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Communicating the End-User's Input to the Video Conferencing Industry - Using Outcome-Driven Innovation

Master of Science Thesis

MARTIN ANDERSSON

ERIK JONSSON

Department of Product and Production Development
Division of Product Development
CHALMERS UNIVERSITY OF TECHNOLOGY
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- Using Outcome-Driven Innovation

MARTIN. ANDERSSON

ERIK. JONSSON

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Department of Product and Production Development

Chalmers University of Technology

SE-412 96 Göteborg

Sweden

Telephone + 46 (0)31-772 1000

ABSTRACT

The video conferencing industry has been on the verge of success for many years but has still not gained broad acceptance from professional users. The reasons for the failure are many; from IT infrastructural problems to usability issues. The purpose of the Master's Thesis "Communicating the End-User's Input to the Video Conferencing Industry - Using Outcome-Driven Innovation" is to gain knowledge about the end-user's experience of room-based and telepresence video conferencing systems and communicate that to the video conferencing industry. Providing the end-users with what they really want can be what is missing for video conferencing to get its final breakthrough. To fulfill the purpose, a recommendation is given that specifies how the video conferencing industry should act in order to gain significant growth. The method used for this project is based on Outcome Driven-Innovation, which is a recognized method to capture customer inputs, identify market opportunities, and define a targeting strategy. The study has consisted of personal interviews, a survey and at last analysis of the result to finally create the recommendation to the industry. The results of the study indicate that there are many things that need to be improved according to the end-users which confirm that the industry is still in an early stage. The many end-user needs to satisfy are in the recommendation grouped into themes to summarize the most important things the industry has to focus on in the closest future.

Martin Andersson and Erik Jonsson

Product and Production Development,

Chalmers University of Technology

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Erik Jonsson

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1. INTRODUCTION

The introduction will give you an overview of this project and its specifics. The subject of the report, video conferencing will be described to form a common understanding and some basic knowledge of the subject. The introduction will also describe the project's focus and what it aims at.

1.1. Background

Meetings are arranged in corporate businesses, organizations, governments, and authorities, among friends and in many other types of groups. Time savings, economical savings as well as environmental savings could sound like obvious reasons for people to choose to avoid the travel in favor of distance meetings (today known as teleconferencing or video conferencing). Still people choose to travel to attend face to face meetings. Video conferencing could because of the above-mentioned benefits be an important communication channel in the future and the development of such equipment is the focus of this project.

1.1.1. Video Conferencing in the 1980s and '90s

The use of video in distance meetings started to become popular in the 1980s (Down, 2009) but had been available for a long time before that (Egido, 1988). The interest was growing because people started to realize the benefits a video conference comes with. Video conferencing was at that time thought to have the capacity of changing the way we communicate and help companies to save money and time and to be more environmentally friendly. However, the Internet was in its development stages and the data traffic capacity was low. This became one of the reasons for the downfall of video conferencing as an industry, together with the high expectations to replace the regular face to face meeting (Egido, 1988; Magnusson A., 2010a). Because of the limitations in data traffic capacity, the audio and video quality was poor which made the end-users dissatisfied. The IT infrastructure needed development efforts to be able to cope with high data traffic demands from video and audio traffic. Another problem was the lack of usability aspects in the systems that made them hard to use (Mines, 2008).

After the downfall it was believed for many years that video conferencing would never get its breakthrough (Egido, 1988). But as the IT infrastructure developed to handle large amounts of data traffic, it became possible to have high quality video conferences (Magnusson A., 2010a). The usability was also addressed by the industry and the systems are now possible to use without having previous knowledge (Magnusson S., 2008). However, the market is still suffering from people's bad experiences of video conferencing in the early '90s and the technology of video conferencing has still many market obstacles to break down before the industry can get its final breakthrough.

1.1.2. Video Conferencing Today

As earlier mentioned, the video conferencing industry is in its early stages and the manufacturers have not penetrated the market completely. Only the segment of early adopters uses video conferencing at the moment (Magnusson A., 2010b).

There are many players on the market but according to Misnevs, Krivchenkov, Muravjovs, and Muravjova (2010) there are two companies that are in the lead of manufacturing video conferencing equipment, namely Polycom and Tandberg. However, it is difficult to get an overview of the market since there are many homemade solutions and many selling agents that combine different types of equipment to their customers. Figure 1 shows an overview of the different actors and sales channels in the market.

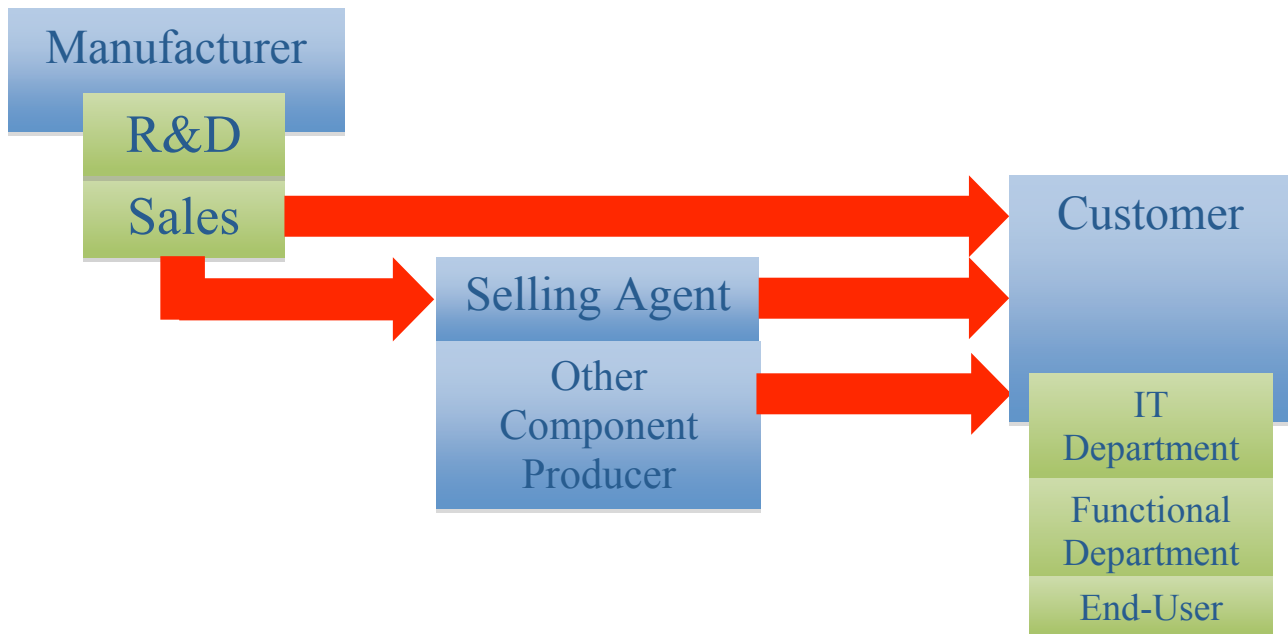


Figure 1. Actors and Sales Channels

Advantages of Video Conferencing

Employees that work for global companies are often required to travel for different business purposes. Many of the advantages of video conferencing regard avoiding the traveling needed to attend conferences. Time savings, cost savings, and environmental savings are the most prominent advantages of not having to travel to attend conferences (Mines, 2008; Magnusson A., 2010a).

The risk for employees to get into accidents is costly for companies - a risk that can be reduced if travels are avoided. The employees' health will also benefit from avoiding traveling because of a better work-life balance and more family time during the week. In addition, reduced traveling time will also shorten lead times (Bohm & Templeton, 1984).

Further on, it is often difficult to find a suitable conference time when the participants are geographically separated as they must set aside additional time for traveling. It is therefore much easier and more convenient to find a suitable time for a video conference as traveling time does not have to be taken into consideration (Magnusson A., 2010a).

Disadvantages of Video Conferencing

There are also some disadvantages of video conferencing. Technology creates boundaries that could be hard to break down and the possibility of socializing with people could be difficult. In video conferences it is not possible to have dinner or a cup of coffee together as you do in regular face to face meetings. The technology will also decrease the quality of the conference as all of our senses will never be completely

supported. In addition, the quality in the information of the senses that are supported will always be lower than in a regular face to face meeting (Down, 2009).

Further on, the technology boundaries make it difficult to collaborate. It is, for instance, not possible to draw together with the other participants on a whiteboard. In some cases usability issues can also be a disadvantage as it was when the industry was in its earliest state (Mines, 2008).

Another disadvantage of video conferencing is the high costs it comes with. Not only are the initial expenses for purchasing a video conferencing system high, the high bandwidth needed is also expensive and a continuous cost (Cooke, 2009).

1.1.3. The Future of Video Conferencing

In the future it is believed that video conferencing will gain popularity in companies (Magnusson A., TechWorld, 2010a). A recent study points towards that 75% of all American companies will be using video conferencing within two years (Laggar, 2011).

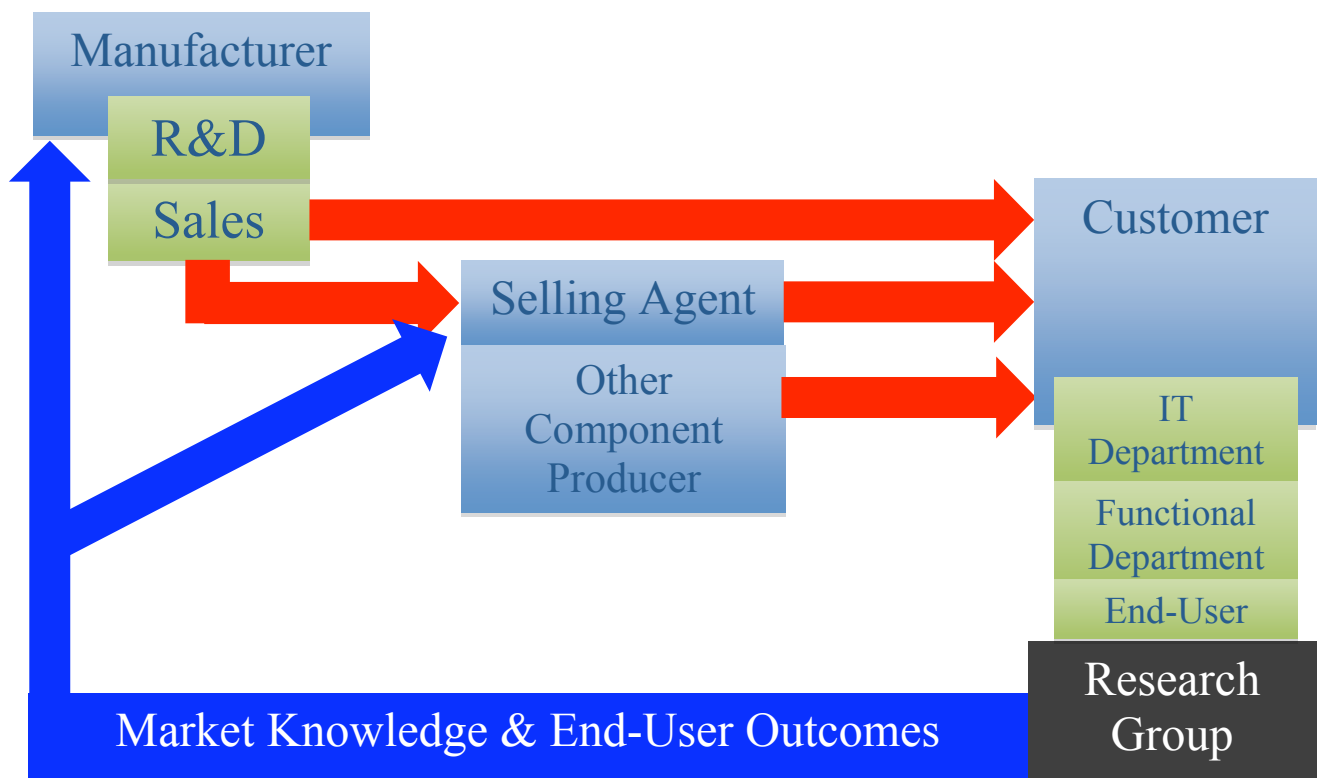


Figure 2. Closing the Gap

The development of video conferencing products is very technology-focused and the manufacturers have not gained thorough knowledge of the end-user behavior yet. The lack of knowledge creates a gap between the end-users and the manufacturers and selling agents. The early state of the industry together with the way the market is structured could be one of the reasons for this gap. Since the manufacturers have little direct contact with the end-users and purchasers of the systems they have not gained much customer feedback or information about the needs of the end-users. It is important for the future of the video conferencing industry to close this gap. Little effort has up until now been spent on this market research, i.e. to really understand what circumstances a conference implies and why a regular face to face meeting is by the vast

majority of people preferred instead of a video conference. Figure 2 visualizes how market research in this area can close the gap.

1.2. Purpose and Objective

The purpose of this thesis is to gain knowledge about the end-user experience of video conferencing systems on the market. Gaining that knowledge will make possible to close the gap described in section 1.1.3. The Future of Video Conferencing and visualized in figure 2. When the end-users' needs are ensured it is possible to create more qualitative products, that satisfy the end-users' needs better.

The objective of the thesis is to create a recommendation for the future development of video conferencing products for the gain of the industry. The recommendation will include plans for how to satisfy the end-user that can be applied by the whole industry. The thesis will bring forward the most important things for the industry to put efforts on in order to satisfy the end-users of the systems. The recommendation will also support the whole industry to make decisions based on facts about the end-users.

The recommendation will be based on what was discovered and ensured in the capture of end-user's outcomes. Based on these outcomes, a recommendation that will address the manufacturers and selling agents of the industry will be created for how to satisfy the needs of the end-users.

The purpose and objective are summarized into three research questions that the thesis should answer.

RQ1 - What are the perspectives of video conferencing from an end-user?

This research question is used to specify which type of customer that the study aims for and to emphasize the importance of searching for all the end-user perspectives of video conferencing. The question is wide and will be answered during the capture of the customer input.

RQ2 - What are the most important and least satisfied end-user outcomes for the video conferencing industry to focus on?

This research question is very important in order to know how to handle the answer of RQ1 to make it applicable to the industry in a later stage. If this question is answered, the industry will have a good foundation to act upon.

RQ3 - How should the video conferencing industry satisfy the end-users with respect to the most important and least satisfied outcomes?

The results from RQ2 will be analyzed in order to create some recommendations, which should answer to RQ3.

1.3. Scope

The project will be limited by only concerning the early phases of the product development process and will only result in a recommendation to the industry. Hence, no detailed video conferencing solution will be developed.

1.3.1. Market Scope

The potential market is substantial and there is no such thing as a one size fits all solution for distance conference rooms. That makes it impossible to cover all possible market segments with the available resources. The segment addressed for the research in this project will therefore be limited to Swedish, Norwegian, and Finnish officials that

use video conferencing on a regular basis. There are also many different types of video conferencing systems on the market. This study will only address room-based and telepresence products, which are described further in section 2.2. Products.

The scope of the research segment in the study is wide, but according to the method this is preferred to gain as many views as possible from the end-users of the products. The variety of respondents will create a versatile result that can be used to position future products in relation to different segments of end-users.

1.3.2. Capturing the End-User's Input

Chapter 3. METHOD describes that the end-user experience will be captured through interviews and confirmed through a survey, and through these two procedures only. The aim is to capture all experience oriented outcomes the end-users have, although there must be boundaries of which experiences that should be included in the study. Some parts of the end-user experience will therefore be excluded. End-users are often compelled to book video conferencing rooms and only the most important parts of that experience will be included in the research. The experiences concerning the different IT systems that are connected to the video conferencing equipment will also only be briefly addressed in the research.

Figure 1 shows the video conferencing manufacturers' different types of customer groups. This thesis's purpose is to acquire knowledge about the experience of a specific customer group, namely the end-user. IT departments and functional departments are all types of customer groups that would also be interesting to study. However, these customer groups will be excluded in this thesis because of limitations in time and resources.

An important detail in the capture of end-user inputs is that the research group should not have any previous opinions or knowledge within the subject. Since it is of highest importance to find out how end-users measure a product's performance, the research group will not apply any knowledge within the field in the search for the answers of the research questions. Rather will the research group try to exclude existing opinions and knowledge about communication, video conferencing and teleconferencing to not be biased when capturing the end-user input. The thesis work will therefore not include any deeper studies within the subject.

