# Digital collaboration tools

## What types of frustrations do managers experience?

by

Henrik Andersson

Ahmet Mutlu

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# Abstract

Today's flow of technological improvement, along with increased demand from corporations, is creating workplaces that are becoming more based on digital collaboration technologies. It creates new digital landscapes for corporations and their management. Previous research has shown that users experience frustration when using digital collaboration tools. This study aims to contribute towards facilitating higher utility in available digital collaboration tools. Inside this, this research will contribute by exploring the managers' various frustrations in the use of digital collaboration tools. Based on a literature review and interviews with managers, the research question asks: What types of frustrations do managers experience when using digital collaboration tools? From the literature review, a taxonomy on digital collaboration tools was introduced, along with different types of frustration. This was integrated into a matrix framework that was used during the interviews with managers. The analysis of responses showed that managers mentioned numerous different reasons for being frustrated. From this, common themes of frustrations were grouped together. The two most recurring themes were a "lack of physical presence" and a "confusing work process."

**Keywords:** *management, digital collaboration tools, frustration, human-technology interaction*

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Henrik Andersson

Ahmet Mutlu

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# 1    Introduction

*This chapter provides a background for the main concepts of the study. Next, it introduces the process behind the research aim. This is followed by the research purpose as well as the research question, before laying out the structure of the study.*

## 1.1    Background

There is a push and pull effect that is providing the corporate world with incentives to become more and more based on digital technologies (Ende & Dolfsma, 2005). According to Brynjolfsson & McAfee (2014), the push comes from what researchers argue to be the introduction of the Second Machine Age, referring to digital advances that have changed the way we operate today, similar to the way the late 19th-century steam engine did. They further suggest that these rapid digital advances are due to Moore's Law. Moore's Law denotes that the cost of technology will continuously decrease, while technological computing power will double every 18 months (Brynjolfsson & McAfee, 2014). Hence, technology is improving rapidly, supplying a push effect where increased power and functionality are becoming readily available for corporations.

The pull effect can be described as "revolutions are never just one thing" (Baldwin, 2016), which refers to how internet revolutions have triggered a mix of information-management innovations that make spatial coordination of complex activities easier, cheaper and faster. It denotes the pull effect, which is explained in part by globalization as demand increases due to larger markets (Economics Online, 2020), which can be interpreted as corporations are craving for these new information-management innovations for spatial coordination. The corporations pull for the new technology, and the rapid digital advances push the demand of corporations. Therefore, new digital landscapes are created for corporations and their management.

The role of management is key when transitioning into these digital landscapes. Kleppestø (2019) explains that one of the suitable purposes of management is to facilitate coordination, collaboration, and control through some sort of communication. Salopek (2000) describes how collaboration, in particular, is seen as crucial to the foundation of society, dating back to mammoth hunting; that is, without collaboration, the mammoth would trample you and survival would be at risk. Gratton & Erickson (2007) also point to the importance of collaboration in teams to pull off the many complex tasks corporations face in contemporary times. Today, collaboration frequently takes place online since tasks may require knowledge of people from many locations (Gratton & Erickson, 2007). In addition to this, Baldwin (2016 p. 82) shows how the increase in information sharing between 2006 and 2007 was 1.06x1036 greater than

the sum of all information transmitted in the previous decade. One of these new landscapes for corporations is that collaboration is turning into digital collaboration.

Since collaboration is becoming increasingly digital, researchers (Lazar, Jones & Shneiderman, 2006) state that certain aspects of this transformation can cause frustration. Coleman defines digital collaboration as "an interaction between two or more people, mediated by a computer" (Salopek, 2000, p. 39). To collaborate digitally, workers use Digital Collaboration Tools (DCT). This frustration is to be expected since DCT is relatively new, where Nilsson (2019) explains how the rate of technological adaptation is different amongst people. There is a gap between the use of technology for users. The outcome is bound to be frustrating.

According to Kimmel (2015), frustration is based on expectations and perceptions. In short, the definition of frustration can be derived from an inhibiting condition, which acts as a barrier toward goal attainment (Freud, 1921). Frustration is a subjective term (Lazar, Jones & Shneiderman, 2006), making it difficult to measure on a scale. Kimmel (2015) writes how there are two kinds of frustration. One being internal frustration, coming from one's own expectations, such as not attaining one's personal goals (Kimmel, 2015). Second, external frustration comes from events outside an individual's own capacity, such as physical obstacles of traffic queues or perception of wasting time (Kimmel, 2015). Since the purpose of managers is to facilitate collaboration, managers remain a key part of this digital transformation, and therefore also a role in managing these expectations and perceptions.

Therefore, the subjective thoughts of the managers' use of DCT are of particular interest. If managers become frustrated because of some aspect of DCT, it is an indication of being unable to fulfill a goal. Frustration from the use of DCT is, therefore, an organizational problem. Understanding why managers are frustrated can help utilize this knowledge to optimize the utilization of DCT. A higher utility of DCT is relevant for improving collaboration via digital landscapes. This study will, therefore, further explore the manager's frustrations when using DCT.

## 1.2   Research Aim

After researching frustrations connected to the use of DCT, it was concluded challenging to find articles that integrated all the concepts of this study. The authors suggest that there is an overall lack of understanding of the DCT and its dynamics at the workplace. Therefore, this study will aim to bring three main concepts together and integrate them into a larger picture. These three main concepts are managers and collaboration, digital collaboration tools, and frustration from human-technology interaction.

As will be demonstrated in the paragraphs below, the authors register that research has been done within the general topic that this study will attempt to address. However, the concepts are often covered separately from each other, thereby missing out on addressing valuable dynamics when combining them.

In the first main concept of the study, the researchers emphasize that understanding the importance of collaboration for managers is key to developing understanding when it comes to digital collaboration. In order to achieve this, numerous articles were reviewed in the management discipline. Firstly, the researchers provide a brief discussion on the difficulties in defining management as a term (Fayol, 1949; Kotter, 2001; Mintzberg, 2009; Moss 2018). It is followed by narrowing down the focus to the central player of management: managers. The authors were inspired by Mintzberg's (2009) "Managing" book to bring together managers and collaboration. Following this, having a collaborative mindset (Gosling & Mintzberg, 2003) for a manager and the importance of collaboration in management (Gratton & Erickson, 2007) will be pointed out. Finally, the researchers discussed how the digital landscape could change the collaboration dynamics for the manager in line with relevant articles and books (Kiesler et al., 1985; Mintzberg, 2009; Baldwin, 2016).

Secondly, the researchers saw value in introducing a taxonomy of digital collaboration tools before discussing its frustrations, which will help to understand the managers' experiences. For this reason, the research gave a brief definition of digital collaboration (Salopek, 2000) to understand better its managerial advantages (Weiseth et al., 2006; Gierszewska, 2013; Chasanidou, Elvesæter & Berre, 2016) and disadvantages (Cascio, 2000; Rezgui, 2007). In addition to this, the previous DCT taxonomies (Townsend, Demarie & Hendrickson, 1998; Salopek, 2000; Eppler & Sukowski, 2000; Shen, Gallivan & Shen, 2006; Thissen et al., 2007) were presented. The author used these to introduce a new up-to-date taxonomy, where digital collaboration tools are categorized based on their similar intended uses, to be able to apply them to the managers' frustrations.

The last concept was chosen to highlight the manager's frustration in the use of DCT. In this field, the researchers mainly focused on the perspective of human-technology interaction (Rosenberg 2004; Tams et al. 2011; Saariluomaand & Jokinen, 2014), and technology frustration (Lazar, Jones & Shneiderman, 2006; Jokinen 2015). The researchers began discussing the subjectiveness of this frustration (Freud, 1921; Lazar, Jones & Shneiderman, 2006; Kimmel, 2015), to refer to why frustration varies depending on perceptions (Lazar, Jones & Shneiderman, 2006), ability and expectations (Tams et al. 2011; Yin et al., 2018), goal commitment (Locke & Latham, 1990), cultural background (Bandura, 1973), and maturity level (Barker, Dembo & Lewin, 1965) of people. In the end, the researchers defined different types of frustration that can be experienced by the manager in the use of technology while reviewing relevant literature (Lazar, Jones & Shneiderman, 2006; Mastrangelo, Everton & Jolton, 2006; Carton & Aiello, 2009; Addas & Pinsonneault, 2015; Jokinen 2015; Hoeven, Zoonen & Fonner, 2016; William & Murugesh, 2016; Yin et al., 2018; Kim, 2018).

Finally, these three main concepts of this study will be merged in order to address the research aim.

