

**Title:** Potential Effects of Virtual Meetings on Employees in Swedish Public Authorities

**Authors:** Voytenko, Y., Arnfalk, P., Mont, O., Klintman, M.

Yuliya Voytenko

International Institute for Industrial Environmental Economics (IIIEE) at Lund University

P. O. Box 196 Tegnersplatsen 4

SE-221 00 Lund, Sweden

Tel. +46 46 222 0229

e-mail: [yuliya.voytenko@iiiee.lu.se](mailto:yuliya.voytenko@iiiee.lu.se)

Peter Arnfalk

International Institute for Industrial Environmental Economics (IIIEE) at Lund University

P. O. Box 196 Tegnersplatsen 4

SE-221 00 Lund, Sweden

Tel. +46 46 222 0245

e-mail: [peter.arnfalk@iiiee.lu.se](mailto:peter.arnfalk@iiiee.lu.se)

Oksana Mont

International Institute for Industrial Environmental Economics (IIIEE) at Lund University

P. O. Box 196 Tegnersplatsen 4

SE-221 00 Lund, Sweden

Tel. +46 46 222 0250

e-mail: [oksana.mont@iiiee.lu.se](mailto:oksana.mont@iiiee.lu.se)

Mikael Klintman

Department of Sociology at Lund University

P.O. Box 114, Paradisgatan 5, House G

SE-221 00 Lund, Sweden

Tel. +46702845548

e-mail: [mikael.klintman@soc.lu.se](mailto:mikael.klintman@soc.lu.se)

## Potential Effects of Virtual Meetings on Employees in Swedish Public Authorities

**Abstract** - While research exists on the introduction and use of virtual meetings (VMs) in a private sector context, similar studies in the public sector are limited. Specifically the employee perspective on the substitution of face-to-face meetings (F2FMs) with VMs, and individual costs and benefits from VMs are poorly understood. There is also a lack of established and commonly used indicators to measure the effects of VMs on individuals.

Swedish government introduced a strategy calling for a wider adoption of information and communication technologies (ICTs) in the public administration in 2010-2015. This article explores potential effects of VMs on employees in seven Swedish public authorities. Applying an earlier developed conceptual framework for VM effects it structures and rationalises data collected via extensive literature review, 10 structured and 17 semi-structured in-depth interviews with VM users in Swedish public and private sector. This article advances the framework by developing 37 indicators of potential effects of VMs on individuals. Indicators are grouped in 10 categories including work situation (negative stress and work-life balance); social interaction; career and recruiting; performance, work productivity and quality; gender and social equity; personal safety and information security; age; discipline and attention; potential to learn; and meaning and significance.

This article addresses identified knowledge gaps by 1) providing a better understanding of VM effects on individual; 2) developing a conceptual framework and indicators to measure these effects. While this article focuses on the findings from Swedish public sector, its results are generalisable to broader contexts.

**Index Terms** - Effects on employees, ICT, public authorities, virtual meeting.

**Yuliya Voytenko** is a researcher at IIIIEE, Lund University. She holds a PhD in Environmental Sciences and Policy from Central European University (Hungary) and a postdoc from Graz University of Technology (Austria). Her main activities include research and education on virtual meetings, business models and organisation for sustainable energy systems, sustainable mobility and city planning, energy policy evaluation. She was involved in projects with UNFAO, OSCE, UNEP, UNDP, EEA.

**Peter Arnfalk** is an Associate Professor at IIIIEE, Lund University. He holds a PhD in Industrial Environmental Economics from the IIIIEE, Lund University, a postdoc from NIMC, Tsukuba (Japan) and an MSc in Chemical Engineering. His main research area is green ICT with a focus on effects from technology applications. He has been involved in Green ICT-projects for the European Commission, Swedish Innovation Agency, Swedish Transport Administration and Energy Agency.

**Oksana Mont** is a Professor in Sustainable Consumption and Production at IIIIEE, Lund University. She holds a PhD in Engineering, MSc in Environmental Management and Policy, MSc in Biology and Chemistry. Her main research area is sustainable consumption and production in food, mobility and housing sectors. She combines research on innovative business models with sustainable lifestyles and sustainable consumption policy. She leads projects on the role of policy and governance to shape everyday choices of individuals, businesses, organisations.

**Mikael Klintman** is a Professor at the Dep. of Sociology, Lund University (LU). He holds a PhD in Sociology from LU, and a postdoc in Environment and Sustainability Studies from Massachusetts Institute of Technology (USA). His research is usually international and focuses on roles, values and conditions of general public in making choices of environmental and social relevance. Local and regional levels are of interest with synergies and conflicts across environment, society and economy. He worked in a dozen sectors empirically with transportation being the main topic.

“Virtual meetings” (VMs) is a collective term for professional real-time communication between geographically remote participants with the help of audio-, video- or web-conferencing (Fig. 1). The application of VMs in work routines of different organisations has been growing in the past decades [1] as a result of increased technology availability and maturity, lower costs and due to a number of positive implications that VMs may potentially deliver.

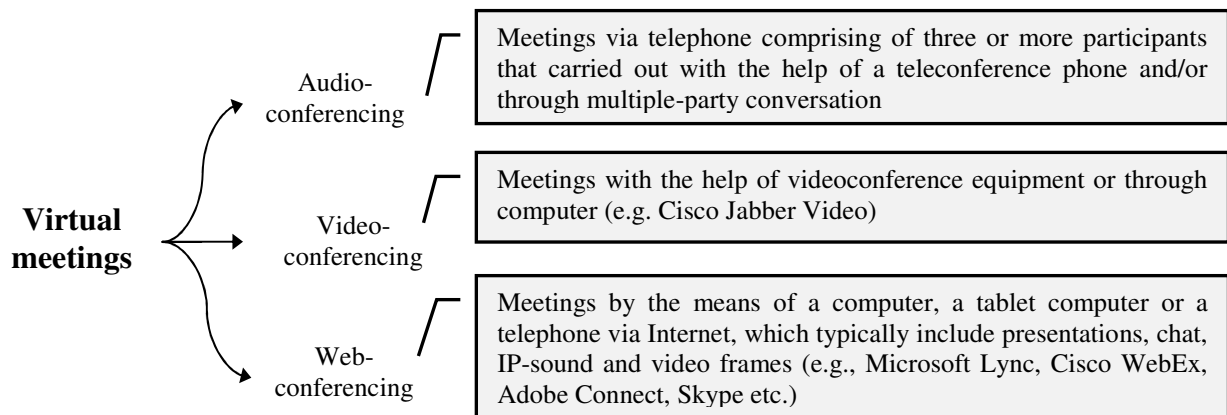


Figure 1. Types of virtual meetings

The most common sought-after effects include cost and time savings when a VM substitutes a face-to-face meeting (F2FM). While these are referred to with a relative certainty in the literature [2-5], opinions on other VM implications such as reduction of environmental impacts due to business travel substitution with VMs, gender and family effects of VMs, trust and social agenda in VMs vs. F2FMs etc. diverge [5-10]. Such divergence poses a research and practical problem which unfolds in exploring the instances when the benefits delivered by VMs to individuals, organisations and the society could be maximised while the costs – minimised. (We refer to not only economic benefits and costs but include a broad range of positive and negative social and environmental effects that VMs may cause.)

Research exists on how VMs influence organisations [11-14], and numerous guidelines on how to introduce VMs in an organisation have been developed [4, 15, 16]. Most of these studies focus on business sector and involve cases of companies, while very little to none research appears on the use of VMs in the public sector [17].

At the same time, in Sweden the government introduced a strategy calling for a wider adoption of information and communication technologies (ICTs) in the public administration in 2010-2015 called “IT for Greener Management - Agenda for ICT for the Environment” [18]. This strategy gave a start to a number of projects by public and private actors including REMM-project (from Swedish *Resfria möten i myndigheter* – Virtual Meetings in Public Authorities) by Swedish Transport Administration, which aims to increase and develop the use of VMs within and between 19 Swedish public authorities.

At the same time the effects of increased VM use remain poorly understood. There is very little research encompassing individual costs and benefits of VMs, and a lack of knowledge on the instances when VMs appear more suitable from the perspective of an individual. No practical attempt to measure VM effects on individuals has been found in literature. This area is, however, important to explore since individuals are the users of new technology in organisations, and therefore the ones to catalyse its adoption.

