Mobile Communication within Healthcare Environment

A Case Study at Danderyds University Hospital

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Mobil Kommunikation inom Sjukvårdsmiljö

En Fallstudie på Danderyds Sjukhus

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Abstract
Organizations within the healthcare industry are under a constant pressure with a continuous growth, resulting in a larger number of patients in need of attention and an increased demand for healthcare services. The pressure put on the different departments at hospitals challenges the communication channels within the organization. This in turn prevents the employees from driving change efficiently where a perceived lack of information flow and fragile communication is the cause. To facilitate a transition, ICT is acting as a fundamental driver for a transformation, where emerging technologies are changing the workflow in organizations. It has contributed with mobile applications to work as solutions to enhance communication by improving connectivity and facilitating information flow. Therefore, the purpose of the report was to investigate how a mobile application could help to enhance the internal communication in the healthcare sector.

For the master thesis, the investigation has been realized by conducting a descriptive case study at the infectious disease department. Findings were derived from observations, three interviews with representatives from the management and a pilot study consisting of thirteen people. The process was to observe existing communication channels, obtain a needs analysis from the management regarding improvement factors as well as implement and evaluate a mobile application as a new communication channel based on their requirements.

From the initial observations and interviews it was possible to identify a gap between the management’s information distribution and the employees’ information receiving. This was addressed by implementing, testing and evaluating a mobile communication channel in order to make the information more accessible. It was discovered that by dividing employees into smaller groups with their own specific purpose, it was possible to direct information and prevent information overload. By establishing a mobile communication channel the workflow at the department could be improved with a facilitation of transmitting information as a result.

Keywords: Healthcare, ICT, Mobile communication, Information flow, Change management
Sammanfattning

För masteruppsatsen har undersökningen genomförts genom att utföra en deskriptiv fallstudie på infektionsavdelningen. Resultaten härledes från observationer, tre intervjuer med representanter från ledningen och en pilotstudie bestående av tretton personer. Processen bestod av att observera befintliga kommunikationskanaler, erhålla en behovsanalys från ledningen med avseende på förbättringsfaktorer, samt implementera och utvärdera en mobilapplikation som en ny kommunikationskanal utifrån deras krav.

Från de initiala observationerna och intervjuerna var det möjligt att identifiera skillnaderna mellan ledningens informationsdistribution och de anställdas informationsmottagning. Detta åtgärdades genom att implementera, testa och utvärdera en mobil kommunikationskanal med syftet att göra informationen mer tillgänglig. Det upptäcktes att genom att dela in anställda i mindre grupper med sitt eget specifika syfte var det möjligt att rikta information och förhindra informationsöverbelastning. Genom att upprätta en mobil kommunikationskanal kunde arbetsflödet vid avdelningen förbättras med resultatet att informationsöverföringen underlättades.

Nyckelord: Sjukvård, IKT, Mobil kommunikation, Informationsflöde, Förändringshantering
Foreword and Acknowledgements

This report presents my master thesis and is the final stage of my educational degree of Master of Science in Engineering. The work corresponds to 30 academic credits and was conducted during the spring of 2017 at the department of Industrial Economics and Management at the Royal Institute of Technology, KTH in Stockholm, Sweden. It is a master thesis with the orientation anchored in both the programs of Industrial Management as well as Information Communication Technology in order to achieve a double degree.

I would like to send my sincerest regards to…

The management at the infectious disease department that was kind enough to provide me with their valuable support and participation in various activities throughout the whole study.

All participants in the pilot study, who have invested their time and motivation as well as shown their interest in testing the new mobile communication channel.

Remaining employees at the infectious disease department and in specific the ones I had the opportunity to observe during the pre-study. You all have been very welcoming and helpful.

Christoffer Haas from the Clinical Innovation Fellowships who always has supported me with ideas, contacts and formalities at Danderys University Hospital.

My academic supervisor from KTH, Maria Hammarén, who has been providing me with feedback and guidance.

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Thank you all!

Patrik Söderström
Stockholm, June 2017
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Abbreviations

CTMH  Centre for Technology in Medicine and Health
CIF   Clinical Innovation Fellowships
ICT   Information Communication Technology
SCC   Stockholm County Council
SITHS Secure IT for Healthcare Settings

Glossary

Care Unit Manager  Vårdenhetschef
Chief Physician    Chefsläkare
Nurse Manager      Chefssjuksköterska
Physician Manager  Läkarchef
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1. Introduction

The introduction chapter presents the background of the research area and why it is of interest to investigate. This is followed by the problematization, purpose, research questions, limitations and delimitations as well as the contributions of the study. In addition, an outline of the report is provided to give the reader an overview of the thesis.

1.1 Background

The life cycle of a growing organization describes the transition through a series of stages, from a company’s current state to a desired state. As an organization grows, a wide range of problems and challenges will occur that requires different solutions. The continuous change will test the organization’s ability to cope as well as adjust currently used tools and processes to fit the new state of the organization. In order to maintain well-functioning business operations, it is essential for the employees to have an understanding in how the change will affect the organization as well as knowledge of how to manage the transition for the growing organization. In particular, organizations within the healthcare industry are under a constant pressure, where the global healthcare spending will increase with 5.1 percent between 2015 and 2020, reaching $8.7 trillion (Deloitte, 2017). This growth will mainly focus on the expansion of services in developed countries. In the healthcare sector a growing business is equal to a larger number of patients in need of attention and an increased demand for healthcare services. The pressure put on the different departments at hospitals challenges the communication channels within the organization and prevents employees from driving change efficiently.

To cope with this transition, the technological development within the field of Information and Communication Technology (ICT) is acting as a fundamental driver for a transformation, where emerging technologies are changing the workflow in organizations. It has contributed with alternative mobile applications to work as solutions to enhance communication by improving connectivity and facilitating information flow. In order for the healthcare sector to manage growing organizations more efficiently, it is essential to leverage ICT-solutions. According to Gordon et al. (2015) technology plays an important role for communication among employees in healthcare environments to greatly improve the cohesiveness within the organization and prevent malpractice.

With a higher need of specialist clinics in Sweden, the infectious disease department at Danderyds University Hospital was expected to grow in early 2017. As one of the leading departments in the country within infectious diseases, the inpatient care increased by 150 percent and the outpatient care increased from 1500 to 10 000 patients (Danderyds sjukhus, 2017a). Prior to the expansion of the department, the Clinical Innovation Fellowships (CIF) Program from the Centre for Technology in Medicine (CTMH) had observed and identified a need to review if their communication channels were sufficient as the department expanded. The growth of the infectious disease department generates an even greater pressure on both
employees and management to have efficient communication channels suitable for a larger organization. Danderyds University Hospital realizes that new technology not only will simplify daily communication, but also work as a tool to improve the day-to-day operations if implemented successfully.

1.2 Problematization
Deficits in communication and information transfer could result in confusion and misunderstanding between the management and employees in any organization. Within the healthcare sector, inadequate communication and information transfer is one existing risk area that could ultimately affect the patients if not attended properly. Lack of communication and insufficient information flow within and between different occupational groups complicates and slows down processes. In the healthcare sector these processes often involve many people where information must be passed on in order to take proper measures. It is also an imminent risk that right information never reaches its destination even if it might have been distributed on several communication channels. This result in the prevention of driving change initiatives efficiently among the employees where they feel excluded of the communicated information, which substantially decreases the confidence for their management.

Currently, the infectious disease department at Danderyds University Hospital is experiencing deficiencies in their communication methods, which have led to an increased dissatisfaction among the employees. Although the employees are provided with several communication channels to receive information on, it evidently have arisen misconceptions in their communication. As the department grows and the pressure on staff increases, it becomes even more important to find suitable communication channels to facilitate their transition as well as day-to-day operations as a bigger department. Therefore, it is of great importance to establish well-functioning communication channels for the infectious disease department in order to fit a larger organization.

1.3 Purpose
The purpose of this report is to investigate how a mobile application could help to enhance the internal communication in the healthcare sector.

1.4 Research Questions
In order to counter the problem at hand and be able to achieve the purpose of this report, following main research question will be answered.

Main research question:

- Main RQ – How can a mobile application be implemented as a communication channel in order to improve the internal communication in a healthcare department?

To address the main RQ and be able to answer it, three sub research questions were operationalized in the process. These questions were based on a conducted case study at the infectious disease department at Danderyds University Hospital and thus anchored in as well as related to their operations.
Sub-questions:

- RQ 1 – What formalized internal communication channels exist and how do they work in practice?
- RQ 2 – Where could improvement opportunities in their current communication channels be identified?
- RQ 3 – How will the department as well as the employees accept the implementation of a new mobile application?

1.5 Delimitations

In terms of delimitations, by choosing to focus specifically on the infectious disease department at Danderyds University Hospital, it automatically delimitates this study on a geographical and industrial level. As the topic of investigation relates to communication within the healthcare sector and a specific department, the solution will be based on how the infectious disease department is operating.

When it comes to communication the scope is delimitated to include internal communication within the department solely, but still investigate both formal and informal channels. In addition, another delimitation made in the thesis regarding communication is to focus on mobile communication and not to investigate any other types of communication methods. To delimitate the research to involve internal communication, the investigation has included the information flow from the management down to different target groups, e.g. physicians, nurses and assistant nurses, with the possibility for feedback loops. In addition, the communication within the different occupational groups is also included in this report as well as a communication between employees on an individual level.

Furthermore, in relation to three perspectives of industrial management, the scope of the research was held within the functional and individual level as both levels reflects to the substance of the research questions.

1.6 Limitations

As for limitations regarding the thesis, it exists some that might have had an affect on the overall value contribution. Probably the most substantial aspect of limitation is focused around the time perspective. Since the work had time constraints, it have affected used resources and in specific limited the analysis to produce more precise results. As a consequence from the lack of time to perform a quality benchmarking of mobile communication channels at other hospital departments, it is linked to the usage of the specific application, Slack, in this master thesis. Time also limits the technology selection to the existing solutions available during the time the study was performed. Technology in itself is a fast-developed area with continuous improvements, which might have affected the relevance of the application used as a tool during the pilot study.
1.7 Contributions
This master thesis intends to contribute with knowledge of how a department within the healthcare sector could streamline their communication in order to facilitate day-to-day operations using mobile ICT-solutions. The results from this report will also provide implications of the difficulties and barriers that occur regarding employees when implementing mobile communication channels in a healthcare department. Moreover, these contributions could be seen as valuable for other hospital departments across the country experiencing similar problems as the one at the infectious disease department of Danderyds University Hospital. Furthermore, from the results recommendations are made of how the infectious disease department should act and reshape their communication channels.

1.8 Outline
The presented master thesis is divided into seven chapters with belonging subsections, where the structure can be seen more in-depth in Table 1. For further information of what content each chapter includes, a short introduction is available in the beginning of every chapter. This also mentions how the RQs are addressed in order to fulfill the purpose of the thesis.

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*Table 1 - Disposition of Thesis*
2. Literature Review

In this chapter, appropriate literature is presented and described with a related discussion of their contribution to achieve the purpose of the report. Carefully selected theoretical frameworks the researcher intends to use are also presented in order to address the research questions at hand.

In order to introduce the subject of the thesis, an overview of the communication aspects applied for the study is provided. Two basic communication models are presented on which a foundation for a mobile application could be influenced by, depending on the demand from the management and different occupational groups of the infectious disease department. These models are helpful to define the required communication flow for the application used to address the main research question. By defining formal and informal communication, it facilitates the identification of internal communication channels reflected in RQ 1. Further, by analyzing the literature regarding organizational communication it is possible to get broader knowledge on how to approach the design of a communication channel as well as what to consider for the information flow. This helps to identify possible improvement opportunities related to RQ 2. As for the frameworks highlighted in the literature study, the implementation of a new communication channel that is to be applied initiates a change in a technological dimension. Hence, the change will affect the process and people dimension as well. Therefore, Murthy’s (2007) key dimensions of change management is an appropriate model to ensure an alignment of the three dimensions when implementing the application, relating to the main research question. As the people aspect should be emphasized in a change it is essential to highlight a framework directly anchored to the employees of the infectious disease department, which is reflected in RQ 3. Applying Stephen C. Hayes (2002) emotional phases of a change transition and the mobile service acceptance model by Gao et al. (2010) guarantee this and in the end fulfills the purpose of the thesis.

