literature review, three different sources of data are used. First, data collected under the REMM project is used. The REMM Project has been developed as a result of the Swedish Government's Green IT agenda. The project started in 2010, to promote VMs in order to reduce the environmental and climate impact from business travels in 19 selected Swedish authorities. These authorities are being monitored since 2010 in terms of business travels, VMs and CO_2 emissions. Business travels and VMs are monitored through surveys to the employees of these 19 agencies. The second source of data is, surveys conducted with the travel managers of 28 different organizations in Sweden. The aim of this data collection is the identification of different approaches to reduce business travels and the determination of the role of VMs in the organization from the travel manager's perspective. The third source of data is, in-depth interviews conducted with 7 employees of a large international retail company. Although this part mainly aimed to identify the rebound effects in the organization, other inputs were also obtained. The company that was selected has already been using VMs for a long time, and the virtual literacy of the employees is considered to be high.

By combining these three different perspectives, it was attempted to identify mitigation measures in the different levels of the organizational structure. Additionally, since there is no extensive research about the rebound effects in the organization due to VM culture development, it was also attempted to collect information about the role of rebound effects. Due to containing different perspectives with large amount of data, it can be said that the data collected are represented different levels in the organization. Additionally, they provide sufficient information to answer research questions.

7.2 Research questions

Three research questions with three overall sub questions are investigated in this thesis. The first question is about the approaches to reduce the environmental impact of business travels. The question is managed to be answered using a literature review and surveys with travel managers. The aim of this question was to create a baseline for the overall question. The second question was also another background information question and is managed to be answered by using literature, surveys with travel managers and in-depth interviews.

However, the third question was the overall research question with three sub questions. In order to answer this question, the three data sources and literature are combined.

7.3 Sensitivity Analysis

The most important input about the rebound effect is obtained through in-depth interviews with seven employees of one organization. Although they are working in different levels in the organization, all of the employees had high virtual literacy. Additionally, it was observed that the interviewees that are working at a higher level or have more job experience tended to answer the questions more objectively. Therefore, more information could be obtained from them.

Furthermore, since these seven in-depth interviews were the major sources to identify rebound effect due to poor literature, the results need to be checked in large scale for certain period of time.

7.4 Generalizability

During the data collection, both private and public organizations were selected. However, the data consists only of Swedish organizations. In terms of generalizability, there are possibly two factors that have to be considered. First of all, the data of only one country is used. In different countries, the priorities or main drivers can be different from the country selected or the organizations participated. Secondly, ICT development and related policy development is quite advanced and awareness about the environmental impacts of business travels is also high. Therefore, during the adaptations of the recommendations to different organizations, these two things should take into account.

8 Conclusion

This chapter revisits the research questions and shares the main findings. Also, provides suggestions for further research.

8.1 Revisiting the research questions

RQ1: What tools/options/approaches are used to reduce environmental impacts of traveling in an organization?

Based on the travel managers' survey, it is seen that the approach that is mostly used is the encouragement of VMs usage to reduce the environmental impacts of business travels. It is followed by having relevant travel and meeting policy. Little more than half of the organizations indicated that they have "travel guidelines, routines and/or restrictions" and / or they are "using alternative fuels for cars (e.g. biofuels, electricity)" to manage the negative environmental impacts of business travels.

Surprisingly, travel budget limitations are not widely applied. On the other hand, although not so many organizations stated the usage of "allowing telework" and "encouraging bicycling and walking", organizations that are using these two are considered as doing more than merely reducing the environmental impacts of business travels.

Table 8-1 Different approaches that can be used to reduce environmental impacts of business travels

Approaches / tools to reduce business travels
Travel or meeting policy development
Travel guidelines, routines and/or restrictions adaptations
Encouraging VM usage
Setting travel budget limitations/cuts
Shifting to more environmental friendly transportation type
Using alternative fuels for cars
Encouraging bicycling and walking
Allowing/encouraging telework

Additionally, one organization added that when they need to use air traffic, that they select direct flights instead of connecting flight even if it is more expensive. Also, during the booking process, they have been using a tool that visually shows CO2 emission levels for the other travel alternatives.

When it comes to the employee side, self-awareness seems to be one of the key components of adopting CO2 reductions into the project (e.g. PM1, 2015; GSD, 2015). The employees with higher environmental awareness tend to optimize their travels according to the environmental impact caused.

RQ2: How common is it for organizations to use VMs as a means to reduce business travel volumes?