This article focuses on potential impacts of VMs on individual employees in Swedish public authorities, who apply VMs daily in their work routines, and aims to:

- contribute to the existing knowledge on the effects from VMs on individuals;
- develop a conceptual framework and indicators to measure these effects.

Swedish public authorities represent an interesting research case as they are 1) unconventionally large in size as compared to related ministries; 2) characterised with high degrees of openness and accountability (e.g. public access to official documents); 3) significantly independent from central power structures with an unusually high degree of autonomy for civil servants; 4) governed from the top by broad objectives and fiscal instruments with annual reporting to the Government on their activities and finance; 5) somewhat similar to business companies (e.g. in labour rights, freedom to decide on their organisational structures internally etc.) [19].

This work is a part of a research project Implications and Reporting of Virtual Meetings (project description: [http://www.iiee.lu.se/research/sustainable\\_consumption\\_and\\_lifestyles/](http://www.iiee.lu.se/research/sustainable_consumption_and_lifestyles/)). Project goals are to develop a methodology to assess impacts from VMs in Swedish public authorities, and to perform an impact analysis based on the developed evaluation parameters and indicators. This article is targeted at academia searching for a better understanding of societal effects of ICTs and VMs as well as a suitable methodology to evaluate these effects. It also informs and supports decision-makers, managers and employees in public and private sectors who develop and implement meeting and travel policies by guiding them on which (negative) effects of VMs need to be suppressed and which (positive) ones - enhanced.

The paper has the following structure. The introductory section justifies this research, identifies research gaps, and presents the paper's focus objectives and target audience. The next section reviews existing literature and is followed by a methodology description. Then key empirical findings are presented followed by the analysis and discussion of research findings, particularly in their relation to similar and diverging opinions on VMs and VM effects on individuals. Concluding section closes the paper and presents future research implications.

## **Literature Review: Potential Effects of Virtual Meetings on Individuals**

**Conceptual Framework for Virtual Meeting Effects** As a part of the research project Implications and Reporting of Virtual Meetings a conceptual framework to evaluate the effects of VMs on organisation, society and individuals has been proposed [20]. It is based on the data from literature review, internal workshops and expert opinions of the research group, consultations with representatives from Swedish public authorities and experiences of above 30 companies, municipalities and other organisations involved in VM projects [15]. The framework has been presented in earlier work by one of co-authors and structured potential VM effects on individuals into five categories including work situation, social interaction, career, performance and gender equity (Fig. 2). The framework has guided this literature review and has been used as a point of departure for its further development as well as for data coding and analysis carried out in this paper

to propose indicators of potential VM effects on the individual. (Potential effects of VMs on the organisation and society are addressed in two other research sub-projects.)

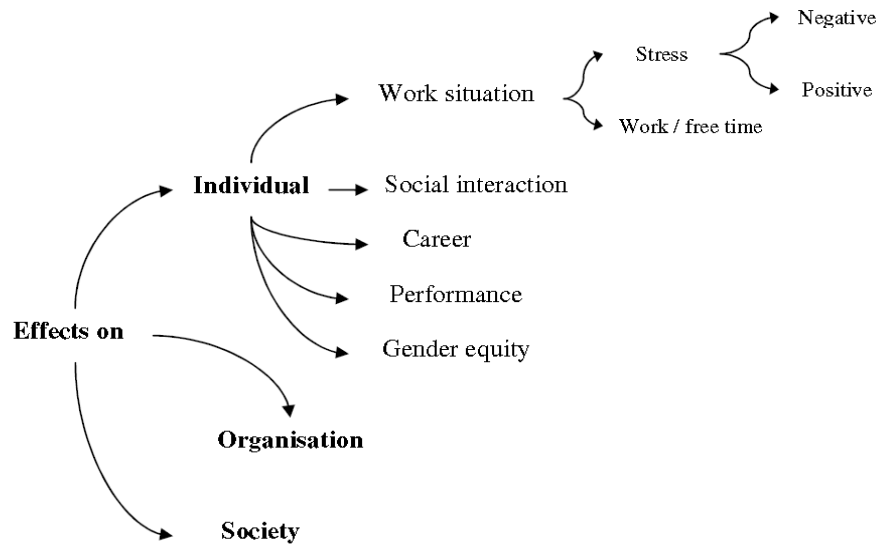


Figure 2. Potential effects from the increased VMs use at individual level, based on [20]

**Studies in the Field** Categories of conceptual framework presented above guided the structure of the literature review. This section therefore discusses potential effects of VMs on individual employees in relation to work situation, social interaction, career, performance and gender equity.

*Work Situation:* Previous studies by others indicate that VMs have a potential to influence a work situation of employees in a number of ways including: personal stress levels, time implications, work flexibility and work-life balance, and perceptions of social status.

On the one hand, VMs can contribute to personal stress reduction in all stages of business travel (i.e. pre-trip, during trip and post-trip) as they substitute such travel [5, 10, 11, 13, 21-23]. On the other hand, personal stress levels when conducting a VM can increase due to the uncertainty in handling hard- and/or software [5, 17, 24].

By saving time, reducing stress linked to travelling [3, 21] and providing better flexibility to work routines [17] VMs can contribute to the improved quality of life and a better work-life balance [20].

VMs are also recognised to contribute to time saving when they substitute F2FMs [3, 21] as well as due to the fact that VMs are generally shorter than F2FMs [3-5]. Denstadli et al. [3] have estimated

that an average duration of F2FMs was five hours as compared to less than two hours for VMs. If one is to evaluate the efficiency of time spent in transit when travelling to a F2FM, employees at Swedish media companies [5] found working on a train as more continuous than during a flight, however, some felt that air travel was faster, more efficient, comfortable and “nicer” way of travelling.

Travel can also be perceived as “stimulating and enriching”, as “a source of variation and new experiences” [10], “intriguing, educational, career enhancing, exciting and challenging” [22] as well as an indication of social status. Fifty percent of employees at Telia Research AB consider business travel as an indication of social status, and 70% enjoy getting out of the office [11].

*Social Interaction:* VMs implications for social interaction fall within four key domains: importance of F2FMs in addition to VMs, trust building in virtual teams (VTs), the role of VMs in maintaining professional relationships, and social agenda issues. (VTs include any form of non co-located working, which involves virtual or remote team working, multiple site organisations, remote or home working, and geographically distributed or dispersed working [9].

Literature demonstrates that F2FMs build and sustain personal relationships [3, 5, 22]. It appears that “physical proximity promotes higher degrees of involvement and fosters psychological closeness and mutuality – a sense of connection, similarity, solidarity, openness, and understanding” [25]. Business management studies emphasise a need to meet in person despite available technology because “to build relationships, there’s no substitute for meeting face to face” [4] and “[t]he development of mature, trust-based personal relationships requires repeated human contact” [22]. It is also advised to use richer media during the initial stages of a project to speed up relationship building [9]. (Media richness - ability of a medium to carry and reproduce information based on feedback, multiple cues, language variety, and personal focus [26].

A widespread perception that the first meeting must be carried in person is supported by the survey results by Denstadli et al. [3], who studied the attitudes of business air passengers in Norway. VMs

have been found unsuitable for meetings with unknown people by 70% of respondents while 56% considered it difficult to develop contacts with the help of VMs. Having said this, it is, however, difficult to claim to which extent such results are representative since the respondents include air passengers, who have made their choice in the favour of travelling. At the same time, Guo *et al.* [25] argue that VTs can still be as effective as F2F teams “as long as they can share their values of effective communication and their frame of reference”.

Another key issue in understanding VTs effectiveness is trust building [27]. Existing research shows that richer media are generally better for trust building and maintenance [6, 9] although face-to-face (F2F) “is still a gold standard” [6]. Therefore it is often more difficult to develop trust in online setting compared to F2F [6-9, 28]. This also applies to mutual understanding, which requires the presence of a shared context, and VTs typically experience difficulty to establish the latter [9].

Research by others [4, 9, 25] claims there is a need for additional efforts to facilitate trust building in VTs, e.g. by creating shared mental models with the help of a dialogue technique [25], planning extra time for relationship building into the project that is carried out virtually [9], establishing a shared context via frequent and explicit communication (preferably via richer media) and spontaneous communication [9] etc. Over time - albeit with delays - trust levels in VTs [6, 8, 9, 25] as well as the quality of their meeting outcomes [25] have a potential to increase to the same levels as in F2FMs. It might take a minimum of two weeks for computer mediated communication (CMC) become as socially grounded as F2F relationships [9], however, the ease and frequency of communication can reduce this delay.