## 1.3 Research Purpose

The purpose of this research is to contribute towards facilitating higher utility in available digital collaboration tools. Inside this, this study will contribute by exploring the managers' various frustrations in the use of digital collaboration tools.

It is important to note that this study does not focus on managerial solutions to overcome DCT-related frustrations. Instead, the paper concentrates on increasing understanding of these frustrations in the workplace.

## 1.4 Research Question

- What types of frustrations do managers experience when using digital collaboration tools?

## 1.5 Outline of the Thesis

**Chapter 1:** This chapter provides a general introduction to the topic of the research. Background information is presented, introducing essential concepts of the study. It is followed by the research aim, research purpose, and research question.

**Chapter 2:** In this chapter, the literature review is presented. This contains three main concepts from different perspectives and disciplines. Furthermore, a matrix framework is presented following these three concepts.

**Chapter 3:** This chapter describes the methodology of the research. It provides an outline for the research approach, research design, as well as the methods used for data collection and analysis. The chapter also contains explanations for the methods used, as well as a section discussing the validity and reliability.

**Chapter 4:** This chapter provides comprehensive qualitative data analysis of the main findings in the research. It also presents a discussion around the main topics by relating back to the literature review.

**Chapter 5:** In this chapter, the research question is answered in summary, and the conclusions of the analysis are provided. It also includes limitations and suggestions for future research.

# 2     Literature Review

*This chapter explains the main concepts of the study. The concepts are managers and collaboration, digital collaboration tools, and frustration. These are selected to explore the frustration that is caused by technology-human interaction. The authors begin each section by providing a rationale for why the mentioned concepts are valuable for this research. First, an overview of the manager's role in the collaboration is provided in section 2.1. Next, the authors transition into introducing a taxonomy for DCT in section 2.2, followed by section 2.3 that defines specific types of frustration that arise when using these DCT. Finally, these concepts are then integrated into a so-called matrix framework in section 2.4, which is a tool for data collection and analysis.*

## 2.1     Managers and Collaboration

*This section focuses on increasing the understanding of the collaboration dynamics. To begin, the authors briefly review the manager's role in collaboration from a management perspective. The importance of collaboration for managers is emphasized. Also, the authors elaborate on how the digital era has an impact on collaboration..*

### 2.1.1     The role of a manager

Management is comprehensive, and its interpretation can change depending on its context (Mintzberg, 2009). The literature discusses the different definitions of management. According to Fayol (1949), management comprises of five main functions: commanding, planning, coordinating, organizing, and controlling. Drucker (1954) argues that management can be understood in its two core responsibilities of innovation and marketing. Kotter (2001, p. 4) explains that "management is coping with complexity."

In contrast, Mintzberg (2009) suggests that instead of seeking the definition of management, it can be more appropriate to shed light on managerial practices. He also suggests that management is situational, as opposed to following a set of rules. From these perspectives, it is essential to understand how managers are involved in management, in order to understand the importance of collaboration for managers.

Management practitioners give directions about the manager's role in managing. According to Mintzberg, the manager takes part at the center of management. He describes how being at a central position requires managing external and internal relationships in "between the unit for which he or she has formal responsibility and its surroundings" (Mintzberg, 2009, p. 49). Also,

Gosling and Mintzberg (2013) state how managers should also have a collaborative mindset to manage these relationships at work.

Additionally, being at the center position requires the manager to take on several managerial roles. According to Mintzberg, the managers practice the managing activity in three planes, and they perform two roles on each plane. Firstly, Mintzberg (2009, p. 49) states how "on the information plane, managers communicate (all around), and control (inside)." It means to process information in order to encourage people through communication and control. Secondly, he explains managing on the people plane as "they lead (inside), and link (to the outside)" (Mintzberg, 2009, p. 49). It refers to how managers help people in making things happen. Lastly, the author describes the managing activity on the action plane as "they do (inside), and deal (outside)" (Mintzberg, 2009, p. 50). It describes the process of managing actions while doing the work, and simultaneously dealing with external negotiations.

As a summary, the manager plays a crucial role in the practice of management. Although Mintzberg (2009) clearly distinguishes the managerial planes, the managerial roles are blurred at the margins, and cross over during managing activity. However, the importance of managing relationships inside and outside of the unit remains at the center and requires strong collaboration.

## 2.1.2 The role of the collaboration

Managers focus on sustaining various individual and group relationships inside of their unit (Mintzberg, 2009). The managers have a reason for maintaining these relationships, as they are unable to do all company tasks on their own. They need channels to collaborate within and outside the corporation. To emphasize the importance of these collaboration channels, Barnard (1938, p.218, cited in Mintzberg, 2009 p. 54) suggests that managers should "become the nerve center of the unit - its best-informed member."

Additionally, these collaboration channels create a sense of being codependent on co-workers across divisions or alliances. It is well in line with the collaborative mindset of a manager, as Gosling and Mintzberg (2003, p. 7) discuss that "to be in a collaborative mindset means to be inside, involved, to manage throughout.". From this, being a manager is understood as being in an interactive role, as a manager is dependent on internal and external relationships related to their working unit.

Lastly, Gratton & Erickson (2007) also points to the importance of collaboration in teams to pull off the many complex tasks corporations face in contemporary times. They further describe how large and diverse virtual teams consisting of educated specialists, have developed important characteristics to face complex tasks. The same characteristics make it hard for teams to complete tasks (Gratton & Erickson, 2007). Collaboration is even more critical when facing complex situations. Here, the managerial role is in the spotlight, being the facilitator of coordination, collaboration, control, and communication.

## 2.1.3 Managers in a digital era

Mintzberg (2009) speculates that small changes in workplace practice can have profound effects on managing. On the topic of the internet and managing, the author exemplifies these effects as

constant interruptions by notifications, and an increased pace of managing. These are hardly desirable effects for managers. As Baldwin (2016) states, there has been a substantial increase in digital information sharing in recent years. Considering this increased flow of information that a manager can take part in, managers are pressured to filter through unnecessary information in order to prevent becoming overwhelmed with the pace of managing.

Mintzberg (2009) hypothesizes yet another profound effect on how the internet can provide an illusion of being in control. The author explains this with how a manager can be fooled into believing that they understand the situation, merely because some words popped up on a screen (Mintzberg, 2009). The authors interpret this to be an issue as managers become digitally removed from the action, while still being digitally present in controlling and decision-making. Lowered understanding of the situation would, therefore, have profound effects. These effects on managing may be unintended. Nevertheless, these new digital collaboration landscapes offer advanced new functions, pushing users towards even higher usage of DCT.

Social interaction is a crucial element of collaboration for managers, but digital conversations can have severe consequences on this interaction. A study by Kiesler et al. (1985) has shown that communication via computers can cause unfavorable judgments. To illustrate the impact on social interaction, Kiesler et al. (1985, p. 77) performed laboratory experiments. They found that "computer-mediated communication technologies focus attention on the message" and that they "transmit social information poorly." Kiesler et al. (1985, p. 78) also stated that "people who communicated by computer evaluated each other less favorably than did people who communicated face-to-face." It is in line with Mintzberg (2009), who argues that two people can participate in a digital conversation and still have little basis on which to judge each other. This can have severe consequences on managing, where Mintzberg (2009) states the importance for managers to judge, trust, and respect co-workers in order to maintain their relationships.

## 2.2    Managers and Collaboration

*In this section, the authors begin to define digital collaboration and briefly discuss the advantages and challenges of DCT for managers. Secondly, the focus shifts to existing in-depth research on DCT. Finally, the authors introduce an up-to-date taxonomy in order to further explore the DCT-related frustrations.*

### 2.2.1    Digital collaboration

The rapid development of electronic information and communication technology has changed the nature of business organizations (Hertel, Geister & Konradt, 2005). One of the technological developments in organizations is the introduction of DCT, and such change emerges as a new form of collaboration in the workplace. Thus, DCT promotes digital collaboration in the workplace. The term digital collaboration will first be reviewed in order to better understand the intended use of DCT.

The literature defines the new form of collaboration as digital collaboration. Coleman states digital collaboration as "an interaction between two or more people, mediated by a computer" (2000 cited in Salopek, 2000 p. 39). Masie also explains digital collaboration as "the use of technology to enhance and extend the abilities of individuals and organizations to collaborate, independent of their vertical area." (2000 cited in Salopek, 2000, p. 39). However, the primary intention of digital collaboration is evident. The new form of collaboration allows people to be part of the business remotely, independent of city or country (Martinez-Sanchez et al., 2006).