2.1 Communication

Communication consists of various complex processes, but can be simply summarized to transfer information from one point to another. Heide et al. (2005) describes communication as a social process to convey information in a message. There exist many theoretical models to describe communication processes, where Shannon and Weaver (1949) introduced the first major model and referred to it as the transmission model. It was the first schematic communication, which consists of three components: sender, message and receiver. In this model, the communication is seen as linear, where the message is transferred from the sender to the receiver. This linearity has been criticized for being unidirectional with isolated individuals and heavily sender oriented (Hallahan et al., 2007; Chandler, 1994), which makes the receiver being perceived as passive. Why the model is appropriate to emphasize in this study is that the linearity rather describes a communication process closer to information transfer in ICT than interpersonal communication between individuals. With this said, this standard view of communication could be seen as a powerful channel of influence and a critical dimension for a management to maintain efficiency with internal communication channels in downward directions.
Further, other scholars have expanded the process of communication and one additional model that is relevant to present for the purpose of this study is the interactional model. Wilbur Schramm (1954) is opposing a linear communication and instead promotes a circular process where both sender and receiver take turns to communicate. Compared to the transmission model, it has an expressed medium through which the message will be transferred. This is the condition for a circular communication where it becomes difficult to identify the beginning or the end of the conversation. To set interactive communication into perspective, it is comparable to Internet as the receiver can give feedback even in mass communication. However, the communication becomes linear if the receiver does not respond.

2.1.1 Formal and Informal Communication
There exist two types of communication in which people interact: formal and informal. Both ways are used on a daily basis, but are more or less appropriate in different scenarios. An overview of the differences of these communication types is presented in Figure 1.

![Figure 1 - Differences in Formal and Informal Communication](image)

**Formal**
The formal communication process is often used in for example meetings, performance reviews, mails, PMs and similar communicative activities required in an organization’s daily operations. Fred Lunenburg (2010) defines formal communication as the exchange of messages regarding official work in an organization. A formal dialogue is controlled and the content is limited, where the approach is determined by the structure of the organization (Falkheimer & Heide, 2011). This type of communication is suitable in predictable situations influenced by routine procedures. Falkheimer and Heide (2011) also state that the notion of formal communication includes the employee communication and feedback to the management in formal context as well.

**Informal**
Informal communication occurs during coffee breaks, lunch or in the hallway and is usually in form of interpersonal communication, but also includes conversations on social media. According to Fred Lunenburg (2010) informal communication could be defined as the exchange of unofficial messages unrelated to the formal activities of the organization. The conversations happen spontaneous and are not limited, which makes the dialogue difficult to
control compared with the formal communication. Falkheimer and Heide (2011) argue that the informal dialogue, in terms of volume, is the largest form of communication within an organization and has maintained a significant role in modern organizations. Research within the area describes informal communication channels as a useful tool with strong influences to promote a fast and efficient distribution of information (Davis & O’Connor, 1977; Kreps, 1990).

2.1.2 Communication within Organizations

Regardless of the size or type of organization, it cannot exist without an internal communication (Falkheimer & Heide, 2011). All companies communicate with their employees in one way or another and as an organization grows it becomes even more important to find suitable communication channels for the management to communicate among themselves as well as to the rest of the organization. Morley et al. (2002) argue that organizations succeeding to establish efficient communication channels perceive a more positive working environment, which facilitates the achievement of organizational objectives. Therefore, to establish an effective internal communication within the organization four types of functions are recommended to address (van Riel & Fombrun, 2007):

1. Structure – Relates to the formal and informal channels through which internal messages are conveyed.
2. Flow – The process of identifying how the information through the internal communication flows. If it is vertically or horizontally.
3. Content – Ensuring the appropriate and specific content for the information that is distributed.
4. Climate – Describes the climate and the nature of internal communication channels in the organization, i.e. if the employee perceive professionalism or open-mindedness.

The significance of communication within an organization has its origin from the 1990’s according to Högström et al. (1999), where big changes created new terms for companies and organizations. External factors forced a development that implied more complex organizational structures in order to cope with new business demands, which resulted in an increasing need for quick internal changes. This development has made the importance for efficient communication processes within organizations even more visible (Högström et al., 1999). It is difficult to realize internal changes and adapt to external demands without a well-functioning communication.

Högström et al. (1999) have identified an overwhelming information flow as one of the reasons for organizations to be proven unsuccessful when it comes to communication. During the 70’s and 80’s, Jan van Cuilenburg (1987) noticed a big increase in terms of the distributed amount of information in both society and in organizations. The amount of information continued to increase during the 90’s, where the modern information technology to a large extent contributed to the abundance of information (Högström et al., 1999). A deciding factor regarding the complexity of the problem with the amount of information is that the effect in form of; new knowledge, attitude change or action created from the information is constant
over time (van Cuilenburg, 1987). Consequently, it is difficult to affect employees through an increased amount of information. This has resulted in that the management must create time to sort and filter information within organizations.

An increased information flow within organizations might give rise to a problematic scenario for employees where Henrik Simonsen (2002) argues the difficulty to differentiate important information and its access location. All the published information on different communication channels generate according to Mats Heide (2005) a phenomenon called information overload, where employees struggle to find the right information at the right time. Since a large amount of information is of a general character, it is the managers’ responsibility to filter it for the right target group among all employees in order to establish well-functioning communication channels in upward and downward directions (Falkheimer & Heide, 2011; Bloisi et al., 2006). One of the most important communication responsibilities of the management is therefore to interpret the information and adapt the messages after the potential receivers in different target groups.

Furthermore, Bloisi et al. (2006) express the importance of internal communication to include both the upward and downward direction in order to involve employees and create feedback loops. By enabling an upward information stream where employees are provided with the possibility to confirm or give feedback to messages, it will be seen as encouraging and motivating. Harald Leawitt (2004) discusses the differences between using a one-way and a two-way communication within an organization. Using only a downward communication flow is more suited when the management demands fast transmitting of simple information, while a bidirectional information flow promotes accuracy and efficiency.

2.1.3 Strategic Communication
The term strategic has its organizational theory origin in the 1950s, where it was first used (Hatch & Cunliffe, 2012). At that time, the purpose was to describe how organizations could compete on the market to gain competitive advantage and obtain market shares. Prior, the term has in general been associated with warfare in its most negative context, but new notions of the word strategic has emerged since then to involve research regarding the roll of communication to formulate strategies (Hallahan et al., 2007). As well, strategic has through the decades been increasingly used in conjunction with change management (Hatch & Cunliffe, 1997; Gagliardi, 1986), to emphasize the role of using communication in organizational change (Ströh, 2005). A clear definition of strategic communication does not exist and a broad spectrum of scholars has attempted to explicate the concept. Hallahan et al. (2007) define it as the purposeful usage of communication in order for organizations to fulfill their missions, where their research focuses on trying to encompass a more participatory communication. In contrast, Argenti et al. (2005) promote a framework of strategic communication for the management relating to the importance of delivering messages through the most effective channel, both internally and externally. Benita Steyn (2003) instead focuses on strategic communication within organizations urging to anchor stronger links between the content being communicated and the employees, while Zerfass and Huck (2007) argue to extend the notion to include process of innovation and leadership. In general
it can be concluded that strategic communication primarily is associated with power and decision-making, which implies a hierarchal structure with a management function.

From these various approaches to define strategic communication, Hallahan et al. (2007) have addressed the emerging concept across six disciplines, where each discipline concerns a particular organizational purpose. They are practiced by different personnel within the organization and are as follows: management communication, marketing communication, public relations, technical communication, political communication and information/social marketing campaigns. This thesis focuses the strategic communication on the discipline of management communication, where personnel from the management and employees throughout the department are involved. Therefore, the definition of strategic communication used in this thesis is: “To facilitate the orderly operations of the organization. Also, to promote understanding of an organization’s mission, vision, and goals; and to supply information needed in day-to-day operations” (Hallahan et al. 2007).

2.2 Information Communication Technology
Using technology in communication has today become a standardized way in how we communicate with each other. As time goes on, emerging technologies are going to transform our communication methods to have an impact both among individuals and businesses. ICT is an extended term of information technology, which emphasizes the role of unified communication with the integration of telecommunication (Zuppo, 2012). It is often used to describe a wide range of technologies with the purpose to gather, store, retrieve and transmit information. Every business uses ICT in different ways to reach targeted customer segments as well as have they embraced technology to facilitate a communication within the organization. ICT has become an ever-increasing presence, where large and small businesses try to incorporate the latest technology. Regardless of the complexity of the implementation, an incorporation of new technology will be accompanied by change. Technological systems can act as a catalyst for achieving a desired change and Dennis Mumby (2012) argues that the evolution of ICT has been the largest single influence on organizational architecture and in specific organizational communication in different forms.

2.2.1 Mobility
Mobile technology has had a rapid development in recent years and changed the way organizations operate considerably. The concept of mobility is nowadays strongly associated with the use of mobile devices and has been defined by Stuart Barnes (2003) as a moving entity where the communication context still is active. Mobile devices are referred to items in tab sizes, which for example could be smartphones, tablets and to some extent laptops (Poslad, 2009). Mobility could bring great benefits to an organization if implemented successfully, where it has the possibility to enhance employee satisfaction as well as increase efficiency and productivity. Continuous improvements made regarding mobile devices suggest them to be a perfect alternative to desktop computers, since they easily can be moved and are able to perform more or less the same tasks (Poslad, 2009). A general idea of mobility is described by Stuart Barnes (2003) as a level of geographic independence of employees enabled by wireless data solutions. This is further strengthened by Voelpel et al. (2006) who
argue the cutting edge of mobility has enabled unlimited access to information independent of space, time and location.

However, the rapid development of new mobile services has made the adoption and acceptance difficult to manage. One model created by Gao et al. (2010) highlights important factors to consider at an acceptance stage. It promotes six constructs, which in turn determine whether the implemented mobile service gets accepted. The six constructs are (Gao et al., 2010): context, personal initiatives & characteristics, trust, perceived ease of use, perceived usefulness and intention to use, which is described more in depth in Table 2.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Context</td>
<td>Any information that can be used to characterize the situation of entities that are considered relevant to the interaction between a user and an application, including the user and the application themselves</td>
</tr>
<tr>
<td>Personal Initiatives and Characteristics</td>
<td>The user’s willingness to experiment with new services</td>
</tr>
<tr>
<td>Trust</td>
<td>The user’s beliefs or faith in that a specific service can be regarded to have no security and privacy threats</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>The extent to which a person believes that using a particular system would be free from effort</td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>The degree to which a person believes that using a particular system would enhance his or her task</td>
</tr>
<tr>
<td>Intention to Use</td>
<td>The user’s likelihood to engage the mobile service</td>
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</table>

Table 2 - Mobile Service Acceptance Model (Gao et al., 2010)

When implementing mobile services at a department it is important to consider the constructs Gao et al. (2010) mention. For the constructs, they are all to some extent affecting the acceptance of an implemented mobile service, either directly or indirectly. Depending on how well the mobile service aligns with the six constructs, the probability for a successful adoption increases.

2.2.2 Minimum Viable Product
In order to ensure the highest probability for an adoption of any kind of mobile service it is essential to introduce the right product to the whole department. According to Eric Ries (2011) most new ideas for products or services will not bring the expected value and even be entirely wrong. In order to create long-term success without committing huge resources into what ultimately could be a dead-end, one technique is to create a product or service with just enough value to make it attractive. This is where the minimum viable product, MVP, is of use. It is the concept of creating a product with few features where the main focus lies in gathering insights from user tests to continue development (Ries, 2011). For an idea, there will always be an accompanying value hypothesis, which states the actual value the idea will bring. By testing the MVP incrementally and iteratively to validate an alignment with the
value hypothesis from user feedback, it is possible to ensure resources are being well spent (Münch et al., 2013).

Therefore, in this thesis an already developed application was used on a smaller test group to investigate the effect an implementation of a mobile service has on the department. It is partly because the lack of resources and time to develop a customized application for the department’s need, but mainly to be able to make the first iteration in the MVP process and leave implications on how to continue based on the user feedback.

2.3 Change Management

As a technological implementation is accompanied by a change management process, it is of great essence to investigate how this change is going to affect the employees and the department as a whole. Change Management refers to a systematic approach for achieving a transformation in people, departments and organizations in order to move from an existing state to a desired future state (Hiatt & Creasey, 2012). Tim Fritzenschaft (2014) further explains it to include all activities, tasks and measures, which are essential in the transition process to perform changes in strategies, processes, system and behavioral patterns. If a change management project is to be successful, it is an efficient way to increase the productivity level by modifying and complementing existing organization systems. However, the implementation of a successful management project is rare. According to Meaney and Pung (2008) only one out of three organizational changes are realized with the expected result. A major reason for the low success rate is almost exclusively connected to the resistance of change from the employees (Dent & Goldberg, 1999; Ford et al., 2008). The resistance to change could, in the case of streamlining a business, have its underlying source in the fact that this type of change may result in an increased workload (Curry et al., 2006). In other cases the uncertainty of change is the threat itself, where changes could disrupt groups and relations (Kotter, 1995). According to Rune Todnem By (2005) there are several models and methods to set the path and facilitate the work of conducting change effectively, in order to help the management to structure change management projects.