When it concerns the suitability of different meeting solutions for various kinds of communications, research on the perceptions of employees at four Swedish media companies emphasises that physical closeness is necessary to create (new) relationships, initiate a negotiation, discuss certain delicate matters and when meeting for more creative activities [5]. Most managers prefer a richer media (e.g. a telephone over an e-mail) to hear about sensitive or complex issues to avoid misunderstandings [4]. For difficult negotiations [22], complex social interaction and interpersonal



communication that demand sharing of rich information (e.g. project start up and task allocation) media with “a higher degree of social presence” (e.g. F2F) is more suitable [25]. The same applies to the instances when interactivity and reciprocity are needed in communication [25] (e.g. during seminars, workshops, group meetings [17] etc.). A study on the perceptions of VMs by employees in a Swedish telecommunication company Telia Nära [11] reveals that F2FMs are preferred in the beginning and end of a project, while VMs are best suited for follow-up and information tasks or short and repetitive meetings. Research on business air travel and VMs in Taiwan’s technology industry [29] concludes that F2FMs are required for business discussions, negotiations, marketing demonstrations and even participation, while VMs are adequate for the information exchange, management meetings, training and consulting.

VMs have implications for the development and continuity of professional relations. One advantage of VMs is establishment and maintenance of long-term working relationships between geographically scattered groups of people or departments in one organisation [5]. VMs have a potential to increase collaboration frequency between people both in remote and close locations, which contributes to a change in social dynamics of a working group [20]. Nearly half of business air travellers in Norway think that VMs improve their contacts with collaborating partners [3].

Literature in the field [17] identifies lack of social agenda among negative VMs implications for their users. CMC technologies restrict the transmission of non-verbal cues (tones, gestures, feelings etc.) [9, 25], the ability to perceive individual differences and the physical presence of others [25]. At the same time, a significant share of F2F communication is non-verbal [30], which means that when people have non-verbal cues at their disposal, they rely on them to a great extent [9]. However, research also shows that people will deploy whatever communication cue systems they have to form impression and develop relationships [9], and in the absence of non-verbal communication cues coordinate their actions and clarify the issues verbally [17, 31]

An important comparative aspect of meeting forms is their potential to deliver entertaining experiences. VMs are often perceived as more intensive, rigid, unsuitable for social chitchat and have limited potential to combine a meeting with other social events [20].

*Career:* There is a hypothesis [20] that F2FMs with managers, project leaders and partners are important for career advancement due to a closer personal contact and easier trust development, and that VMs are not able to replace such tacit benefits. On the other hand, VMs can enhance possibilities to keep in touch (see above) and therefore open new career opportunities for employees [20]. Furthermore VMs may increase professional performance of employees (see below) thus contributing to career advancement[20].

Another potential advantage of VMs in relation to career encompasses the facilitation of employment interviews without travelling [5].

*Performance:* Individual performance at work can be evaluated in terms of one's work efficiency. There is an assumption that work efficiency improves with the increased VM use due to time savings from avoided travel. This has been reported in the study on Swedish media companies [5], where employees have been interviewed on their perceptions of VM use. With the introduction of VMs the pace of work increased [5]. Research at Cisco shows that by avoiding travel with CMC employees gained productivity and improved their performance, and sometimes time savings were 24 hours or more per trip [12, 21].

Another factor potentially contributing to work efficiency is the possibility for nearly instant information transfer between the meeting participants and "more rapid identification of problems and opportunities" in VMs as compared to F2FMs [28].

*Gender Equity:* Work-related travel is known to be "a predominantly male activity" [32, 33] regardless of the family situation [10, 33]. However, no explicit description has been found on VM implications (if any) related to gender equity.

At the same time international [34] and Swedish [10, 35] studies indicate that women are still expected to take the main responsibility for home and family. The latter might limit career development for many women, and therefore VMs might positively contribute to women's career opportunities by enhancing their work flexibility. This is also relevant for men, who get higher chances to engage in family responsibilities. Such VM implications are likely to gain significance in the changing world, where the full-time paid work by men and women and their equal participation in household tasks becomes more and more common [10, 34].

VMs can potentially provide a meeting alternative for everyone [5] including those restricted from business travelling for some reasons. For example, employees with small children at Telia had been particularly reluctant to travel frequently to the meetings [11].

**Research Gaps** This section departs from the literature review above and identifies key areas where knowledge on VMs and their effects is fragmented or missing.

First, no studies have been found that address or seek to evaluate different-sided effects of VMs on individuals and their social implications in an integrative and holistic way. Relevant research appears in a variety of disciplines, and in most cases is focused on one or a few aspects of VMs in their relation to an individual employee. These include possible stress linked to the use of equipment for VMs [5, 17, 24]; VMs potential to reduce stress embedded in travelling [3, 21]; time savings from VMs [3-5]; comparison of VMs and F2FMs in terms of their social component including trust building in VTs [6-9, 28] and types of situations that require physical presence of meeting participants [5, 11, 25, 29]; and improvements in the work efficiency of employees due to the increased use of VMs [5, 12, 21].

Second, existing research on the effects from work activities on employees addresses the implications of business travel for gender and family issues [5, 10, 11] and for gender differences [10, 32, 33]. However, there is a lack of research on VMs implications for gender and family and relationships between VM use by parents and the presence of small kids in a family.

Furthermore there is a lack of studies that would link VM use with social equity, age, career development and recruitment. There is a need to clarify whether business travel is still perceived as an indication of social status as well as whether this is applicable to Swedish public authorities. More research is needed to explore the impacts from VMs on employee availability, the ability of meeting participants to keep attention and focus in VMs, and the extent to which VMs can be stimulating and enriching as compared to F2FMs.

This article seeks to address research gaps linked to potential VM effects on individuals and methods to measure those. Other knowledge limitations are sought to be filled by continuous and ongoing work by the authors.

## **Methods**

**Method Choice, Research Credibility and Limitations** This work applies qualitative methodology to data collection and analysis, which is preferred when the investigator is interested in “how” (e.g. how do VMs influence their users?) and “why” questions (e.g. why might it be beneficial/harmful from economic, social and environmental perspectives to substitute business travel with VMs?) [36]. Qualitative approach is applied when a researcher has little control over events and when the focus is on a contemporary phenomenon (ICTs and VMs) within real-life context (Swedish public sector). It is used in this work as it aims to explore the conditions under which specified outcomes occur (e.g. VMs have impacts on employees), the mechanisms through which they occur (e.g. mechanisms through which individual benefits from VM use are delivered), “rather than uncovering the frequency with which those conditions and their outcomes arise” [37].

A number of techniques have been used to ensure the empirical credibility and trustworthiness of the results. First of all, the study has been developed with its adherence to a traditional scientific protocol, which presupposes framing of a research problem and questions/aims, development of hypothesis, and construction of a conceptual framework at early stages in the study [38]. Triangulation (using a variety of data sources and multiple methods to obtain answers to research

questions) [36] has been applied to overcome single method deficiencies, produce a more accurate account of the researched subject and therefore ensure findings credibility.

Key limitations of this research are in its somewhat narrow focus on the employees at Swedish public authorities. Although the findings are generalisable to broader contexts and situations, certain precautions should be taken when trying to translate the results to business or non-governmental sectors, as well as to other jurisdictions than Sweden. When further applying indicators developed in this work it is important to remember that they may be inappropriate for a different application (i.e. other than measuring the effects of VMs on individual employees). According to [39], the credibility of results obtained from indicators depends on two factors: 1) their appropriate selection for a defined purpose; 2) an appropriate interpretation of results obtained from indicator application.

**Data Collection** Data has been collected via literature review and in-depth interviews with the representatives of public authorities and other organisations in Sweden. Reviewed literature covers the fields of social and business studies and science, technology and society (STS) approach, and includes international and Swedish sources. It comprises scientific articles and reports on the VM adoption and use; work and effectiveness of VTs and related trust building; comparison between F2FMs and VMs; business travel and its implications for gender and family, social status and career; travel and meeting management; VMs role in the job search and recruiting process etc. Key sources have been summarised in shorter documents and then coded in relation to the topics revealing the (potential) effects of VMs and ICTs on individuals.