Digital collaboration presents various opportunities. One of the advantages of digital collaboration is the strengthening of coordination and decision-making processes in the workplace (Weiseth et al., 2006). Such technologies also allow for organizations to save time from work processes, with the ability to access work documents online (Chasanidou, Elvesæter & Berre, 2016). According to Gierszewska (2013), these tools increase social interaction and help teams with achieving content management more interactively and socially. Moreover, DCT enables companies to have excellent communication between workers, but also provides effective project management as well as integrated collaboration within internal and external environments (Salopek, 2000). In conclusion, DCT is crucial for collaborating faster, cheaper, and more effectively in the workplace.

On the other hand, these new technologies in the business environment reveal an unprecedented change in organizational dynamics (Rezgui, 2007). These changes introduce new challenges for managers. For example, although DCT enables the advantage of working remotely and decreases the face-to-face meeting costs (Townsend, Demarie & Hendrickson, 1998), it requires managers to learn new communication skills in order to prevent misunderstanding and misinterpretation due to a lack of real face-to-face interaction (Cascio, 2000). Additionally, Cascio (2000) explains that advanced digital collaboration technologies led to the development of various applications and software for different tasks and purposes in the workplace. However, he further states how it brought problems in performance management, defining performance targets, and encouraging performance in the team, clearly and effectively. For this reason, it is crucial to examine these technologies by exploring them in distinctly different categories, as the purpose of each DCT is valuable in understanding its related managerial frustration.

### 2.2.2 Existing DCT taxonomies

Past researchers have already developed many taxonomies. These taxonomies help to acquire a better understanding of the intended use of DCT and facilitate higher utility. In earlier studies, Townsend, Demarie & Hendrickson (1998) divide DCT into three categories: video-conferencing systems, collaborative software systems, and intranet systems. According to them, video-conferencing systems enable all team members to communicate with each other actively. They provide face-to-face interaction in online meeting rooms instead of conference rooms.

Additionally, Townsend et al. (1998) discuss collaborative software systems that allow individuals to work asynchronously, on the same online document. This advantage leads to effective project management and data sharing. Lastly, they introduced intranet systems which allow organizations to share company files securely through an internal system. In conclusion,

these different DCT categories have different intended purposes. All DCT empower employee communication and enable organizations to be informed, up to date, on the project processes.

In another study, Salopek (2000) introduced a DCT taxonomy and categorized DCT into seven different categories. The paper begins by defining electronic messaging systems, grouped email, and instant messaging software. She introduces video-conferencing systems and collaborative software systems similar to Townsend, Demarie & Hendrickson (1998), naming it an electronic meeting system and document handling system, respectively. To expand on what Townsend et al. wrote, Salopek (2000) discusses asynchronous conferencing systems, online communities, workflow management systems, and groupware framework systems. These categories are more widely distinct in the focus of the purpose of DCT.

Other researchers introduced a detailed taxonomy with seven categories (Thissen et al., 2007). However, they improve the DCT taxonomy and include available software under each category, as can be seen in Table 1.

*Table 1. This table shows seven different categories of tools used by virtual teams (adopted from Thissen et al., 2007).*

| Tool | Examples | |
|---|---|---|
| Instant Messaging and Chat | • Yahoo Messenger | • AOL Instant Messenger |
| | • MSN Messenger | • Skype |
| Groupware / Shared Systems | • Lotus Notes | • Novdl Groupwise |
| | • Microsoft Exchange | |
| Remote Access and Control | • NetMeeting | • Remote Desktop |
| | • WebEx | • pcAnywhere |
| Web Conferencing | • NetMeeting | • Meeting Space |
| | • WebEx | • GoToMeeting |
| File Transfer | • NetMeeting | • Meeting Space |
| | • WebEx | • GoToMeeting |
| Email | • Numerous vendors and free applications | |
| Telephone | • Plain Old Phone Service | |
| | • Voice Over Internet Protocol | |

### 2.2.3   An updated DCT Taxonomy

Based on reviewing numerous literature and taxonomies, the researchers developed a new taxonomy. In the process, the researchers combined some of the DCT categories, which have similar intended use, into the one category. The reason was to integrate the taxonomy into a matrix framework. From this, the new taxonomy covered four main DCT categories.

Numerous researchers defined a DCT category as video-conferencing tools (Townsend, Demarie & Hendrickson, 1998; Salopek, 2000; Thissen et al., 2007; Gierszewska, 2013). These tools present various features for the user: phone-calls, audio conferencing, chatbox, and desktop sharing (Gierszewska, 2013). In its intended use, these video-conferencing tools cover verbal communication, coordination, and contribute to remote decision making, cost efficiently. Examples of these are WebEx, GoToMeeting, Google Hangouts, and Skype.

Secondly, the authors decided on the clustering of email, instant chatting, and social networking tools into one category, defining it as instant messaging & communication tools, due to their similar intended use. Examples are Microsoft Outlook, Google Mail, and Skype. These provide synchronous and asynchronous interaction between workers (Thissen et al., 2007). This category forms an online communication channel to distribute information (Chasanidou, Elvesæter & Berre, 2016). As a result, instant messaging & communication tools allow for organizations to communicate and collaborate with internal departments and external customers much faster.

The third category was defined as file-sharing tools. These tools include file transfer (Thissen et al., 2007), groupware/shared systems (Thissen et al., 2007), intranet systems (Townsend, Demarie & Hendrickson, 1998), and file handling systems (Salopek, 2000), which all provide the opportunity to manage these tasks altogether. Examples are Google Drive and SharePoint. Consequently, file sharing tools allow accessing documents digitally, but also for distributing them for collaborative purposes.

Fourthly, the researchers defined project management tools as the last category. Software such as Microsoft Projects, Slack, and Trello help organizations to manage projects, remotely. They support delegating tasks, creating timelines, and monitoring Gantt charts. As a result, project management tools support team collaboration and assist knowledge management, information exchange, coordination, communication, co-creation, or shared authoring (Chasanidou, Elvesæter & Berre, 2016).

Finally, some DCT tools, which serve similar purposes, were grouped together into one, and present four different categories. Table 2 introduces an up-to-date taxonomy. These categories will be integrated into the matrix framework in section 2.4.

*Table 2. A summary of the taxonomy on digital collaboration tools that was found in literature.*

| Digital Collaboration Tools Taxonomy | | |
|---|---|---|
| **Type** | **Definition** | **Softwares** |
| **Videoconferencing Tools [1][3][4]** | *recreates the face-to-face communication remotely with video and audio share among team members [1][2]* | • WebEx [2]    • Google Hangout [3]<br>• GoToMeeting [2][3]    • Skype [3] |
| **Instant Messaging & Communication Tools [2][3][4][6]** | *makes possible the instant interaction with sending texts either synchronous and asynchronous way [2][6]* | • Outlook [3][6]    • Gmail [3][6]<br>• Skype [2][3][6]    • Facebook [3] |
| **File Sharing Tools [1][2][3][4]** | *enables uploading, sharing, editing the documents in shared folders among office workers [2][3]* | • Intranet Systems [2]    • Google Drive[3]<br>• File Transfer Protocol [2]    • SharePoint[3] |
| **Project Management Tools [3][4][5][7]** | *employs to support team collaboration with knowledge management, coordination, information exchange, communication, collaborative learning [5][7]* | • Slack [5]    • Microsoft Projects[3]<br>• Trello [5] |

References
[1] Townsend et al. (1998)
[2] Thissen et al. (2007)
[3] Gierszewska (2013)
[4] Salopek (2000)
[5] Chasanidou (2016)
[6] Shen & Gallivan (2006)
[7] Eppler & Sukowski (2000)
<u>Note</u>: The complete reference list can be seen in References Page

# 2.3 Frustration from human-technology interaction

*Since frustration is one of the critical concepts of this research, a better understanding of the concept is needed to address how it lives up to the purpose of the thesis. This section does not expect to overcome frustration, but rather to understand it better. The following paragraphs begin by providing a brief overview of frustration, followed by exploring variables that vary the degree of frustration. Lastly, this section provides three different types of frustration caused by using human-technology interactions, which are then projected onto DCT. Following this, the three types of frustration are included in a matrix framework in section 2.4..*

## 2.3.1 A brief overview of frustration

In short, the definition of frustration can be derived from an inhibiting condition, which acts as a barrier toward goal attainment (Freud, 1921). Freud's, and other definitions of frustrations may be relevant, but this thesis explores the subjective frustrations of managers. Managers choose how to explain their own frustration. Because of such, this section merely provides a brief overview of frustration.