2.3.1 Dimensions of Change Management

In order to increase the probability for a successful transformation within a change process, change management could be categorized into three key dimensions (Murthy, 2007). These key dimensions are technology, process and people (see Figure 2). The success rate for a change management project will be at its highest when all dimensions are aligned. On the contrary, when the relationship between them is not completely understood it increases the risk for the project to fail. Murthy (2007) continues to state that the difficulty level of each dimension is correlated to the impact of time and business, which are two factors to take into consideration in a change management project. The business impact implies if the change will solely affect operational activities, i.e. low impact, or have a higher impact if it involves strategic decisions. In the case of the time factor, it is directly influenced by the time it takes to resolve the change for each dimension. Regardless of the impact of time and business, the three key dimensions of people, process and technology are significant factors to coincide in a business or IT strategy to ensure success. Another remark of the framework linked to this
study is that the key dimensions are directly affected when a change is influenced by the introduction of a new ICT system.

![Figure 2 - Key Dimensions of Change Management (Murthy, 2007)](image)

**Technology**
When an organization is going to implement a technical solution, the expected value can be anchored to the benefits of the implementation. By analyzing the technology dimension of change management from the level of difficulty perspective, it can be seen that the technology aspect is the most time efficient dimension (Murthy, 2007). It does neither require a lot of time to implement compared to the other two key dimensions nor does it usually have a high business impact. The technology dimension implicates enhancing efficiency in processes, but according to Westerman et al. (2014) it is the outcome of people ensuring that things are done right.

**Process**
The process dimension is more time consuming in relation to technology, where implementations in operational activities must be approached more strategically with a direct impact on the business (Murthy, 2007). A prerequisite for a process is to have clear definitions in order to facilitate an alignment with the other key dimensions. By having the process well defined it is possible to identify the right type of technological solution that is required. Haron et al. (2013) further strengthens this by arguing that technology only helps when the organizational framework for a process is set. It helps the business to prepare for the technological change.

**People**
Among the key dimensions, the people perspective is considered as the most crucial and should be emphasized. It is on this level the change will be carried out and accepted. If people does not use the new technology it would not have an impact or contribute with the expected value. Therefore, the people aspect has the highest level of difficulty and is very time
It includes operational activities such as recruitment, retention and training, which in fact has a low impact on the business but are considered as just as important (Murthy, 2007). People are primarily seen as the major driver in reaching change management success, but in order to succeed the organization must also provide the employees with a supportive leadership. Subir Chowdhury (2002) and John Kotter (1996) argue about the importance of strong leadership where the management has to take the initiative and lead the change. In this dimension, the leaders have the responsibility to ensure that all components of the change are integrated, i.e. linking the whole organization system (Cameron & Green, 2015).

2.3.2 Individual Change
Change management is a wide concept, but can quite bluntly be narrowed down into three perspectives: organizational, group and individual level. As the people aspect of a change often is seen as the major driver, it is essential to include the employees’ attitudes, feelings and emotions in order to consider the individual level in change management. John Kotter (1996) identifies the extra effort needed in the process of learning new knowledge as well as breaking old habits are reasons behind a human resistance towards change. This is further strengthened by Tom Karp (2006) who argues that the resistance to change occurs when behavioral patterns changes in which employees are familiar to, understand and control. It becomes even more evident when the change is initiated in departments of larger organizations and the force comes from external initiators. In these cases it is of great importance to have knowledge and understand how to manage this resistance on an individual level.

The process of dealing with resistance is preferably done in an open-minded manner with a fundamental emphasis on the approach from the perspective of the employees. If the resistance to change from the employees is to be ignored there is an increasing probability for the change initiative to fail (Recardo, 1995). In order to cope with the resistance, it is of necessity to understand possible emotional reactions from the employees. According to Stephen C. Hayes (2002) there are seven phases of emotional reactions every person has to go through during a change process (see Figure 3).

![Figure 3 - Emotional Phases of a Change Transition (Hayes, 2002)](image-url)
This model gives the possibility to facilitate an understanding of why people have a resistance to change and how to approach this phenomenon. Normally, the initial emotional state people experience when facing change is (1) **the shock phase**. This is a direct consequence of insufficient preparations for the change without any issued warnings (Balogun & Hope Hailey, 2004). Shock arises from the mismatch of how things become contra how employees believe things should be. Tim Fritzenschaft (2014) emphasizes that employees might feel overwhelmed and the emotional state can be characterized as immobilizing. To encounter this during the early stages, Stephen C. Hayes (2002) urges the importance to prepare the employees for the upcoming changes in order to create readiness as well as willingness.

The second phase is referred to as (2) **the denial phase**, where employees often deny the need for change (Fritzenschaft, 2014). Here, it is a high chance for the employees to ignore the change initiative and proceed with normal routines. This behavior from the employees result in the resistance to change reaches its peak, as they “cling to the past” (Hayes, 2002).

For the next phase, (3) **the depression phase**, Lines et al. (2015) express that the transformation becomes obvious and new processes are being implemented which forces people to change. Employees can feel depression and frustration towards dealing with new situations, as the change is impossible to deny at this stage.

The fourth phase is called (4) **the discarding phase** and is influenced by an acceptance of a new reality, where the recognition of change is highlighted among the employees. In this phase the employees look forward to new changes of the organization (Hayes, 2002). Colin Carnall (2007) states that the change is looked upon as necessary as well as unavoidable.

When the employees now begin to participate in the change, (5) **the testing phase** will initiate and people will explore and cope with changing situations. It can be described as “trial and error”, where new skills are learnt as employees try out new methods. This phase is fragile according to Stephen C. Hayes (2002), where employees who fail once more might question the importance of the implemented changes and regress to more familiar ways. In this step it is essential to emphasize employees that have succeeded to recognize the necessity of change to act as a catalyst and a motivational force for other people to follow (Fritzenschaft, 2014).

Later on, (6) **the consolidation phase** is reached where the employees start to realize the meaning behind the change. Colin Carnall (2007) argues that the implemented changes are acting as the “new norms” when a mutual understanding exists among the employees. At this stage it is clear to see the implemented change on an individual level.

The seventh and last step people go through in a change initiative is (7) **the internalization phase**. All employees have in this phase accepted and modified the new processes and behaviors (Hayes, 2002). Tim Fritzenschaft (2014) claims that the initiated changes are not integrated into daily operations and considered the normal way of working until a person has reached this phase.
3. Method

In this chapter the research process is described as well as the different methods that were used in order to conduct the case study. Further, the chapter also presents a more practical assessment of the approach regarding information gathering with its foundation in literature review, interviews and the pilot study. A critical evaluation of the approach is also provided in form of a discussion regarding the quality of analysis used in this thesis. The aspects in the discussion are validity, reliability, generalizability and ethics.

3.1 Research Design

This thesis is based on a case study approach, where the focus has been on investigating the communication channels at the infectious disease department at Danderyds University Hospital. Elements of activities made at the department are of a descriptive nature, where a descriptive research was used to find patters in order to formulate a conclusive solution to an existing problem (Collis & Hussey, 2014). The research process of this thesis can be derived from different qualitative methods in form of a pre-study, interviews and a pilot study. Based on these qualitative methods, research data have been gathered in form of primary data with the aim to interpret and analyze. This implies that an interpretivist paradigm has been used throughout the study, where Collis and Hussey (2014) argue an interpretivism approach tends to produce rich and subjective qualitative data. Its definition states that the researcher interacts with the phenomenon during the study where knowledge comes from subjective evidence (Collis & Hussey, 2014). The interpretations of the primary data are analyzed in relation to secondary data, which has been collected through an extended review of literature. An overview of the research design of the thesis can be seen in Figure 4.

![Figure 4 - Research Design Process](image-url)

Initially, a pre-study has been made with the intention to gain a wide knowledge base and understanding regarding both the infectious disease department and the stated problematization. This was done through observation sessions at the department, where the researcher followed employees in their daily working routines. An observation methodology is well suited for a descriptive research approach. By doing these observations, the researcher was able to generate knowledge to formulate a researchable problem as well as identify
relevant literature. This approach, where knowledge is gained through observations is to an advantage if the phenomenon is to be determined, described and identified. In conformity with an inductive approach, it facilitates the formulation of focused research questions. This is further strengthened by the fact that the empirical findings show which theory was of interest for the thesis (Blomkvist & Hallin, 2014). Based on the pre-study, the literature review had its major focus on finding literature regarding communication as a concept, models and in specific organizational communication. In addition, the process of gathering secondary data also included all information related to change management as well as ICT in the context of implementing a mobile application in order to find appropriate theoretical frameworks.

From the pre-study and literature review, sufficient knowledge had been gained in order to conduct three semi-structured interviews with the management to establish a needs analysis of the department regarding their communication. Based on the needs analysis, a mobile application have been chosen and tested in a pilot study. For the pilot study a test group consisting of thirteen people participated including different occupational groups at the department. A two-step evaluation was made, where a small survey and a panel discussion was included in the evaluation process.

All the methods used in this thesis have enabled the researcher to practice data and methodological triangulation, where it was possible to ensure information from different sources were not reflected as biased (Collis & Hussey, 2014). By collecting data from multiple sources describing the same phenomenon the information could be tested by assessing their correlation. In addition, the usage of different methods to study the same phenomenon should provide both higher reliability and validity, given that they reach similar conclusions (Easterby-Smith et al., 2012).

3.2 Literature Review
For this case study a literature review has been conducted, focusing on communication as a concept and to some extent models as well as parameters to consider when implementing communication channels. In addition, theoretical frameworks related to change management have influenced the literature review as well as the implementation of ICT solutions. The search for relevant literature was broad in order to gain a wide knowledge base. Before it gradually funneled down to focus on communication within organizations in a general perspective and frameworks concerning how to integrate technology with regards to the people aspect of an organization. A more in-depth research with more specific search results could be applied when the identified problem was clear. This process has been continuous throughout the whole case study, as the researcher has worked inductively to find relevant theory in relation to the empirical findings. To gain as much knowledge as possible regarding the phenomenon of communication during a limited time, the literature study entails identifying already published material in the specific field to be able to facilitate the creation of new knowledge (Blomkvist & Hallin, 2014). Therefore, the literature review could be summarized into the following steps: (1) generate search terms based on empirical findings, (2) identify relevant literature using different databases, (3) critically analyze the gathered
secondary data and (4) re-evaluate and re-formulate the research questions depending on the findings from empirics and literature (if necessary).

In the process of gathering significant information at an early stage of the thesis, the main sources that provided literature were the search engines Google Scholar and KTHB Primo. From this, multiple types of sources such as various scientific and research articles, books and other published material were used in order to gain the needed knowledge base. To facilitate the processing of all information a thematic analysis was applied, where a categorization of compiled data is generated in major areas (Blomkvist & Hallin, 2014). The areas this thesis concerns are: communication, ICT and change management. By using keywords and phrases for the in-depth search for literature, it ensured the provided information was sorted and well structured. Following keywords were used to conduct the literature review:


These keywords were carefully selected as a foundation to identify potential knowledge gaps in the infectious disease department’s current communication routines related to theory. Blomkvist and Hallin (2014) argue that the literature review indicates how the author will continue to build on existing knowledge in the specific field and consequently show the intended contributions. By analyzing the empirical findings in relation to the literature, it facilitates a comprehension regarding the communication methods used in practice as well as the possibility to identify constraints, which relates to the research questions in the thesis.

3.3 Data Collection
In this section, the methods used in the case study regarding data collection of the primary data will be presented and described in more detail.

3.3.1 Pre-Study
In the first phase of the thesis a pre-study was conducted in order to gather valuable insight regarding the infectious disease department and how the employees behave in their daily routines. The method that was used in order to collect data was observations, which occurred in a natural healthcare setting with the aim to observe the phenomenon of communication within their everyday situations at the department. This was done in four observation sessions, where the researcher had the opportunity to follow nurses and assistant nurses during their shifts. Additional data to strengthen the observations were gathered by asking the person the researcher was following regarding their view on communication within the department from a wide selection of questions (see Appendix A). According to Robert Yin (2009), it is efficient to complement less formal observations protocols, such as taking notes, with additional pre-determined questions. From this, it was possible to get a comprehensive understanding of the departments different operating areas related to communication. As the researcher’s role in the observation sessions extended to be fully involved with the employee
and the researched phenomenon, not only shadowing how they act at work, it can be described as a participant observation (Collis & Hussey, 2014). With this specific method, it is possible to obtain a detailed understanding regarding the observed persons’ perception of a certain phenomenon.