Empirical data collection included 27 in-depth (10 structured and 17 semi-structured) telephone interviews with representatives from Swedish public authorities and other organisations in Sweden including If, Cisco, Swedish Business Travel Association (SBTA), Proffice Life Science and one big retail company. This pre-selection of organisations has been made by the research team before entering the study field to choose those applying VMs in their work routines in addition to F2FMs. The pre-selection is based on data from documentary analysis, information from previous collaborations with Swedish organisations as well as from initial telephone or e-mail contacts with

employees at Swedish public authorities (mainly those responsible for REMM-project - see the introductory section).

Criteria that guided respondent selection for interviews are explained in Table I. Respondents included travel, environmental, infrastructure, business meeting and sales managers; IT specialists and project leaders on VMs; financial and human resource directors; and organisation developers. Interviewees were contacted via e-mail or telephone, and were introduced to the purpose of this research before having been requested for an interview. All those requested for an interview expressed their willingness to participate.

Table I. Criteria guiding interviewee selection

#	Criterion	Criterion satisfaction
1	Organisational maturity in VM application	Employees in organisations that have been using different VM forms (Fig. 1) in addition to F2FMs for at least several months; organisations would normally (but not limited to) use VMs to communicate both internally and externally
2	Individual experience in VM application at work	Employees who use different VM forms occasionally as a substitution or supplement to F2FMs with their internal and external colleagues
3	A need to apply VMs at work	Employees who have meeting needs as a part of their occupational duties and those who travel occasionally/often for business (e.g. employees in leading roles, geographically scattered regions etc.)

All interviews were carried out by the research group in June-August 2012 and took between 30 minutes and one hour in length; the data was recorded with a voice recorder and/or instant notes, and then transcribed in detail within ca. one week after the interview.

**Data Analysis** Conceptual framework to structure and rationalise potential VM effects presented in the literature review (Fig. 2) is used as a point of departure to develop a conceptual framework, code and analyse data with an aim to propose indicators of VM effects on the individual.

During the literature review, empirical data collection, data coding, structuring and rationalisation the conceptual framework by Arnfalk [20] has been refined and several indicator categories have been added to advance it. Our new conceptual framework (Fig 3) will be introduced in the following sections together with the description, analysis and discussion of proposed indicator categories and developed indicators.

### Indicators to Measure Effects of Virtual Meetings on Individuals

In order to measure potential VM effects on employees in organisations a list of indicators has been developed and divided into ten categories (Fig. 3). It is based on data from literature review and in-depth interviews. The clarification of each category and our empirical findings are presented in this section followed by the aggregated diagram of proposed indicators.

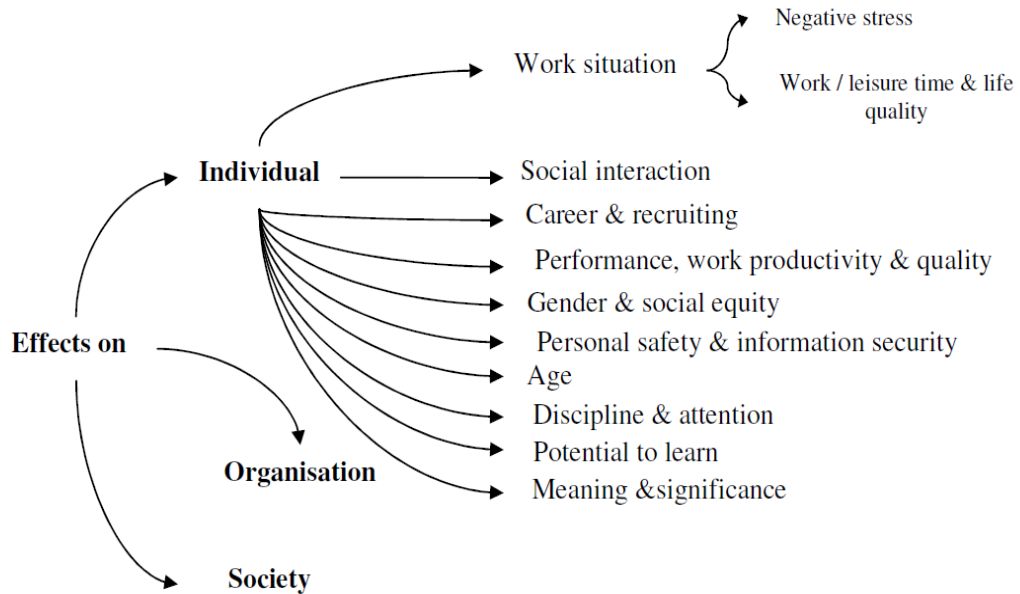
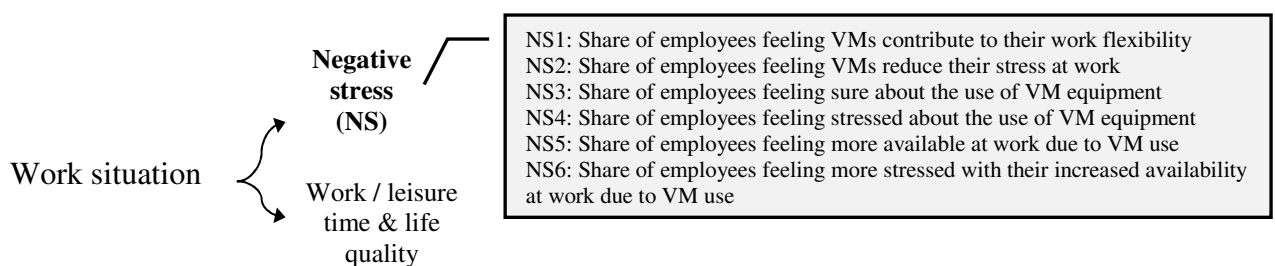


Figure 3. Advanced conceptual framework to measure virtual meeting effects on the individual

**Work Situation** These indicators focus on the degree of employees’ satisfaction with their work in relation to VM use at work. VMs can influence the work situation through the: 1) change in personal stress levels experienced from an increased VM use; 2) contribution of VMs to the employees’ success in balancing their work and private life.

*Negative Stress:* Proposed indicators in this sub-category are shown on Fig.4.



## Figure 4. Negative stress indicators

Interview results confirm that VMs can reduce journey related stress by avoiding travel planning hassle, tiredness from the trip, a need to leave early and return home late, insecurity with traffic schedules and a need to deal with accumulated work at home office. A broader VMs use is also reported to reduce employee stress by increasing their work flexibility (as cited below), as well as through shorter meeting times and higher efficiency of VMs as compared to F2FMs.

VMs save enormous amount of time as you do not have to travel. A [virtual] meeting takes 1-2 hours... you can sit wherever you want, e.g. if you have a sick child at home or a handyman coming... If I am in Gothenburg and my colleague is in Malmö, we can still meet virtually. VMs can provide more flexibility... You avoid trip booking and expenses. And I find it a very fun tool (female, manager at Swedish Social Insurance Agency, 2012).

On the other hand, VMs might increase employee stress related to the handling of technical equipment (e.g. equipment that is not functioning properly). Some employees, however, feel confident about this, and it does not cause them any stress, while others try to choose equipment they are well-acquainted with when holding a VM:

[Connecting] to everyone with a web-camera... used to make people very nervous. Back then I needed support from the technology department... But gradually I became quite good at technology. For video conferences I try to choose a place where I am acquainted with the equipment and know which buttons to press (female, consultant at Swedish Courts, 2012).

Another observed implication of VM use is increase in personal stress levels due to increased employee availability at their work places. However, some employees think that one's increased availability is under one's own control, and therefore one can decide how they keep professional contacts, and in this way cope with related stress. Others perceive enhanced possibility to hold professional contacts with VMs' help in a positive way.

No implications of positive stress from VM use, which is characterised by increased motivation and excitement from work, have been encountered during interviews.

*Work/Leisure Time & Life Quality:* Another factor that may influence employee satisfaction with their work due to VM use is their ability to balance professional and private life [20]. Proposed indicators in this sub-category are shown on Fig. 5.