However, to be able to address the end-users with questions about the interaction between them and the system there is one important aspect that the research group must be knowledgeable about. That is how a video conferencing system looks like and what functions the end-users are interacting with during a video conference. Without this knowledge it would be hard for the research group to understand and prepare questions to capture end-user inputs during the interviews. This information is brought up in section 2.3. Products.

1.4. Stakeholders

In this section the stakeholders of the project will be introduced.

Since this is a Master's Thesis, the Product Development Department at Chalmers University of Technology has an influence and an interest in the project and will thus also be seen as a stakeholder of the project.

The end-users of video conferencing systems are important stakeholders since all the effort in this project is directed towards them by uncovering their needs and giving recommendations to the industry on how to address those in the future development of video conferencing products.

Companies, governments, organizations and authorities that use video conferencing products are also affected in some aspects. Especially purchase departments, traveling functions, environmental functions, not to mention the organizational functions that use video conferencing as a communication aid in their daily work.

Other stakeholders of this project are those that are coupled to the industry of video conferencing. Firstly the manufacturers of equipment are stakeholders and will be affected by the conclusions of the thesis. So will the selling agents as they are the ones that sell, distribute and install the systems. Within the industry there are also partners to the manufacturers (telecom corporations, IT infrastructure providers etc.) that will be affected by the results of the thesis. The last stakeholder is the IT departments of the companies that often have the responsibility to purchase, install, maintain and support the video conferencing systems. The stakeholders coupled to the industry could be seen in Figure 1 as actors in the sales channels, from the manufacturer to the end-user.

2. THEORETICAL FRAMEWORK

There are many approaches that try to apply and integrate the customer in the product development process. This section will describe some of the most recognized methods and approaches that can be useful in this type of study. It will also describe the most important specifics about video conferencing systems, which are important for the research group to be knowledgeable about in order understand the end-user experience of video conferencing systems.

2.1. Marketing Methods

The customer-driven approach has for the past decades been the trend in innovation. When it was introduced in the mid-1980s innovation changed from being technology focus to customer-driven. Companies started to interview their customers to find out what they wanted, which in many cases lead to more successful products and services. Since then, many different articles and books have dealt with the subject and suggested different approaches for how to involve the customer in the product development process in the best manner, all having different answers to the questions; What type of information is needed from the customer? From what customer should the information be captured? How should the customer input be captured? (Ulwick, 2005).

2.1.1. Kano Model

The recognized and entrenched method by Noriaki Kano, the Kano Model states that there are three types of customer needs one should be aware of; namely basic needs, performance needs and excitement needs (Sauerwein, Bailom, Matzler, & Hinterhuber, 1996). The basic needs are usually not stated by the customer, if the product does not meet these, the customer will become dissatisfied. If the product meets the basic needs, the customer will only be “not dissatisfied” since the customer takes these things for granted. Performance needs are often explicitly expressed by the customer and the satisfaction is proportional to the fulfillment of them. The excitement needs are defined as those needs that seldom are known by the customer but that yield more than a proportional satisfaction.

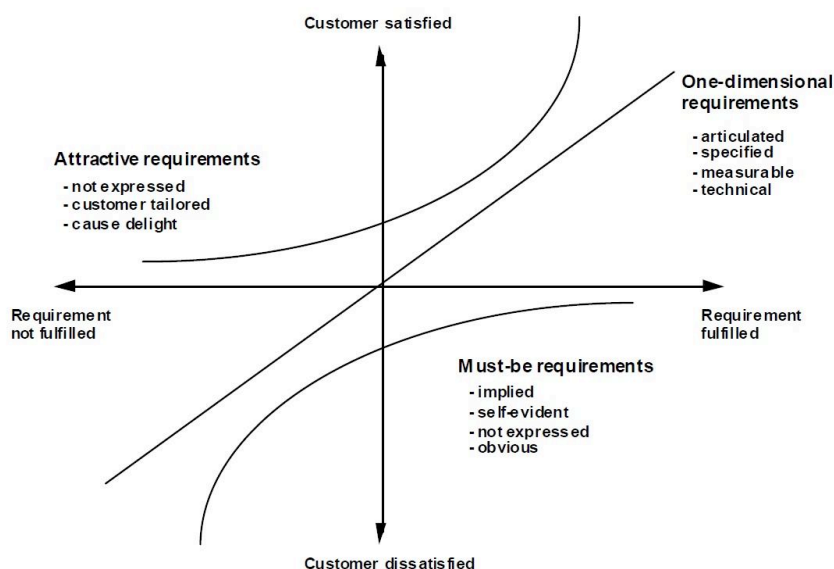


Figure 3. Kano Model (Sauerwein, Bailom, Matzler, & Hinterhuber, 1996)

2.1.2. Voice of the Customer

Value is a measure of what a customer really appreciates in a product, and the creation of a product is all about creating value for the customer. Voice of the Customer (VOC) is a concept regarding that capturing the customer's voice can create additional value in a product (Yang, 2008; Roman, 2011). Hongbin, Minghua, and Xinhua (2008) define VOC as a wide concept to describe the customer's needs and requirements. Roman (2011) goes further by stating that VOC is a term used to describe the process of capturing critical details regarding the desires, needs and requirements of a given prospect, customer, or target group. VOC is what allows us to give the customer what they really want from us.

To capture these needs and requirements, which can be either stated or unstated by the customer, a face to face meeting is the most common method (Hongbin, Minghua, & Xinhua, 2008). Yang (2008) states that other methods often used for capturing the VOC are surveys, focus groups and ethnographic research.

Roman (2011) also recommends interviews and advocates a five-step VOC-driven marketing process where the creation of a VOC relationship and relation strategy is the first two steps. The creation of the communication channels is steps three to four and the final step is to invest in the customer experience by listening to complaints and opinions about the product/service offer. This process is a new way of marketing according to Roman (2011) that requires the organization to fully adapt to this vision in order to succeed.

In VOC literature there are many holistic views and approaches that emphasize the importance of using the VOC in the creation of products and services. There are nevertheless few approaches and methodologies about how to get hold of and apply the VOC in a practical way in order to create value in the products and services of manufacturing companies.

2.1.3. Outcome-Driven Innovation

According Anthony Ulwick, the author to *What Customers Want*, "U.S. companies still find that 50 to 90 percent of their product and service initiatives are failures, collectively costing them more than \$100 billion each year". The reason for this has to do with variance – in customer requirements. Companies do not know what types of information they need to obtain to develop successful products and services. Neither does the customer. Over the past decades more and more business tasks get planned into detail, leaving less and less to speculations or chance except for one business task – innovation (Ulwick, 2005).

Analogously to how variance in manufacturing was controlled by the introduction of Six Sigma it is believed that innovation can be controlled. The outcome-driven method is what Ulwick (2005) advocates as the solution for less variation and higher predictability in the innovation process. If the innovation process could be controlled, companies could spend their resources on fewer initiatives, those that are likely to succeed.

To understand the method and the way of thinking one must first understand the key tenets that define outcome-driven innovation.

First of all one must think of a product as an aid for a customer to get a job done. The idea is that when customers become aware of a job they need to get done they will

search for a product or service to help them with that. This job (and not the customer) is the matter of focus in outcome-driven innovation.

The second key tenet is that customers use a set of metrics (outcomes) to judge how well a job is getting done and how a product performs. Hence, when customers use a product or service to help them get a job done, they measure the performance of the product based upon a set of outcomes. Customers use typically 50 to 150 outcomes for evaluating how well a job is getting done. All of these outcomes are seldom articulated by the customers and has therefore been difficult to capture in customer-driven approaches when listening to the “voice of the customer”.

The third tenet is that all downstream activities’ efforts should be based on the outcomes and especially those that are underserved, i.e. important and unsatisfied. By focusing effort and creativity on areas that matter to the customer the likelihood of developing products and services that the customers want is increasing drastically (Ulwick, 2005).

2.2. Products

The research group has aimed the research on end-users using two different products in this thesis and those should therefore be mentioned in order to completely understand the end-users perspective in their use of video conferencing systems.

2.2.1. Room-Based Systems

Conference rooms are very common at companies. These conference rooms are often equipped with projectors and other presentation equipment. A room-based video conferencing system is designed to fit into such a room. The system usually consists of a codec¹, a microphone, one or two flat screens, speakers, and a control unit. Some products offers can also include a table, chairs, and other relevant room interior. The room-based system is a flexible system that could be installed in any conference room and the components and features can be customized based on the customer’s needs. This kind of system is the most common video conferencing product on the market and can either be delivered by a manufacturer, or by a selling agent that combines components from different manufacturers. Room-based systems are often used for communication within a project, information meetings, status meetings, etc., where several individuals attend the meetings.



Figure 4. Room-based system from Tandberg (Cisco Systems Norway)

2.2.2. Telepresence Systems

The newest type of system on the market is the telepresence system, which is a further development of the room-based system. A telepresence system is an entire room that has been designed and equipped to fully support video conferences, including layout, furniture, equipment, etc. Compared to the room-based system, the telepresence system does not have the same flexibility and cannot be adjusted by the end-user, but it enhances the feeling that all conference participants are located in the same room.

¹ a device for encoding and decoding digital data streams

Telepresence systems are often very expensive because of high quality components and the complete interior design.



Figure 5. Telepresence System from Tandberg (Cisco Systems Norway)

3. METHOD

This chapter will describe the planned approach for answering this project's research questions that were stated in section 1.2. Purpose and Objective. Method execution and deviations from the planned approach will be discussed in chapter 6. METHOD VALIDATION.

The planned approach is based on the eight-step Outcome-Driven Innovation method, introduced in section 2.1.3. Outcome-Driven Innovation. As can be seen in Figure 6 only four of the eight steps will however be executed. The Outcome-Driven Innovation method was chosen because of several reasons. Firstly, the idea of the method is very fundamental – customers use a set of metrics to evaluate the performance of any product and that information is the only customer input needed. In other methods, the type of information that is going to be captured from the customer is often vaguely defined and could include requirements, needs, solutions, benefits, guidelines, etc. The Outcome-Driven Innovation method also has, in contrast to many other product development methods, well-defined procedure steps that were found to address the research questions in a perfect way. Another reason for choosing Outcome-Driven Innovation as a basis is that it manages development of existing products in a good way. Finally, the method is new and relatively unproven and was therefore found to be an interesting method to take on and also to evaluate.

According to the Kano-model there are some things that a customer-based method like Outcome-Driven Innovation cannot cover. Since the input to this project is planned to be gathered from the end-user it is evident that the needs and demands that are unspoken by the end-users (basic needs and excitement needs) will not be captured. This is however not seen as a problem here as the video conferencing products available today are widely accepted which indicates that the basic needs are already satisfied. In addition, since the video conferencing industry is far from fully developed it is believed that all performance needs have not yet been fully satisfied. Hence, satisfying excitement needs are at this stage of little importance (see section 2.1.1. Kano Model).

Sections 3.1-3.4 will describe the four steps extracted from the Outcome-Driven Innovation method (see Figure 6). Step 1 – Formulate Innovation Strategy, was carried out in the scope and objective statement; this project aims at making improvements on an already existing product and focus on the end-user. In addition, steps 6-8 will not be carried out because these are downstream activities that would require in-depth technical knowledge about video conferencing. Recommendations on how to carry out steps 6-8 will however be given as the last step in the planned approach is to develop a strategy for how to target the revealed opportunities.

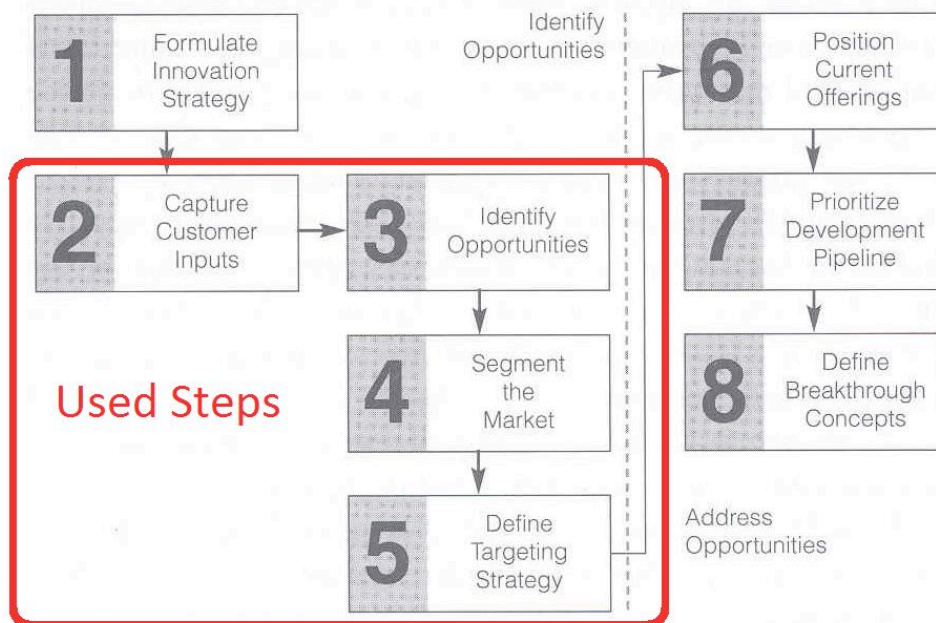


Figure 6. Modified Outcome-Driven Innovation Process (Ulwick, 2005)

3.1. Capturing Customer Inputs

The work of capturing customer input is one of the most critical steps in the innovation process. In traditional customer-driven methods solutions, specs, needs, and benefits are all captured from customer interviews and observations. In addition, the customer inputs are often immeasurable and too vague to be of value for designers and engineers. This creates variability and leaves room for interpretation that causes innovation failure.

One-on-one customer interviews will be used to capture the customer information because of its convenience. During the interviews three types of information will be captured.

Jobs to Be Done

Customers hire products to get jobs done. It is fundamental to understand what customers use the product for, i.e. what job they are trying to get done when using it. It is however also important, for growth, to understand what related and ancillary jobs the customers are trying to get done, besides the primary job. By identifying these related and ancillary jobs opportunities for growth emerge.

Desired Outcomes

Customers use a set of metrics (outcomes) when evaluating how well a product supports them in getting a job done. It is important to capture all outcomes as it is impossible to know which ones could lead to growth if addressed.

To reduce variability and room for interpretation the outcomes are going to be captured in a precise format, shown in Figure 7.

“Direction” + “Unit of Measure” + “Outcome Desired”

Figure 7. Dissection of an Outcome (Ulwick, 2005)

The direction term will only have two possible options; “minimize” and “increase”.

Constraints

The third type of information that will be gathered from the end-users is the constraints they are dealing with. Questions will be asked that concern the end-users' limitations and constraints during a video conference.

3.2. Identifying Opportunities

Once all ancillary jobs, outcomes and constraints related to the primary job have been captured the next step is to find out which ones are opportunities for growth and innovation.

A survey will be prepared to find the most prominent jobs, outcomes, and constraints. The survey will consist of all jobs, outcomes and, constraints that were captured during the interviews. The survey participants (end-users) will be asked to rate the importance of all the jobs, outcomes, and constraints using a scale of 1 to 5. Analogically, they will also be asked to rate the degree to which they are satisfied with how the solutions they are using today address these jobs, outcomes, and constraints.

Ulwick (2005) recommends that the survey is distributed to a sample of 180 to 600 people that should represent the market. However, since this project has narrow time and resource limits, the sample size will be smaller and the sample will most likely not be fully representative.

Once the survey results have been gathered the importance and satisfaction ratings will be used in the opportunity algorithm, shown in Figure 8.

$$\text{Importance} + \max(\text{Importance} - \text{Satisfaction}, 0) = \text{Opportunity}$$

Figure 8. Opportunity Algorithm (Ulwick, 2005)

The greatest opportunities will be for those jobs, outcomes, and constraints that have high importance in combination with a low satisfaction. The percentage of respondents that have given a rating 4 or 5 will be used. If 95% of the respondents gave an outcome an importance rating of 4 or 5, 9.5 should be used for the opportunity algorithm.

The jobs, outcomes, and constraints with opportunity scores greater than 12 are perceived as great opportunities that will be addressed in the following method steps. In addition, jobs, outcomes, and constraints with a satisfaction score greater than the importance score are considered to be overserved. These could also be viewed upon as opportunities – for cost reduction, halted efforts, or engagement in disruptive innovation.