As for the observation sessions, it consisted of two shifts with assistant nurses as well as two shifts with nurses (see Table 3). By choosing to follow two different occupational groups, it facilitates the process of mapping a more detailed view of the different communication channels at the department since the groups have different level of responsibilities. This detailed view is essential to establish at an early stage according to Blomkvist and Hallin (2014), as assignments from external companies often includes studied phenomena that are so complex it can point in several different directions. Furthermore, the observations were done with a mix of morning and evening shifts in order to experience the different work tasks the shifts had to offer as well as investigate how the communication channels are used in those scenarios.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Nurse</td>
<td>2017-01-27</td>
<td>07.00-15.00</td>
</tr>
<tr>
<td>Nurse</td>
<td>2017-01-31</td>
<td>07.00-15.00</td>
</tr>
<tr>
<td>Nurse</td>
<td>2017-02-01</td>
<td>14.00-21.00</td>
</tr>
<tr>
<td>Assistant Nurse</td>
<td>2017-02-02</td>
<td>14.00-21.00</td>
</tr>
</tbody>
</table>

*Table 3 - Observation Sessions*

From all observation sessions the researcher could elaborate three concrete problem formulations regarding communication suitable for a master thesis with respective approach to research them. These three propositions were presented in the final stage of the pre-study in a so-called reference group meeting. The reference group consisted of three people from the management, three physicians and two nurses. At the meeting they had the chance to give feedback on the ideas and in the end selected the project that would bring the most value for the department in a long-term perspective.

### 3.3.2 Interviews

One of the sources to provide empirical evidence came from three conducted one hour semi-structured interviews with the management (see Table 4). The decision to use semi-structured interviews as a method was to guide the respondent in a preferred direction without setting boundaries, in order to ensure a sense of freedom and independency in their answers (Blomkvist & Hallin, 2014). Qualitative data gathered from these interviews was the foundation to establish a needs analysis of the department regarding their communication. In addition, the interviews also addressed RQ 1 directly regarding existing internal communication channels and to some extent addressed RQ 2, which related to the improvement opportunities in their communication.
Together, the combined positions of the respondents covered a broad spectrum of the department, which in turn gave qualitative data applicable on the department in general. All three respondents were of high managing positions with different work responsibilities. Their experiences within the department made it appropriate for them to participate and were selected in consultation with the external supervisor at CIF. In the first interview, the respondent was the Care Unit Manager who has the administrative responsibility of the infectious disease department. With this competence, it was an opportunity to get an overview over the whole department, how they operate related to communication and in what areas they are lacking. For the second and third interviews, with the Nurse Manager and Chief Physician, the aim was to get more specific information regarding a specific target audience, i.e. nurses and physicians. By interviewing these people with the responsibility of a whole occupational group, it was possible to get the group’s perception of the studied phenomenon of communication without having to conduct several interviews within respective group.

Each conducted interview was audio recorded, for which approval has been asked beforehand. This choice was made in order to facilitate the transcription process as well as having access to original statements. Also, it was done to avoid misinterpretations in later stages during the analyzing process. To complement the recordings, notes were taken in parallel to ensure a general impression of the interview. In case of the need for additional information in areas that was not covered during the actual interview, the respondents have been asked either via mail or phone.

When working under an interpretivist paradigm, the process of designing interview questions requires considerable knowledge regarding the phenomenon beforehand (Collis & Hussey, 2014). Therefore, the questions for the interviews were developed in line with an analysis of the literature review related to communication in combination with observations of the department from the pre-study (see Appendix B). The interviews included open-ended questions regarding situations when the communication is challenged as well as more specific questions related to the respondents’ perception of communication in the department. This was done in order to cover important aspects that must be taken into consideration when implementing a new mobile communication channel. An influence in the development of the interview questions came from the Star Model developed by Jay R Galbraith (1973), where he argues there are five perspectives to cover in order to gain knowledge of an organization’s design and understand how they operate within departments. The five categories of the Star Model are: strategy, structure, processes, rewards and people. Therefore, to be able to get a deeper insight into their current communication methods and identify possible improvement opportunities, the interviews covered all the important perspectives of the Star Model.
3.3.3 Pilot Study
In this thesis, a pilot study was used in order to evaluate a mobile application in practice at the infectious disease department. Based on the findings from the interviews regarding identified improvement opportunities, a mobile application was selected to best match the needs analysis compiled from the employees and the management. Gathered data from an evaluation linked to the usage of the mobile application made it possible to analyze how the implementation got accepted by the employees, related to RQ 3. In the end, the pilot study also served as a foundation for a discussion if a mobile application could improve their internal communication, which is anchored in addressing the main RQ.

For the mobile application, the decision fell on the team collaboration tool called Slack. Slack is a communication tool that initially was meant for organizational communication but has slowly developed into a community platform. It allows people to create a team for a specific purpose, where it is possible to establish both private and public channels organized by topics as well as direct messaging between members (see Figure 5). Slack also offers features to search all content inside the team, including files, conversations and people with an alternative to turn off notifications during specific times of the day among other things. (Slack, 2017) These mentioned features are the main reason why the researcher considered Slack to be an appropriate tool for the infectious disease department to use as a communication channel. As it is fairly unfamiliar to the general population and therefore the employees as well, an ulterior motive to why Slack was chosen compared to other well-known alternatives is that boundaries between private and work life gets more distinguished.

![Figure 5 - Layout of Slack](image-url)
This application got tested on a pilot group consisting of thirteen people, spreading across occupational groups of the management, physicians, nurses and assistant nurses. It was a small scale preliminary testing over the course of two weeks in order to evaluate the different functions Slack had to offer. As for the group it was assembled in consultation with the management, where a number of employees got asked if they were interested in participating in the pilot study. This ensured an overall voluntary participation with incitement towards the application. One important aspect was to have a mix of occupational groups and participants of varying ages to actually challenge the employees as well as the technology. In order to start using the application at the infectious disease department in practice, the researcher held an educational seminar lasting one hour to instruct the participants. By having a session to educate the pilot group regarding the different features of the mobile application, it ensured a higher usage from the whole group, as they became aware of the overall functionality. Also, this made it more likely to get a good foundation of material for the results to a larger extent. During the pilot study additional questions from the participants regarding Slack were answered in person and through the application in direct messages.

In connection with the pilot study, a two-step evaluation was made consisting of a survey and a panel discussion. The first step was a short twelve-question survey (see Appendix C) with a mix of open and closed questions. Its purpose was to evaluate the application more in-depth and individually before complementing with a panel discussion to get the most out of the evaluation. For the survey, the responses were collected online and distributed via the used application in the pilot study. Further, the panel discussion was held at the department and lasted for one hour. It was designed as an open discussion where the participants had the opportunity to highlight their own opinions regarding the application. However, in order to gather data of high quality a set of predetermined discussion questions were used to ensure the evaluation included specific areas (see Appendix D).

3.4 Quality of Analysis
In this section, a discussion regarding the quality of methods and sources is presented. It has its foundation in three evaluation areas, which are: validity, reliability and generalizability. In addition, a discussion regarding ethics of the thesis is also included.

3.4.1 Validity
The concept of validity is according to Collis and Hussey (2014) a tool to ensure to which extent a research measures what it is supposed to measure as well as how the results reflect the studied phenomenon. For this master thesis, the most essential groundwork in order to ensure high validity of the results was the use of triangulation to overcome the disadvantage of implicit bias. In particular, both data and methodological triangulation, where data has been validated through cross verification from multiple sources and methods. A number of scholars agree upon triangulation as a method to search for regularities in research data in order to produce more detailed and accurate results of a whole phenomenon (O’Donoghue & Punch, 2003; Denzin, 2006).
An important aspect to consider in a discussion regarding validity relating to observations as a data collection method is the risk of the Hawthorne effect (Adair, 1984). It is an effect where people improve their usual behavior when being observed by an external participator. Therefore, the observations might be influenced by the Hawthorne effect, where the observer’s perception was altered compared to the actual occurrences at the department and in that case somewhat decrease the validity of the collected data. This has been limited by the fact that multiple observations were made with different participants.

In addition, the literature review was based on scientific articles published by well-known research journals as well as books written by authoritarians within their respective area, which provides rather high validity. As far as the expected validity concerning the interviews, it was anchored in the level of competence possessed by the respondents. Since the thesis focused on investigating communication within the infectious disease department, it was vital to have respondents with expertise within the area of interest. By interviewing respondents with high roles in the management it is likely they have good insight in the departments operation related to communication. Further, the choice of semi-structured interviews resolved the issue of ambiguity during the interview, where a possibility for explanatory questions existed in order to increase the validity (Collis & Hussey, 2014).

When it comes to the choice of application, the design of the pilot study was influenced by relevant findings from the observations, literature and the interviews. In addition, to involve thirteen participants has strengthened the validity of studying communication in the application. Testing usability and different functions often requires approximately ten people to provide analyzable results (Hwang & Salvendy, 2010), which was covered in this thesis. What could instead reduce the relevance of the assessed validity with the evaluation process might be poor samples and misleading measurement. Inaccurate measures could be one factor affecting the results from the evaluation and act as a research error.

### 3.4.2 Reliability

The notion of reliability refers to which extent the study could be replicated and still generate similar results (Collis & Hussey, 2014). In relation to the gathered secondary data through the literature review it could be argued that the reliability for the thesis is expected to be rather high. This is because the original sources are well documented in the reference list, with detailed descriptions of used keywords and search engines. It facilitates a reproduction of the literature review, where the gathered data is organized thematically with necessary areas to investigate.

However, from a critical point of view, what could decrease the reliability in this case study is the fact that involved persons are kept anonymous, both during observations and interviews. This could problematize the repeatability, where respondents are referred to as their professional role. For the observations, a lower source of reliability could be identified since an observer might have different perception of the observed phenomenon compared to someone else. To increase the reliability of this method a sheet with predetermined questions was used, which ensures a certain type of similar results if the observations were to be
repeated. Further, semi-structured interviews are generally characterized with lower reliability since different respondents might provide different answers to identical questions. To increase the repeatability to some extent, the interviews were recorded in order to have the possibility to re-listen and facilitate the transcribing process. This is in accordance with Patel and Davidson (2011), who emphasize an increase in reliability if the interviewer records the conversation to reuse it later.

As for the pilot study, it is difficult to assemble an exact group of individuals with the same attitude and perception towards technology in order to obtain similar results. However, the mixture of different occupational groups and age variation could easily be obtained. As well, presented evaluation questions increase the reliability of the research in order to direct an attempt to repeat a similar pilot study.

3.4.3 Generalizability
According to Collis and Hussey (2014), generalizability refers to which extent the research results can be extended to other settings. In general, an interpretivist research is very limited when it comes to generating generalizable results, as it is not an expected attribute in qualitative methods (Williams, 2000). As the phenomenon of investigation relates to communication in organizations and in specific a healthcare department, the findings are based on how the infectious disease department is operating. It does not necessarily mean that the research has lower generalizability since many departments within the healthcare sector operates in similar ways. In addition, a mobile communication application like Slack is applicable on various working groups operating across different working contexts with indicated lack of communication. Therefore, it can be argued the generalizability is rather high in the overall findings, independent of the usage of an interpretivist study.

For the method choices in specific, the interviews have been conducted with people covering different roles of the department. The care unit manager has insight regarding how the management operates relating to the studied phenomenon as well as the nurse manager and chief physician covers perspectives of their respective target groups. By doing so, the diversification of the empirical findings could increase in generalizability and be applicable in the department’s different occupational groups as well as operating areas relating to communication. On the contrary, the pilot study could be considered to have a lower generalizability since solely thirteen participants are involved. It could be argued that this is not sufficient in order to produce generalizable results.

3.5 Ethics
From an academic researcher’s perspective a master thesis could be seen from two different levels: a national and an internal. On the national level a researcher has common ethical codes in Sweden within social science: the “Swedish Research Council’s principles of ethical research for the humanities and social science” and is summarized into four requirements involving information, consent, confidentiality and good use (Blomkvist and Hallin, 2014). Further, on the internal level a researcher must investigate whether ethical principles exist within the university or organization the study is taking place at. Therefore, the ethical principles of the KTH Royal Institute of Technology have been taken into consideration when
conducting the literature review. Gathered secondary data from published sources followed the guidelines regarding plagiarism and research misconduct from an academic perspective.