The surveys with travel managers showed that all 28 organizations are using VMs and 25 of them indicated that they are using VMs to reduce the negative impacts of business travels. In order to identify which mode of virtual communication among videoconference, audio conference, and computer mediated communication is more commonly used, a relevant question was added into the survey. With approximately 93%, computer mediated meeting had the highest number of organizational usage. However, according to the results in the REMM project, in overall VMs, usage of audio conference is 50%, computer mediated meeting is 21% and videoconference is 33%. In general, for REMM agencies, we can conclude that audio conference methods are the most preferred as VMs technology. However, the survey results of the travel managers showed that audio conference method is the least used among the 28 organizations that participated. Perhaps the main reason behind this difference is the misunderstanding of audio conferencing by travel managers. According to the literature review, even phone calls can be categorized as audio conference, which could be easily forgotten to be considered under audio conference due to the regular usage in the organization that becomes part of their routine. So, it is expected to see audio conference in the first place.

During the surveys with the travel managers, their employees' VM communication frequency was also asked. The most received answers are "most employees use VMs often" and "some employees use VMs often". Since VMs usage frequency is measured in interviews with travel managers in relativistic terms, for more numerical representation, those business trip numbers and VMs frequency collected from REMM agencies, their share of VMs could be calculated for 12 of the agencies. In order to calculate it, the share of VMs in individual agencies, the sum of all VMs are divided to the sum of all VMs plus all business trips, during the specified time period. The average is calculated as 52%, which means that half of the meetings are conducted by using ICT technologies.

RQ3: How can organizations use VMs as a means to reduce the environmental impact of business travel?

Before answering this question, the sub questions are to.

How do VMs affect travel trends in an organization?

It is projected that business travel trends will continue to increase as a result of globalization. However, this growth can be controlled by travel management and by the substitution of business travels with VMs. On the other hand, substitution may create rebound effects. Based on this information a formula is created to develop three possible scenarios for the organizations' business travel trends;

- Case 1; if "substitution effect + impact of travel management < rebound effects + growth of business travels", this will result in an overall increase in the organization's business travel trends.

- Case 2; if "substitution effect + impact of travel management = rebound effects + growth of business travels", this will result in an equilibrium situation and business travel trends will be stable.

- Case 3; if "substitution effect + impact of travel management > rebound effects + growth of business travels", this will result in an overall decrease in the organization's business travel trends. This is considered to be a desired situation in this thesis.

What is the role of the rebound effect in virtual business meetings, and how can the effect be controlled?

In order to identify the rebound effect in the organizations, two relatively easy to measure results of rebound effects were selected. The first of these is an increase in business travel volume. Although the rebound effect also has a direct effect on the budget of the organization, productivity and time spent, it is not easy to differentiate these from other negative factors such as technical and personal reasons. However, it is easier for the organizations to measure the business travel volume and this can increase as a result of some types of rebound effects. Secondly, the number of VMs and their durations can be used to identify rebound effects as well.

Starting with business travel volumes, these are measureable and can be affected as a result of some types of rebound effects. The factors that can increase business travel volumes can be related to budget management, time management, getting more projects or the necessity to have FTF meeting with new connections obtained via virtual communications. When making the transmission to virtual mobility, organizations need to decide between dematerialization (or degrowth) and globalization (or growth). As a first option, which is also explained by Hilty & Aebischer (2015), the overall impact of ICT on the environment was relatively small and by using ICT instead of travelling, organisations can select dematerializing or degrowth.

Basically, the saved time and cost can be spent on increasing the quality of work or on decreasing the number of employees since the required job can be done by fewer people etc. On the other hand, there is a globalization and geographically expanding the markets as factors to consider (Aguiléra, 2008). Most of the organizations try to grow by taking more jobs. Although, it is hard to change this mentality, there are a couple of actions and push mechanisms;

- Direct or indirect push from policy makers such as an increase in emission taxes;

- Mandatory emissions reporting;

- Company policy to reduce or limit travelling;

- Travel budget limitations.

In general, the actions related to the budget and reputation of the organization can reduce the rebound effects for the first part.