3.3. Segment the Market

The next step is to segment the market. This is the last upstream activity and aims at grouping customers that offer the greatest opportunity for growth – customers that have unique underserved jobs, outcomes, and constraints. The idea is that it is not always the case that all customers in a market agree on which outcomes are underserved. There might be just a small group of customers who believe a set of outcomes is underserved while another group of customers believe that another set of outcomes is underserved. These groups of customers are seen as market segments in outcome-based segmentation.

The statistical analysis software SPSS will be used to group like jobs, outcomes, and constraints into distinct groups by using factor analysis. The job, outcome, or constraint with most variation in market response will then be selected from each group. The selected ones will thereafter be used in a nonhierarchical cluster analysis in SPSS where

patterns in customers' opportunity scores are revealed. The analysis will result in a handful of clusters of customers that have unique opportunities in common. The last step in outcome-based segmentation is profiling the different clusters by identifying similar characteristics the customers have within a group. These characteristics are based on the use data (use frequency, type of system, type of conferences, etc.) gathered in the survey.

3.4. Define Targeting Strategy

The last step that is going to be applied in this project is to give recommendations on how to utilize the opportunities that were revealed during the preceding steps.

Broad-Market Opportunities

The broad-market opportunities will be targeted first, i.e. underserved and overserved outcomes that are found when looking at the market as a whole. Depending on how the set of opportunities will look like a handful of paths could be taken for growth and innovation. The first one that is relevant for this project is to look for related opportunities that form a theme. If it is found that several opportunities are related these should be considered as a theme and be addressed together. These types of themes are the best chance for growth and innovation. Thereafter the unrelated underserved outcomes that cannot be tied to any theme will be addressed. However, only the outcomes with significantly high opportunity scores will be considered. The third and last type of opportunity that is relevant for this project is to address overserved outcomes. If it turns out that outcomes representing costly features are overserved recommendations for how to reduce product cost (without reducing overall product satisfaction) should be given.

Segment-Specific Targeting

Another strategy for growth and innovation is to address the specific market segments derived in the segmentation step. This will be done first after the broad-market opportunities have been addressed or if the market is found to be overserved. Here, the outcomes that are underserved through several market segments and are the least-challenging will be the ones to address first. The segment-specific targeting will be considered only if the broad-market opportunities are considered to be insufficient for significant growth.

3.5. Missing Data Analysis

One weakness of surveys is that most of the times there are missing data because of different reasons. In addition to the method described it is important to analyze the missing data. It is suggested by Hair, Black, Babin, Anderson, and Tatham (2006) that the missing data issues that could affect the generalizability of the results are addressed. The main objective of this stage is to discover patterns in the missing data that could affect the results negatively. A part of a four step method by Hair et al (2006) will in this project be used to analyze the missing data.

3.5.1. Determine the Type of Missing Data

According to Hair et al (2006) there are three types of ignorable missing data, namely data in the population that are not represented in the sample, data missing due to the design and collection of data (i.e. not applicable questions or participants skipping questions), and censored data which is hidden data not available in the sample of choice. If the missing data are of any of these types it could be ignored.

There are two sorts of non-ignorable data, namely missing data processes that the researcher has little control over (i.e. known missing data because of incomplete surveys) and data that is related directly to the user (i.e. unknown missing data because respondents have refused to respond to or has no opinion or knowledge to answer the questions). These non-ignorable data should be minimized as much as possible, especially the latter type which can be adjusted by thinking about how the participants will interpret the questions. If non-ignorable data are found one should determine the extent of missing data and take the proposed actions.

3.5.2. Determine the Extent of Missing Data

If there are some non-ignorable data discovered the extent of the missing data should be determined. The objective of this step is to determine if the extent of the missing data affects the result or not. This judgment is done through searching for patterns in the missing data, e.g. tiredness in the end of the survey. If any of the questions is found to have patterns in its missing data the variable or question should be considered to be removed from the survey. If the missing data is greater than 50% the data should be removed. Variables with lower missing data levels than 15% could be accepted if the missing data answers are removed. If the missing data levels are higher than 20% one should think of removing the question from the survey.

If these steps are followed the missing data will be overcome and the result will be acceptable for continuing the studies (Hair et al, 2006).

4. RESULTS

This chapter will show the results from the execution of the method. The results have been divided into three sections; interview discoveries about the end-user experience of video conferencing, survey results, and finally market segmentation.

4.1. Captured End-User Inputs

As mentioned in section 3.1. Capturing Customer Inputs the first part of the project was to discover the end-users' outcomes concerning video conferencing systems. This was realized through 25 one on one interviews directing the whole end-user experience of a video conference. In the end, the research resulted in 107 outcomes. The outcomes covered a wide scope of the end-user experience and were because of that divided into seven different categories. Each category will in this section get a brief introduction. The reason for creating categories was to group like outcomes for an increased readability of the survey. See APPENDIX A – OUTCOMES CAPTURED FROM INTERVIEWS for a complete list of the captured end-user outcomes.

Realistic Communication

Many of the outcomes in this category regard communication between people and the quest for a realistic conference environment, despite the presence of technology. The outcomes deal with everything from the feeling of being in the same room and having eye contact with the other conference participants to make the conversation flow.

Prerequisites & Constraints

This category describes the prerequisites for having a video conference and the obstacles that hinder end-users from communicating via video. The outcomes deal with the availability of video conferencing rooms, compatibility, and conference room prerequisites, etc.

Preparation

The third category describes the end-user experience of booking video conferencing rooms, conference specific preparation, extension of a booking, and agenda distribution.

Information Sharing

A category widely discussed during the interviews was possibilities of sharing information. This category regards PowerPoint presentations, document sharing, metadata about conference participants, etc.

Adjustments & Settings

The category of adjustments and settings is probably the most evident of all the categories. It gathers all the end-user experiences of system adjustments, interface interaction, and system feedback.

Audio/Video Quality

The majority of the outcomes in the Audio/Video Quality category regard the video screen and the speakers, but other quality aspects such as the room acoustics, noise, and other external disturbance sources are also included in this category.

Training & Support

The last category, Training & Support, consists of outcomes that address training in how to use the system and video conferencing in general, problem solving, and IT support.

4.2. Survey

The 107 outcomes captured during the interviews were put in a survey to discover their opportunity scores. According to the method the opportunity score decides which of the outcomes that should be addressed in the analytical part. The results of the survey showed that many of the outcomes are underserved, i.e. important and unsatisfied. The most interesting results are the outcomes with the highest opportunity scores, which will be further analyzed in section 5.1. Opportunity Analysis. The top three outcomes with the greatest opportunity scores can be seen in Figure 9.

37. Öka sannolikheten att det finns ett ledigt videomötesrum när du behöver det
111. Minimera tiden det tar att åtgärda tekniska problem
41. Öka kompatibilitet mellan datorer och videomötessystemet

Figure 9. Outcomes with the highest Opportunity Scores

The survey results are declared fully in APPENDIX B – SURVEY RESULTS to show each outcome’s importance, satisfaction and opportunity score.

In addition, the survey also resulted in survey participants’ use data, one of the questions in the use data part of the survey can be seen in Figure 10.

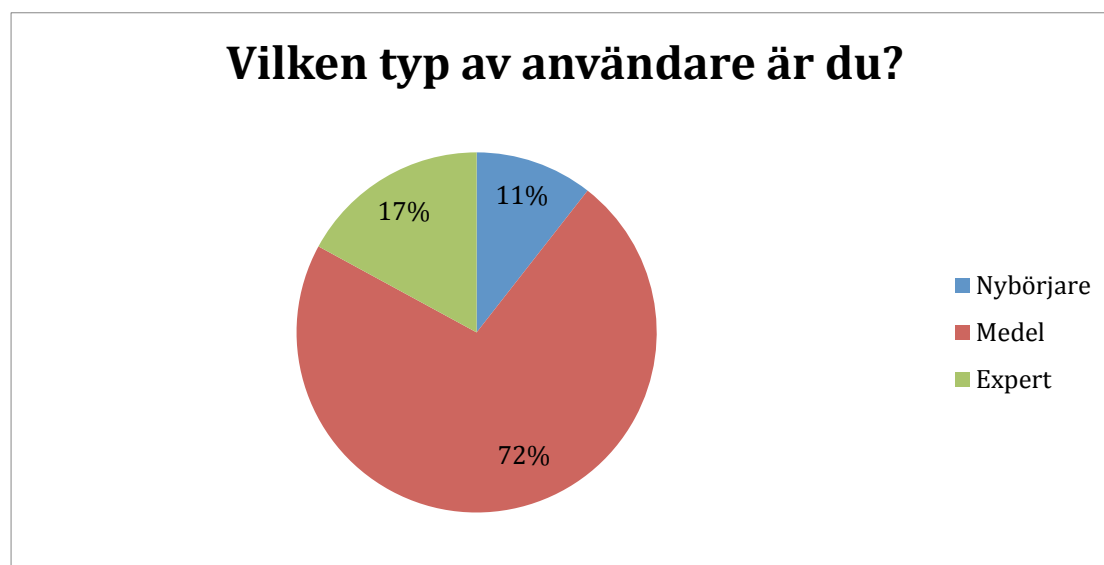


Figure 10. Use Data Question - Type of User

Several other use data questions were included in the survey (use frequency, type of system, type of conferences, etc.), to be used for market segmentation purposes. Complete results of the use data questions are declared in APPENDIX J – USE DATA.

4.3. Market Segmentation

In addition to the opportunity scores the use data for each survey participant were used as input to the market segmentation. The market segmentation consisted of two separate steps; factor analysis and cluster analysis. This section follows the procedure of section 3.3. Segment the Market.

4.3.1. Factor Analysis

The factor analysis showed that 20 factors would be appropriate to gather like outcomes in. However, in only 10 out of the 20 factors could the outcomes in each factor be explained why they belonged there and was therefore chosen to be the basis for the

market segmentation. These 10 factors were then named in order to have a common understanding of how they are related. Figure 11 shows a list of the 10 factors.

Factor 1 – Presentation & Collaboration
Factor 2 – Establishing video connection
Factor 3 – Interaction with other meeting participants
Factor 4 – Settings
Factor 5 – Ergonomics
Factor 6 – Smooth conversation
Factor 7 – Meeting flexibility and availability
Factor 8 – Sound
Factor 9 – Meeting minutes
Factor 10 – Meeting participation

Figure 11. Factors

APPENDIX G – FACTORS declares the factors fully, with each factor’s subsidiary outcomes. The red marking indicates that the specific outcome showed large variation in market response as well as it was considered to be representative for the factor. The red-marked outcomes were thus chosen to represent the factor for the cluster analysis.

4.3.2. Cluster Analysis

The nonhierarchical cluster analysis is based on the 10 outcomes that represent the different factors. Six clusters were chosen to represent the market, and the different segments' opportunity scores of the 10 outcomes can be found in APPENDIX H – OPPORTUNITY SCORES FOR CLUSTERS. Outcome 10 and 27 showed only a small variation among the different clusters and were therefore removed from further analysis. The different clusters with their corresponding opportunity ratings for each of the 8 outcomes are presented in two spider charts in Figure 12 and Figure 13. In the spider charts it can be seen that each cluster has a set of underserved outcomes that the individuals representing the cluster rated as important and unsatisfied. These outstanding outcomes, together with some respondent characteristics that were shown to be representative for that specific cluster, can be found in APPENDIX I – CLUSTERS. In three out of the six different clusters conclusions about the relationship of the set of underserved outcomes and respondent characteristics could be drawn. These will be discussed and analyzed in section 5.2.2. Cluster Analysis.

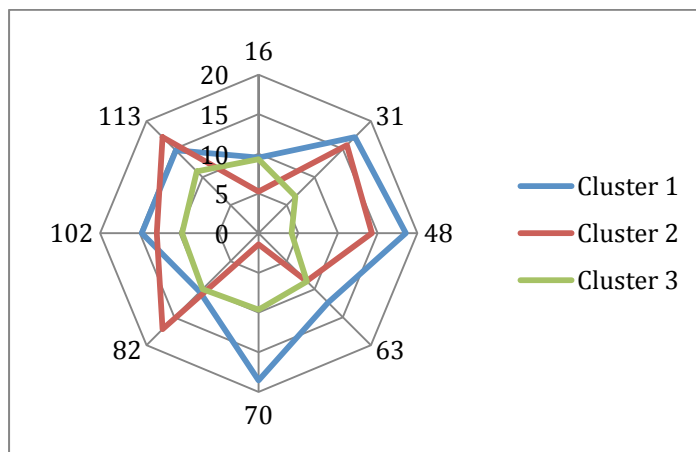


Figure 12. Spider Diagram 1. The numbers of each corner in the spider diagram represent the different outcomes used for the clustering. For each outcome and cluster the opportunity rating can be read on the radial axes.

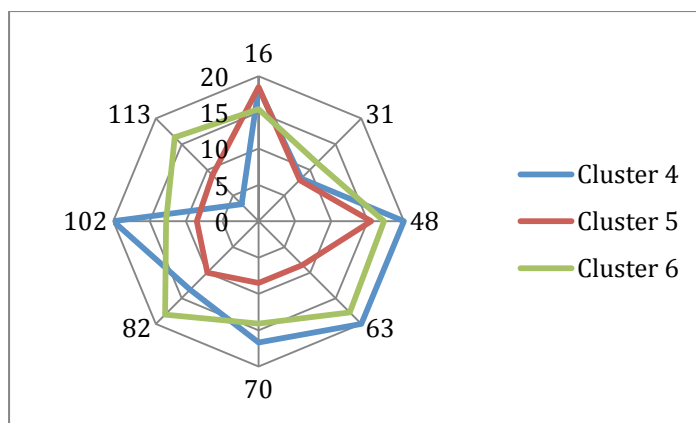


Figure 13. Spider Diagram 2. The numbers of each corner in the spider diagram represent the different outcomes used for the clustering. For each outcome and cluster the opportunity rating can be read on the radial axes.

5. ANALYSIS

The main focus of the analysis will be on the opportunities the survey revealed. It will be carried out in accordance with the method described in section 3.4. Define Targeting Strategy. However, the results from the market segmentation and the missing data analysis will also be analyzed in this chapter.

5.1. Opportunity Analysis

The opportunity scores with the most outstanding outcomes will in this section be analyzed in order to pinpoint the underlying reasons for their prominent. In this stage the opportunities will be approached with the theory described in section 3.4. Define Targeting Strategy, which recommends that outcomes that are related to each other can be grouped because of their specifics. Some of the outcomes are unrelated to others and should thus be treated as unrelated growth opportunities.

5.1.1. Underserved Themes

When the results of the survey were gathered 39 outcomes were found to represent outstanding opportunities (opportunity scores between 12 and 20). These are underserved outcomes that should be addressed thoroughly by the industry to increase the satisfaction rate of them. The majority of the underserved outcomes have been grouped into different themes, i.e. groups with common characteristics. In total seven different themes were created. However, these themes should not be confused with the categories described in section 4.1. Captured End-User Inputs as those were only used for increased readability of the survey.

Technology Issues

The outcomes in this theme concern issues with the compatibility between the video conferencing system and PCs, and general issues with the presentation feature. Since a video conferencing system is used by many different people in an organization, the system needs to be compatible with many different PCs, operating systems, and settings. These compatibility issues could be the reason for many presentation related problems end-users have. Many times these problems could be solved by changing settings on the PC, but that requires that the end-user is an experienced PC user.

Fixing Problems

These outcomes concern the knowledge of fixing problems that arise in the usage of video conferencing. The relation between these outcomes and the rest of the underserved outcomes is in this case interesting. Since these outcomes would not be underserved if any of the other problems had not arisen, satisfying other outcomes will therefore also satisfy these outcomes to some extent. Analogously, satisfying these outcomes will also satisfy other outcomes about problems related to the usage of video conferencing systems.

The theme addresses how to fix problems, the time it takes to fix them, and the knowledge needed to fix them. It should also be mentioned that one of the overall top three underserved outcomes belongs to this category; “minimize the time it takes to fix technical problems”. The theme also holds a specific outcome that regards the knowledge of how to carry out a video conference effectively. Inexperienced end-users seem to have issues with the behavior differences a video conference requires in comparison to a regular face to face meeting, e.g. the need of looking into the camera for eye contact and the inappropriateness of playing with pens or paper close to the

microphone. It is believed that these are things that you probably learn after have been using video conferencing for a while.