For this master thesis, it was conducted at the infectious disease department at Danderyds University Hospital. Since it is a healthcare department at a large emergency hospital, one stipulation in order to gain approval and be granted access to write the thesis was for the researcher to sign a non-disclosure agreement (NDA). This legal contract specified that sensitive information would not be leaked or disclosed to a third party, relating to the confidentiality requirement of the ethical codes. Sensitive information regarding the department and patients in general has been handled with highest concern. Further, all respondents of the interviews have been offered anonymity with regards to confidentiality. An intentional choice in order to prevent the disclosure of any kind of sensitive information linked to specific persons. Consequently, the only information provided for respondents is their position at the department.

Additionally, the interviews as well as the pilot study have covered the remaining aspects of ethics relating to information, consent and good use where all people participated voluntarily. Respondents have been clearly informed of the purpose of the thesis and that it will be used for its purpose solely. This was also done in order to ensure that the respondents felt comfortable with providing information and not exposing something without their consent.
4. Danderyds University Hospital

In this chapter a description of the empirical setting of the case study is introduced, where Danderyds University Hospital is presented briefly followed by CTMH and CIF. Further, a more detailed description of the infectious disease department is provided, with an organizational structure as well as the communication flow within the organization.

Danderyds University Hospital is a wholly-owned subsidiary of Stockholm County Council, SCC, where it was founded in 1922 and is one of five hospitals under SCC’s responsibility with large emergency units. Specialized areas consist of internal medicine, cardiology, infectious diseases, orthopedics, obstetrics & gynecology and surgery & urology. Danderyd is northern Europe’s largest maternity hospital; where close to ten percent of all children in Sweden are born here. As of emergency patient seekers, Danderyd welcomes 85 000 patients yearly, of which a third is admitted to the hospital. There are approximately 3 800 employees working across 540 hospital beds. (Danderyds Sjukhus, 2017b)

Danderyds University Hospital has a mission to conduct planned and emergency specialist care, clinical training and patient oriented research for current and future patients. This falls into collective values including three stances of policy within quality and care (Danderyds Sjukhus, 2015):

1. Provide healthcare on equal terms based on the patients’ need
2. Show respect for each individual
3. Take responsibility to develop and improve the healthcare

To be able to offer modern care, satisfying the patients’ expectations and meet the medical care need of the future, SCC has decided to invest in public healthcare. This means, for Danderyds University Hospital, a new emergency care unit as well as renovation and refurbishment of existing departments. In addition, this also implies an increased assignment within colorectal surgery, neurology, pulmonary medicine, urology and infectious diseases where the hospital will receive more patients. (Danderyds Sjukhus, 2015)

4.1 Centre for Technology in Medical and Health
CTMH is a cooperative organization between the Karolinska Institute, KTH Royal Institute of Technology and SCC. The organization has the aim to contribute to the development of the Stockholm region to become the front-edge of medical technology. CTMH works as an interdisciplinary organization with the vision to utilize the potential from the different educational institutes in order to shape a unique development environment in Sweden as well as forming world leading medtech startups. It can be seen as a platform that stimulates the exchange of knowledge and competence between business, academia and healthcare (CTMH, 2017).
4.1.1 Clinical Innovation Fellowships
CIF is a program within CTMH and is executed on a yearly basis. Each year a new multidisciplinary team is recruited, where participants have different backgrounds including professions within medicine, business, and engineering. The purpose of CIF is to identify clinical needs and challenges across different healthcare areas and departments in order to improve the overall healthcare. This is done through countless of observations, which is acting as a foundation to create solutions to address those needs. (KTH, 2017)

During the autumn of 2016 CIF identified a need, which later became the foundation of this thesis, where the growth of the infectious disease department puts pressure on their communication channels. This identified need was suitable for a master thesis project and in combination with the observations during the pre-study, a concrete problematization was further developed and studied more in-depth.

4.2 Infectious Disease Department
The infectious disease department is divided into an inpatient and outpatient care. In the outpatient care, they receive patients where physicians can give medical treatment that does not require an overnight stay at the department. On the contrary, the inpatient care treats patients with more contagious and complicated infections, which require multiple days of medication. These infectious diseases could be for example pneumonia, sepsis and different tropical diseases. (Danderyds Sjukhus, 2017a)

In early 2017, the infectious disease department has expanded from solely one departmental floor to consist of three floors. Consequently, the department has increased its inpatient care by 150 percent as well as increased the outpatient care by 750 percent, from 1500 to 10 000 yearly patients. To cope with this expansion, the department has staffed over 100 employees including managers, physicians, nurses and other personnel (see Figure 6).

![Organizational Structure](image)
As it could be seen from the representation of the organizational structure, the three care unit managers are responsible for respective employees on their department floor and the outpatient care reception. Accordingly, the physician manager is accountable for all physicians, but with the assistant of two so-called medically responsible physicians. Linking all managers together is the operations manager, who has the head responsibility for the overall department operations at the infectious disease department. This occurs in close collaboration with the chief physician and the nurse manager, who are acting as support functions to the operations manager.

4.2.1 Information Flow within the Department
At the infectious disease department, the operations manager is responsible to transfer information regarding the department to all managers in meetings. This information is constantly flowing in a downward direction with feedback along the way in opposite direction. All managers are obligated to process the information and convey it to all employees it is concerning. It is done over four different formalized communication channels (see Figure 7) in order to spread the information more efficiently.

![Figure 7 - Information Flow](image)

In specific, operations related information directly affecting the employees is preferably distributed through workplace meetings in any form, where a discussion among the whole working team is possible. Elsewise, there is a continuous information flow at the department where news are mediated to the employees over the intranet. In addition, a weekly letter is published at the end of each week that summarizes all information and news regarding the department.
5. Results

In this chapter the empirical results from the pre-study, the interviews and the pilot study are presented. Both the pre-study and the interviews were valuable methods in order to gain insight in the infectious disease department’s formalized internal communication channels as well as identify improvement opportunities, related to RQ 1 and RQ 2. However, to address RQ 3 and the overall main RQ the major focus instead was on in the pilot study. It facilitated an understanding of how an implementation of a new mobile application would get accepted by the employees and in the end improve the internal communication.

5.1 Results from Pre-Study

Beginning of each shift nurses and assistant nurses are divided by rooms, which they primarily are responsible for, but naturally they are helping each other with respective patient. The responsible nurse for the rooms from the previous shift sat down with the ones taking over the same rooms and handed over information regarding the patients. It was to ensure they had the latest update of all patients and what happened during the shift before. Each day at nine o’clock there was a morning meeting with all nurses and assistant nurses on respective departmental floor, where a physician or care unit manager did a quick check up on all patients and delegated work thereafter. After the morning meeting nurses did rounds with the physicians in charge, where they analyzed patient’s tests and samples to ordinate right medication and treatment depending on the outcomes from the samples. The assistant nurses on the other hand prepared medications for the day and did regularly checks called mews, which is a medical service to quickly determine the patients’ degree of illness. Hereafter, the shift continued with the different specific exams and medical procedures for each patient and administrative work where nurses registered the patient’s health in their medical records.

During the pre-study, observations were also made in relation to their daily communication as well as gained knowledge regarding communication through unstructured questions. While the observations were made, the interaction did not solely consist of the appointed nurse or assistant nurse. There was a possibility to talk to everyone working at the department at different occasions. Before and after shifts, the current communication occurs via social media and in specific an after work group on Facebook. However, during the shifts the employees preferred informal face-to-face communication and phone calls, but they also used more formal communication methods such as mail and over the intranet. Overall they considered the information to be easily accessible both PMs in the mail as well as news and weekly letters on the intranet. However, a routine check of newly provided information occurred solely once a day, in many cases, when the employee arrived at the department as a consequence of very slow login systems. Additional information from the management during the workday is in form of information transfer between persons. For a nurse, the communication with physicians and assistant nurses is of most importance where they work as an intermediary between the two. In the rounds, physicians and nurses discussed appropriate treatment methods, which are then communicated to the assistant nurses in order to facilitate the assistance and awareness of patients.
Another type of formal communication experienced at the department was the weekly workplace meeting every Thursday. Here, employees and the management were gathered to discuss topics concerning the department and try to find solutions on current problems. Since all occupational groups were present at this meeting, it acted as a forum to communicate information from the management to the entire department.

Where it became possible to identify deficiencies in some cases related to their communication methods was when a person needed assistance with patients to evaluate the most appropriate medical procedure. It could be added that these kind of situations were common where a person wanted to be in touch with another colleague. If the person in question was not at the department at that time, it was difficult to come in contact with that person. Interdepartmental communication between floors in the infectious disease department’s current state could be identified as very limited and sparse.

5.2 Results from Interviews
In this section three semi-structured interviews with representatives from the management are presented. In order, the interviews consisted of the Care Unit Manager, the Nurse manager and the Chief Physician at the infectious disease department. The interviews highlighted aspects on the existing communication methods and how the management communicates information on a daily basis. They also provided a foundation for a needs analysis with requirements from the management as well as different occupational groups regarding a new communication channel.

5.2.1 Care Unit Manager
The first conducted interview was with the Care Unit Manager at the infectious disease department. As a Care Unit Manager, the work assignment involves administrative activities regarding the department with focus on economy, personnel and development. With over twenty years of experience in emergency medical care, whereof ten of them at a leading position as a line nurse and flow coordinator, the respondent got employed as a Care Unit Manager in the fall of 2016.

During the interview, the respondent identified their formal communication channels to include: (1) intranet for weekly letters and news, (2) email in case of additional staffing, (3) informational board placed around the department regarding specific daily information and (4) spoken communication in form of workplace meetings. Nurses and assistant nurses are provided with information on these communication channels, but the employees neglect the distributed information. In addition, there does not exist a formal communication channel specifically for the physicians.

“If the employees are unaware of information and occurrences at the department, it is because they choose not to look into the provided communication channels”

What is problematic with their current communication methods is that the information solely includes employees working at the time, whereas remaining personnel outside the workplace with an interest of the information does not have access to it. Here, the Care Unit Manager
identified a need to have the possibility to reach out with information to all the persons concerned. This could be in form of a notice where the employees could make an active decision to further pursue the information if they feel it is of importance to them individually. The respondent continued to discuss the gravity of the balance between private and work life, which is a significant factor to consider in a new communication channel.

A recent incident was described by the Care Unit Manager that summarizes how the current process of communicating information could lead to miscommunication. To cope with an increasing number of patients as the organization grows, the management had to cover six overtime shifts a day. The employees complained at the Monday, which escalated on the Tuesday and Wednesday with the consequence to shut down four beds on the Thursday, due to the lack of nine nurses. News regarding the situation was provided on the intranet, informally at the department and through the informational board. At the workplace meeting the same day, the management got criticized for how they communicated the information. To make it available on the intranet before notifying them and gain approval from the employees personally was something they did not accept. Remaining personnel that did not participate in the workplace meeting but were supposed to work the day after were unaware of the taken actions, which created confusion.

“When the employees express dissatisfaction actions need to be taken, which will not be appreciated by all. The problem lies in how this type of information should be communicated in order to prevent misunderstanding and confusion”

As the organization grows, the Care Unit Manager expressed challenges regarding communication to include the distance between colleagues. An informal communication disappears, where the respondent believes a bidirectional communication might give a perception of closeness. However, it would be pointless unless the information reaches the receiver in order to engage communication. Meaning everyone has to be communicating on the same platform.

5.2.2 Nurse Manager
The second conducted interview was with the Nurse Manager who has the head responsibility of the nurses and assistant nurses. Primarily work tasks as a Nurse Manager involve patient safety controls and quality development with the major focus on educational seminars. In short, it means the respondent is responsible for evaluating the current competence at the infectious disease department and if it is needed, sending employees to educational seminars in order to increase the overall area of expertise. This is to ensure the patient safety is maintained. Originally, the respondent has worked as a nurse and researcher with published theses in the area of sore and resistant bacterium, but has been employed at the department for the last 29 years.

As a Nurse Manager, the respondent has received complaints from both nurses and assistant nurses where they have expressed a dissatisfaction regarding a lack of information. Consequently, they perceived that the management does not listen to their requests, which in
some scenarios have generated a chain reaction that is difficult to manage. The respondent further argues shortcomings always exist in a communication process and that it is difficult to please everyone. However, several improvements have been made in the last six months where the management actively has been working to improve communication methods at the department. At each workplace meeting, the management mentions the importance of reading news and weekly letters on the intranet, i.e. the information the employees seek exist. Furthermore, there is always a possibility to reach people in the management through mail, open-door policy, request a meeting etc.