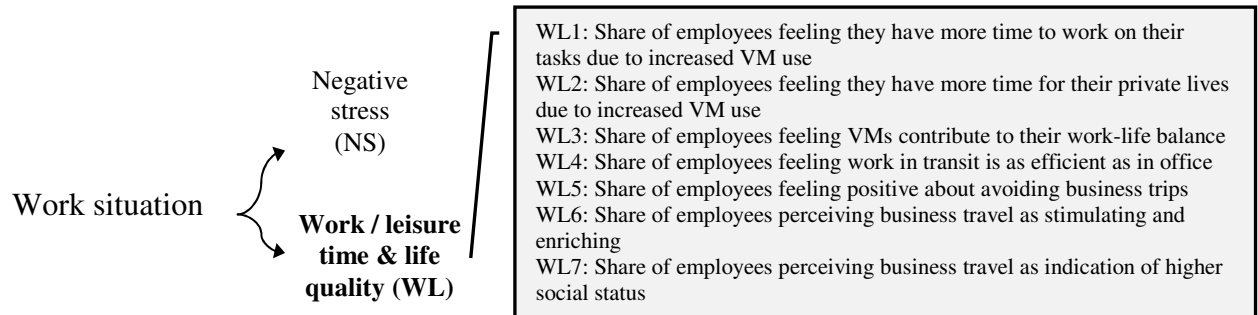


Figure 5. Work/leisure time and life quality indicators

There has been an overall agreement among respondents that one of the most important advantages of VMs uncovers in time saving, which makes VMs more efficient than F2FMs, and confirms literature findings. This also means that VMs offer a potential to obtain more free time inside and outside work hours, which can be spent either as efficient work time or as leisure time. In this way VMs are found to contribute to work-life balance:

One wins in time... It takes 7-8 hours to travel to Stockholm and back to Jönköping. It is fantastic to have VMs. I do not become as tired as when I travel, I get more free time and more time for my social life. I do not need to travel (female, consultant at Swedish Courts, 2012).

Travelling time reduces. People get time for something else. There is no need to travel during your free time. You can cope with your working tasks a little faster and do not have to work late in the evening or on the weekend (female, organisation developer at Swedish Courts, 2012).

Confirming literature findings some respondents perceive that VMs are shorter on average than F2FMs, which is another way to save time unless the virtual collaboration results in more meetings. F2FMs are also often viewed as more suitable for longer meetings.

Respondents reflected on advantages and drawbacks of spending time in transit while travelling to meetings with different transportation means. Overall many find it less efficient to work while travelling than in the office. Some agree that train is the most efficient means in terms of working possibilities. Many find it difficult to work when travelling with an airplane, bus or car. Transit time on airplane or train can also be used for other things than working (e.g. reading, resting etc.):

A train journey can be quite efficient for working. You can connect with people in your office...sit and read, and write... But a flight is useless. Sometimes you fly 1-2 hours, and you sit at the airport for 1-2 hours ... Or if it is a car trip, and you are driving, it is not efficient. But transit in particular cases is quite OK (male, consultant on virtual solutions at Swedish Environmental Protection Agency (EPA), 2012).

During F2FMs people meet other people, which may contribute to quality of their lives outside work. Some enjoy travelling or may associate it with higher status in society or at work, while others believe that the latter is the issue of the past.

**Social Interaction** Proposed indicators in this category are shown on Fig. 6

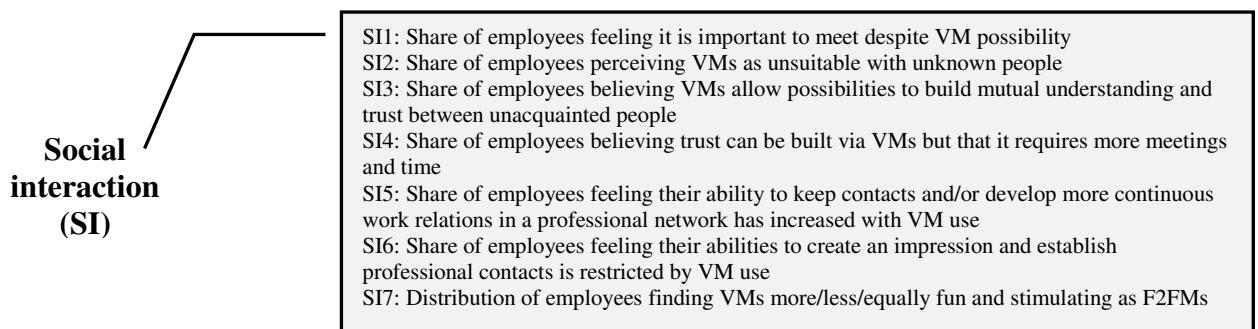


Figure 6. Social interaction indicators

There is a widespread perception between respondents on F2FM importance and the need to meet in person occasionally despite available technologies. Many believe that the first meeting is best to be held in person before the relationship could be moved to the virtual level. These empirical findings support literature data and are well-illustrated with the following citations:

It is very difficult to have a VM with people you have not met before... If you have met at some point, then you can proceed with VMs. In Sweden it is very good to attend [a meeting]... When you meet other agencies and people, your presence is very important... You can... achieve better impact (female, manager at Swedish Customs, 2012).

At first one or two meetings I would like to meet people [physically]... once you have built a relationship, it is totally fine to just meet virtually. When one has succeeded in their job..., I think it is also important to meet and celebrate the fulfillment together... this is my experience... that I still use (male, manager at Swedish EPA, 2012).

Many interviewees find it more difficult to develop mutual understanding and build trust during VMs compared to F2FMs as well as find it easier to have a VM with a person they have met physically before than with a person they have not met before.

If I have not met people personally, I cannot build a relationship with them, shall I work with them or shall they take orders from me. When one has not met people [personally] who can be trusted to do things, it is very easy to misunderstand orders or get things the wrong way...It is also the authority that you build during physical meetings (male, manager at Swedish EPA, 2012)

Some respondents believe that trust can be built gradually in VMs and can be enhanced by further and more frequent meetings, although it would require longer time to build a relationship than if people were meeting in real life. This has also been demonstrated in the literature [6, 8, 9, 25].

VMs are sometimes viewed as lacking interactive participation (e.g. the participants are quieter, do not ask questions as they arise, some are less engaged than others etc.), and therefore being more suitable for the delivery of one way information. Some interviewees suggest seminars and workshops should be conducted F2F since it is easier to hold the discussion between the participants, and many can be more active than in VMs. Others believe that VMs can be more efficient than F2FMs as they offer broader possibilities to interact, particularly with the help of tools allowing several people to work on the same document simultaneously.

Other types of meetings that according to interview respondents require physical presence include: salary or other types of negotiations; discussions on personal development, private or sensitive issues and personal problems or conflicts; critique delivery; job interviews; creative meetings; project kick-off meetings; project closure and celebration of achievements; lectures when the respect and trust of the audience is crucial; allocation of tasks and duties; building of authority: and environmental audit and monitoring.

Another issue in this category is the possibility to keep a more continuous contact with colleagues in a professional network, which has been confirmed by many interviewees.

VMs are seen by the respondents as missing social component (“social agenda”) in the form of informal talks and chitchats, potential to develop “we”-feeling, possibility to meet new people and socialise. VM participants may lack the ability to see each other and read body language, observe how the group reacts, understand the feelings and handle the reaction:

[Meetings requiring physical presence include the ones] where social agenda is important. Social agenda is about creating trust between those who meet, seeing each other, observing how others move, choosing people whom I can work with and can trust (male, consultant on virtual solutions at Swedish EPA, 2012).

One can go out and grab a coffee, and chat with each other... and you miss this during VMs (female, organisation developer at Swedish Courts, 2012).

Interviewees were asked to comment on their perceptions in terms of how fun and stimulating they find VMs compared to F2FMs. While some consider VMs as less fun and/or stimulating, others note that VMs “function well”, allow avoiding travel, which “feels good”, and are more efficient. Others find these two types of meetings “about the same”, and emphasise that factors in question do not depend on the meeting media but rather on its topic.

**Career and Recruiting** Proposed indicators are shown on Fig. 7. VM implications for recruiting have been added to this category after the empirical study, which identified them.

**Career and recruiting (CR)**

CR1: Share of employees feeling VM presence in their organisation can be used as a motivation during recruiting  
 CR2: Share of employees believing VMs are a good substitution to a F2F job interview  
 CR3: Distribution of employees believing it is more difficult/easy/the same to identify a suitable person for a job position, if they met this person in a VM compared to a F2FM

Figure 7. Career and recruiting indicators

Interviewees have either not observed any influence from VM use on their career development or found it difficult to link such to increased VM use. Some interviewees see VMs as a potential motivation factor during recruiting for people looking for more flexibility at work:

Today many young people can be very interested, if a work place offers VM possibilities. And I do not think that there are so many who would like to travel a lot. If the position implies

less traveling... this could be an advantage. And if one likes travelling, then it is not so good for them to not have an opportunity to travel (female, manager at Swedish Social Insurance Agency, 2012).