IT-Related

The outcomes in this theme regard the ambition of a problem free video conference, without audio and video noise, technological problems in the connection phase, etc. What makes these outcomes different, from all other outcomes, is that they originate from IT-related causes. As mentioned in section 1.1. Background, the development of IT infrastructure is what has given video conferencing a boost over the last couple of years, but evidentially many problems still exist that end-users find crucial.

The reason for that the problems related to IT infrastructure still exist could be that companies' IT solutions are very complex, including much equipment from several different providers. The complex IT infrastructure could cause temporary dips in the bandwidth capacity, which could be the reason for audio/video noise, time delay, and desynchronization. Problems related to connections being cut off and to establishing connection to external video conferencing systems could also be explained by complex IT infrastructures.

However, it is important to remember that each outcome regards a specific aspect that is not only dependent on the IT infrastructure. The conclusion is therefore that solving the IT infrastructural problems is not the only way to address the IT-related outcomes.

Smooth Communication

This is a theme formed by outcomes that all regard smooth and complication free communication. Complications that often occur during video conferences are that participants interrupt each other, especially participants that are not familiar with the system and with each other. The reason for this could be that it is difficult to sense the indications that someone is about to start talking. The audio/video delay, discussed in the IT-related theme, is another reason for the occurrence of participants interrupting each other.

Participants of video conferences want to be able to discuss and interact as smoothly as possible without any complications. It is therefore desirable that the communication in a video conference can be held in the same way as in a regular face to face meeting.

Visibility

Video conferencing participants want to see more things and they want to see things better. They desire a realistic feeling in video conferences and therefore want the visual information to be of the same quality as in reality.

Some of the outcomes related to this theme deal with being able to see the person who is talking, body language, participants' reactions and so forth. One of the most prominent reasons for these issues is that the camera does not capture everything in a conference room because of its angle limits, see Figure 14. This can result in that individuals, or other important objects, are not captured by the camera and therefore not seen by the participants in the remote conference room.

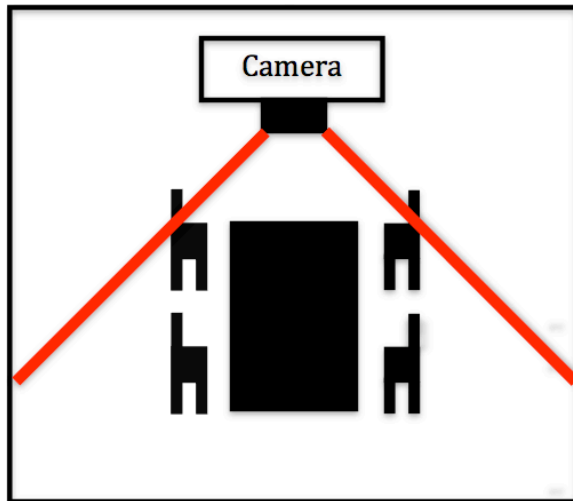


Figure 14. Camera Angles

Many cameras can be maneuvered by panning and zooming to a desirably position. This flexibility implies some obvious advantages for the end-users as they can control the outgoing video stream. However, it could also cause problems since the camera could be poorly adjusted. The reasons for a poorly adjusted camera position could be that the end-user does not know how to adjust it for the best possible position or simply because it is difficult to maneuver it. Another reason for poorly adjusted camera positions could be that the end-user does not want to be “blown up” on the video screen, and therefore zooms out too much. In addition, the problems related to a poorly adjusted camera appear in the remote conference room whereas the adjustments must be made in the local conference room.

There are also some causes that do not relate to settings or adjustments. If the video screen is too small it could be difficult to see all participants, their reactions, and interaction with each other.

Another reason why the outcomes in this theme are underserved can be because of poor video quality, as many of the outcomes concern visual details. The quality of visual details depends on bandwidth capacity, screen resolution, lighting, camera quality, etc.

The last two reasons found are related to the installation and layout of the equipment. The lighting could for instance be incorrectly installed, or the video screen mounted at an inappropriate height. It is also possible that the layout of the room results in that someone is not visible for other participants or too far away from the screen and camera because of the placing of the table.

Usability

Using technology is many times not as easy as it should be. The usability outcomes concern two different areas, namely the complexity of the interface and the complexity of the menu system.

When using a menu system it is crucial that the menus are intuitive. In the ideal menu system no time should be needed for interpreting the available options. The menu system should be so obvious that one should immediately find the option that represents the intended action. Rating complexity in menu systems is however very subjective and while someone might believe that the menus are very easy to navigate someone else

might experience the very opposite. End-users may think that the menus have too many levels or that there are too many options at each level.

There is a wide range of different interfaces for operating the video conferencing system. The most common ones are touch screens, remote controls, computer mice, and keyboards. The fact that there is no standardized interface for video conferencing systems could be one of the reasons why usability related outcomes were found to be underserved. However, this hypothesis presumes that the end-users use different types of interfaces.

The most common interface is the handheld remote control (see Figure 15 for an example). Although the remote control is widely used in different electronic consumer products each has its own set of buttons and functions that must be learned. If the conference has been booked in advance, the end-user does in general not have to use the remote control during the conference. Many systems establish the connection automatically and no action has to be taken to start the conference. However, if the conference has not been booked in advance or if something unexpected happens, interaction with the remote control is needed.



Figure 15. Tandberg TRC-3 Remote Control (Cisco Systems Norway)

The reason why end-users think that the remote control is complex could be that the end-users hardly ever use it. And once they actually need to use it, they do not know how it works. In this sense, a semiautomatic video conferencing system could be counterproductive regarding usability.

The difference of the interface units is also apparent when using video conferencing systems. In contrast to the remote control, the mouse, and the keyboard, the touch screen is not only used to provide input to the system; it is also used to receive output, since the touch screen is both showing the menus and continuously giving the end-user feedback on changes made. In the other types of interfaces system input is done using the control unit, but system output (feedback on changes) is given on the video screen. A touch screen is therefore considered to be better in terms of usability.

Booking

As mentioned in the Usability theme, many end-users of video conferencing systems book their conferences in advance. Each company has its own booking system and the procedure could include booking resources such as a conference room, connection points, a video conferencing system and the participants.

The many procedures that must be carried out in order to book a conference could be the reason for why the outcome “minimize the time it takes to make a booking of a video

conference” is underserved. Another outcome in the Booking theme regards the possibility of extending a booking if the conference is running over time. There is already a feature addressing this outcome in some present video conferencing systems. An automated message pops up on the video screen when five minutes remain in the booking. The conference participants are at this point also given the option to extend the booking. Because the associated outcome is underserved, this seems to be a desired feature.

The last outcome in this category regards the availability of video conferencing rooms. This outcome has highest opportunity score (16.7) of all the outcomes and must not be ignored. The most probable reason why this outcome is underserved is that there are too few video conferencing rooms at companies which makes it difficult to find an available room whenever needed.

All the seven themes with their associated outcomes are fully declared in APPENDIX C – UNDERSERVED OUTCOMES.

5.1.2. Unrelated Underserved Outcomes

There are also some unrelated outcomes that are underserved but does not belong to a theme.

Outcome 105

An outcome with a very high opportunity score regards noise due to clicking with pens and playing with paper. The microphones used for video conferencing systems are very sensitive, especially for vibrations and sounds originating close to it. The microphone amplifies these sounds which could have a negative impact on the conversation.

Outcome 43

Because most video conferencing systems are not portable situations exist where a conference participant cannot attend the conference on regular conditions. That can be one of the reasons why an outcome that addresses the possibilities of participating in a video conference using a telephone is underserved. The reason why this outcome was rated unsatisfied is however not as obvious. However, it might be linked to the outcomes dealing with connection cutoffs, discussed in the IT-Related theme. It could also have the simple explanation that the function of connecting to a telephone is not available in the specific video conferencing system.

Outcome 47

There are many different types of conferences. One of these types was specifically addressed in the survey, namely creative meetings (brainstorming sessions, teambuilding, workshops, etc.). The reason why this outcome is underserved is probably the fact that many of the activities in a creative meeting require a high level of collaboration and interaction among the participants. However, in the video conferencing systems available today, there are very few creative tools that support collaboration over the boundaries of participants’ locations.

Outcome 102

Another outcome that was found to be underserved has to do with acoustics. Bad acoustic can heritage from the installation of the system, amount of furniture or its layout, the shape/size of the conference room, and low-quality audio equipment.

Outcome 1

Many participants also rated the feeling of being in the same room as underserved. Just as mentioned in many of the underserved themes the participants have a desire of having video conferences that are perceived as regular face to face meetings.

Outcome 24

The next outcome that was found to be underserved concern the importance of staying focused throughout a conference. There is always a risk that the participants become tired when the conference is long and unconstructive. The fact that participants lose their focus on the conference content can have many different reasons. One hypothesis is that because video conferences mainly have its strengths in distributing information, status conferences and conferences following a strict agenda are the typical types of conferences carried out via video. These types of conferences can because of its content be seen as non-stimulant which could be the reason why participants lose focus. However, it should be mentioned that it is not evident that participants of regular face to face meetings are more focused on the conference content than video conferencing participants. This issue could therefore just as well originate from conferences in general.

See APPENDIX C – UNDERSERVED OUTCOMES for a complete list of the unrelated underserved outcomes.

5.1.2. Overserved Outcomes

There are also some overserved outcomes (satisfaction rating greater than importance rating) that should be mentioned. Many of these outcomes address things that do not consider the technology, but rather preparation for conferences and specifics of the conference room. The total time that must be spent on a conference and the time it takes to get to the conference room are both in this category. Outcomes concerning the amount of possessions that have to be brought to the conference and the available space on the conference table were also found to be overserved. The last two overserved outcomes regard visible cabling and the time participants see themselves on the video screen. As mentioned, these outcomes do not address the technology or the video conferencing system in specific, but rather the surroundings of the conference. The fact that neither of the core video conferencing outcomes is overserved is a confirmation of that the industry is still in its early stages. However, with time and development the industry will slowly close the gap and the number of overserved outcomes will increase.

See APPENDIX D – OVERSERVED OUTCOMES for a complete list of the overserved outcomes.

5.1.3. Important Outcomes

The outcomes that are important and also well satisfied should not be ignored when proceeding to the development stage of video conferencing products. It is, for instance, crucial to take the important and satisfied outcomes into considerations in tradeoff situations. If not considered, the risk of reducing the satisfaction ratings of these outcomes will increase. This is however the only aspect to consider with important and satisfied outcomes and will because of that not be followed up in the recommendation to the industry.

Three outcomes in this category concern the beginning of the conference; the time it takes to establish a connection to a video conference, the time it takes to power up the system, and finally the time it takes to change settings on the system. The fact that these

outcomes are satisfied shows that it is quite easy to carry out the preparatory steps before a conference can take place. This hypothesis can be challenged though, because many of the underserved outcomes are also related to the preparatory steps of a conference.

Two other outcomes in the category aim at ancillary jobs of video conferencing. The possibility of sharing documents and the possibility of finding information on the Internet during a conference were both found to be important. The former is represented by a well developed function that has been a part of video conferencing products for a long time whereas the latter one's high satisfaction rating is probably independent of the video conferencing system. The hypothesis is that conference participants often bring their PCs to the conference, which enables them to find information on the Internet.

The rest of the important outcomes that are well satisfied are unrelated outcomes. One of them regards disturbing sounds from outside the room. The conclusion that can be drawn is that the conference room is sufficiently soundproof, or possibly that there is usually no activity outside the conference room during a conference.

Another unrelated important outcome has to do with conference preparation, which is also independent of the actual video conferencing system. The conclusion is that conference participants are generally well prepared for the conference, and no further support functions are needed at this stage.

The last outcome has to do with equipment tidiness, i.e. that microphones, control units, furniture, etc. are on their intended place. In flexible conference rooms there is a risk that the set up is being changed often and therefore has to be rearranged before each conference. But evidently this is a well satisfied outcome that should just be kept in mind when taking actions on the underserved outcomes.

See APPENDIX E – IMPORTANT OUTCOMES for a complete list of the important outcomes.

5.2. Market Segmentation Analysis

The results from the factor analysis and cluster analysis will in this section be analyzed. As mentioned in section 6.3. Survey Reliability survey respondents were not considered to be a representative sample of the market because they were not randomized selected. In addition, the use data gathered were not sufficient to make clear distinctions between the market segments. The market segmentation was because of this considered to be invalid and therefore excluded in section 8.1. Recommendation.

5.2.1. Factor Analysis

The first part of the market segmentation analysis consisted of a factor analysis in order to find a set of factors that represents the 99 outcomes. The initial execution of the factor analysis showed that 27 factors had eigenvalues greater than one. As 27 factors were found to be too many to handle in the second step of the factor analysis a reduction was necessary. It is suggested by DeCoster (1998) that the horizontal breakpoint in the scree plot should decide how many factors to include, however there was no clear indication of a break point in the scree plot. Three different cases with a 10, 15, and 20 factors solution were thus chosen. The results showed that the most appropriate solutions included 20 factors with a minimum coefficient value of 0.4. The minimum coefficient value was chosen so that the vast majority of the outcomes belonged to a factor as well as that not too many outcomes were represented in more than one factor.

As mentioned in section 4.3.1. Factor Analysis only 10 out of the 20 factors were chosen for further analysis because those were the only ones that could definitely be said to have any relevant affinity. The first factor's outcomes all had to do with PC presentations and collaboration among the participants and were therefore chosen to be included in the further analysis. The factor was named "Presentation & Collaboration". On the other hand, factor 11's outcomes were "Increase the likelihood of establishing a video connection to a system outside the company's organization", "Increase the availability of information about the conference room in the booking system (e.g. capacity, available equipment, location, descriptive picture)", and "Increase the possibility to find information during a conference (from a PC, the Internet, etc.)". No clear conclusion could be drawn why these outcomes had been grouped and the factor was therefore removed from further analysis.

32 out of the 99 outcomes were excluded from the factor analysis when the number of factors was reduced to 10. Since only 67 factors were included with a coefficient value greater than 0.4 in the 10 factors, several aspects of the outcomes were lost.

5.2.2. Cluster Analysis

A three-segment solution was initially chosen to reflect the market. However, it was difficult to differentiate the segments as they did not have any prominent outcomes. The reason for this was assumed to be because there were too few segments for the large number of factors analyzed. A six-segment solution was instead examined that showed to have more differentiation in comparison to the three-segment solution. The use data (system brand, system type, frequency of use, conference type, etc.) were to some extent significant in three of the clusters. These clusters are described below.

Cluster 1

Cluster 1 rated outcomes regarding eye contact and ergonomics as important but not satisfied while their characteristics showed that there are no expert users, 20% of the members work in public authorities, 25% of the members do not know what brand their system is, and 65% of the members use the system 1-2 times per week. The conclusions drawn from the most outstanding outcomes and characterizing attributes is that the cluster consists of individuals that care about human interaction and that are not so keen on adopting new technology.

Cluster 2

Cluster 2 found that their knowledge about the system is important and unsatisfied as well as the time it takes to connect a PC to the system. The most outstanding characteristics for the cluster showed to be that 57% of the respondents use the system less than once a week and that 25% of them are beginners. The conclusion made is that the cluster is represented by individuals who do not use the system very often, who have not used it for a longer time period, and who find that the education and instructions for using the system are insufficient.

Cluster 6

Cluster 6 thought that the time it takes to create meeting minutes and to connect a PC to the system are important and unsatisfied outcomes. The most outstanding characteristics for the cluster were that 67% of the individuals attend video conferences less than once per week. The assumption made from looking at cluster 6 is that the members are likely to be assistants or secretaries.

5.3. Missing Data Analysis

Section 3.5. Missing Data Analysis describes two steps in order to decide how to analyze the missing data in the survey. These steps were followed and the conclusions were that outcomes that had a higher rate of missing data than 30% were removed from the study. In addition, some outcomes with missing data rate under 30% were also removed because of non-ignorable missing data. By removing such data it was found that the generalizability of the survey increased. All questions that were analyzed due to missing data can be found together with their associated missing data value in APPENDIX F – MISSING DATA. The questions that were removed from the study are marked in red.

6. METHOD VALIDATION

The Outcome-Driven Innovation method defined, not only the project in general, but also much details of different aspects throughout the study. The impact and complications it implied will be discussed and analyzed in this chapter.

The experienced benefits of using such a dominant method, as Outcome-Driven Innovation is, were that the project got a clear foundation to be built on and a complete procedure to follow. However, the chosen method also locked in the project to some proceedings that were not how the research group would have proceeded on their own. An example of this is the precise format the outcomes should be captured in (see Figure 7) that was believed to be time-consuming and could be misinterpreted.