First of all, according to Lazar, Jones & Shneiderman (2006), frustration is a subjective term (Lazar et al., 2006). This creates difficulties in measuring frustration on a scale of e.g., 1 to 5. Two managers can have different interpretations of a certain something being frustrating. A minor inconvenience can be described as frustrating, while a substantial obstacle can be described as being acceptable. This study intends to explore the strength of the frustration itself, and not the size of the obstacles. The method section explains how the method was constructed in order to avoid this becoming a problem.

Additionally, Kimmel (2015) suggests that there are two distinctly different kinds of frustration. Some frustrations can be more manageable than others. One being internal frustration coming from within, from one's own expectations, such as not attaining one's personal goals (Kimmel, 2015). External frustration comes from events outside of yourself, such as being put on hold, traffic queues, or perception of wasting time (Kimmel, 2015). This points to how some frustrations are more internalized than others. If frustration is internal, the authors see an opportunity to manage this frustration by changing their personal goals.

However, before changing personal goals, Kimmel (2015) states that frustration can be both positive and negative. The author explains that if frustration causes a person to take action to resolve the conflict, it is positive. The ultimate goal of frustration should not be to decrease it, but to rather explore its potential in discovering a willingness to resolve the frustration. If a desire to resolve the frustration is created, such frustration can the situation to be viewed differently, thereby finding alternate goals or solutions (Kimmel, 2015). This is interpreted as frustration being perception-based, opening up to the opportunity of decreasing the frustration through the changing of an individual's personal perception.

To summarize the above, the brief overview of frustration shows that it is a subjective term, and there are different kinds of frustration, that can be both positive and negative. These factors

create difficulties in making distinct conclusions of how managers perceive the situation. Therefore, more knowledge is required on the variables which affect the degree of frustration.

### 2.3.2    Varying degree of frustration

It is easy to state that the managers only need to change their perception when it comes to DCT, but the solution can be more complex than this. Previous research on human-technology interaction suggest that one of the consequences is frustration (Lazar, Jones & Shneiderman, 2006; Yin et al., 2018; Tams et al., 2011). Lazar, Jones & Shneiderman (2006) explain how more than a third of time spent in front of a computer is lost due to frustrating experiences, when factoring in both the time spent on fixing the problem, but also the additional time lost due to the inconvenience. This suggests that time could be spent more effectively.

Another example, according to Yin et al. (2018), is how workers exhibit frustration when being overloaded with technology. Tams et al. (2011) added that technological tools cause interruptions that break the users' concentration and cause frustrations. These interruptions can be caused by notifications, which creates a dilemma for managers on whether they can and should turn off the notifications, despite, as Barnard (1938, p.218, cited in Mintzberg, 2009, p. 54) suggests, the fact that a manager should become the "best-informed member" in the unit.

Additionally, DCT is relatively, a newly introduced workplace tool, which can create a mismatch in abilities and expectations. Nilsson (2019) explains how the rate of technological adaptation is different amongst people. Some people will acquire more digital abilities than others. To add, Ayyagari, Grover & Purvis (2011) find that workplace frustration depends on the users' abilities. Therefore, frustration is an expected outcome, considering how individuals can expect everyone else in the workplace to match one's own DCT abilities. Another study argued that belief in personal capabilities impacts goal commitment and the level of frustration (Locke & Latham, 1990). Past failures influence future commitments to a goal. The authors further stated how frustration levels are affected by the individual's persistence to achieve a goal. Persuading yourself from having inadequate digital skills can make managers less inclined to frustration when using DCT. This is about accepting that the issue will always be there.

Lastly, in the literature, cultural background and maturity levels of individuals are accepted as essential factors in the amount of frustration experienced. The personal background is, therefore, a variable. Bandura (1973) argue that individuals learn how to cope with societal frustration, and this directly affects their frustration tolerance. Also, Barker, Dembo & Lewin (1965) discuss how the maturity of the individuals changes the reactions when they experience frustrations. The degree of frustration can change depending on the perception, understanding, and experience of the individual. Even if frustration is narrowed down specifically to the technology frustration, it still maintains its subjectivity. However, these variables can be argued and categorized into certain types of frustration with the use of DCT.

### 2.3.3 Types of frustration in the use of workplace technology

As mentioned above, there are difficulties in understanding where the frustration comes from, as there are many variables. However, different types of frustration appear when the individual and DCT interact. To facilitate a clear discussion, the following paragraphs will elaborate on different types of frustration found in the literature.

**Technical-related aspect**

Numerous researchers studied the frustrations caused by the technical aspect of workplace tools (Lazar, Jones & Shneiderman, 2006; Addas & Pinsonneault, 2015; Carton & Aiello, 2009). It is exemplified by Lazar, Jones & Shneiderman (2006), who state that losing internet connections creates frustration. Another example is mentioned by Addas & Pinsonneault (2015), who point out that notifications create workflow interruptions, and Carton & Aiello (2009) add that these interruptions are burdensome in workplaces. Pew (2003 in Lazar, Jones & Shneiderman, 2006) also mention that people find technological tools overwhelming and confusing, because of the technical complexities when using them. Therefore, the technical-related aspect appeared to be a distinct type of frustration.

**Human-related aspect**

In the literature review, another type of frustration was identified in relation to the human aspect of DCT. This is exemplified by Ayyagari, Grover & Purvis (2011), who argue that frustration can appear as users have different abilities in adapting to newly introduced workplace tools. Kim (2018) mentions another example, which finds that managers are becoming frustrated when seeing employees using DCT for personal use. This is interpreted as not being a part of technical aspects, as it instead focuses on human using the technology. From this, the human-related aspect appeared to be a second distinct type of frustration.

**Way of working-related aspect**

The final type of frustration was identified as frustration related to the way of the working aspect in DCT. For instance, according to Hoeven, Zoonen & Fonner (2016), technological workplace tools allow an extensive range of work styles and provide the opportunity to work outside of working hours. The authors continue to argue how these advantages can cause frustration for users in a way of removing between office boundaries and leisure time. It is enabled with managers having the opportunity to take the work phone and computer home, allowing for working, during non-office hours. Another example of frustration from the way of working is mentioned by Pindek, Krajcevaska & Spector (2018), who explain that managers need digital training to cope with these frustrations. If the company does not provide this training, frustration will appear. The final example is mentioned by Mastrangelo, Everton & Jolton (2006), who state that companies implement policies and procedures to achieve the proper use of technological workplace tools. However, if these policies are confusing or overly strict, it can lead to improper use of DCT. This can also cause frustration. This type of frustration is not a part of the technical aspect DCT. It is neither a part of the human aspect of DCT, as it focuses on the system that humans have set up for co-workers to use the technology. From this, the way of working-related aspect appeared to be a third distinct type of frustration.

Finally, three types of frustration from the use of DCT are divided into three categories: technical aspect, human aspect, and the way of working aspect. The defined types of frustration can be seen in Table 3 below.

*Table 3. Literature summary of the different frustration types from human-technology interaction.*

| | Frustration types in use of digital collaboration tools | | |
|---|---|---|---|
| | **Technical-related** | **Human-related** | **Way of Working Related** |
| **Definitions** | *frustration caused by tools' origin and their technicalities* | *frustration caused by human interaction with tools* | *frustration caused by from organizational decision, approach or limitation* |
| **Specific Frustrations** | • Notification interruptions [1][2] | • Tech-adaptation of user [5] | · Removing boundaries between office and outside [1] |
| | • Overwhelming and confusing [3] | • Extensive use [4] | • Limiting policies and procedures [8] |
| | • Lost/dropped connections [1] | • Personal use [6] | • Lack of training [9] |

References
[1] Addas & Pinsonneault (2015)
[2] Carton & Aiello (2009)
[3] Pew (2003, in Lazar et al., 2006)
[4] Yin et al. (2018)
[5] William & Murugesh (2016)
[6] Kim (2018)
[7] Hoeven et al. (2016)
[8] Mastrangelo et al. (2006)
[9] Pindek et al. (2018)
[10] Lazar et al., 2006

Note.: The complete reference list can be seen in References Page

## 2.3.4   Bringing it all together: Matrix Framework

*Based on the literature review, the authors identified four DCT categories. This was followed by introducing three types of frustrations that occur after human-technology interaction. The following paragraphs integrate these main concepts into a unified structure. This structure is called the matrix framework and is presented at the end of this section. It is notable that this matrix is not a model, but instead a tool to help collect and analyze data for the following chapters.*

Firstly, the authors integrate the DCT taxonomy into the matrix framework. The authors believe that if the managers could visualize the DCT categories during the interviews, it would be easier to remember their frustrations. The four defined DCT categories in the workplace are video-conferencing tools, instant messaging & communication tools, file-sharing tools, and project management tools.