Others assume that these factors will gradually gain meaning with the maturing of VM technology or do not consider VMs have any implications for recruiting at all:

It is much easier to conduct a telephone [job] interview using Live meeting since you can see each other. This is positive, I think. I believe VMs do not have any meaning as motivation factor for [job] applicants. When I employ a person, I can tell them that I use VMs in my work (male, manager at Swedish Transport Administration, 2012).

While some respondents would not carry out a job interview in a VM, others see VMs - and videoconferencing in particular - as a useful solution in addition to F2FMs in the recruiting process since VMs expand geographical boundaries for employers and applicants, can be adjusted easier to varied conditions or save time to interview more applicants. Others differentiate the type of job position and the applicability of VMs for the related job interview:

You would normally like to meet a person you are going to recruit physically. If it concerns somewhat shorter assignments and cooperation, e.g. data collection, computer typing, doing mainly mechanical work..., then maybe you can recruit this person in a VM (female, organisation developer at Swedish Courts, 2012).

Many respondents consider that it is more difficult to identify and evaluate if a person is suitable for a job position, if they have met this person during a VM compared to a F2FM.

**Performance, Work Productivity and Quality** Personal performance at work can be measured by the work productivity and the quality of delivered tasks. Proposed indicators are shown on Fig. 8.

**Performance,  
work productivity  
& quality (PPQ)**

PPQ1: Share of employees believing their work efficiency increased with VM use  
PPQ2: Distribution of employees believing their work efficiency in VMs is higher/lower/the same as in F2FMs

Figure 8. Performance, work productivity and quality indicators

Empirical study confirmed literature findings: interviewees agree that their (or their colleagues') work productivity has improved with the increased VM use due to time savings from avoided travel. Many have reported their work quality and/or efficiency had improved as they could perform their

work tasks in less tight time frames and/or cope with more tasks as compared to when they would travel to the meetings:

It feels like we have too many meetings. If you are away one day, it takes a lot of time. One can be much more efficient and do much more in fewer meetings. You feel that you progress further in your tasks, when you save time with VMs. You can also get some time for the reflection, and work a little more proactive and less reactive... If you work with the goals proactively, it becomes... more structured and effective. In this way you get more time and therefore become more efficient (female, manager at Swedish Social Insurance Agency, 2012).

Work productivity and quality during VMs has been assessed by some respondents as similar to that of F2FMs or that work quality during VMs could be improved (e.g. when sharing files, exchanging information etc.). One respondent notes, however, that it is “very easy to be efficient during a VM” (e.g. due to the instant access to all required documents in the system, possibility to find the needed information immediately etc.) and that the overall work quality can increase by 10% due to the learning potential of VMs, exchange of opinions etc.

***Gender and Social Equity*** Proposed indicators are shown on Fig. 9. This category has been extended to include VM implications for social equity, which were identified in the empirical study.

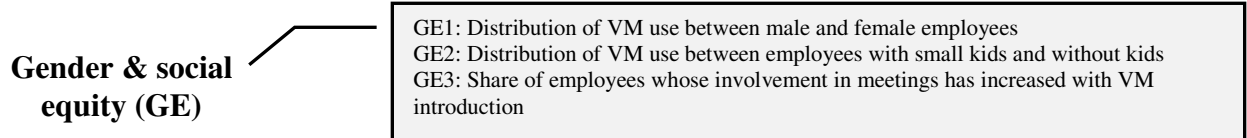


Figure 9. Gender and social equity indicators

While some respondents consider gender equity as an important indicator to measure when evaluating VM effects on individual, others find it irrelevant for this purpose. Some respondents felt men were travelling more than women in their work, which had been shown in earlier quantitative studies. Many perceive VMs provide possibilities for parents with small children to take care of their families without leaving their homes and still participate in a meeting:

It is hard to say that [advantages and disadvantages between VMs and F2FMs differ between men and women]. Maybe it concerns when a person has to stay at home with family and kids. This has an impact on gender equity (female, manager at Swedish Transport Administration, 2012).

The fact from the literature that many women are still expected to take the main responsibility for home and family is reflected in the perceptions of some respondents while others do not think it is valid anymore:

It depends on the life situation... If you live unequally [from a gender perspective] and take more responsibilities at home, VMs are more important. It is probably rather common that women take major responsibility for home and children (male, manager at Swedish Courts, 2012).

I believe that there is no difference between men and women who have kids. It used to be so but it is not any longer. It is a nice world (male, manager at Swedish EPA, 2012).

In their perceptions whether an increased VM use can improve equity between different (groups of) people, some respondents referred to the increased flexibility at work and the chance for everyone to access a meeting and/or related information. In particular, positive VM implications have been stated for people with challenges to move and for the participants from abroad who might need visa to travel to a meeting. Others found it, however, somewhat difficult to connection VM use to social equity.

Negative implications for equity between people using VMs have been exemplified with an “unfair” distribution of more and less advanced equipment between meeting participants; a privilege to use videoconferencing equipment, which is expensive; not similar “presence” in mixed meetings where some are gathered F2F and others participate via e.g. telephone; and inadequate positioning of picture and voice, which might create a feeling that some participants have more central role in the meeting than the others.

***Personal Safety and Information Security*** This category has been added after the literature review, which identified that increased VM use could contribute to improved personal safety due to eliminated need to travel and associated reduction of journey related risks [3]. Proposed indicators are shown on Fig. 10.

**Personal safety &  
information  
security (PIS)**

PIS1: Share of employees feeling their personal safety has been improved due to increased VM use  
PIS2: Share of employees trusting VM technology in sharing and exchanging information

Figure 10. Personal safety and information security indicators

Some respondents felt VMs eliminated personal safety risks related to travelling while others elaborated on information security and privacy in the use phase of VMs. In that regard, many do not see any problems in sharing and exchanging information virtually due to the high information security and available encryption techniques.

**Age** Proposed indicators in this category are shown on Fig. 11.

**Age (AG)**

AG1: Distribution between different age groups and the rate of VM use

Figure 11. Age related indicators

Age has been included in the analysis as some respondents referred to the potential correlation between VM use and age (e.g. younger generation is less afraid of technology, is more interested and capable to use VMs etc.). Interview responses have been, however, contradictory as some consider the rates of VM adoption and use to be individual and not age-dependent. On the other hand, as described in sub-sections on work situation and gender and social equity, many respondents consider that young families with children may be more interested in VMs use due to a potential for higher work flexibility.

**Discipline and Attention** VMs have been described as more concentrated [4, 17] and “to the point” than a meeting in person [4] as well as “efficient and focused” and therefore requiring discipline and attention from the participants [5, 17, 24]. This category has been therefore included in the analysis. Proposed indicators are shown on Fig. 12.



**Discipline & attention (DA)**

DA1: Share of employees feeling it is easier/more difficult/about the same to keep attention during a VM as compared to a F2FM  
 DA2: Factors influencing the ability to keep attention in VMs, and the share of employees considering these factors relevant to their work routines

Fig. 12 Discipline and attention indicators

This study included a question on whether VM users felt it as more or less difficult to keep their attention during VMs as compared to F2FMs. Some respondents find VMs as more intensive, requiring more concentration than F2FMs, and therefore it might be easier for the participants to get tired. For many their ability to keep attention depends on the meeting length:

[I]t feels that often VMs are a bit shorter..., more concentrated... And it is nice, if the focus is kept up. If it is easy for a person to lose focus, it will probably be a longer meeting [in person]... The ability to keep attention and focus depends a bit on how long the meetings are (male, manager at Swedish Courts, 2012).

In addition, since VMs are often held at employee regular workplaces some respondents found it easier to get distracted. However, such distractions were reported to be minimal in case of video-based VMs or if the participants from the same place sit in the same room. In case of a dialogue and voice use in a VM the ability to keep attention is reported to be quite high:

I take a videoconference: you see a person's gaze direction all the time. And that is pretty important. The attention is very much about where the focus is. I can sit and look forward during a lecture but miss everything what has been said. Or I can sit in a lecture... and look at Facebook instead ... In a web-conference it would be much easier to get distracted ... In a video-conference it is much more difficult since the screens are on all the time. But as long as you have a dialogue, if you use your voice, it is a good opportunity to keep attention in a VM (male, consultant on virtual solutions at Swedish EPA, 2012).