The general impressions about the method is that it is structured well and that it fulfills its purpose - to uncover customer outcomes and give explicit recommendations on how to utilize the knowledge gained during the upstream activities. With some small modifications in some areas were problems arose, the method would have been perfectly suited for the purpose of this project.

6.1. Capturing Customer Input

Surprisingly, most of the companies contacted have video conferencing equipment and use it on a regular basis. It was however not an easy task to get in contact with end-users since there are many layers in a company that have to be passed in order to get hold of end-users. In addition, because many of the end-users of video conferences hold high positions it was not always easy for them to set aside an hour for an interview.

As this indicates, it could be very difficult to get hold of the correct interviewee since many officials are hidden behind organizational functions. In this study the end-users were mostly hidden behind an IT-department as it usually has the responsibility of the video conferencing systems. However, once contact with the actual end-users had been established they tended to be very interested in the study and were enthusiastic about the interview.

During the capturing of jobs, outcomes and constraints it became evident that these types of customer inputs are hard to distinguish. Instead of following the planned method all types of customer input were phrased in same format as the method suggests for outcomes. The reason for this was not just because the different types of customer input were difficult to distinguish, but also because it made the creation of the survey more convenient.

Another issue with the collection of outcomes is that it could be difficult to really understand what the interviewee means when mentioning something. Interpreting an opinion or a statement in an incorrect way would be hazardous for the results, because the outcomes must not be biased. It is therefore important to keep personal views and opinions away from the outcomes, something that was found to be a tough challenge. However, aided by the method's procedure of capturing outcomes, the challenges could be overcome and the outcomes were captured unbiased.

6.2. Identifying Opportunities

Over the 25 interviews 180 outcomes were captured. The reason why so many outcomes were captured is that a room-based video conferencing system has many separated units, e.g. video screens, interfaces, cameras, booking systems and room interior which makes the scope very wide. It was found to be necessary to reduce the number of outcomes so

that the survey would not take too long time to complete. A tradeoff situation arose as reducing the survey too much would mean fewer dimensions investigated, while keeping too many outcomes would imply a lower response rate. This issue was considered to be a misfit between the method and the project, as the method has difficulties in handling such a complex product with as many different aspects as a video conferencing system has. In addition, like outcomes were merged into one that made them more generalized and less detailed. The consequence of this was that the tracing of the origin of the outcomes became more difficult in the analysis.

Further on, the two dimensions the survey respondents were asked to rate each outcome along were found to be possible to interpret in different ways. The reason for this is believed to lie in the format of the outcome. As each outcome has a direction (minimize or increase) it is difficult to rate the importance without taking the current solution into consideration. If, for instance, the outcome “minimize the likelihood of that the conference is being cut off” were to be rated, it is easy to rate the importance based on how high the likelihood is today. However, according to the method, the importance rating should be independent on the currently used video conferencing system. The magnitude of this issue is not known, but it could definitely have a significant impact on the results of the survey.

6.3. Survey Reliability

It is believed that the individuals who completed the survey had a very positive attitude towards video conferencing. This conclusion is made from the fact that the companies contacted that had bad experiences from video conferencing refused to devote time to be interviewed or to fill in the survey. In addition, during interviews and from survey comments the attitude towards video conferencing in general was very positive. The fact that individuals’ attitude towards video conferencing very much depends on how well their company has invested in the systems and in training, the attitude is generally homogenous throughout a company. Because of this, companies that had implemented video conferencing successfully are probably overrepresented in the survey. Because of this, it is likely that the sample of survey respondents is not representative for the general market and the conclusions made therefore have a significant uncertainty.

Although it is believed that 120 survey respondents were satisfactory for this study, Outcome-Driven Innovation suggests that the number of respondents should be 180-600. Despite the large amount of time that was spent on searching for end-users to fill in the survey, the suggested minimum limit was not reached. Even if it would have been reached, with let us say 250 respondents, the results would not have been statistically significant. This is one of the general problems with the method, as it demands a thorough effort in the search for survey participants.

7. DISCUSSION

Throughout the project the research group has gained some own experience in the use of video conferencing by interviewing end-users and communicating with other stakeholders via video. In addition, the research group was prone on listening to the end-users to try to understand their perspectives of the subject. This experience was however the only basis the research group had for analyzing the underlying reasons for the underserved outcomes and their interrelationship. No technical knowledge of video conferencing has been the basis for the analysis and recommendation. Thus, it is important for the industry to, not only look at the analysis and recommendation, but also do their own interpretation and analysis of the outcomes so that correct conclusions can be made. It is also recommended that the outcomes are analyzed by a group of experts from different departments of the manufacturing firm (e.g. R&D, marketing and production) to increase the likelihood of understanding the circumstances of the underserved outcomes.

Further on, this project focused only on the end-user's experience of video conferencing. There are more types of customers (see Figure 1) that must be taken into consideration when developing a video conferencing system. During the course of the project, the research group has realized that the IT-department and the purchase department at companies have a large impact on video conferencing and must also be addressed by the industry. It is therefore recommended that similar studies to this carried out where the focus is on IT-departments and purchase departments.

Many of the aspects in the recommendation depend on the relationship between the main actors of the industry, namely the manufacturers and the selling agents. The sales channels of the industry are very complex and it is therefore difficult to find from which actor the cause of an unsatisfied outcome originates. The manufacturers have, for instance, difficulties in assuring that their products are used the way they are intended to. In the same way, the selling agents have difficulties in delivering the correct designed video conferencing systems without making necessary adjustments to the system that might decrease the overall quality of the product. This aspect will, as long as the sales channel situation is unchanged, be one of the most prominent challenges for the industry to focus on. The proposed solution is to create a close partnership between the two main actors. In addition to this partnership, the industry is also recommended to create close partnerships with telecom and IT infrastructure providers to secure that the internal and external IT infrastructures are compatible with video conferencing.

During the initial stages of the project the research group was concerned about finding an adequate number of participants for the survey, because of the time it would take to complete it. It was therefore surprising that 120 end-users completed the survey, representing 60% of the total number of officials that the survey was distributed to. The high respondent rate was believed to be because of a thoroughly preparatory work, where a large part of the individuals were personally contacted by either email or telephone with the purpose of introducing the study. There were however still a significant number of participants not completing the survey and a handful of comments regarding the extent of it. Another aspect regarding the extent of the survey is that participants could become unmotivated and dishonest. But the fact is that no patterns or trends in answers were found during the brief examination that was carried out.

As mentioned in the introduction to chapter 3. METHOD, the end-user interviews were not capable of capturing outcomes that belong to the Kano Model's basic needs and

excitement needs categories. The reason for this is that these types of needs are unspoken, i.e. the end-user is not aware of them. The opportunity analysis did however reveal some of the basic needs as many of them are related to the captured outcomes. Excitement needs have, on the other hand, not been addressed in this project as the method does not reveal them. As discussed earlier, this is not considered to be a problem because the Kano Model advocates that excitement needs are worth addressing first after the performance needs have been sufficiently satisfied. And as the underserved outcomes are considered to be performance needs these should be the initial focus. However, as the video conferencing industry develops, the number of underserved outcomes will be reduced and the importance of satisfying excitement needs will increase.

As this project confirms, with 39 underserved outcomes, the video conferencing industry is still in early stages. The research group believes though that it is just a matter of time before the video conferencing industry gets its final breakthrough. What is keeping it waiting is not the technology, but the current systems' inability to create a realistic meeting environment, inadequate IT-infrastructure, bad reputation from the introduction failure in the 1980s, and companies' unawareness of the great advantages video conferencing comes with.

8. CONCLUSION

This chapter will propose actions that the video conferencing industry should take in order to satisfy the most important and least satisfied outcomes that were found in this study. In addition, section 8.2. Answers to Research Questions will answer the research questions that were stated in the project initiation.

8.1. Recommendation

In section 5.1. Opportunity Analysis all outcomes with an opportunity score greater than 12 were analyzed in order to exactly pinpoint what caused the high opportunity score and how end-users think about the addressed area. The following recommendation will sum up the opportunity analysis and describe how the industry should deal with the different market opportunities.

8.1.2. Underserved Themes

The seven underserved themes that were introduced in section 5.1.1. Underserved Themes will here be addressed.

Technology Issues

Three of the outcomes that belong to the theme Technology Issues have to do with connecting a PC to the system and getting it ready to start a presentation as fast as possible and without complications. To address these outcomes it is suggested that the manufacturers make the systems more robust, e.g. the PC should work as a plug and play device with no setting changes needed to start a presentation. To make the system robust it is suggested that the manufacturers should initiate collaboration with operating system developers and PC manufacturers to make the system more compatible with PCs. The last action the manufacturers should take is to check the system's robustness by testing different PCs with different operating systems to make sure that there are no scaling problems or other complications.

As a long-term solution it is also recommended that the manufacturers look over the possibility to make the PC connection wireless, or to have a desktop PC available in the conference room with intranet and Internet connections so that all conference related information could be easily accessed.

For the selling agents it is important to secure compatibility between the video conference system and the purchaser's PCs. It is also the selling agent's responsibility to make sure that all necessary cabling and connection ports are available and easily accessed.

Fixing Problems

It is suggested that feedback is given continuously on what is happening in the system. By giving the end-user clear indications on what settings have been made and what options are available in the current mode it is more likely that the end-user will gain knowledge about how to use the system. It is also very important for problem solving that feedback is given to the end-user, e.g. feedback on what type of problem has occurred, a guide of how to fix it, and how to get hold of support.

The manufacturers should strive for a product that does not need any training for regular use. However, it is believed that many people are afraid of new technology and therefore some sort of training in how to use the system is necessary, and should be implemented as a short-term solution. All end-users should be invited - not just the system administrators. It is suggested that this training is given by the selling agents for smaller

deals, while the manufacturers must take on more responsibility when dealing with larger sales volumes.

It is also suggested to appoint a system administrator that will get extensive training, so that there is at least one person at the company that knows the system in-depth. The system administrator role should be appointed to a person who is easily available, i.e. not the IT manager who is often busy with other work tasks.

Further on, it could be interesting to look over the possibilities of integrating a training guide and manual into the video conferencing system that could be useful for officials starting to use video conferences after the official training has been held.

The last thing that is recommended for a better training is that the video conferencing concept is introduced in a good way. By giving the end-users comprehensive training about limits and possibilities of video conferencing, and recommendations on how to carry out a video conference in the most effective way will benefit all parts. It is suggested that the training material is developed and provided by the manufacturer, but that the selling agent is responsible for giving the training to its customers. To assure that sufficient training is given, there must be a clear agreement between the manufacturer and selling agent on what each part is responsible for.

It is also important for the selling agent to show their customers that the training was found to be a critically important part of video conferences so that the purchaser understands the need of a comprehensive training.

IT-Related

To make the end-users satisfied regarding the IT-related outcomes the underlying reasons must be found. What can be concluded from the analysis is however that the manufacturers have to focus effort on:

- Collaboration with IT-infrastructure providers and telecom companies
- Assuring sufficient bandwidth
- Studying time delay and audio/video synchronization problems

The main aspect of his theme is for the manufacturers to work together with the IT-infrastructure providers and telecom companies, for better integration and compatibility with local and global networks. There are many important factors that have to be studied in order to assure integration and compatibility; bandwidth, distance between conference locations, security issues, hubs, servers, etc.

The manufacturers should also study the time delay and audio/video synchronization problems to see how these things have affected the low satisfaction ratings of the related outcomes.

Once the underlying reasons for the low satisfaction ratings are uncovered, the manufacturers must create specifications on how the problems should be solved by the selling agents. It is then the selling agent's responsibility to deliver what the specification says for a qualitative video conference experience.

Smooth Communication

As mentioned in the analysis, the outcomes that belong to the Smooth Communication theme originate from the same problems as in the IT-Related theme. Therefore, by

following the recommendations given in that theme the outcomes related to Smooth Communication will also be satisfied.

Visibility

To satisfy the outcomes related to the Visibility theme the manufacturers should consider the following areas.

- The camera and its position, pan and zoom
- The room layout
- The video screen size

To satisfy the visibility related outcomes the manufacturers should spend time on finding the ideal balance between the video screen size, the room layout, and the camera position and settings. While doing so, the telepresence products should be kept in mind as these address the visibility related outcomes very well. The most prominent reason for this is that the layout in a telepresence system is locked up, which makes the system's behavior more predictable. However, locking up the system will result in inflexibility. Thus, finding a balance between flexibility and lock up is a tradeoff matter.

There are also things that the selling agents must address to ensure satisfaction.

- The room layout
- Sufficient bandwidth

It is the selling agent's responsibility to assure that the conference room layout is according to the specification from the manufacturer. The layout includes the placement of furniture as well as electronic equipment. It is also important to mention that the selling agent is responsible for that a sufficient bandwidth is provided. Although the selling agent is responsible for assuring these two aspects, the manufacturer has a responsibility for giving the selling agents layout and bandwidth specifications for the specific systems.

Usability

There are three different aspects to consider for satisfying the opportunities found in the Usability theme. In contrast to many of the other themes this is a theme that only depends on the manufacturer of the systems. The manufacturers are responsible for both the menu system and the system interface. Three different aspects should be considered.

- Standardized and intuitive menu systems
- System feedback
- Touch screen interface

The menus should be designed in accordance with standards and research work that have been done in the subject of usability. Both the depth and the width of the menus must be considered. To reduce confusion and the time it takes to navigate the menu system it must also be intuitive.

As mentioned in the Fixing Problems theme, it is very important that feedback is continuously given to the end-user about what is happening in the system and what options are available in the current state.

However, the most extensive and prioritized action that should be taken is to introduce a touch screen as system interface. In contrast to other interfaces, a touch screen works as

both the input and the output unit. The benefit of this is that the end-user will receive instant feedback without having to shift focus.

Booking

The far most underserved outcome found during the project concerns the availability of a video conferencing room whenever needed. As discussed in the analysis the most likely reason for this is that there are too few video conference rooms available. It is therefore important that the purchasers in companies receive this information. If they would be informed that the most significant area of disappointment among end-users is the availability of a video conferencing room it is likely that more video conference systems would be purchased.

However, a short-term solution to the problem is to introduce a conference prioritization in the booking system. Further studies must be made to make such prioritization realizable, but it would make the booking system more flexible with an increased probability of finding a time slot for an important conference.

In order to address the related outcome, the reason why end-users believe it takes too long time to make the booking must be found. This should be done by localizing where in the booking process the most time demanding tasks take place. A booking process with few iterations is desirable as that would decrease the overall time. It is also recommended that as few extra steps in the booking process are added to the booking process of a regular face to face meeting, as that will make the booking procedure intuitive for the end-user. The ideal solution would however be to reduce the need of bookings.

Another action that must be taken is to find out why end-users believe extension of a conference does not work satisfactory as it is today. Is it because the video connection is automatically closed when the scheduled conference time ends or is it because the conference room must be left for another conference?

It is also recommended to include information regarding the video conferencing rooms available in the booking system. Information such as number of seats, available equipment, location and room layout should be available for the end-user. By including such information in the booking system it is more likely that a room suitable for the conference's purpose and number of participants is found.

8.1.3. Unrelated Underserved Outcomes

As mentioned in section 3.4. Define Targeting Strategy, only the unrelated underserved outcomes with significantly high opportunity scores will be considered. Because of this, only three outcomes will be addressed in this section.

Outcome 105

In order to develop a microphone that is robust to external noise it is important that the manufacturers work in collaboration with the selling agents, as those are the ones that install the systems. For a noise free sound recording there are some different microphone aspects that must be considered:

- Type
- Positioning
- Fastening and suspension

For the positioning, fastening and suspension aspects the selling agents should be involved in the layout design, as they are the ones that install the microphones in the conference rooms.

Outcome 43

This outcome has some correlations to the IT-Related theme since it does not only depend on the video conferencing system, but also on telecom companies and IT-providers. The manufacturers must find the underlying reason for the outcome's low satisfaction rating and base the actions on that. The focus should be put on the compatibility between the video conferencing system and telephony systems.

Outcome 47

To be able to have creative meetings, interaction and collaboration are essential. It is therefore important to create tools for end-users that support them in creative meetings. Since the technology is not there yet a long-term focus in the development of such tools is the rational choice.

8.2. Answers to Research Questions

This section will briefly answer the research questions stated in the beginning of the report in section 1.2. Purpose and Objective.