Secondly, frustration in human-technology interaction was another important concept. As explained in section 2.3, the authors defined three main types of technology frustrations to project onto the use of DCT. These are the technical-related, human-related, and the way of working-related.

Thirdly, many variables, such as age, experience, and nationality shape individuals' perceptions (William & Murugesh, 2016; North & Shakeri, 2019). With this in mind, the authors decided to integrate the managers' personal background information into the matrix framework in order to have a better understanding of how frustrations can differ from each other.

Finally, the authors brought together all the main concepts of the study and developed a three by four matrix framework, as can be seen in Figure 1. This framework is not a model to directly overcome this frustration in the workplace, but a tool for data collection. It aims to help pinpoint the managers' frustrations during interviews. The 12 available cells refer to the managers' specific frustrations experienced when using specific DCT in the workplace.

| | Types of Frustration | | |
|---|---|---|---|
| | Technical-related | Human-related | Way of working-related |
| **Videoconferencing Tools** | Cell 1 | Cell 2 | Cell 3 |
| **Instant Messaging & Communication Tools** | Cell 4 | Cell 5 | Cell 6 |
| **File Sharing Tools** | Cell 7 | Cell 8 | Cell 9 |
| **Project Management Tools** | Cell 10 | Cell 11 | Cell 12 |

*Figure 1. This matrix framework integrated the four DCT categories and the three frustration types.*

# 2.4    Chapter Summary

This chapter defined the key concepts of the study and provided an overview of these to increase the understanding of workplace technology frustration. The definition of these key concepts is summarized below in table 4. Lastly, the chapter presented a matrix framework to facilitate the data collection in the interviews, but also as a structure to analyze the data.

*Table 4. Chapter summary showing the definitions of the key concepts.*

| Digital Collaboration Tools Taxonomy | |
|---|---|
| **Key Concept** | **Definition** |
| **Videoconferencing Tools** | *recreates the face-to-face communication remotely with video and audio share among team members (Townsend et al., 1998; Thissen et al. 2007)* |
| **Instant Messaging & Communication Tools** | *makes possible the instant interaction with sending texts either synchronous and asynchronous way (Shen & Gallivan 2006; Thissen et al. 2007)* |
| **File Sharing Tools** | *enables uploading, sharing, editing the documents in shared folders among office workers (Thissen et al. 2007; Gierszewska 2013)* |
| **Project Management Tools** | *employs to support team collaboration with knowledge management, coordination, information exchange, communication, collaborative learning (Eppler & Sukowski, 2000; Chasanidou et al., 2016)* |
| **Frustration Types** | |
| **Key Concept** | **Definition** |
| **Technical-related** | *frustration caused by tools' origin and their technicalities ( Lazar et al., 2006; Carton & Aiello, 2009; Addas & Pinsonneault, 2015)* |
| **Human-related** | *frustration caused by human interaction with tools (William & Murugesh, 2016; Yin et al., 2018; Yin et al., 2018; Kim, 2018)* |
| **Way of Working-Related** | *frustration caused by from organizational decision, approach or limitation (Mastrangelo et al., 2006; Hoeven et al., 2016, Pindek et al., 2018)* |

# 3   Methodology

*This chapter explains the applied research method. First, the research approach and research design are introduced. Secondly, the chapter elaborates on the data collection method and data analysis methods of the study. Finally, it discusses the validity and reliability of the research.*

## 3.1   Research Approach

*In this section, the authors introduce the research approach and point out how these approaches apply to the study.*

The broad problem area and narrowed down to a specific problem area. Literature was reviewed to help pinpoint the research aim. Furthermore, the authors performed a literature review to develop the matrix framework. This framework did not include any hypothesis, as it was a tool for data collection and analysis. The authors interpreted the results, followed by a discussion connecting back to previous literature. Finally, the authors discussed the matrix framework and concluded the findings.

The authors took a pragmatist approach to the research. According to Sekaran & Bougie (2016, p. 29), pragmatists feel that "research on both objective, observable phenomena and subjective meanings can produce useful knowledge.". Moreover, this approach includes different viewpoints, and it is helpful to understand and solve a business problem (Sekaran & Bougie, 2016). Lastly, the pragmatist approach states that the "current truth is tentative and changes over time", and the results consist of provisional truths (Sekaran & Bougie, 2016, p. 29). In this section, the authors introduce the research approach and point out how these approaches apply to the study.

## 3.2   Research Design

*This section explains the general plan of the study and ends by illustrating the planning process.*

After a preliminary literature review regarding the research problem, the authors decided on conducting an exploratory study. Considering the overall lack of information in the research area, the authors focused on increasing the understanding of the problem. Another reason was to explore what is happening in this problem area and to seek new perspectives, ask questions, and assess phenomena based on new insights (Robson, 2002).

In the first step, the authors reviewed the existing literature in order to increase the understanding of the research topic. Following this, a matrix framework was introduced as a tool for qualitative data collection. The flexible structure of this matrix framework allowed authors to gather new insights and perspectives in the interviews. The matrix framework helped the authors analyze qualitative data in order to explore the managers' frustrating experiences in the use of DCT. Furthermore, they presented findings and discussed the results, after which they shared the conclusions of the study, completing the overall research design. The design process, which will be thoroughly in the following sections, is presented in Figure 2 below.
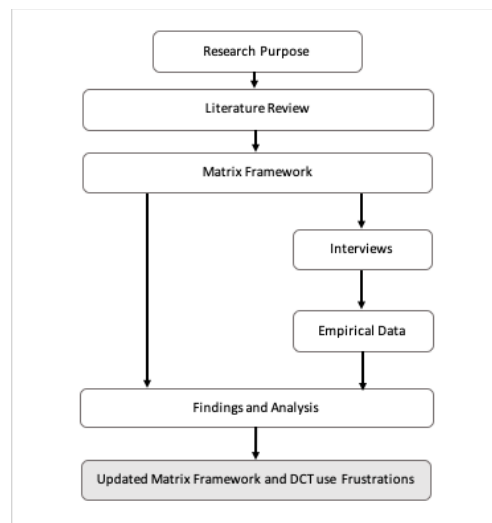


*Figure 1 Illustration of the research design.*

## 3.3    Collecting the Best Available Knowledge

*In this section, the authors explain how an increased understanding of the research topic is acquired.*

The authors reviewed numerous articles to acquire an adequate understanding of the research topic. The literature was mainly gathered from the Lund University database (LUBsearch). Following this, the authors met Lund University librarians to improve the searching method to be more precise and related to the research area. This way, the authors increased their search channels by using additional e-libraries such as AIS e-Library, ACM digital library, and Web of Science.

In the searching process, the authors used keyword search methods: digital collaboration, DCT, virtual teams, technology frustration, human-technology interaction, digital workplace. After obtaining the most relevant articles, they gathered inspiration from references within these articles and authors who were referred. Here, the Scopus website helped them to find relevant

articles. Hence, the authors were able to increase their understanding of the most relevant and recent articles in the research area.

# 3.4 Data Collection Method

*This section describes which data collection method is used and includes motivations on why this method is deemed appropriate for this study.*

The choice of data collection method hinges on the research purpose, questions, and design (Sekaran & Bougie, 2016). Primary data collection can be carried out with surveys, observations, questionnaires, and interviews (Saunders, Lewis & Thornhill, 2007). Since this research focuses on conducting an exploratory study, the authors decided on collecting qualitative data via interviews in order to establish different perspectives from managers.

The authors considered collecting data via surveys. However, the lack of existing research created difficulties in formulating survey questions. Besides, the authors assumed that using surveys causes them to hinder the new perspectives in the research area. For this reason, the authors saw a risk in that using surveys could have induced more biases when formulating multiple-choice questions. These questions could have limited the perspectives of respondents due to directing respondents to only the available choice alternatives. As a result, conducting interviews helped the authors maximize the understanding of the frustrations, as it was a dynamic discussion that clarified what the managers were saying during interviews. This could have been difficult to interpret from surveys, as frustration is subjective to each manager.

## 3.4.1 Interviews

*In this section of the thesis, the authors elaborate on which type of interviews that were conducted. An overview of how interview questions were formulated is provided, along with the biases during these interviews.*

According to Sekaran & Bougie (2016), interviews can be conducted face-to-face, by telephone, or online. Most interviews were finished below 45 minutes. Due to isolation circumstances, the authors strictly conducted interviews via video-conferencing, which was recorded on a computer. This way of interviewing ensured the authors set up flexible interview dates and share computer screens during the interviews (Sekaran & Bougie, 2016). In addition to this, this allowed the authors to conduct interviews with a higher number of managers since the authors were not bound to managers located in one location. This increased the quality of the collected data, as a more diverse set of managers could be interviewed.