“Statistics regarding how often employees log onto the intranet and read news and weekly letters show that it should not be possible to complain about lack of information”

One thing that bothered the respondent is the weak responsiveness from the employees when it comes to reading emails as well as provided information on the intranet. According to the Nurse Manager it is not unusual with incidents where important emails never get opened and therefore questions how to reach people in an efficient way. The existing communication channels used today would work in practice if everyone started to use them. For the respondent it is the employees’ responsibility to seek correct information, not wait for it to be delivered through coworkers. Information provided by the management goes unread and the respondent identified a need for a communication channel including a notification to the employees when important occurrences happen at the department.

“If employees are ill or on vacation it is optional to choose whether an update regarding the department is needed, but when they are at work it is required to read provided information”

Further, the respondent also mentioned the same incident brought up by the Care Unit Manager in previous interview regarding the closing of four beds. It was not a popular decision to make from the head management at the hospital’s point of view since the hospital is dependent on these beds to treat patients. Also, it was a complicated process involving decisions made at the highest level, but necessary in order to respond the nurses’ complaints. The respondent explained that the nurses unfortunately do not realize how much time and effort the management put in for their well-being. This fell into a need for a communication channel that would ensure the nurses to have the possibility to discuss critical matters with the management. Therefore, a bidirectional communication channel with a fast response time seemed like an interesting idea for the Nurse Manager.

5.2.3 Chief Physician
The third conducted interview was with the Chief Physician at the infectious disease department. As a Chief Physician, the respondent has been a part of the management at the infectious disease department for three and a half years, with an additional one and a half years of experience as an operations manager at another infectious disease clinic. During that time, the respondent has worked as a medical responsible physician with a clinical background as a physician. The research background extends to include the title as an associated professor within medicine. Before the newly employed physician manager in late
In relation to communication within the physician group, the Chief Physician believed the communication to a large extent is involved around informal and spoken language, both clinically and administratively. The identified formal channel was a weekly structured meeting consisting of all physicians, where the physician manager presents information from the management, acting as a link between them. It is according to the respondent a good way to include the physicians in a type of communication process. Therefore, a direct contact does not exist between physicians and the management of the infectious disease department, but rather the physician manager is their communication channel. The Chief Physician thought this worked reasonably well, but was feeling that sometimes the follow-up information on the made decisions are down-prioritized. This has the Chief Physician noticed, where information regarding the infectious disease department does not get communicated to the physicians.

At one point, the operations manager was located in the same building as the physicians, which invited a more informal communication with an open-door policy. The Chief Physician argued a direct contact between people is something physicians always have appreciated, but it becomes difficult to structure. Nowadays, urgent information must be discussed with the physician manager, either in person or through email, which in turn gets presented before the management. As the physician manager often is busy and unavailable, it limits a communication between physicians and the management. The Chief Physician identified a new communication channel as a way to unburden pressure from the physician manager and promote good communication. It would also facilitate a formalized communication approach to delegate work when the physician manager is absent.

"There is a need to synchronize the communication tool between physicians and the management in order to prevent conflicts and misunderstandings"

This was something the respondent felt could be more structured and managed through continuous coordination. The Chief Physician emphasized a common communication between physician manager and the management to be of high importance since it is together they are going to improve healthcare. As of now the communication occurs when it is convenient or a need is discovered, regularity on the contrary could help prevent issues beforehand. The weekly letter posted on the intranet affect nurses to a larger extent and is not directed to physicians normally.

"It is important to get information regarding the infectious disease department, but most physicians do not read the weekly letter by default, not out of malice. The information flow does not often concern physicians in any way"

When the organization grows, the Chief Physician emphasized a greater need to formalize and synchronize the communication between the different managers as well as the communication
to all employees. This communication channel has to include both formal and informal communication in a bidirectional direction.

5.3 Results from Pilot Study
As stated previously, the evaluation was divided into two parts, a small evaluation survey and a panel discussion. In this section results from these two methods are presented, in which they highlight the participants’ perception of the tested communication channel in the pilot study.

5.3.1 Survey
For the survey, the presented results are in form of different charts below and represent answers from eleven out of thirteen participants from the pilot study. It is due to the fact that two participants considered they did not participate to the extent of which is sufficient to answer the survey for different reasons. As for the presented bar charts, Likert scale questions were used that ranges from disagree (1) to agree (5) with a neutral response alternative (3).

A primal aspect to investigate was to which extent the application could be comprehended and used without any extensive training. As it can be seen in Figure 8, the three questions are reflected in the areas of understandability and usability. Here the results gave a clear indication that the used application was perceived as easy to use as well as to learn, hence showing proof on good usability, where 81.8 % in both questions agreed and 18.2 % gave a neutral answer. What increased the understandability for the application was the fact that all participants believed it to be easy to understand, divided over the two agreement alternatives (see Figure 8).

Further, it is essential for the employees to feel that the application brings value to them and the department as a whole. To be able to get a measurement of value, one question from the survey highlighted if the application facilitated the daily work (see Figure 9). As it can be seen in Figure 9 the majority of the participants, 54.5 %, neither disagreed nor agreed whereas the remaining participants did perceive it to facilitate their daily work. However, only one person strongly agreed with the statement.
Opposite to a facilitation of the daily work, it was also an important aspect to consider whether the application was being perceived as a distraction during the daily work. From Figure 10 it is possible to draw conclusions from the survey that the overall experience of using the application was not perceived as a distraction, where 90.9 % did not agree with the question. This included the use of a mobile phone in the daily work with relating notifications. However, the remaining person did experience the application to be a distraction to some extent (see Figure 10).

Another significant perspective to investigate was if the participants perceived an implementation of this type of a mobile communication channel as a possible complement to existing channels. Easiest way to do this was by directing questions toward an overall usage appreciation regarding the application (see Figure 11). Beginning with a question relating to the preference of distributing information and in specific comparing the new communication channel to existing channels. As it can be seen in Figure 11, 54.5 % of the participants preferred to leave certain type of information via the application, whereas 9.1 % had the opposite opinion. The remaining 36.4 % of the participants had no opinion regarding the question. Further, from the results regarding usage appreciation it is clear that the participants would recommend using the application to the remaining employees at the department since 81.8 % answered “yes” and the remaining 18.2 % had no opinion. For the last question it was acting as the ultimate measurement for the overall usage appreciation and in specific it became a guideline for the impact of the application at the department. Since 100 % of the participants are interested of continuing with the application it gave a clear indication of an appreciation towards a new mobile communication channel (see Figure 11).
5.3.2 Panel Discussion
For the panel discussion, the presented results are divided into three areas for which a discussion has been held. During the session nine participants from the pilot study were present, where the reason for absence was a consequence of their heavy schedule.

Slack compared to existing communication channels

A general view of the application, which the testing group had, was an increased flexibility compared to their usual login on the stationary computers with their SITHS-card, which is a type of Service ID for physical and electronic identification. To get access and read news on the intranet this type of login is needed, which usually takes a lot of time from their busy working day. This is also one reason according to the group why it is so bad follow-up on the information distributed through the department’s existing communication channels. They felt a positive impression with an increased flexibility from the usage of the application regarding news and additional communication. What did facilitate the information flow had its origin in the possibility to create channels according to themes and the opportunity to join channels suited for the individual using the application.

Another facilitation with Slack compared to other communication channels, which the participants experienced, was the process of distributing information in short messages. This could be a reminder for different educational seminars, which is not suitable for mail to the same extent. Mail is used to distribute important information and therefore one of the areas the application was used for involved it being a tool to send short messages and reminders.

As of now, the employees have created a Facebook group as means for communication outside of work. It was used by all participants in their private life and in this case creates an associating link to work life. The management does not use it to distribute information, but
rather the employees are communicating regarding shift changes among other things. They thought the application could be a used as a tool to reach out to a greater extent from home, unlike the intranet at the department. This would also be associated to work solely, as the intranet. One participant estimated the information on Facebook to be approximately 90 percent work related, when the purpose instead should focus on after work activities.

**Educating the remaining employees at the infectious disease department**

It is essential to use a momentum from the pilot study in order to implement the application across the whole department. According to the group it could be beneficial to motivate the employees with positive experiences from the test period and describe what value an implementation could bring to the department. One example mentioned during the discussion was to make the Facebook group sociable again with appropriate after work information and move more work related information to Slack. This clearer barrier between work and private life where certain communication in the group could be replaced was something the group believed to have an impact of the acceptance of the application.

Next step could according to the group be to make an internal investigation to find interested employees to carry out a second iteration with a larger pilot group. To elaborate on the existing mobile communication channel, one participant proposed that each individual from the test group could act as a supervisor. Their objective would therefore be to handle a couple of employees and teach them the application as a transition towards using the new communication channel. In this type of phase it is of significance to find a moderator to supervise which of the employees that are a part of the application in order to prevent someone being excluded. In addition, there must be well-grounded policies of what is allowed to be written in what channels in order to prevent the loss of important information as well as informing employees regarding the use of confidential material and respecting personal data.

**Risks connected with using a mobile application as a communication channel**

One continuously occurring issue experienced in the pilot study was the consequences of a participation of a relative small group in relation to the total number of employees at the department. It lowered the impact of the information flow since specific information had to be distributed to reach all employees and therefore the management had to use multiple communication channels. Here, the application was used for test purposes and backed up by existing communication channels. A challenge that will arise is to find a balance for the information flow when more people are joining the application, but it is still a necessity to involve a larger part of the employees.

If the number of people was to increase and no strict policies exist, the group feared the application could turn into a regular messenger application or groups chat where the relevant information gets hidden in a sea of messages. This could lead to a lot of notifications both at work and in the private life. They believed it would be difficult to relax on the free time with a constant connectivity.
6. Analysis and Discussion

In this chapter the analysis and discussion is presented, where the empirical findings are discussed in relation to the theory of communication, ICT and change management. The different sections in this chapter are addressing RQ 1, RQ 2 and RQ 3 respectively. In addition, to wrap up the chapter a discussion regarding sustainability is included as well.

With an increasing information flow both in society and in organizations it becomes difficult to strategically systemize the internal communication to work efficiently. Especially within the public sector, where Danderyds University Hospital operates, technical and financial resources limit the possibilities for organizations to work with long-term strategic communication. As the needs of patient have increased in complexity in combination with an explosion of medical knowledge, the healthcare industry has been targeted with a need for more effective communication (Gordon et al., 2015). By promoting the role of ICT in intra-organizational communication, there is much potential for mobile technology to improve this type of communication within healthcare environments.

6.1 Existing Communication Channels

At the infectious disease department there are at the moment four official formal communication channels of which information is distributed. These are the intranet, email, an informational board and workplace meetings. In addition, the employees are using a Facebook group not directly provided by the management to communicate both informally as well as taking formal work related decisions. As expressed in the panel discussion, people that do not use Facebook are discontented with how the communication channel is used to discuss work related activities, such as shift changes. They might be interested of this information, but unaware of its existence. Communication through Facebook groups in general requires cohesiveness in order to work properly, with routines of how more formal decisions such as shifts changes should be proceeded. To ensure a substitute shows up it must be handled with care, where a Facebook group might work currently, but with a growing organization and an increasing number of employees make it an inappropriate approach.

As for the other formal communication channels, it was obvious to identify a gap between the management’s information distribution and the employees’ information receiving. This was partly highlighted in the interviews with both the Care Unit Manager and the Nurse Manager as well as during the observations and is further strengthened by the participants in the pilot study. An information flow involving the stationary computer using the SITHS-card to login is time consuming and preferably avoidable. Communication channels affected by this type of login are both email and news distributed through the intranet. As a consequence these channels are being neglected by a part of the employees at the infectious disease department and lowers the accessibility for the information flow. From the panel discussion, the employees emphasize this to be the key factor for a bad follow-up. It is something that should not be taken lightly since it could lead to misunderstandings and miscommunication. At work it is required to read provided information, whereas it becomes optional if an employee wants to be updated in the private life.
Further, it exists shortcomings in their daily informal communication at the department as well, nothing substantial but nonetheless something that could be observed during the pre-study. In specific situations a person needed to pass on information to a colleague, where it was rarely an emergency but still information that needed to be communicated. As a result much time was wasted searching for the receiver of the information, which could be spent on work related activities.

In continue, another aspect worth mentioning is the absence of a continuous formal communication channel between the care unit managers and the physicians. As mentioned in the interviews by the Care Unit Manager and emphasized by the Chief Physician a communication channel between them have never been established. It is of necessity to synchronize a structured communication channel involving physicians to improve the care of the patients as well as prevent conflicts and misunderstandings.