RQ1 - What are the perspectives of video conferencing from an end-user?

To get the end-users' perspectives of video conferencing 25 interviews were held. The interviews resulted in 107 outcomes concerning the entire end-user experience of video conferencing.

RQ2 - What are the most important and least satisfied end-user outcomes for the video conferencing industry to focus on?

This question is of highest importance to be able to handle the outcomes that were captured during the end-user interviews. A survey with 120 respondents was directing the importance and satisfaction of each outcome and therefore answered this question well. The results showed that 37 outcomes were found to be underserved (i.e. important and unsatisfied). However, some reliability issues arose regarding the respondent sample and survey design and extent.

RQ3 - How should the video conferencing industry satisfy the end-users with respect to the most important and least satisfied outcomes?

There are some important areas for the video conferencing industry to focus on in order to satisfy the most important and least satisfied outcomes found in this study.

- Create an IT-infrastructure solution that fits video conferencing
- Continue the quest of a realistic conference
- Improve the messaging to the purchasers by stressing that the far most important thing for end-users is the availability of a video conferencing room
- Include a more comprehensive training
- Focus on reducing problems
- Improve usability and system feedback

In addition to the above mentioned proposals, it is crucial that effort is spent on tracing the underlying reasons for each underserved outcome and take actions based upon that.

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APPENDIX A – OUTCOMES CAPTURED FROM INTERVIEWS

Realistic Communication
1. Öka känslan av att samtliga mötesdeltagare sitter i samma rum
2. Minimera tiden det tar innan man känner sig bekväm med videomöten som kommunikationsverktyg
3. Öka möjligheten att kunna se samtliga mötesdeltagare
4. Öka sannolikheten att kroppsspråket är synligt för samtliga mötesdeltagare
5. Öka möjligheten att tydligt kunna se den som pratar
6. Öka möjligheten att se andra mötesdeltagares reaktioner
7. Öka möjligheten att kunna bestämma vad du ska se i det andra videomötesrummet
8. Öka sannolikheten att du kan se samspel och interaktion mellan mötesdeltagare
9. Öka sannolikheten att alla mötesdeltagare får lika mycket uppmärksamhet, oavsett var de befinner sig
10. Öka känslan att du har ögonkontakt med mötesdeltagarna på video
12. Öka möjligheten att adressera mötesdeltagare på video genom kroppsspråk
13. Öka möjligheten att kunna se vad andra mötesdeltagare tittar på
14. Öka möjligheten att kunna "flika in" när någon annan pratar
15. Öka möjligheten till en "flytande" konversation när man har videomöte
16. Minimera antalet gånger man pratar i mun på varandra
17. Öka möjligheten att kunna ha sociala diskussioner via video ("small talk")
18. Minimera det man går miste om under kaffeпаuser när man inte befinner på samma plats som de andra mötesdeltagarna
19. Öka möjligheten att påkalla uppmärksamhet om man vill säga något
20. Öka möjligheten att kunna ha "sidodiskussioner", med vilka av de andra mötesdeltagarna som helst, under mötets gång
21. Minimera sannolikheten att "sidodiskussioner" stör mötet
23. Minimera negativ inverkan på mötet då någon mötesdeltagare behöver utföra icke mötesrelaterade uppgifter
24. Minimera sannolikheten att mötesdeltagare tappar fokus på mötesinnehållet
25. Öka möjligheten att sköta känsliga frågor/konflikter via videomöten
26. Minimera den onaturliga stämningen som kan uppkomma i början av ett videomöte
27. Öka delaktigheten hos försynta mötesdeltagare
28. Minimera känslan av utanförskap när ni är färre i rummet jämfört med de andra videomötesrummen
29. Minimera sannolikheten att en person som inte ska höra mötesinnehållet ändå hör det
30. Öka sannolikheten att rums klimatet är behagligt
31. Minimera oergonomiska sittställningar och rörelser under videomötet
32. Minimera känslan av att du hela tiden behöver stirra in i videomöteskärmen
34. Öka möjligheten av att kunna höra varifrån ljud i det andra videomötesrummet kommer (t.ex. vem som pratar)
35. Minimera tiden du ser dig själv på videaskärmen
36. Minimera sannolikheten att man känner sig instängd i videomötesrummet

Prerequisites & Constraints

37. Öka sannolikheten att det finns ett ledigt videomötesrum när du behöver det
38. Öka antalet mötesdeltagare som videomötesrummet är lämpat för
39. Öka möjligheten att kunna anpassa videomötesrummet efter antalet deltagare
40. Öka kompatibiliteten mellan olika videomötessystem
41. Öka kompatibilitet mellan datorer och videomötessystemet
42. Öka möjligheten att kunna ansluta till videomötessystem utanför företagets organisation
43. Öka möjligheten att kunna delta i ett videomöte med telefon
45. Öka möjligheten att kunna genomföra oplanerade videomöten utan agenda
46. Öka möjligheten att kunna starta upp projekt via video
47. Öka möjligheten att kunna genomföra kreativa videomöten (workshops, teambuilding, brainstorming etc.)

Preparation

48. Minimera tiden det tar att boka ett videomöte
49. Minimera tiden det tar att ta sig till videomötesrummet
50. Minimera den totala tiden du behöver avsätta för ett videomöte
51. Minimera tiden mötesdeltagare närvarar i ett möte där de inte behöver vara delaktiga
52. Minimera antalet saker du behöver ta med dig till videomötet
53. Öka sannolikheten att du får plats med alla dina tillhörigheter på mötesbordet
54. Minimera utskriften av mötesmaterial du behöver göra inför ett videomöte
56. Öka sannolikheten att mötesdeltagare är förberedda inför videomötet
57. Öka tillgången på information om videomötesrummen i bokningssystemet (t.ex. antal platser, utrustning, adress, bild)
58. Minimera tiden det tar att skicka ut mötesspecifik information (agenda, mål med mötet etc.) till mötesdeltagarna
59. Öka möjligheten att förlänga bokningen av videomötesrummet när mötet drar över på tiden
60. Öka möjligheten att få information om att den uppbokade videomötetiden snart är slut
61. Minimera stress vid indikation om att den uppbokade videomötetiden snart är slut
62. Minimera det extra arbete som krävs då handskrivna anteckningar ska överföras till dator
63. Minimera tiden det tar att skapa mötesprotokoll
64. Minimera tiden det tar distribuera mötesprotokoll till intressenter
65. Öka tillgängligheten av mötesprotokoll (även för personer som inte deltog i mötet)
67. Öka kvaliteten på mötesprotokoll

Information Sharing
68. Öka möjligheten att detaljerat kunna visa fysiska objekt (pappersdokument, prototyper, komponenter etc.) för mötesdeltagarna på video
69. Öka möjligheten att kunna visa dokument (t.ex. PowerPoint, Excel, CAD, mötesanteckningar) för mötesdeltagare på video
70. Öka möjligheten att kunna visa handskrivna anteckningar och skisser för mötesdeltagare på video
71. Öka möjligheten att se detaljer i en presentation
72. Öka antalet presentationer/dokument som kan visas på videomötesskärmen samtidigt
73. Öka möjligheten för videomötessdeltagare att kunna arbeta tillsammans med mötesanteckningar, skisser, ritningar etc.
74. Minimera sannolikheten att en datorpresentation blir felskalad (eller avklippt) på videomötesskärmen
75. Minimera sannolikheten att en presentation leder till att bilden av mötesdeltagarna blir förminskad
76. Öka tillgängligheten till agendan under videomötet
78. Öka möjligheten att ta reda på information under mötet (från personlig dator, internet, etc.)
79. Öka tillgängligheten på information om de andra mötesdeltagarna under mötet (namn, titel, roll på mötet etc.)

Adjustments & Settings
80. Minimera tiden det tar att starta upp videomötessystemet
81. Minimera tiden det tar ansluta sig till ett videomöte
82. Minimera tiden det tar att koppla in en dator till videomötessystemet
83. Minimera antalet justeringar av kamerans läge som behöver göras
84. Minimera tiden det tar att utföra inställningar på videomötessystemet
85. Öka möjligheten till feedback på de inställningar du gör
86. Öka möjligheten till feedback på hur väl du hörs hos mötesdeltagarna på video
87. Öka möjligheten till feedback på hur väl du syns hos mötesdeltagarna på video
89. Öka möjligheten att före mötet kunna kontrollera att anslutningen kommer fungera problemfritt
90. Minimera komplexiteten på kontrollenheten (fjärrkontroll, touch screen, tangentbord etc.)
91. Minimera komplexiteten i menysystemet
92. Minimera sannolikheten att anslutningen till videomötet inte kan upprättas
93. Minimera sannolikheten att videomötet bryts oavsiktligt
94. Minimera de tekniska problem som tillkommer då du ska ha videomöte med fler än ett annat videomötesrum

Audio/Video Quality

95. Minimera videomötesteknikens synlighet och märkbarhet
96. Minimera synligheten av kablage
97. Öka sannolikheten att utrustning (anslutningsmöjligheter, mikrofon, fjärrkontroll, möblemanng osv.) är på sin plats i videomötesrummet
98. Öka storleken på bilden av videomötesdeltagarna
100. Öka kvaliteten på videobildens färg och ljus
101. Minimera kvalitetsstörningar i bilden
102. Öka kvaliteten på akustiken i videomötesrummet
103. Öka ljudkvaliteten från högtalarna (fyllighet, frekvensomgång, etc.)
104. Minimera kvalitetsstörningar i ljudet (rundgång, ljudbortfall, sprakljud, etc.)
105. Minimera ljudstörningar som uppkommer vid knackande på bord, klickande med pennor, pappersprassel osv.
106. Minimera tidsförskjutningen mellan ljud och bild
107. Minimera tiden det tar för ljud och bild att ta sig från det ena videomötesrummet till det andra (fördröjningstid)
108. Minimera att ljud utanför videomötesrummet hörs
109. Minimera att aktivitet utanför videomötesrummet syns

Training & Support

111. Minimera tiden det tar att åtgärda tekniska problem
112. Minimera tiden det tar att få kontakt med support
113. Öka kunskapen för hur systemet ska användas (rent tekniskt)
114. Öka kunskapen för hur man genomför videomöten på ett effektivt sätt
115. Öka tillgängligheten av instruktioner för hur systemet fungerar
116. Öka kunskapen om hur din användning av videomöten bidrar till besparingar för miljön, tid och ditt företags ekonomi
117. Minimera videomötessystemets energiförbrukning

APPENDIX B – SURVEY RESULTS

	Opportunity	Importance	Satisfaction
1. Öka känslan av att samtliga mötesdeltagare sitter i samma rum	12,6	8,4	4,3
2. Minimera tiden det tar innan man känner sig bekväm med videomöten som kommunikationsverktyg	8,9	7,5	6,0
3. Öka möjligheten att kunna se samtliga mötesdeltagare	12,4	9,3	6,1
4. Öka sannolikheten att kroppsspråket är synligt för samtliga mötesdeltagare	13,7	9,2	4,6
5. Öka möjligheten att tydligt kunna se den som pratar	13,3	9,5	5,8
6. Öka möjligheten att se andra mötesdeltagares reaktioner	14,0	9,3	4,5
7. Öka möjligheten att kunna bestämma vad du ska se i det andra videomötesrummet	6,3	5,1	4,0
8. Öka sannolikheten att du kan se samspel och interaktion mellan mötesdeltagare	14,1	9,1	4,1
9. Öka sannolikheten att alla mötesdeltagare får lika mycket uppmärksamhet, oavsett var de befinner sig	11,0	7,6	4,2
10. Öka känslan att du har ögonkontakt med mötesdeltagarna på video	14,2	8,9	3,6
12. Öka möjligheten att adressera mötesdeltagare på video genom kroppsspråk	11,1	7,5	3,9
13. Öka möjligheten att kunna se vad andra mötesdeltagare tittar på	9,8	6,9	4,1
14. Öka möjligheten att kunna "flika in" när någon annan pratar	12,3	7,9	3,6
15. Öka möjligheten till en "flytande" konversation när man har videomöte	14,5	9,4	4,4
16. Minimera antalet gånger man pratar i mun på varandra	11,4	7,7	4,1
17. Öka möjligheten att kunna ha sociala diskussioner via video ("small talk")	8,7	6,3	3,9
18. Minimera det man går miste om under kaffepauser när man inte befinner på samma plats som de andra mötesdeltagarna	5,7	3,7	1,8
19. Öka möjligheten att påkalla uppmärksamhet om man vill säga något	12,4	8,4	4,4
20. Öka möjligheten att kunna ha "sidodiskussioner", med vilka av de andra mötesdeltagarna som helst, under mötets gång	4,5	3,0	1,5
21. Minimera sannolikheten att "sidodiskussioner" stör mötet	11,8	7,3	2,7
23. Minimera negativ inverkan på mötet då någon mötesdeltagare behöver utföra icke mötesrelaterade uppgifter	10,3	6,8	3,4
24. Minimera sannolikheten att mötesdeltagare tappar fokus på mötesinnehållet	12,7	8,7	4,6
25. Öka möjligheten att sköta känsliga frågor/konflikter via videomöten	8,4	5,8	3,1
26. Minimera den onaturliga stämningen som kan uppkomma i början av ett videomöte	7,4	5,5	3,7
27. Öka delaktigheten hos försynta mötesdeltagare	10,9	7,2	3,4
28. Minimera känslan av utanförskap när ni är färre i rummet jämfört med de andra videomötesrummen	9,6	6,6	3,6

	Opportunity	Importance	Satisfaction
29. Minimera sannolikheten att en person som inte ska höra mötesinnehållet ändå hör det	11,3	7,8	4,4
30. Öka sannolikheten att rums klimatet är behagligt	11,6	7,6	3,6
31. Minimera oergonomiska sittställningar och rörelser under videomötet	10,4	6,7	3,0
32. Minimera känslan av att du hela tiden behöver stirra in i videomötesskärmen	9,3	6,3	3,3
34. Öka möjligheten av att kunna höra varifrån ljud i det andra videomötesrummet kommer (t.ex. vem som pratar)	11,4	7,6	3,8
35. Minimera tiden du ser dig själv på videoskärmen	3,7	3,7	3,9
36. Minimera sannolikheten att man känner sig instängd i videomötesrummet	4,3	4,3	4,3
37. Öka sannolikheten att det finns ett ledigt videomötesrum när du behöver det	16,7	9,8	2,8
38. Öka antalet mötesdeltagare som videomötesrummet är lämpat för	8,0	5,8	3,6
39. Öka möjligheten att kunna anpassa videomötesrummet efter antalet deltagare	10,5	7,1	3,8
40. Öka kompatibiliteten mellan olika videomötessystem	14,1	8,4	2,7
41. Öka kompatibilitet mellan datorer och videomötessystemet	15,4	9,4	3,4
42. Öka möjligheten att kunna ansluta till videomötessystem utanför företagets organisation	14,0	7,8	1,6
43. Öka möjligheten att kunna delta i ett videomöte med telefon	14,2	9,0	3,8
45. Öka möjligheten att kunna genomföra oplanerade videomöten utan agenda	11,4	7,2	2,9
46. Öka möjligheten att kunna starta upp projekt via video	8,3	6,5	4,7
47. Öka möjligheten att kunna genomföra kreativa videomöten (workshops, teambuilding, brainstorming etc.)	13,6	7,9	2,3
48. Minimera tiden det tar att boka ett videomöte	13,2	8,4	3,6
49. Minimera tiden det tar att ta sig till videomötesrummet	5,7	5,7	6,3
50. Minimera den totala tiden du behöver avsätta för ett videomöte	5,8	5,8	5,9
51. Minimera tiden mötesdeltagare närvarar i ett möte där de inte behöver vara delaktiga	10,0	7,8	5,5
52. Minimera antalet saker du behöver ta med dig till videomötet	5,8	5,8	6,1
53. Öka sannolikheten att du får plats med alla dina tillhörigheter på mötesbordet	5,4	5,4	6,3
54. Minimera utskriften av mötesmaterial du behöver göra inför ett videomöte	6,1	6,1	6,3
56. Öka sannolikheten att mötesdeltagare är förberedda inför videomötet	11,8	8,4	5,0
57. Öka tillgången på information om videomötesrummen i bokningssystemet (t.ex. antal platser, utrustning, adress, bild)	12,0	8,5	5,0