Additionally, Saunders, Lewis & Thornhill (2007) stated that interviews can be conducted in three formats: structured, semi-structured, and unstructured in-depth. According to Saunders, Lewis & Thornhill (2007, p. 312), a semi-structured interview means "the researcher will have a list of themes and questions to be covered, although these may vary from interview to interviews". Considering that managers from a large variety of sectors will be interviewed, the

authors decided that a semi-structured interview format is appropriate for this topic. This provides an opportunity to add or remove the questions and emphasize certain areas most applicable to each manager's role to collect the most accurate data for the research.

Moreover, semi-structured interview questions included 3 steps. The first step consisted of an introduction, in which the authors introduce themselves along with the topic while also asking for permission to record the interview (Sekaran & Bougie, 2016). In the second step, warm-up questions and main questions are used to cover the aim of the interview (Sekaran & Bougie, 2016). Finally, the authors are allowed to ask follow-up questions, using probing techniques to talk in-depth about managers' frustration (Sekaran & Bougie, 2016). The interview questions can be seen in Appendix A.

Since interviews are an integral part of this research, it is also key to address the biases from interviews (Sekaran & Bougie, 2016). They further exemplify how the interviewee can be extremely busy or not in a good mood when they are interviewed, causing collected data to become biased. In this perspective, many of the interviewees referred to their hectic working style and their tight schedules.

Additionally, conducting the interviews via Zoom could have been created biases for respondents. Videoconferencing tools are one of the DCT categories which are being explored. This could have directed the managers' frustration towards the DCT right in front of them, instead of focusing on other categories. The authors tried to mitigate this by spending equal time on each DCT category. Nevertheless, frustrations could have been focused on video-conferencing tools.

Also, being recorded during this online meeting could have caused respondents to choose their words carefully in front of the camera. Despite sharing that their participation will be anonymous, some managers could still have been hesitant in sharing their true opinions to an interviewer they have never met.

Furthermore, the authors conducted some interviews separately. Different personalities and understanding of research topics could have introduced bias onto the respondents (Sekaran & Bougie, 2016). Also, both authors noted that the interviews were conducted faster at the end, maybe because the authors have been biased about what they were looking for. Therefore, the authors could have missed out on important perspectives during the last interviews. The same goes for the first interviews, where the authors were not sure what to look for, and some important perspectives could have been lost here.

Lastly, the authors discussed how the interview introduction text could have introduced additional biases (Sekaran and Bougie, 2016). This could have carried a risk of limiting the respondents' answers to think just about specified frustration types and specified DCT categories, thereby missing out on some important type or category.

### 3.4.2   Respondent selection

*This section explains the respondent selection process. An explanation for non-probability sampling is provided, as the authors clarify how the respondents were contacted. Lastly, possible biases are mentioned.*

After determining the data collection method, the target population was defined by one selection criterion for the respondents. The respondents were required to have worked in managerial positions in their organizations. This means that respondents who define themselves as being in charge of managing activities or people in their workplace.

Next, the authors considered the research objectives as time and cost would constrain in this study. A goal was set to interview 25 managers of varying age, sector, and nationality. This number would enable exploring multiple perspectives of the managers' frustrations.

In designing the sampling process to reach the target numbers, the researchers used a non-probability sampling design. This sampling infers that "the elements in the population do not have any probabilities attached to their being chosen as sample subjects" (Sekaran & Bougie, 2016, p. 237). According to Sekaran & Bougie (2016), this sampling design is commonly used in qualitative research because it does not include the necessity for statistical assumptions. "When time or other factors, rather than generalizability, become critical, non-probability sampling is generally used" (Sekaran & Bougie, 2016, p. 240). Therefore, the researchers decided on this using this sampling design.

Furthermore, convenience sampling was chosen in the respondent selection process. According to Sekaran and Bougie (2016), this sampling refers to reaching out to members of the population that are conveniently located for data collection. As this sampling is quicker and less costly, it is the most used method in exploratory studies when a study has a time-limitation (Sekaran & Bougie, 2016). Hence, convenience sampling was deemed appropriate.

It is also important to note that respondent selection based on convenience sampling is easy (Sekaran & Bougie, 2016). For this reason, in the process of respondent selection, authors reached out to the target population via LinkedIn, which is the biggest business social media platform with 690+ million users

As a weak side of the convenience sampling, this study was exploratory and based on non-probability sampling in data collection. Considering this, the generalizability of the study is low, which means the external validity of the research is limited.

Lastly, Saunders, Lewis & Thornhill (2007, p. 234) state how "convenience sampling is prone to bias and influences that are beyond the control". The authors desired a respondent selection spread out over many countries, but ended up using authors their own internal business networks due to the time limitation of the study. As a result, this process could have induced biases in the selection of respondents due to the authors' nationalities, thereby concentrating the manager's origin to Turkey and Sweden.

### 3.4.3 Empirical Data

*This section explains the purpose of the matrix framework and the operationalization of the main concepts into this matrix. Lastly, the possible advantages and disadvantages of this tool are discussed.*

Empirical data collection is an essential part of research papers. An appropriate data collection method should be determined after considering the required data type, data accuracy, and time limitation of the study (Sekaran & Bougie, 2016). Here, the authors decided on using a matrix framework, introduced in section 2.4, which was used as a data collection tool during the interviews.

The matrix framework provided an opportunity to operationalize the concepts before collecting qualitative data. The authors defined two main dimensions, along with one additional dimension in the matrix. The first main dimension of the matrix was available DCT at the workplace. To achieve effective operationalization, the authors integrated a DCT taxonomy into the x-axis of the framework. Thus, the authors were able to pinpoint various types of frustrations based on what managers said during interviews.

The second main dimension was the frustration emerging after human-technology interaction. Considering how Lazar, Jones & Shneiderman (2006) states that frustration is a subjective term, Sekaran and Bougie (2016) argue that abstractness needs to be reduced and operationalized to collect data for it. For this reason, the authors implemented three types of frustration into the y-axis of the matrix framework. Hence, the matrix framework enabled authors to collect different frustrations experienced in the use of DCT more accurately. The authors also defined one additional dimension, which was to collect empirical data of the managers" personal information.

Considering that this matrix framework combined four elements in the x-axis and three elements in the y-axis, it added to a sum of 12 available cells. The semi-structured interview format can now allow the interviewees to identify and further explore the manager's most dominant cell. The most dominant cell refers to the manager's most dominant type of frustration when using a specific DCT category. This will be one of the cells numbered from 1 through 12. The most dominant cell is an important term and refers to identifying what each manager said to be their most frustrating use of DCT. Hence, instead of asking managers to classify their frustration on a scale of 1 through 5, this data collection method provided less vague data collection, considering how frustration is a subjective term.

As a result, this matrix framework was chosen as an appropriate way to collect empirical data. However, it still could have caused neglecting certain perspectives located outside of the cells. This matrix also entails a risk due to its structure, considering how it could produce some biases for respondents due to directing them to only focus on these 12 cells. Some important areas could be overlooked. To minimize this bias, the authors asked additional questions on whether the managers wished to include another type of frustration or another DCT category.

## 3.5    Data Analysis

*This section focuses on describing the steps of qualitative data analysis that were processed in this research.*

Qualitative data analysis generally includes three steps: data reduction, data display, and the drawing of conclusions (Miles and Huberman, 1994). First, the authors used the matrix framework for data collection during the interviews. The two-axis of this framework naturally became a coding system in terms of reducing the collected data. The structure of the matrix allowed the authors to identify the managers' most frustrating DCT experience.

Second, the data was reduced to be displayed in an organized manner. According to Sekaran & Bougie (2016), charts and diagrams can assist researchers in realizing patterns in order to conclude findings. Therefore, the authors used charts and diagrams in addition to the matrix to share analysis.

Third, the drawing of conclusions included analyzing the additional dimension of the matrix, is the personal background of the managers. This data played an important role in searching for patterns between the type of frustration and its subjectivity related to the managers' personal background.

Finally, the authors decided on using a table chart to analyze these variations and to identify possible patterns. This table chart includes all 25 managers and can be seen in Appendix B.