Some respondents pointed to the fact that VMs required good structure, prepared agenda and well-maintained discipline to be successful. The importance of effective preparation and meeting management in a VM have also been identified in literature [11].

**Potential to Learn** This category has been added to the analysis after the literature review and interviews. Proposed indicators are shown on Fig. 13.

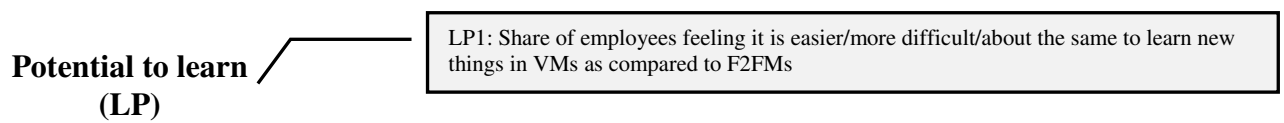


Figure 13. Potential to learn indicators

Respondents have been asked to comment on their ability to learn during VMs as compared to F2FMs. While some have found it easier to learn new things when they meet in person, others underlined that their learning potential depended on the situation and type of information they acquired. For example, VMs and F2FMs suit equally well for one way communication or delivery of information while when the employees need to learn about more complicated systems or relationships on a particular subject a F2FM is of preference.

At the same time VMs provide with new tools that facilitate learning, interaction and information exchange (e.g. screen sharing and simultaneous document editing together with other participants):

I think it goes well with VMs... For example, [my] colleague...would show me something in Excel... He was in Stockholm and I was in Jönköping, and we shared the screen... I saw what he was doing... in the document, and he explained it to me... It could not have been any better physically (female, organisation developer at Swedish Courts, 2012).

Sometimes VMs can be even more interactive than F2FMs. For example, webinars could be suitable for a continuous parallel dialogue with the presenter or other colleagues while it can be more difficult to achieve in large conference rooms in a F2FM.

**Meaning and Significance** This category has been added to the analysis after the literature review and interviews. Proposed indicators are shown on Fig. 14.

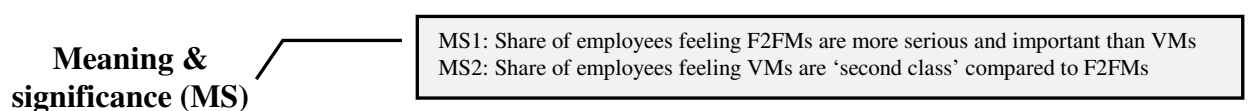


Figure 14. Meaning and significance indicators

The question has been posed to VM users whether they perceive VMs as more or less important compared to F2FMs. Some did not perceive any difference in this sense, and agreed that the significance of a meeting rather depended on its topic and content than the media used: “I do not think that importance has anything to do with a meeting form. It rather concerns what kind of meeting it is. One can make a decision on how to use [one million Euros] in a VM” (male, manager at Swedish EPA, 2012).

Others perceived F2FMs as more important due to time and resources spent to hold a meeting. Employees at Telia in 2003 perceived VMs as “second class meetings” that are “less significant” while F2FMs were referred to as of “higher interest, seriousness and respect” [11]. No such perceptions were observed in this study, which had been, however, carried out nine years later in a different context of VM technology development and in a public sector.

***Aggregated Indicators*** A diagram summarising all proposed indicators in each category is shown on Fig. 15.

## **Analysis and Discussion**

This study collected and analysed individual perceptions, opinions and experiences around VM use by employees in seven Swedish public authorities and several companies, and compiled them with facts and arguments from literature. Different issues around VM use and its potential effects received comments from interview respondents. These issues have been structured and rationalised in 10 categories of a refined conceptual framework (Fig. 3), and indicators to measure identified VM effects on individuals have been developed (Fig. 15). Sometimes respondent opinions were similar while sometimes they varied; in some cases literature findings were supported with interviewee answers while occasionally interviews brought different or new perspectives on the subject. First the consensus on various VM aspects is addressed followed by the discussion of dissonance in findings.

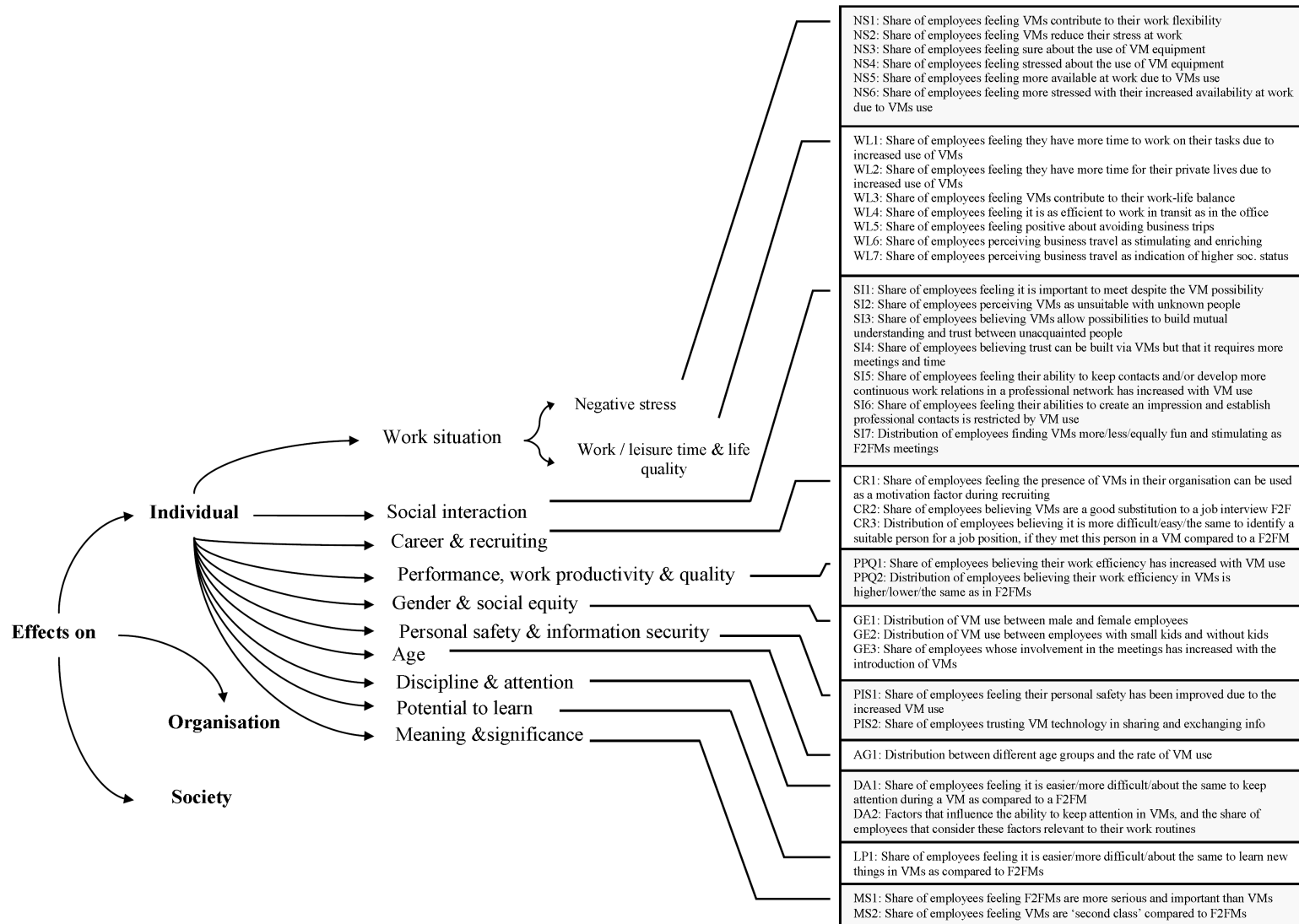


Figure 15. Indicators of potential VM effects on individual employees

**Consensus about Virtual Meetings** All respondents agree that major VM advantages include time and cost savings, which have been broadly described in literature. There is a general agreement (both among interviewees and researchers) that travelling causes stress in one way or another.

Most respondents agree that working in office is more efficient than while travelling to a meeting, and that it is more efficient to work, if one travels by train than by airplane or car, which is confirmed in the literature. These are common sense statements, especially considering that trains in Sweden are well-equipped with power supply and have possibilities for Internet connection. Most interviewees agree that VMs improve individual work efficiency due to time savings from avoided travel to and from meetings.