The other options is that during the transition to VM culture, it is normal to observe an increase in VMs. However, the speed of the increase should be related to a decrease in business travels. If there is relatively higher increase in VMs, this may indicate possible rebound effects. VMs can make communication easier and faster, but this may also may bring a couple of rebound effects. Since, it is cheaper than travelling, a virtual meeting can attract more people in the organization than needed (PM1, 2015). Having too many people can slow down the speed of the meeting and decrease the meeting efficiency. This may result in more meetings or longer meetings. Additionally, since there is little effort put to connect with others, people tend to be more unprepared, which also decreases the efficiency of the meeting (BA2, 2015). The other complaints about VMs that were obtained during the in-depth interviews were that having too many meetings results in hardly no time to do other work (DM, 2015). In other words, there is an increase in work load. As a result, the increase in VMs may indicate rebound effects related to job quality, productivity, and work load. Effective VM management is the key to control in this case, which is discussed in detail under the effective virtual meeting adaptation section. However, there are some actions that can be taken;

- Meeting management to eliminate unnecessary meetings;

- Meeting agenda preparation for time management and to control too many people in the meeting by proving the scope of the meeting;

- Distributing pre-meeting reads to make people prepare for the meeting;

- Proper VM tool selection;

Overall, the actions that can increase productivity works better for this part.

How can an organization influence the effect of VMs on business travel volumes?

According to the results from the REMM project, by assuming that there is a direct relationship between business travel trends and CO2 emission, VM increase actually decreases the travel volume as well. As previously mentioned, the rebound effect can result in an increase in business travels. That's why, it is important to identify the main reasons in order to control these negative effects.

In the surveys, one travel manager mentioned that in their organization that they use a lot of VMs and still have a lot of business travels. They could not see any strong relationship between these two. Based on the literature and the thesis finding, this organization might be experiencing the rebound effect. The other organizations that measures the number of their VMs and business travels indicated that they found that there is a relationship between travel volumes and VMs. As they mentioned in the surveys, they experienced that the increase in the VMs resulted in a decrease in the business travels. Also, one travel manager agreed with the in-depth interview findings that some meetings still needs to be FTF.

Going back to the initial research question, "How can organizations use VMs as a means to reduce the environmental impact of business travel?". Successful VM adaptation is important for organizations to get the full benefit from their usage. Based on the finding, organizations use VMs for cost management, time management, to increase productivity, reduce environmental impacts and reduce business travels. The successful VM adaptations are investigated under five different levels; policy-maker level, organizational (upper management) level, project management level, employee level, technical level.

1. **Policy Maker Level:** According to De Graff (2004), externalities such as congestion and environmental impact, which have a negative impact on welfare gets policy makers' attention. Policy makers can set certain limitations or put specific restrictions on activities by using regulatory instruments or can create incentives through taxes or additional fees. Also, they can change behavior through knowledge such as mandatory reporting to authorities (Arnfalk, 2002c). These instruments work as a push mechanism for organizations to move towards virtual mobility. However, one important point is that, some taxes especially those that are on activities like air travel can affect individuals as well, which can create undesired conditions. Therefore, it is important to select a target group.

2. **Organizational Level:** According to the survey results, the main drivers for the organization to reduce travelling and move towards virtual mobility is related to cost savings and productivity (including time). Despite it being not mentioned in the surveys, organizational reputation is also another important driver (Roby, 2014). First of all, the ambition of the organization is an important factor to adopt VM culture. The other factor is how VM and travel policy is developed. There are five steps that can be followed for effective adaptation; setting clear objectives, measuring, setting goals, developing policies, and monitoring.

3. **Project Manager Level:** From the project management perspective, it is observed that the most important driver for reducing business travels is the productivity perspective. During the in-depth interviews, it was learned that project managers have

the power to limit business travels and encourage the employees to move towards the direction of virtual mobility.

4. Employee Level: When it comes to the employee side, productivity as well as WLB become the main drivers to use VMs. Besides, the pressure from the upper management, self-awareness is a very important factor to replace VMs. For this part, possible staff trainings in the organization can increase awareness among employees.

5. Technical Level: As it is emphasised during the literature review and repetitively mentioned in the interview, VM tool selection is very important. According to media richness theory, there is an ideal technology for different types of tasks. In order to communicate efficiently, depending on the complexity of the communication the appropriate level of ICT technology needs to be selected (Daft & Lengel, 1986). For example, higher complexity messages should be transferred via videoconference. When the complexity gets lower, emails can also be used. The other technical issue that may affect the effectiveness of VMs is the quality of the tools. Furthermore, line connection quality is also another other important factor. Having better ICT infrastructure can both ensure better communication and increase the willingness to use VMs.

8.2 Suggestions for further research

Although it is mentioned before, there is no extensive research on rebound effects due to VM development in an organization. Considering the complexity of the topic, the results of this research are limited to the experiences of seven employees in one organization. Therefore, more diverse research with a higher number of interviews is needed.

The other part is that mitigation measures for rebound effects are developed from the input from interviews and from more logical bases. However, the effectiveness of these measures are not monitored in the scope of this thesis. Therefore, the author suggests that a study about the effectiveness of these control methods should be conducted.