## 3.6    Validity and Reliability

*This section discusses the validity and reliability of this study. Finally, further biases are spotted and commented on.*

Sekaran & Bougie (2016) state that data-driven conclusions should be plausible, reliable, and valid. They further state that a well-defined operationalization leads to higher category reliability and higher interjudge reliability. In order to increase the reliability of research, the authors operationalized the main concepts into the matrix framework of the data collection. This operationalization allowed them to reduce the abstractiveness of collected data within the target population. It provided higher category reliability in their research.

Furthermore, the authors aimed to have high interjudge reliability while using the same matrix format to collect and analyze data. To achieve this, the authors clarified their data collection method and data analysis processes, respectively, to increase the interjudge reliability of the study. However, the research was exploratory and based on non-probability sampling in data collection. It means that the generalizability of the study is low, and the external validity of the research is limited.

Due to executing a qualitative analysis on a subjective term like frustration, possible ambiguities remain as interviewees could have interpreted the questions differently from what the authors expected. Some of this ambiguity was decreased, as the authors interpreted what the managers said, asking follow-up questions on any vague answers. Also, the managers were asked about their most dominant frustration. The point of this question was to make sure that the manager would become transparent on their most frustrating experience. This can help to get straight answers from managers, as they touch upon many other areas of frustration during interviews.

Also, interview participants possess varying levels of DCT-experience. These different perceptions and experiences could have induced biases, as some managers can be very interested in the topic and be able to discuss it for more extended periods. In contrast, some managers might not have reflected vividly on their DCT habits, and there have difficulties in phrasing their actual frustrations during interviews. In order to decrease these biases, the authors introduced each manager to the topic in an effort to create an equal playing field.

Another bias that could have been introduced is how the person holding the interview can create biases. According to Saunders, Lewis & Thornhill (2007), variables such as roles, personalities, and behaviors of interviewers might introduce bias, as it affects the respondent's response. To counteract this, the authors conducted most of the interviews in pairs, where one of them took the role of an observer in the online meetings. After each interview, a short discussion followed between the authors, where they explained their view on the manager's frustration.

The authors were inspired by the MECE principle when creating the matrix framework. The MECE principle suggests finding distinct categories that are both mutually exclusive and collectively exhaustive (Minto, 2009). The authors will comment on how well the matrix framework lived up to the MECE principle in the discussion section.

It is important to mention that an unfortunate event happened while analyzing the data. The authors accidentally deleted 14 video-recordings of interviews. This incident did not affect the findings of the research, as the authors still had notes saved from each interview. However, the authors could not go back to transcribe what these managers said precisely. It decreased the reliability and validity of the data, as authors were unable to quote some managers directly.

## 3.7   Ethics

*In this section, the authors consider the ethical part of this study.*

Research ethics refers to the expected and conducted social norms of behaviors during the research process (Sekaran & Bougie, 2016). The information given by respondents and interviews recorded by the authors has been treated confidentially. Following this, the respondents' names and organizations were considered as sensitive information and have been removed from this paper to maintain anonymity. Finally, every respondent kept the right of either canceling their participation or asking for the final copy of the study.

## 3.8 Chapter Summary

Methods used in this research were aligned together to answer the research question and to achieve the thesis purpose. After preliminary research in the research area, the authors defined their research approaches as a pragmatist. Following this, they completed the research design, first by reviewing literature and the second by deciding on the appropriate data collection method. As this is an exploratory study, interviews with the semi-structured questions were deemed appropriate to collect data. After respondent selection and sampling design are clarified, they explained the used qualitative data analysis method. Finally, the authors discussed the reliability, validity, and ethics of the study. Also, possible biases that could have been induced during the respondent selection, interviews, data collection, data analysis processes were presented.

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# 4    Findings and Discussion

*This chapter will provide a summary of the data, which is followed by discussing the findings. Next, these findings are connected to the managers' personal background to discuss possible patterns. Lastly, the advantages and disadvantages of the matrix framework are discussed..*

## 4.1    Summary of Empirical Data

The researchers collected qualitative data from 25 managers with interviews. The interview results showed that the most dominant frustrations existed in only eight cells out of twelve cells available in the matrix framework. These findings are introduced in Figure 3 below.

| | | Types of Frustration | | | Most frustrating DCT |
|---|---|---|---|---|---|
| | | Technical-related | Human-related | Way of working-related | |
| **Digital Collaboration Tools** | **Videoconferencing Tools** | • Poor internet connection affets sales presentations [C]<br>• Poor internet connection gives low motivation for work [N]<br>• Too many functions create difficulties in finding right settings [W] | • Other's inability to adapt new technologies [A]<br>• Lack of body language and does not replace physical meetings [D]<br>• Missing interactive whiteboard sessions [G]<br>• Lack of social aspects of work life [I][V]<br>• Hearing disturbing background noices [Q]<br>• Tiring to sit on video calls all day and miss real social interaction [T]<br>• My own inability to adapt new technologies [U]<br>• Change in working habits changes our habits  [Y] | • Want to appear competent for new company, but lack of training and tech skills [J]<br>• Lack of trust in letting managers use digital tools [P] | 14 frustrations due to the use of videoconferencing tools |
| | **Instant Messaging & Communication Tools** | • Inefficient search toolbar and hard to find e-mails [R] | | • Company was slow in transitioning to digital tools [B]<br>• Getting work messages at late evening [F]<br>• Having work during night time [M]<br>• Variety of tools creates confusion [S]<br>• Amount of email is overwhelming with non-important information [X] | 6 frustrations due to the use of Instant Messaging & Communication Tools |
| | **File Sharing Tools** | | | • Undefined managing of foldering system [H]<br>• Using a big variety of applications in the projects [O] | 2 frustrations due to the use of Files Sharing tools |
| | **Project Management Tools** | • Cumbersome clicking process to find documents [K] | | • Confusing IT process to register errands [E]<br>• Wide variety of available tools and bad coordination between departments [L] | 3 frustrations due to the use of Project Management Tools |
| **Most Dominant Frustrations** | | 5 technical-related frustrations | 9 human-related frustrations | 11 way of working-related frustrations | |

*Figure 1. The completed matrix framework, containing a brief explanation from the managers on their most dominant frustration.*

When starting to analyze, the authors discovered difficulties in analyzing the results cell by cell. Frustration reasons varied within many of the cells. However, some managers similarly explained their dominant frustrations. The authors will, therefore, group these managers together. To do this, the authors looked for common themes of dominant frustrations.

From the data, the authors identified two common themes in technical-related frustrations. These themes can be seen in Figure 4: *Overly complex structure* and *Lost/Dropped connections*. Next, human-related frustrations were grouped into three common themes: *Lack of physical presence, Inability to use technology*, and *Lack of leadership*. Lastly, the way of working-related frustrations was grouped into four themes: *Confusing work process, Company culture, Removing boundaries between office and outside*, and *Lack of training*.
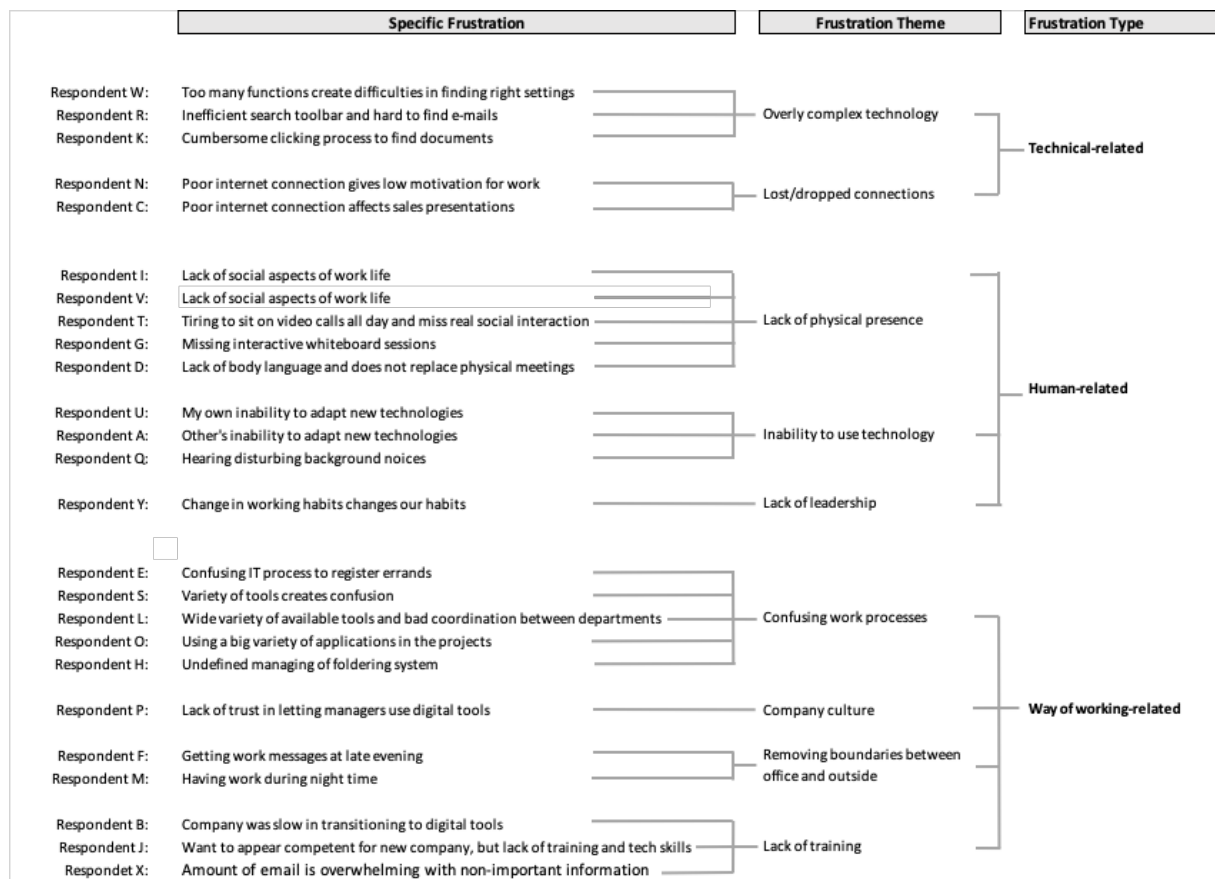