	Opportunity	Importance	Satisfaction
58. Minimera tiden det tar att skicka ut mötesspecifik information (agenda, mål med mötet etc.) till mötesdeltagarna	8,9	7,2	5,5
59. Öka möjligheten att förlänga bokningen av videomötesrummet när mötet drar över på tiden	12,4	8,0	3,6
60. Öka möjligheten att få information om att den uppbokade videomötetiden snart är slut	7,2	6,5	5,9
61. Minimera stress vid indikation om att den uppbokade videomötetiden snart är slut	6,4	5,2	4,0
62. Minimera det extra arbete som krävs då handskrivna anteckningar ska överföras till dator	10,5	6,4	2,4
63. Minimera tiden det tar att skapa mötesprotokoll	10,6	6,7	2,8
64. Minimera tiden det tar distribuera mötesprotokoll till intressenter	6,9	5,6	4,4
65. Öka tillgängligheten av mötesprotokoll (även för personer som inte deltog i mötet)	5,9	5,1	4,3
67. Öka kvaliteten på mötesprotokoll	7,0	5,5	4,0
68. Öka möjligheten att detaljerat kunna visa fysiska objekt (pappersdokument, prototyper, komponenter etc.) för mötesdeltagarna på video	9,8	6,1	2,4
69. Öka möjligheten att kunna visa dokument (t.ex. PowerPoint, Excel, CAD, mötesanteckningar) för mötesdeltagare på video	10,7	8,7	6,7
70. Öka möjligheten att kunna visa handskrivna anteckningar och skisser för mötesdeltagare på video	9,9	5,8	1,7
71. Öka möjligheten att se detaljer i en presentation	12,3	8,0	3,7
72. Öka antalet presentationer/dokument som kan visas på videomötesskärmen samtidigt	7,8	5,0	2,1
73. Öka möjligheten för videomötesdeltagare att kunna arbeta tillsammans med mötesanteckningar, skisser, ritningar etc.	11,7	6,8	1,9
74. Minimera sannolikheten att en datorpresentation blir felskalad (eller avklippt) på videomötesskärmen	12,5	8,2	3,9
75. Minimera sannolikheten att en presentation leder till att bilden av mötesdeltagarna blir förminskad	10,2	6,3	2,3
76. Öka tillgängligheten till agendan under videomötet	5,8	4,5	3,3
78. Öka möjligheten att ta reda på information under mötet (från personlig dator, internet, etc.)	10,9	8,2	5,4
79. Öka tillgängligheten på information om de andra mötesdeltagarna under mötet (namn, titel, roll på mötet etc.)	4,8	3,8	2,8
80. Minimera tiden det tar att starta upp videomötessystemet	10,8	8,6	6,3
81. Minimera tiden det tar ansluta sig till ett videomöte	11,0	8,5	6,1
82. Minimera tiden det tar att koppla in en dator till videomötessystemet	12,7	8,8	4,9
83. Minimera antalet justeringar av kamerans läge som behöver göras	8,8	7,2	5,7
84. Minimera tiden det tar att utföra inställningar på videomötessystemet	11,0	8,3	5,5
85. Öka möjligheten till feedback på de inställningar du gör	7,9	5,7	3,5

	Opportunity	Importance	Satisfaction
86. Öka möjligheten till feedback på hur väl du hörs hos mötesdeltagarna på video	8,4	6,4	4,4
87. Öka möjligheten till feedback på hur väl du syns hos mötesdeltagarna på video	8,1	6,4	4,8
89. Öka möjligheten att före mötet kunna kontrollera att anslutningen kommer fungera problemfritt	13,3	8,3	3,2
90. Minimera komplexiteten på kontrollenheten (fjärrkontroll, touch screen, tangentbord etc.)	13,3	8,7	4,1
91. Minimera komplexiteten i menysystemet	14,5	8,9	3,4
92. Minimera sannolikheten att anslutningen till videomötet inte kan upprättas	13,3	9,4	5,5
93. Minimera sannolikheten att videomötet bryts oavsiktligt	12,8	9,4	6,0
94. Minimera de tekniska problem som tillkommer då du ska ha videomöte med fler än ett annat videomötesrum	14,7	9,7	4,6
95. Minimera videomöteteknikens synlighet och märkbarhet	9,4	6,7	4,1
96. Minimera synligheten av kablage	3,7	3,7	3,8
97. Öka sannolikheten att utrustning (anslutningsmöjligheter, mikrofon, fjärrkontroll, möblemanng osv.) är på sin plats i videomötesrummet	10,1	8,7	7,3
98. Öka storleken på bilden av videomötesdeltagarna	8,4	6,5	4,6
100. Öka kvaliteten på videobildens färg och ljus	9,9	7,7	5,4
101. Minimera kvalitetsstörningar i bilden	13,0	9,1	5,1
102. Öka kvaliteten på akustiken i videomötesrummet	12,1	8,5	4,9
103. Öka ljudkvaliteten från högtalarna (fyllighet, frekvensomgång, etc.)	9,3	7,5	5,7
104. Minimera kvalitetsstörningar i ljudet (rundgång, ljudbortfall, sprakljud, etc.)	12,2	9,0	5,7
105. Minimera ljudstörningar som uppkommer vid knackande på bord, klickande med pennor, pappersprassel osv.	14,3	8,7	3,1
106. Minimera tidsförskjutningen mellan ljud och bild	13,3	9,2	5,2
107. Minimera tiden det tar för ljud och bild att ta sig från det ena videomötesrummet till det andra (fördröjningstid)	13,7	9,4	5,1
108. Minimera att ljud utanför videomötesrummet hörs	11,8	8,8	5,8
109. Minimera att aktivitet utanför videomötesrummet syns	7,6	7,5	7,4
111. Minimera tiden det tar att åtgärda tekniska problem	15,6	9,7	3,7
112. Minimera tiden det tar att få kontakt med support	14,5	9,6	4,6
113. Öka kunskapen för hur systemet ska användas (rent tekniskt)	12,7	8,0	3,4
114. Öka kunskapen för hur man genomför videomöten på ett effektivt sätt	14,2	8,5	2,9
115. Öka tillgängligheten av instruktioner för hur systemet fungerar	12,2	8,3	4,4
116. Öka kunskapen om hur din användning av videomöten bidrar till besparingar för miljön, tid och ditt företags ekonomi	8,9	7,0	5,1
117. Minimera videomötessystemets energiförbrukning	9,4	6,8	4,2

APPENDIX C – UNDERSERVED OUTCOMES

Technology Issues	Opportunity	Importance	Satisfaction
41. Öka kompatibilitet mellan datorer och videomötessystemet	15,4	9,4	3,4
74. Minimera sannolikheten att en datorpresentation blir felskalad (eller avklippt) på videomötesskärmen	12,5	8,2	3,9
82. Minimera tiden det tar att koppla in en dator till videomötessystemet	12,7	8,8	4,9
71. Öka möjligheten att se detaljer i en presentation	12,3	8,0	3,7

Fixing Problems	Opportunity	Importance	Satisfaction
111. Minimera tiden det tar att åtgärda tekniska problem	15,6	9,7	3,7
112. Minimera tiden det tar att få kontakt med support	14,5	9,6	4,6
113. Öka kunskapen för hur systemet ska användas (rent tekniskt)	12,7	8,0	3,4
114. Öka kunskapen för hur man genomför videomöten på ett effektivt sätt	14,2	8,5	2,9
115. Öka tillgängligheten av instruktioner för hur systemet fungerar	12,2	8,3	4,4

IT-Related	Opportunity	Importance	Satisfaction
92. Minimera sannolikheten att anslutningen till videomötet inte kan upprättas	13,3	9,4	5,5
93. Minimera sannolikheten att videomötet bryts oavsiktligt	12,8	9,4	6,0
94. Minimera de tekniska problem som tillkommer då du ska ha videomöte med fler än ett annat videomötesrum	14,7	9,7	4,6
101. Minimera kvalitetsstörningar i bilden	13,0	9,1	5,1
104. Minimera kvalitetsstörningar i ljudet (rundgång, ljudbortfall, sprakljud, etc.)	12,2	9,0	5,7
106. Minimera tidsförskjutningen mellan ljud och bild	13,3	9,2	5,2
107. Minimera tiden det tar för ljud och bild att ta sig från det ena videomötesrummet till det andra (fördröjningstid)	13,7	9,4	5,1
42. Öka möjligheten att kunna ansluta till videomötessystem utanför företagets organisation	14,0	7,8	1,6
89. Öka möjligheten att före mötet kunna kontrollera att anslutningen kommer fungera problemfritt	13,3	8,3	3,2

Smooth Communication	Opportunity	Importance	Satisfaction
15. Öka möjligheten till en "flytande" konversation när man har videomöte	14,5	9,4	4,4
14. Öka möjligheten att kunna "flika in" när någon annan pratar	12,3	7,9	3,6
19. Öka möjligheten att påkalla uppmärksamhet om man vill säga något	12,4	8,4	4,4

Visibility	Opportunity	Importance	Satisfaction
3. Öka möjligheten att kunna se samtliga mötesdeltagare	12,4	9,3	6,1
4. Öka sannolikheten att kroppsspråket är synligt för samtliga mötesdeltagare	13,7	9,2	4,6
5. Öka möjligheten att tydligt kunna se den som pratar	13,3	9,5	5,8
6. Öka möjligheten att se andra mötesdeltagares reaktioner	14,0	9,3	4,5
8. Öka sannolikheten att du kan se samspel och interaktion mellan mötesdeltagare	14,1	9,1	4,1
10. Öka känslan att du har ögonkontakt med mötesdeltagarna på video	14,2	8,9	3,6

Usability	Opportunity	Importance	Satisfaction
90. Minimera komplexiteten på kontrollenheten (fjärrkontroll, touch screen, tangentbord etc.)	13,3	8,7	4,1
91. Minimera komplexiteten i menysystemet	14,5	8,9	3,4

Booking	Opportunity	Importance	Satisfaction
37. Öka sannolikheten att det finns ett ledigt videomötesrum när du behöver det	16,7	9,8	2,8
48. Minimera tiden det tar att boka ett videomöte	13,2	8,4	3,6
59. Öka möjligheten att förlänga bokningen av videomötesrummet när mötet drar över på tiden	12,4	8,0	3,6
57. Öka tillgången på information om videomötesrummen i bokningssystemet (t.ex. antal platser, utrustning, adress, bild)	12,0	8,5	5,0

Unrelated Underserved Outcomes	Opportunity	Importance	Satisfaction
24. Minimera sannolikheten att mötesdeltagare tappar fokus på mötesinnehållet	12,7	8,7	4,6
43. Öka möjligheten att kunna delta i ett videomöte med telefon	14,2	9,0	3,8
47. Öka möjligheten att kunna genomföra kreativa videomöten (workshops, teambuilding, brainstorming etc.)	13,6	7,9	2,3
105. Minimera ljudstörningar som uppkommer vid knackande på bord, klickande med pennor, pappersprassel osv.	14,3	8,7	3,1
1. Öka känslan av att samtliga mötesdeltagare sitter i samma rum	12,6	8,4	4,3

APPENDIX D – OVERSERVED OUTCOMES

Outcome	Importance	Satisfaction
52. Minimera antalet saker du behöver ta med dig till videomötet	5,8	6,1
50. Minimera den totala tiden du behöver avsätta för ett videomöte	5,8	5,9
49. Minimera tiden det tar att ta sig till videomötesrummet	5,7	6,3
53. Öka sannolikheten att du får plats med alla dina tillhörigheter på mötesbordet	5,4	6,3
96. Minimera synligheten av kablage	3,7	3,8
35. Minimera tiden du ser dig själv på videoskärmen	3,7	3,9

APPENDIX E – IMPORTANT OUTCOMES

Outcome	Importance	Satisfaction
108. Minimera att ljud utanför videomötesrummet hörs	8,8	5,8
56. Öka sannolikheten att mötesdeltagare är förberedda inför videomötet	8,4	5,0
84. Minimera tiden det tar att utföra inställningar på videomötessystemet	8,3	5,5
81. Minimera tiden det tar ansluta sig till ett videomöte	8,5	6,1
78. Öka möjligheten att ta reda på information under mötet (från personlig dator, internet, etc.)	8,2	5,4
80. Minimera tiden det tar att starta upp videomötessystemet	8,6	6,3
69. Öka möjligheten att kunna visa dokument (t.ex. PowerPoint, Excel, CAD, mötesanteckningar) för mötesdeltagare på video	8,7	6,7
97. Öka sannolikheten att utrustning (anslutningsmöjligheter, mikrofon, fjärrkontroll, möblemanng osv.) är på sin plats i videomötesrummet	8,7	7,3

APPENDIX F – MISSING DATA

	N/A (Importance)	N/A (Satisfaction)
25. Öka möjligheten att sköta känsliga frågor/konflikter via videomöten	8%	12%
26. Minimera den onaturliga stämningen som kan uppkomma i början av ett videomöte	9%	11%
27. Öka delaktigheten hos försynta mötesdeltagare	8%	11%
42. Öka möjligheten att kunna ansluta till videomötessystem utanför företagets organisation	9%	28%
43. Öka möjligheten att kunna delta i ett videomöte med telefon	2%	11%
47. Öka möjligheten att kunna genomföra kreativa videomöten (workshops, teambuilding, brainstorming etc.)	3%	11%
51. Minimera tiden mötesdeltagare närvarar i ett möte där de inte behöver vara delaktiga	9%	14%
63. Minimera tiden det tar att skapa mötesprotokoll	9%	16%
64. Minimera tiden det tar distribuera mötesprotokoll till intressenter	10%	16%
65. Öka tillgängligheten av mötesprotokoll (även för personer som inte deltog i mötet)	13%	19%
70. Öka möjligheten att kunna visa handskrivna anteckningar och skisser för mötesdeltagare på video	7%	11%
73. Öka möjligheten för videomötesdeltagare att kunna arbeta tillsammans med mötesanteckningar, skisser, ritningar etc.	5%	15%
74. Minimera sannolikheten att en datorpresentation blir felskalad (eller avklippt) på videomötesskärmen	5%	13%
75. Minimera sannolikheten att en presentation leder till att bilden av mötesdeltagarna blir förminskad	7%	16%
76. Öka tillgängligheten till agendan under videomötet	8%	15%
79. Öka tillgängligheten på information om de andra mötesdeltagarna under mötet (namn, titel, roll på mötet etc.)	8%	16%
86. Öka möjligheten till feedback på hur väl du hörs hos mötesdeltagarna på video	12%	15%
87. Öka möjligheten till feedback på hur väl du syns hos mötesdeltagarna på video	10%	13%
112. Minimera tiden det tar att få kontakt med support	4%	17%
117. Minimera videomötessystemets energiförbrukning	4%	39%
40. Öka kompatibiliteten mellan olika videomötessystem	22%	30%
67. Öka kvaliteten på mötesprotokoll	12%	19%
62. Minimera det extra arbete som krävs då handskrivna anteckningar ska överföras till dator	16%	24%
61. Minimera stress vid indikation om att den uppbokade videomötetiden snart är slut	12%	16%
46. Öka möjligheten att kunna starta upp projekt via video	15%	20%
85. Öka möjligheten till feedback på de inställningar du gör	26%	32%
95. Minimera videomöteteknikens synlighet och märkbarhet	17%	18%

APPENDIX G - FACTORS

Factor 1 – Presentation & Collaboration	Variation
72. Öka antalet presentationer/dokument som kan visas på videomötesskärmen samtidigt	4,0
70. Öka möjligheten att kunna visa handskrivna anteckningar och skisser för mötesdeltagare på video	4,7
71. Öka möjligheten att se detaljer i en presentation	2,8
68. Öka möjligheten att detaljerat kunna visa fysiska objekt (pappersdokument, prototyper, komponenter etc.) för mötesdeltagarna på video	4,6
69. Öka möjligheten att kunna visa dokument (t.ex. PowerPoint, Excel, CAD, mötesanteckningar) för mötesdeltagare på video	2,1
73. Öka möjligheten för videomötesdeltagare att kunna arbeta tillsammans med mötesanteckningar, skisser, ritningar etc.	4,5
75. Minimera sannolikheten att en presentation leder till att bilden av mötesdeltagarna blir förminskad	3,9
74. Minimera sannolikheten att en datorpresentation blir felskalad (eller avklippt) på videomötesskärmen	3,0
50. Minimera den totala tiden du behöver avsätta för ett videomöte	2,6
52. Minimera antalet saker du behöver ta med dig till videomötet	2,7
54. Minimera utskrifter av mötesmaterial du behöver göra inför ett videomöte	2,6