Lastly, although there is no geographical restriction in the literature analysis, all the data used in this thesis is from Sweden. The other suggestion is that the findings are tested in other countries to verify the validity of this study.

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In-depth Interviews

PM1, project manager, May 11, 2015

PM2, project manager, May 13, 2015

GSD, global sustainability developer, May 13, 2015

BA1, business analyst, May 14, 2015

IT, IT procurement purchaser, May 15, 2015

BA2, business analyst, May 19, 2015

DM, development manager, May 22, 2015

Appendix A: REMM Project Survey

Excerpts from the Swedish Transport Administration's travel survey (RVU) supplemented with the following issues relevant to virtual meetings and business travel. The survey questions were used in a number of agencies involved in REMM.

Questions about your meetings and business trips

18. Are you aware that [name of the organization] offers virtual meetings options (video, web and audio conferencing)?

☐ Yes

☐ No

19. What do you think of your employer's information about the virtual meeting options available at your workplace?

☐ Very good

☐ Good

☐ Poor

☐ Very bad

☐ I have not received any information

20. Are virtual meetings useful to you in your professional role?

☐ Yes, very useful   ☐ Yes, some useful

☐ No, not useful   ☐ Do not know

21. How well do you think the technology for virtual meetings works?

☐ Very well

☐ Good

☐ Poor

☐ Very poorly

☐ I don't know, have not tested technology

22. How well do you think you can manage the technology/systems for virtual meetings?

☐ Very well

☐ Good

☐ Poor

☐ Very poorly

☐ I don't know, have not tested technology

23. How many meetings/business errands/business trips have you had in the last TWO WHOLE WEEKS?

	Number of meetings
Meetings at your own workplace without video, phone or web connection	_____
Meeting/business errands resulting in a short trip (up to 5 km)	_____
Meeting/business errands resulting in a medium long trip (5 -100 km)	_____
Meeting/business errands resulting in a long trip (more than 100 km)	_____
Virtual meeting: audio conference with at least 3 participants	_____
Virtual meeting: web meeting	_____
Virtual meeting: video conference	_____

24. How many of the virtual meetings you've stated in the pervious question resulted in that you avoided a business trip (which you would have made if the virtual meeting option not was selected)?

_____

25. How far did you travel in service by bus and/or train over the past two whole weeks? Estimate the total distance travelled (in kilometers) for the different modes of travel listed below (type '0' in the box if you did not make any trips).

Number of occasions

Bus, paid by the employer   _____

Train / metro / tram, paid by the employer   _____

Bus, with private paid public transportation cards   _____

Train/metro/tram with public transportation cards paid by
the employee

_____

26. How many of your extended business trips (5 km or more one-way from the workplace) could be replaced by virtual meetings?

Enter an option.

☐ I don't make any business trips

☐ I have already replaced all, or almost all, meetings that are possible to replace with virtual meetings

☐ None   ☐ 10 %   ☐ 25 %   ☐ 50 %   ☐ 75 %   ☐ 100 %

27. To what extent do you think that the [name of the organization] Travel and meeting guidelines provide a good support for business trips and errands? Choose one of these options.

☐ To a very large degree

☐ Largely

☐ To a small extent

☐ Not at all

☐ Not aware of the guidelines

☐ Do not know as I never travel for business purposes

Appendix B: Survey for Travel Managers

This survey investigates how virtual meetings affect work and travel patterns in an organisation. The information will be used to determine different approaches to reduce travel impact and the role virtual meetings may play in this respect. The survey is part of a thesis research project at Lund University. You may answer the questions in both English and Swedish. It will take you approximately 10 minutes to complete. If you have further questions, please don't hesitate to contact us. Thank you for your time!

Aybuke Ozdamar, MSc candidate

Peter Arnfalk, Assoc. Professor, Lund University

1. What's your name?

2. What organisation do you work for?

3. Does your organisation monitor CO2 emissions or any other environmental impact from work related travel? Please check all that apply.

☐ No

☐ Yes, Flights

☐ Yes, Car

☐ Yes, Train

☐ Yes, Other, please explain

Comment:

4. Does your organisation have emission reduction goals for business travel?(please explain)

☐ Yes, quantified emission goals

☐ Yes, but not quantified

☐ Yes, but not concerning emission (e.g. volume, costs)

☐ No

Comment:

5. In what way(s) does your organisation work to reduce or manage the negative impacts of business travel? Please check all that apply.