6.2 Improvement Opportunities
What is most important for the infectious disease department is to increase the responsiveness in their information flow. To be able to achieve this it would be appropriate to engage and motivate the employees in the usage of the communication channels. If it is commonly known that the employees have a bad follow-up on information communicated on channels involving the stationary computer, there must exist one alternative for which employees could use without the need of computers. A good addition could therefore be to introduce a mobile application as a complement since there is a low compliance through mail and intranet. This can be argued to be a more accessible information source during the day because it increases the mobility where the communication channel enables unlimited access independent of space, time and location.

In order to implement a mobile application as means for a new communication channel it will involve an organizational change. From the literature regarding Murthy’s (2007) Dimensions of Change Management it clearly stated the importance of the people aspect to consider as the most crucial dimension. Since the people dimension often is considered as the most difficult to manage it becomes time consuming. By letting the change start from the bottom where the employees have gotten to test a mobile application it has anchored the people aspect into a technological dimension to give the change a head start. The pilot study has made this possible to some extent, which also emphasized a technological change through the employees already in the earliest phase of the implementation. Participants from the pilot study are more likely to be motivated to drive the implementation of the new communication channel, which facilitates the establishing of this channel since the employees at the department ultimately are the end-users. It is of great significance that they feel comfortable using a mobile communication channel and accept an application before starting to use it on a larger scale. During the pilot study, an alignment between motivated people and the technology, i.e. the mobile application, could be identified resulting in a successful integration of technological improvements. Still this in not sufficient to ensure the highest probability for success, as the third dimension involving the process also must be taken into
consideration. From the start, the process that was going to be made more efficient was well defined through a pre-study and interviews, which facilitated the right type of technological solution. It helped the department to prepare for the implementation of a mobile communication channel. This means it did not take time to identify the processes to focus on in order to align it with both the people and technology dimensions. By doing preparatory work on the people and process dimension it allowed an easier choice from the selection of technological tools, which lowered the investment cost to a minimum and enhanced the utilization. A slower introduction of change, which is the case in this step-wise implementation, allows for better change assimilation and facilitates the transition of a new communication channel when it is introduced to the remaining employees at the department.

If an alignment between all dimensions is completely successful, this type of communication channel might even have the possibility to replace existing channels. By analyzing their current Facebook communication in relation to the four functions identified by van Riel and Fombrun (2007) it is possible to discover opportunities to improve. As it is used now by the employees, the communication flows horizontally among nurses and assistant nurses, but is neglected by the management and therefore is missing a vertical flow. This is due to the fact that it is not an official communication channel distributed by the management, but it is not necessarily a weakness. However, if the channel is used for shift changes, which in fact must be notified to the management the channel must include a vertical communication flow. A deficiency of this type will in turn affect the content aspect where the channel must ensure that appropriate information is distributed. Currently, it could be argued that the channel does not ensure this and is further strengthened by the panel discussion where they believe the information content to a large extent does not suit the channels initial purpose. Consequently, it also questions the climate of how the employees should perceive the communication channel. Since it anchors an information flow both in work and private related activities, it becomes difficult to know if it should be perceived either as open-minded or as a professional work tool. A new mobile communication channel focusing on setting boundaries between work and private life is to an advantage in order to enhance a strategic communication and could also address the problem with employees missing out on information linked to social media. Further, it could also be used to invite the occupational group of physicians to start using a mobile communication channel and establish a continuous communication.

One major advantage with this type of communication channel is to address the shortcomings of informal information loss during day-to-day operations. Instead of running around after colleagues with specific information it is possible to introduce a mobile communication channel where each care unit team is connected with tablets to the rooms they are responsible for as well as to other teams. It enables a mobile information transfer and communication between care unit teams, which results in that information could be distributed independent of the location of colleagues. This will make a communication more efficient and time saving as well as a way to relieve employees from pressure to find and deliver information face-to-face. Kupritz and Cowell (2011) have compared the passing of information between face-to-face communication and electronic methods. They concluded that electronic communication sometimes is less time consuming and is the preferable option. It could be daily news, alerts,
updates and other non-confidential information, which are facilitated by the distribution through electronic systems. Therefore, it could be an option to distribute information through the mobile communication channel established by tablets to the different care unit teams, either via other tablets or a mobile telephone individually.

6.3 New Communication Channel
Choosing to use a new mobile communication is going to enable opportunities in the day-to-day operations at the department, but as well induce risks of an implementation. The management must plan carefully which specific communication that is useful for a certain purpose and how it is going to be achieved with a mobile communication channel. Determining stipulations are critical and create a general understanding of what type of messages to deliver through the most effective channel in the application. According to Argenti et al. (2005) the channel choice is an integral feature in order to promote a strategic communication process.

For this specific mobile application, Slack, which has been used during the pilot study, has the possibility to create a foundation for strategic communication. Based on the design of the application it allows users to communicate on public channels and reach out to everyone without the use of emails. In addition, channels can be created to relate to specific topics and private channels allow smaller units of the overall group to communicate freely. On a lower level, direct messages could be sent as private messages to specific users rather than a larger group of people. By dividing employees into smaller teams with their own specific purpose, for example in different occupational groups, it is possible to direct information and prevent an information overload. In accordance with the literature, a wide selection of channels enables a strategic communication where information must be distributed on the right channel. To use various channels also enable a bidirectional information flow with feedback coming from the employees. This two-way communication both facilitates fast transmitting of simple information as well as promoting accuracy and encouraging a motivation among the employees with feedback messages. Relating to theory this type of mobile communication channel is a mixture between the transition model and the interactional model, and is used as either one depending on the content of information being distributed. Different purposes require different functions in the communication and could be varied to strengthen the strategic communication process. Recently mentioned bidirectional communication was also expressed from all respondents in the interviews as an attractive alternative to include when establishing a new mobile communication channel.

However, since it was a relatively small group in the pilot study compared to the total number of employees at the department, the implementation on a larger scale might differentiate. The survey results gave a clear indication regarding understandability and usability, where a majority of the participants perceived it to be easy to use, understand and learn. What is interesting is that not a single participant gave a negative response within this usage area of the application. This result corresponds to one key construct, perceived ease of use, in the Mobile Service Acceptance Model developed by Gao et al. (2010), which could act as a powerful catalyst for an integration of the new mobile communication at the department.
Independent of technology knowledge all participants were able to use the mobile application, which could in fact strengthen the introduction and in specific for the less experienced with technology. In addition, since it also to a large extent was perceived as facilitating the daily work and all participants expressed an interest to keep using the communication channel, the constructs of usefulness and intention to use are extremely high. These psychological aspects are important to fulfill when scaling up the implementation to ensure a continuous usage of the communication channel. During the pilot study the participants’ willingness to experiment with the application in working environment could be observed, which relates to another construct regarding personal initiatives. Since these constructs have an affect on how the mobile application is being accepted, it is of great significance to have the application accepted by a group of employees who also are the future users of the communication channel. As for the remaining constructs involving context and trust, they are intended to be promoted by the pilot group when the mobile communication channel gets implemented on a full scale. In order to promote and convince the whole department to start use the new communication channel, it is important to highlight these constructs and in specific the usefulness and simple usage of the application. An advantage to increase the likelihood of usage and reduce possible resistance to change is the fact that the constructs are aligned.

In order to cope with any individual resistance, it is important to consider the emotional transition each employee might undergo during the implementation of a new communication channel. From the pilot study, it could be argued the test group reached the sixth phase of the Emotional Phases of a Change Transition (Hayes, 2002). At the later stages of the pilot study it could be observed that the participants started to realize the meaning behind the change and what advantages they are to expect by using a mobile communication channel. Why the last phase was not reached is simply because they did not have the possibility. In order for it to occur, all employees must use the communication channel integrated into their day-to-day operations. As for the pilot study’s extent, the communication channel was used for testing how it could work with a mobile communication and therefore never became integrated. However, since the pilot group reached the penultimate phase it is important that they act as motivational figures for the remaining employees and push them to start using the new communication channel. Ultimately, the result of the implementation depends on the participants’ commitment towards the application and how well they engage other colleagues to actually use it. Since they have succeeded to recognize the necessity of change, their motivational force could support other to follow. Their commitment acts as motivators to go through phases, especially the initial phases, where people usually ignore change initiatives and fall back into normal routines.

Reasons for employees to fail a change, in this specific case with an implementation of a mobile communication channel, could be rooted in the risks associated with the change. With using a mobile communication channel there are certain aspects to consider. One recurring aspect brought up in both interviews and the panel discussion is whether it is appropriate to disrupt employees in their private life, and in that case which news it might concern. Employees could feel anxiety to be accessible after working hours and they have to make an active choice regarding the distribution of work related information. What becomes more
troublesome is when the number of people in the channel increases and the exposure of information get substantial. However, it would be pointless to use a communication channel if the information does not reach the intended receiver to engage communication. Therefore, it is of great importance for all employees to be communicating on the same platform. In order to counter the potential problems it comes down to a categorization issue with strict policies of how the communication should be processed to ensure that the right information is distributed through the right channels. This means informal communication must be held in direct messages or a channel with the purpose to engage informal information. Here, an option to snooze it must exist if a person does not want to be a part of it and do not want to receive notifications. In this specific application, Slack, there is a snooze function making it possible to switch on and off the notifications. The risks and benefits have to be presented in a trustworthy manner beforehand, giving clarity for all employees at the department.

6.4 Reflections on Sustainability
A perspective of importance to consider applying is the concept of sustainability in order to make the recommended solution sustainable and effective in the long-term. An aspect for an implemented change to be profitable is to fit it into its environment by including sustainability. Sustainability as a concept is defined as the triple bottom line, which consists of environmental, social and economic factors (Elkington, 1999). In terms of implementing a new mobile communication channel it is often identified as a tool to drive efficiency and streamline communication within an organization. Therefore, it is interesting to analyze this specific communication channel’s contribution relating to the three factors of sustainability.

**Environmental**
Since an application in itself is intangible it does not have a direct impact on the environment. However, it can be linked towards the employees at the department being more mobile. With higher mobility overall, employees could save resources in their daily operations where a consumption of raw materials, such as paper, decreases. This could ultimately reduce the carbon footprint of the infectious disease department.

**Social**
A social sustainability aspect enhanced by introducing a new mobile communication channel is the level of communication connected to organizational development. As a consequence, an enhancement of communication within the department could be strengthened, where the cohesiveness among employees increases with the opportunities to communicate in relation to mobility. Another aspect is better working conditions with reduced stress levels in terms of both inhibited information flow and more accessible information transfer.

**Economic**
Economic sustainability is often associated with cost efficiencies. With regard to efficiency linked to a mobile communication channel, saving resources in operational activities provide benefits for economical aspects. One advantage with an increased mobility for the infectious disease department is a better workflow with more efficient communication. Processes in the context of mobile communication related to work activities could reduce resources in form of time and money with improved decision-making opportunities.
7. Conclusion

In this chapter the summary of findings are concluded, which provides a foundation to address the research questions of the thesis. In addition, managerial implications are discussed in order to facilitate a continuance of the presented work as well as recommendations of future research.

7.1 Summary of Findings

To connect with the purpose of the thesis it was to investigate if a mobile application could make the internal communication between the management and employees at the infectious disease department more efficient as the organization scale up.

In order to achieve the purpose of the report, it was operationalized through following main research question:

*How can a mobile application be implemented as a communication channel in order to improve the internal communication in a healthcare department?*

To be able to address the main research question, three sub-questions were derived and answered based on the case study at the infectious disease department. The findings are presented in the sections below and related to each sub-question, which are acting as the foundation to answer the main research question.

7.1.1 Research Question 1

*What formalized internal communication channels exist at the infectious disease department and how do they work in practice?*

From the pre-study and the interviews it was possible to identify six formalized communication channels of which the infectious disease department uses. The information flow is divided over these channels, which are presented in Table 5 to provide an overview picture with a more in-depth description of how each channel is used as well as how it works in practice.