Factor 2 – Establishing Video Connection	Variation
112. Minimera tiden det tar att få kontakt med support	2,0
81. Minimera tiden det tar ansluta sig till ett videomöte	2,2
92. Minimera sannolikheten att anslutningen till videomötet inte kan upprättas	2,0
94. Minimera de tekniska problem som tillkommer då du ska ha videomöte med fler än ett annat videomötesrum	1,9
82. Minimera tiden det tar att koppla in en dator till videomötessystemet	2,8
93. Minimera sannolikheten att videomötet bryts oavsiktligt	1,7
90. Minimera komplexiteten på kontrollenheten (fjärrkontroll, touch screen, tangentbord etc.)	2,9
91. Minimera komplexiteten i menysystemet	2,9
43. Öka möjligheten att kunna delta i ett videomöte med telefon	3,3

Factor 3 – Interaction with Other Meeting Participants	Variation
6. Öka möjligheten att se andra mötesdeltagares reaktioner	1,6
4. Öka sannolikheten att kroppsspråket är synligt för samtliga mötesdeltagare	1,7
5. Öka möjligheten att tydligt kunna se den som pratar	1,6
8. Öka sannolikheten att du kan se samspel och interaktion mellan mötesdeltagare	1,5
3. Öka möjligheten att kunna se samtliga mötesdeltagare	1,9
12. Öka möjligheten att adressera mötesdeltagare på video genom kroppsspråk	2,0
10. Öka känslan att du har ögonkontakt med mötesdeltagarna på video	2,0

Factor 4 – Settings	Variation
84. Minimera tiden det tar att utföra inställningar på videomötessystemet	2,2
83. Minimera antalet justeringar av kamerans läge som behöver göras	2,6
113. Öka kunskapen för hur systemet ska användas (rent tekniskt)	3,3
114. Öka kunskapen för hur man genomför videomöten på ett effektivt sätt	3,0
115. Öka tillgängligheten av instruktioner för hur systemet fungerar	2,9
74. Minimera sannolikheten att en datorpresentation blir felskalad (eller avklippt) på videomötesskärmen	3,0
90. Minimera komplexiteten på kontrollenheten (fjärrkontroll, touch screen, tangentbord etc.)	2,9
91. Minimera komplexiteten i menysystemet	2,9
86. Öka möjligheten till feedback på hur väl du hörs hos mötesdeltagarna på video	2,8

Factor 5 - Ergonomics	Variation
30. Öka sannolikheten att rums klimatet är behagligt	2,9
108. Minimera att ljud utanför videomötesrummet hörs	2,2
31. Minimera oergonomiska sittställningar och rörelser under videomötet	3,3
53. Öka sannolikheten att du får plats med alla dina tillhörigheter på mötesbordet	2,6
36. Minimera sannolikheten att man känner sig instängd i videomötesrummet	2,8
109. Minimera att aktivitet utanför videomötesrummet syns	2,2

Factor 6 – Smooth Conversation	Variation
16. Minimera antalet gånger man pratar i mun på varandra	3,6
15. Öka möjligheten till en "flytande" konversation när man har videomöte	2,0
14. Öka möjligheten att kunna "flika in" när någon annan pratar	2,8
37. Öka sannolikheten att det finns ett ledigt videomötesrum när du behöver det	2,4

Factor 7 – Meeting Flexibility & Availability	Variation
48. Minimera tiden det tar att boka ett videomöte	4,0
45. Öka möjligheten att kunna genomföra oplanerade videomöten utan agenda	3,3
59. Öka möjligheten att förlänga bokningen av videomötesrummet när mötet drar över på tiden	3,5
37. Öka sannolikheten att det finns ett ledigt videomötesrum när du behöver det	2,4
51. Minimera tiden mötesdeltagare närvarar i ett möte där de inte behöver vara delaktiga	2,0

Factor 8 – Sound	Variation
104. Minimera kvalitetsstörningar i ljudet (rundgång, ljudbortfall, sprakljud, etc.)	2,1
102. Öka kvaliteten på akustiken i videomötesrummet	2,3
103. Öka ljudkvaliteten från högtalarna (fyllighet, frekvensomgång, etc.)	2,2
90. Minimera komplexiteten på kontrollenheten (fjärrkontroll, touch screen, tangentbord etc.)	2,9

Factor 9 – Meeting Minutes	Variation
64. Minimera tiden det tar distribuera mötesprotokoll till intressenter	3,4
65. Öka tillgängligheten av mötesprotokoll (även för personer som inte deltog i mötet)	3,1
63. Minimera tiden det tar att skapa mötesprotokoll	4,1
76. Öka tillgängligheten till agendan under videomötet	2,8

Factor 10 – Meeting participation	Variation
27. Öka delaktigheten hos försynta mötesdeltagare	2,6
26. Minimera den onaturliga stämningen som kan uppkomma i början av ett videomöte	2,4
56. Öka sannolikheten att mötesdeltagare är förberedda inför videomötet	2,3
24. Minimera sannolikheten att mötesdeltagare tappar fokus på mötesinnehållet	2,3
25. Öka möjligheten att sköta känsliga frågor/konflikter via videomöten	3,6

APPENDIX H – OPPORTUNITY SCORES FOR CLUSTERS

Outcome	Cluster					
	1	2	3	4	5	6
10. Öka känslan att du har ögonkontakt med mötesdeltagarna på video	17,6	12,4	11,7	16,7	14,5	15,5
16. Minimera antalet gånger man pratar i mun på varandra	9,5	5,2	9,3	18,3	18,5	15,5
27. Öka delaktigheten hos försynta mötesdeltagare	7,6	12,4	12,1	10,0	12,5	14,5
31. Minimera oergonomiska sittställningar och rörelser under videomötet	17,1	15,7	6,6	8,3	8,0	11,4
48. Minimera tiden det tar att boka ett videomöte	18,6	14,3	4,1	20,0	15,5	17,3
63. Minimera tiden det tar att skapa mötesprotokoll	12,4	8,6	8,6	20,0	8,5	17,7
70. Öka möjligheten att kunna visa handskrivna anteckningar och skisser för mötesdeltagare på video	18,6	1,4	9,7	16,7	8,5	14,1
82. Minimera tiden det tar att koppla in en dator till videomötessystemet	10,5	17,1	10,0	13,3	10,0	18,2
102. Öka kvaliteten på akustiken i videomötesrummet	14,8	12,9	9,7	20,0	8,5	12,7
113. Öka kunskapen för hur systemet ska användas (rent tekniskt)	14,8	17,1	11,0	3,3	9,0	16,4

APPENDIX I - CLUSTERS

Cluster 1	Opportunity
10. Öka känslan att du har ögonkontakt med mötesdeltagarna på video	17,6
31. Minimera oergonomiska sittställningar och rörelser under videomötet	17,1
48. Minimera tiden det tar att boka ett videomöte	18,6
70. Öka möjligheten att kunna visa handskrivna anteckningar och skisser för mötesdeltagare på video	18,6
No expert users 20% authorities (much larger than the other clusters) 25% Does not know what brand their system is 65% use the system 1-2 times per week	

Cluster 2	Opportunity
82. Minimera tiden det tar att koppla in en dator till videomötessystemet	17,1
113. Öka kunskapen för hur systemet ska användas (rent tekniskt)	17,1
20% Cisco users 57% use the system less than once a week 25% expert users as well as well as 25% beginners	

Cluster 3
12% of meetings are creative Only 27% work with insurance

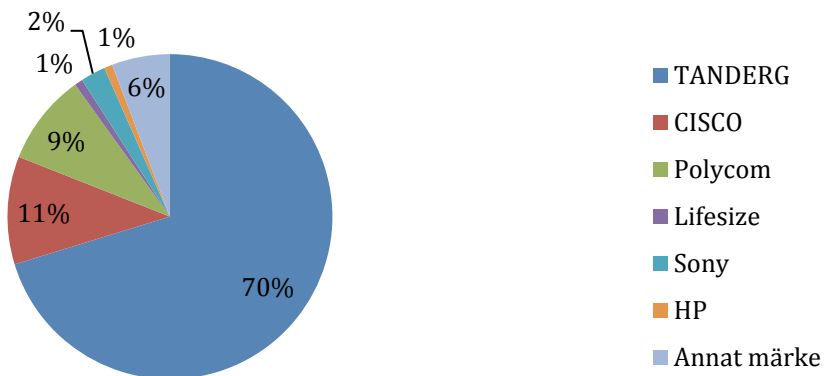
Cluster 4	Opportunity
16. Minimera antalet gånger man pratar i mun på varandra	18,3
48. Minimera tiden det tar att boka ett videomöte	20
63. Minimera tiden det tar att skapa mötesprotokoll	20
102. Öka kvaliteten på akustiken i videomötesrummet	20
100% Tandberg users 56% one screen and 44% dual screen 83% use the system 1-2 times per week	

Cluster 5	Opportunity
16. Minimera antalet gånger man pratar i mun på varandra	18,5
25% use the system 3 times or more per week 58% work with insurance	

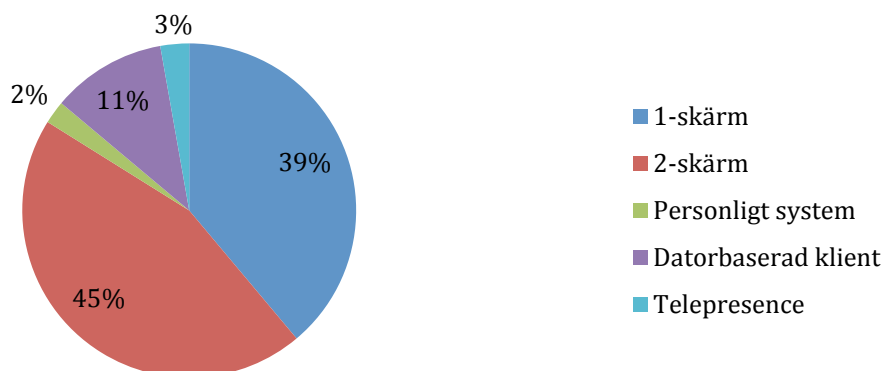
Cluster 6	Opportunity
63. Minimera tiden det tar att skapa mötesprotokoll	17,7
82. Minimera tiden det tar att koppla in en dator till videomötessystemet	18,2
67% use the system less than once per week	

APPENDIX J – USE DATA

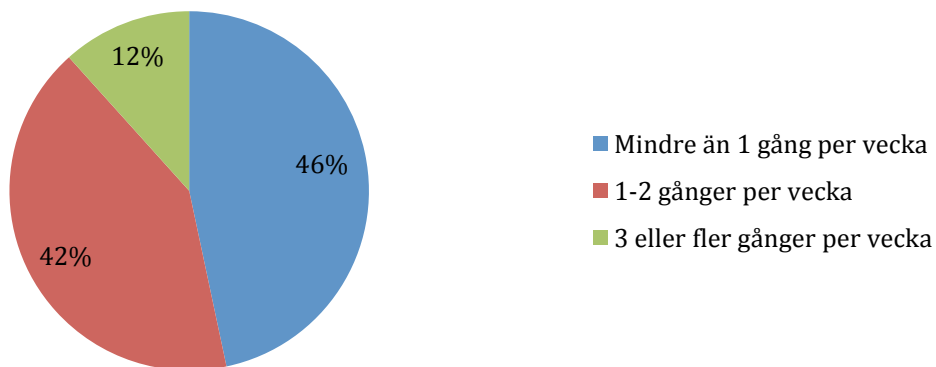
Vilket märke är det på systemet du använder?



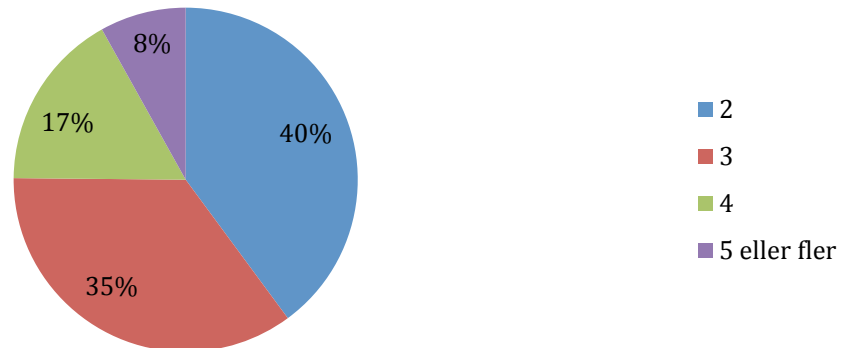
Vilken typ av system använder du?



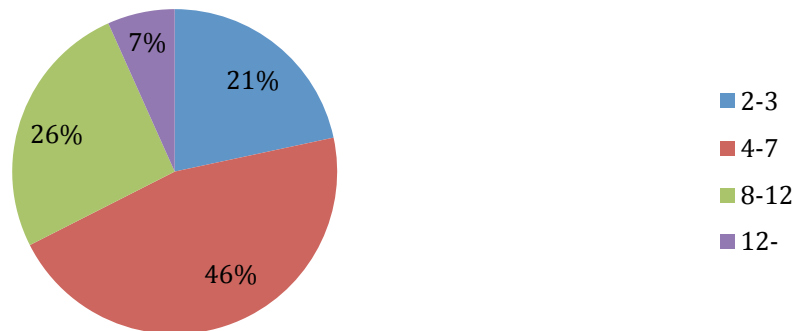
Hur ofta har du videomöten?



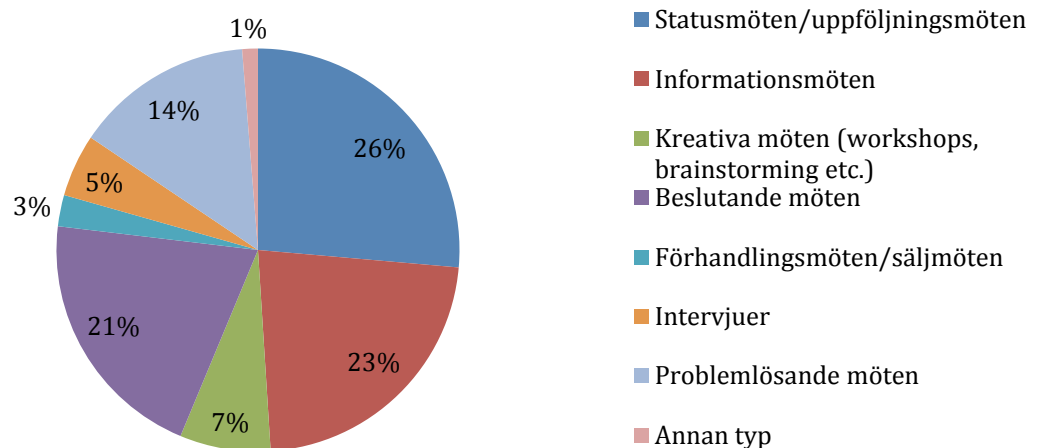
Hur många rum är vanligtvis anslutna till de videomöten du sitter i?



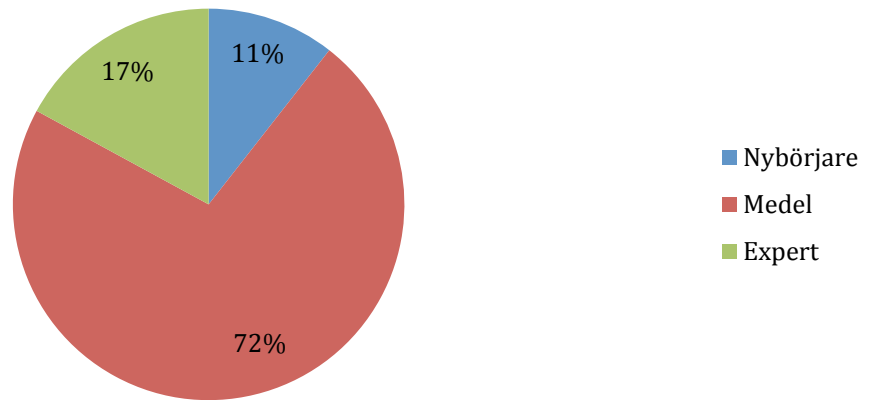
Hur många mötesdeltagare är ni på de videomöten du sitter i?



Vilken typ av möten har du på video?



Vilken typ av användare är du?



Vilken bransch arbetar du inom?