☐ It's stated in our travel and/or meeting policy

☐ Through travel guidelines, routines and/or restrictions

☐ Travel budget limitations/cuts

☐ By moving towards more environmentally friendly means of transport (e.g. flights-train)

☐ By using alternative fuels for cars (e.g. biofuels, electricity)

☐ By encouraging bicycling and walking

☐ By encouraging virtual meeting alternatives

☐ By allowing/encouraging telework (distansarbete)

☐ Other (please specify)

Comment:

6. Do you use virtual meetings in your organisation? Please select all that apply.

☐ Video conferencing

☐ Webb meetings (via computer)

☐ Audio conferencing

☐ Other (please specify)

☐ No

Comment:

The remaining questions are about virtual meeting usage in the organisation. If you answered "yes" to the previous question please continue answering. But if you answered "no" to the previous question, you don't have to continue answering, please go to the end of this form and submit your answers.

7. Are virtual meetings used in the organization as a means to reduce travel?

☐ Yes, it's clearly stated

☐ Yes, it's not clearly stated but commonly understood

☐ Yes, it's a factor but not so important

☐ No

☐ I don't know

Comment:

8. What are the main incentives for your organization to use virtual meeting?

9. Does the organization offer any incentives for the individual employees to use virtual meetings? If so, what are they?

10. How often are virtual meetings used, and how distributed is the use among the employees within the organization?

☐ Most employees use virtual meetings often

☐ Most employees use virtual meetings from time to time

☐ Some employees use virtual meetings often

☐ Some employees use virtual meetings from time to time

☐ A few employees use virtual meetings from time to time

☐ Virtual meetings are hardly used at all

☐ I don't know

Comment:

11. Has your organization taken any measures to improve the effectiveness of virtual meetings? (such as support, guidelines, staff trainings etc.) Please explain.

12. Did you measure how your virtual meeting policy is affecting your organization's business travel trends? If, yes please explain.

☐ Yes

☐ No

Comment:

Thank you very much, your time and input is highly appreciated!
Please don't forget to submit your answers.

Appendix C: Survey Participants' Name and Organization

Name of the Organization	Name of the Participant
Saab AB	Elisabeth Ross
Cloetta	Anna Kalf
Tetra Pak	Ulrika Rosén
"No Answer"	Ann-Sofie
FOI	Irene Hollås Norling
MTG	Siri Persson
Polismyndigheten	Kjell-Ove Lindgren
Volvo Group	Stephan Hylander
DeLaval International AB	Valerie Lancello
Sida	Sylvia Wellroth
The Absolut Company AB	Marie Forsström Sundbaum
Bisnode Sverige AB	Marie Wendelin
Philips	Eva Rahkonen
Skatteverket (Swedish Tax Agency)	Birgitta Sjöstrand
SCA	Johan Lindecrantz
AstraZeneca	Mia Andersson
SKF	Mikael Holmyr
SEB - Skandinaviska Enskilda Banken	Pia Hedberg
Försvarets materielverk	Christina Bixo
Riksrevisionen	Nina Hällström
Arbetsförmedlingen	Rickard Lundström
Swedish Coastguard	Micke Persson

Nordkalk AB	Helena Björkqvist
"No Answer"	"No Answer"
Lantmäteriet	"No Answer"
ICA Gruppen AB	Eva Landqvist
Scandic Hotels AB	Susanna Blomquist
Praktikertjänst AB	Katharina Matsson

Appendix D: Interview Template

The brief introduction about the author and the thesis.

The interview takes approaximately 15 – 20 minutes and it investigates the intervieweers role in the organization, their business travel trends and VM usage.

1. How long have you been working in the organization?

2. Can you describe your work role in the organizations including your tasks and responsibilities?

3. If you work as a project manager, for your project do you consider CO2 reduction? What are you doing in terms of it?

If you are not a project manager, have you ever told by your project manager to consider CO2 reductions in the project?

4. How much do you travel and why do you travel?

5. Have you ever considered or told by upper management to reduce your business related travels to reduce organization's CO2 emissions?

6. How much of your time is spent working remotely from home or elsewhere?

7. In what ways do virtual meetings support your work and how do you use virtual meetings?

8. If you are responsible about budgeting of your projects, have you ever considered reducing the travel expenses to save money? And, if you did, in what way this saved money used, (if you are aware of)?

9. How is your level as a user of virtual meeting solutions?

10. How do you think virtual meetings affect your personal productivity/ job quality?

11. How do you think virtual meetings affect your work load?

12. Are you familiar with meeting and travel guidelines and how do they support you when you plan your work?

13. Do you generally prepare meeting agenda before virtual meeting to be efficient?

14. What do you think about the pros and cons of using virtual meeting during project management?