Most respondents have not observed any impact from VM use on their career development, which was hypothesised in literature. A possible explanation is that these people do not work with CMC technologies/VMs directly but use them as working tools. Thus it is difficult for employees to link VM use to their career advancement, and sometimes it can be challenging to remember such occasions (if any) instantly, unless they have made a remarkable impact.

Most respondents find it more difficult to identify and evaluate whether a person is suitable for a certain job position, if they have met this person in a VM compared to a F2FM. This is likely to be linked to the human nature and habits as well as the desire to use as many senses as possible at a time once an important evaluation needs to be done. F2FMs represent rich media, which allows experiencing all human senses. VMs are, however, often used in early stages of a screening process.

Nearly all interviewees confirmed literature findings on that VMs provide more opportunities for parents with small children, whose participation in F2FMs can sometimes be restricted (e.g. when they need to stay home with sick children, leave them at or collect from the kindergarten etc.).

No one of the respondents has indicated any problems linked to the sharing of information in VMs or that he/she was concerned about the information security. This is also likely linked to the fact

that interviewees represent current VM users, who had a certain degree of trust in information security before adopting VM technology in their work routines.

**Dissonance in Findings on Virtual Meetings** Despite many similarities in responses, many opinions and perceptions about VM use have diverged between respondents. Those employees who felt confident about handling VM equipment have not experienced any related stress, while those less experienced in this area felt higher stress. This is natural as uncertainty is often a reason for human anxiety, fear or frustration, which are typical stress indicators [22].

Respondent opinions on whether travel is the indication of higher social status diverged. While some interviewees consider travel to have no connection with status, others feel these two variables are closely linked (i.e. the higher one's status is, the more one travels). This is somewhat difficult to explain before any quantitative study has been performed. The study would help to explore among other things, if such opinions have any correlation with age (e.g. if younger generation tends to perceive travel less as the indication of higher status or VMs less as "second class" meetings compared to F2FMs). Also it might be true that such opinions would vary between public and private sector (there seem to be sharper associations with work related travel as the indication of higher social status in business) or between Sweden and other countries or cultures (Swedish culture has a low level of hierarchy, where issues like social status bear less cultural value than in high hierarchy cultures). Another context specific factor is the high level of environmental awareness in Scandinavia, which may contribute to a lower value allocated to personal trips in human perceptions. These aspects need to be explored in detail and are subjects for future research.

Most respondents find it is more difficult to build trust in VMs than F2F. However, two respondents have indicated it could be possible to build trust gradually with more frequent VMs, which is reflected in scientific research on VTs. This difference in opinions is likely to be linked to the different levels of skills and expertise in relation to VMs since one of these respondents is an IT and VM expert while another one seems to be fond of technology and ICT tools.

Many respondents suggest seminars and workshops encompassing much interaction between participants are not suitable to be conducted virtually, which has been shown in previous studies. However, this seems to be context and situation dependent, since some interviewees still report about VM advantages in offering interactive techniques such as document sharing. Perhaps these differences point to divergence in individual preferences as well as depend on several factors, e.g. the nature of the task, number of meeting participants, tools available in a VM, suitability of these tools for the task, skills to operate the tools efficiently by the participants etc.

There have been diverging opinions on how fun and stimulating VMs are in comparison to F2FMs. Many find that VMs underscore on this scale while a number of opinions supported the fact that the meeting form does not define how fun and stimulating the meeting is. Such divergence is likely linked to personal preferences and comfort with using new meeting forms instead of well-established and old fashioned F2FMs.

Diverging opinions have also been observed on whether the presence of VMs in an organisation can be used as a motivation factor in the recruitment process or not. This trend is difficult to explain without the examination of more detailed reasons behind such thoughts. Probably this is related to whether a person is actively recruiting people and therefore is knowledgeable about existing and evolving trends in the preferences and the needs of job applicants. This issue requires further exploration with a quantitative study in the society.

While some respondents would not carry out a job interview with the help of a VM, others find it as a useful tool at least during certain stages in the selection of candidates for a certain job position. Such varied opinions are likely to be linked to the routines established in organisations, which the respondents represent (e.g. some organisations conduct video or telephone interviews to shortlist candidates before they invite them for a personal interview, others would like to get a broader selection of candidates from different geographical regions etc.). This is, however, just the authors' hypothesis, and only a quantitative study can prove whether any statistical difference exists. Diverging opinions on this matter can also be linked to the ways one feels more comfortable of

getting to know a job applicant and form a personal opinion about him/her; or whether an employer has long experience of job interviews or not; or how easy it is for an employer to define in a personal interview whether the applicant is suitable for a certain job position or not etc.

Diverging opinions of respondents have also been observed on whether VMs might have important implications for gender equity or not. First, this can be linked to the fact that some interviewees are more than others interested in gender issues and equality (primarily, women). Second, some respondents experienced difficulty to identify the relationship between VMs and gender without additional streaming questions, which have not been used in this study not to provoke any presupposed answers.

While many interviewees noted there were certain implications from VM use for social equity, some have not been able to identify any such connection. However, as in the case with gender equity, the question has been formulated in a way that aimed to avoid any presupposed answers. This has apparently complicated the situation for respondents to not only come up with any examples of such a connection but also to realise whether any link between VMs and social equity exists. One respondent noted that VMs may be favourable for meeting participants from other countries than Sweden for the reasons of diplomatic nature (e.g. if they need a visa to travel to a Sweden). However, it should be noted that this is unlikely to be relevant for the majority of meetings at Swedish public authorities since they would rarely engage participants from other countries (unless in special occasions when the meeting is linked to an international project).

Contradictory opinions have been received on whether the use of VMs and technology is age dependent or not. Since no studies were found on the matter, it would be worth to check the existence of such relationship statistically.

Different perceptions have been reported on the comparison of the respondent's ability to keep attention in a VM and a F2FM. While many felt it was more difficult to keep their focus in VMs, a number of factors seem to be embedded here, and the issue is not that straightforward. In many



cases this ability can be context dependent (e.g. if a meeting involves video, if participants seat in their own office, what kind of meeting it is, how important and how long the meeting is, how well-prepared and structured it is etc.). Therefore a more detailed study on this group of indicators is deemed important to fill in the outlined knowledge gaps.

A similar divergence of opinions is observed when it applies to the learning potential in VMs and F2FMs. While some respondents indicate it is easier to learn F2F, others point to equal or even better learning opportunities in VMs. This is linked, first, to the context and the nature of the problem in question, and, second, to the level of knowledge and skills about the opportunities that virtual tools can provide. To some respondents it may be difficult to answer this question, if they have not been involved in any learning or education applying CMC technologies.

Different opinions have been received when comparing the importance and meaning of VMs as compared to F2FMs. There is a need to quantitatively estimate whether this difference is significant, and if so, what the reasons behind the differentiating opinions are. Sometimes respondents consider that organisation of a F2FM costs more than a VM, and therefore perceive F2FMs as more important. As mentioned earlier, there is a need to research whether the perception of VMs as “second class” meetings is relevant for Swedish public authorities.

## **Conclusions and Areas for Future Research**

This work delineated existing and potential VM impacts on individual employees in Swedish public authorities and selected companies. It analysed data from extensive literature review and a number of in-depth interviews to develop a conceptual framework, which mapped these impacts and rationalised them in 10 categories. Within each category an aggregated list of indicators to measure VM effects on individuals has been suggested. The article has identified a number of knowledge gaps and information controversies, which will require further quantitative studies.

Future research should aim to: 1) support/deny hypothesised causality between VMs use and identified variables statistically; 2) measure existing VM effects on employees in selected Swedish public authorities.

The article outlined a number of hypothetical correlations, which would require statistically based proof since the opinions of respondents diverged. These include:

- stress levels during VM use and the degree of the user's experience with VMs;
- business travel frequency and the indication of social status;
- preference of VMs for workshops and the nature of the workshop task, number of participants in a workshop, tools available in a VM, suitability of these tools for the task, and skills needed to operate these tools efficiently by meeting participants;
- VM possibilities in an organisation and the attractiveness of this organisation as a workplace for potential employees;
- age and individual rate of VM use.

Other areas that would require further research include potential VM benefits for gender and social equity, pros and cons of virtual job interviews, factors determining individual ability to keep attention in VMs and the learning potential of VMs, and significance of VMs as compared to F2FMs in the context of Swedish public sector.

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