<table>
<thead>
<tr>
<th>Communication Channel</th>
<th>Purpose</th>
<th>Work in practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workplace Meetings</td>
<td>Operations related information directly affecting all employees</td>
<td>Efficient communication method involving the whole department with discussions</td>
</tr>
<tr>
<td>Informational Boards</td>
<td>Daily and weekly reminders with on-going projects and special activities</td>
<td>Effective communication tool, but solely reaching out to employees at the department</td>
</tr>
<tr>
<td>Intranet (News &amp; Weekly Letters)</td>
<td>Continuous informational flow with news regarding the department as a whole with</td>
<td>Information is to some extent neglected, where employees do not update themselves on</td>
</tr>
</tbody>
</table>
A distribution of information within these channels occurs both vertically and horizontally with feedback loops across different occupational groups. What in most cases has gotten misaligned between the expected and actual value from the used communication channels is a weak responsiveness and incorrect usage. Consequently, this has created a gap between the management’s information distribution and the employees’ information receiving. One key-contributing factor is the slow login systems using SITHS-card, which was perceived inefficient. This is affecting both the intranet and email, which are two formal communication channels providing important information on a daily basis. For the more informal channels such as Facebook and daily informal communication it could be identified as inefficient usage providing inaccurate results.

7.1.2 Research Question 2

*Where could improvement opportunities in their current communication channels be identified?*

As the department grows and the communication substantially gets affected negatively, it is important to close the gap between the management’s information distribution and the employees’ information receiving. In order to close this gap it is essential for the infectious disease department to focus on increasing the overall responsiveness. This gap gives opportunities for improvements, which could be filled by implementing a new mobile communication channel. A mobile platform could act as a complement to the stationary computers requiring SITHS-card to get access to certain information and thus counter the low compliance. It gives the employees an accessible information source with unlimited access independent of space, time and location.

Compared to more stable communication channels, such as the informational board and workplace meetings, a mobile communication strengthens the distribution of information mediated on these channels. Although they are efficient and effective methods to transmit information, workplace meetings occur once a week and the informational boards only reaches employees at the workplace. Therefore, it is of great significance to complement these two channels with additional tools and increase the spread of information to involve larger parts of the department continuously.

<table>
<thead>
<tr>
<th>Email</th>
<th>additional weekly letters</th>
<th>Communicate important information related to specific individuals</th>
<th>Bad follow-up and responsiveness resulting in misunderstandings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>To enhance cohesiveness through organizing after work related activities</td>
<td>Is to a large extent used for formal work related activities, such as shift changes</td>
<td></td>
</tr>
<tr>
<td>Daily Informal Communication</td>
<td>Informal communication to facilitate day-to-day operations and enhance cohesiveness</td>
<td>Inefficient since it often is difficult locating specific colleagues to distribute information to</td>
<td></td>
</tr>
</tbody>
</table>

Table 5 – Compilation of all Communication Channels
Furthermore, analyzing the informal communication channels, it could be identified that the Facebook group as it is used now has a horizontal communication flows among nurses and assistant nurses, but is neglected by the management and therefore is missing a vertical flow. If formal decisions are taken involving shift changes it is necessary to notify the management and must include a vertical communication flow. Currently, it could be argued that the channel does not ensure that the content is appropriate and right information is distributed. This is further strengthened by the panel discussion where they believe the information content to a large extent does not suit the channels initial purpose. A mobile communication channel could have the possibility to replace this existing channel and create clearer barrier between work and private life. In continue, another advantage linked to improvement opportunities regarding informal communication channels is to address shortcomings of information loss during day-to-day operations. In specific when it comes to locating colleagues, an introduction of a mobile communication could enable an information transfer independent of time and location. It is also possible to invite physicians to be a part of the communication channel since this channel does not exist today, which is a way to improve the care of the patients.

### 7.1.3 Research Question 3

*How will the organization as well as the employees accept the implementation of a new mobile application?*

According to the survey results provided from the pilot study, it could be observed that the used application was easy to use, understand and learn. Despite being a mixed test group with age variations and technological knowledge differences, the results showed clear indications of an acceptance of the mobile communication channel regarding understandability and usability. This could act as a powerful catalyst for an integration of the new mobile communication at the department. However, since it was a relatively small group in the pilot study compared to the total number of employees at the department, the implementation on a larger scale might differentiate with different opinions regarding these areas.

In continue, linking the acceptance of the application by the employees to the survey and panel discussion results, it was perceived to facilitate the daily work. In combination with an easy usage as well as participants both wanting to recommend the application and expressed an interest to keep using the communication channel, the intention to use it increases substantially. This was further strengthened by the fact that 100 % of the participants in the survey considered a value in continuing using the application. With this said, considering these aspects have an important impact on how well a mobile application receives acceptance, it will facilitate an implementation on a larger scale. At the later stages of the pilot study the participants started to realize the significance behind the change and what advantages they are to expect by using a mobile communication channel. If these are promoted and used as motivational aspects it could push the remaining employees to start using the new communication channel.
What could be a risk with the implementation and in the end the acceptance of the new communication channel is whether it is appropriated to disrupt employees in their private life, and in that case which news it might concern. This might be a reason for the employees to fail the change process and makes it important for the management to present the risks and benefits in a trustworthy manner beforehand, giving clarity to employees at the department.

7.1.4 Main Research Question
Choosing to use a new mobile communication is going to enable opportunities in the day-to-day operations at a department, but as well induce risks of an implementation. The management must plan carefully which specific communication that is useful for a certain purpose and how it is going to be achieved with a mobile communication channel. In this way it will unlock the power of mobility where it is possible to get unlimited access of information independent of space, time and location. It could address the gap between the management’s information distribution and the employees’ information receiving by making the information more accessible, even off the workplace. To use various channels also enable a bidirectional information flow, which both facilitates fast transmitting of simple information as well as promoting accuracy and encouraging employees with the possibility to provide feedback messages. Therefore, it is of great importance for all employees to be communicating on the same platform with strict policies of how the communication should be processed to ensure that the right information is distributed through the right channels. By dividing employees into smaller groups with their own specific purpose, it is possible to direct information and prevent information overload. This will streamline the communication and improve workflow as well as a way to relieve employees from stress to find and deliver information face-to-face.

To realize this change it is essential for a pilot group to act as motivational figures to give the new mobile communication channel more credibility and push for the usage of the application. This group of people is crucial in order to establish and integrate the channel into their day-to-day operations. Ultimately, the result of the implementation depends on the participants’ commitment towards the application and how well they engage other colleagues to actually use it. Since they have succeeded to recognize the necessity of change, their motivational force supports other to follow.

7.2 Managerial Implications
During this study, the identified underlying cause for deficiencies in the infectious disease department’s current communication channels is the gap between the management’s information distribution and the employees’ information receiving. This could be addressed by implementing the findings of the thesis in practice. The managerial implications presented in order to follow up on the findings could be divided into three areas:

- **Pilot group**: It is important to continue to promote the application from within, i.e. let the group convince their colleagues to start using the application and present its benefits. By doing it in this way, an implementation will appear more trustworthy and ultimately anchored in the core of the department. Representing influence is crucial
where the responsibility of leading the new communication channel to success is in the hands of the pilot group. Since they have succeeded to recognize the necessity of the change and experienced the application they are perceived to possess expertise and knowledge, resulting in a credibility to lead the implementation.

- **Further education:** A challenge for the department is how to initiate and carry through with the change process in order to minimize the internal resistance. Therefore, in this specific case it is essential to emphasize and approach the change individually. It would facilitate the transition towards using the new communication channel, by having the members of the pilot group to act as supervisors for five to seven employees and coach them in the usage of the application. In addition, an important role that must be covered is to have an admin to supervise which of the employees that are involved in the application in order to prevent someone being excluded.

- **The application:** In order for the application to work as a strategic communication tool it is of great importance for all employees to be communicating on the same platform. When the number of people increases, strict policies of how the communication should be processed must exist to ensure that the right information is distributed through the right channels. This enhances the importance of the information and increases the relevance as well as prevents an information overload. Dividing employees into smaller groups with their own specific purpose provides a selection of various channels and enables as well as empowers a strategic communication.

### 7.3 Future Work
In this study the focus has been to provide implications on how the infectious disease department could improve their internal communication by implementing a mobile communication channel. In the process a pilot study has been carried out introducing an application satisfying the needs of the department. However, due to time constraints it has not been possible to develop a customized application, but rather used an existing one. It would be interesting to follow-up and create a requirement specification in order to develop a customized application to work generally in a healthcare setting. Therefore, to be able to generalize a requirement specification it would be necessary to investigate other healthcare departments and compare the findings. Naturally, the ensuing phase would be to implement it on a larger scale, and not solely at the department.
8. References


Appendix A

**Question Sheet During the Pre-Study**

- How do you communicate with your colleagues before, after and during the shift?

- In what situations and why do you want to get in touch with your colleagues?

- Which communication channels do the employees offer?
  - When are they used and is the information easily accessible?

- How is information communicated from the management (e.g. news and information regarding the department)?
  - How do they work in practice?

- Do you prefer formal or informal communication?
  - In what type of situations?

- Have you experienced any deficiencies in the department’s current communication methods?

- What improvement opportunities do you believe would provide more efficient communication?

- How do you believe the communication in the department would be affected be a growing department?
Appendix B

Interview Questions – Care Unit Manager/Nurse Manager/Chief Physician

General questions:

• What is your role and working assignments at the infectious disease department?
• How long have you been working at the department?
• What is your background and earlier experiences?
• How does the organizational structure look like and who are in a leading position?

Care Unit Manager:

• What communication channels (e.g. intranet, mail) do the management use to reach out with information to the employees?
  o What type of information flow is used in respective communication channel?
  o How well does it work in practice?

• On what occasions and how often do the management communicate information?
  o What type of information does it involve?
  o Is the information confidential in specific scenarios?

• Do you feel the need to direct information to certain target groups?

• Do you believe the communicated information is absorbed by the employees (right information at the right time)?

• Have you experienced a situation where the information flow between management and employees did not work optimally?
  o If yes: Can you give examples how the management related to these situations and what action was taken?

• Have you experienced a situation where the information flow between management and employees worked extremely well?
  o If yes: Can you give examples on what actions were taken to achieve this?

• What challenges do you believe the department will face when it comes to communication in a growing department?
  o What is the biggest difference working at one department floor contra three?
Nurse Manager / Chief Physician:

- What communication channels (e.g. intranet, mail) do the nurses/physicians use to communicate with the management?
  - How well does it work in practice?

- On what occasions and how often do the nurses/physicians communicate information?
  - What type of information does it involve?

- Do you believe the nurses/physicians absorb the information the management is communicating?

- Does a specific communication channel exist where the nurses/physicians can reach the management with urgent questions?
  - How quick do the management respond?

- Have you experienced a situation where the information flow between nurses/physicians and the management did not work optimally?
  - If yes: Can you give examples how the nurses/physicians reacted to these situations and what action that was taken?

- Could you identify any improvement opportunities when it comes to the communication channels between nurses/physicians and the management?

- What challenges do you believe the nurses/physicians will face when it comes to communication in a growing department?
  - What is the biggest difference working at one department floor contra three?
Appendix C

Evaluation Survey of Slack

Evaluation of Slack

Here follows a short evaluation survey regarding the application Slack. The purpose of the survey is to analyze if Slack could act as a complement or even replace existing communication channels at the infectious disease department.

* Required

General questions

Gender *
- Man
- Woman

Age *
- < 25 years
- 25-40 years
- > 40 years

Have you used Slack before? *
- Yes
- No

Slack

1. The application was easy to understand? *

2. The application was easy to use? *

3. It was easy to learn the basic functions of the application? *

4. Using the application facilitated the daily work? *

5. What advantages did the application have?

Your answer
6. What difficulties have you experienced with the application?  
Your answer  

7. Did you perceive the application as a distraction during the daily work? *  

<table>
<thead>
<tr>
<th>Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Agree</th>
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8. What aspects of the application do you consider need to be improved?  
Your answer  

9. Do you have suggestions for additional subject areas (e.g. education, scheduling etc.) in the form of channels that the application is suitable for?  
Your answer  

10. Did you prefer to leave certain type of information via the application as compared to the intranet/mail? *  

- Yes  
- No  
- No opinion  

11. Would you recommend the application to others? *  

- Yes  
- No  
- No opinion  

12. Would you like to continue using the application at the department? *  

- Yes  
- No  
- No opinion
Appendix D

Panel Discussion Questions

General:

• How have you been experiencing the pilot study and what are your general thoughts?

Comparison:

• How is Slack being perceived differently in relation to the existing communication channels (e.g. email, intranet, Facebook)?

• Do you believe the application could work as a complement to these communication channels, alternatively in some respect replace channels?
  o In that case, what type of information in particular is suitable for Slack?

Education:

• How should Slack be introduced and the employees be educated?

• What is needed to be done in order for the employees to adopt the application in a positive way?

• How well do you believe it would be accepted by the remaining employees?

Risks:

• Do you perceive there are any risks with implementing a mobile communication channel? (E.g. increased stress when becoming more accessible or an overwhelming information flow)

• Is the usage of a mobile application sufficient?