*Figure 2. Illustration showing the managers' specific frustrations categorized into common themes.*

As a small note, the authors realized that the DCT could be improved by adding the software programs mentioned in the interviews, as seen in Table 5. The authors listed all the applications and software, which respondents are currently using at the workplace. The authors found that managers have a wide variety of tools in use. In total, 25 managers made use of 67 video conferencing tools, 54 communication and messaging tools, 52 file-sharing tools, and 27 project management tools. This showed that managers often use more than one application that serves the same intended purpose. It is essential to mention that this list is limited to the small scope of respondents who were interviewed. The list would become more comprehensive and valid by gathering more respondents.

*Table 1. Containing the specific software programs and the number of times they were pointed out as used by managers.*

| Digital Collaboration Tools | | | |
|---|---|---|---|
| **Videoconferencing** | **Coomunication and Messaging** | **File Sharing System** | **Project Management Tools** |
| Microsoft Teams x 19 | Microsoft Outlook x23 | Internal Intranet System x13 | Trello x6 |
| Skype x12 | Microsoft Teams x9 | SharePoint x8 | Jira x5 |
| Zoom x12 | Skype x8 | Google-Drive x6 | Microsoft Project x4 |
| WebEx x5 | Slack x5 | Microsoft Teams x6 | Asana x3 |
| WhatsApp x5 | WhatsApp x5 | Microsoft Onedrive x5 | Confluence x2 |
| Google Hangouts x4 | Google Mail x2 | Dropbox x4 | Google-Keep x1 |
| GoToMeeting x3 | AWS-Chime x1 | WeTransfer x2 | Microsoft Azure DevOps x1 |
| Slack x2 | WeChat x1 | Egress x1 | Qlik x1 |
| AWS-Chime x 1 | | Google-suit x1 | Sprint x1 |
| Azure DevOps x1 | | Microsoft OneNote x1 | Team Engine x1 |
| Blue Jean x 1 | | Slack x1 | Workbuster x1 |
| Starleaf x1 | | Skype x1 | Wrike x1 |
| WeChat x1 | | Syncplicity x1 | |
| | | Team Engine x1 | |

The preliminary list from section 2.3. was also updated, as seen in Table 6. Each theme was placed under their three types of frustration, and six new specific frustrations were added to this list. Each of these common themes will now be discussed below.

*Table 2. Summary of the different types of frustration from human-technology interaction, but updated with interview data.*

| Frustration types in use of digital collaboration tools | | |
|---|---|---|
| **Technical-related** | **Human-related** | **Way of Working Related** |
| • Notification interruptions [1][2] | • Tech-adaptation of user [5] | • Removing boundaries between office and outside [7][θ] |
| • Owerwhelming and confusing [3] | • Extensive use [4] | • Limiting policies and procedures [8] |
| • Lost/dropped connections [10][β] | • Personal use [6] | • Lack of training [9][ι] |
| • Overly complex technology [α] | • Lack of social interaction [γ] | • Confusing working process [ζ] |
| | • Inability to use technology [δ] | • Company culture [η] |
| | • Lack of leadership [ε] | |
| **References** | | |
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| [2] Carton & Aiello (2009) | [6] Kim (2018) | [10] Lazar et al., 2006 |
| [3] Pew (2003, in Lazar et al., 2006) | [7] Hoeven et al. (2016) | |
| [4] Yin et al. (2018) | [8] Mastrangelo et al. (2006) | |
| *Note : The complete reference list can be seen in References Page* | | |
| **Respondent** | | |
| [α] Respondent K, R, and W | [δ] Respondent A, Q and U | [η] Respondent P |
| [β] Respondent C and N | [ε] Respondent Y | [θ] Respondent F and M |
| [γ] Respondent D, G, I, T and V | [ζ] Respondent E, H, L and S | [ι] Respondent B, J and X |

# 4.2 Most Dominant DCT Frustrations

The results show that the managers' most dominant frustration was related to the way of working, as seen in Figure 5. 11 managers pinpointed this type of frustration. The second most dominant frustration was human-related, pinpointed by nine managers. Technical-related frustrations were dominant the least amount of times, as only five managers stated this.
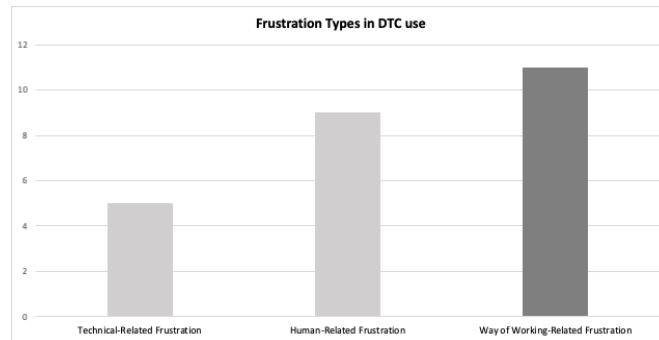
*Figure 3. Illustration showing the managers' specific frustrations categorized into common themes.*

The data is also illustrated in the categories of DCT used by the managers, as seen in Figure 6. In total, fourteen managers connected their most dominant frustration to the use of video-conferencing tools. Next, instant messaging and communication was mentioned by six people as a dominant frustration. In the following sections, the authors will introduce a more detailed record of their findings under each common theme.
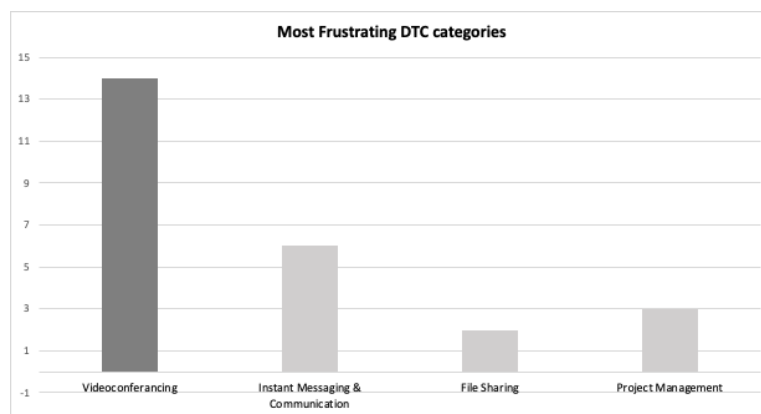


*Figure 4. Diagram showing the number of managers that mentioned each DCT category.*

## 4.2.1   Technical-Related

Figure 6 shows that five managers pointed out a technical aspect as the most dominant frustration. Therefore, this aspect was mentioned the least times. Two different themes were identified and will be discussed below

**Theme 1: Overly complex technology**

When asked about the most dominant frustration, Manager W showed appreciation for fewer functions within the software, providing that the functions used in digital tools actually work. The authors note that if the video-conferencing tools include too many functions, it will create difficulties in finding the proper video settings for Manager W. Therefore, the abundance of video settings was experienced to cause frustration for this manager.

Furthermore, manager R and K also connected their most dominant frustration to technical aspects. Manager K summarized their frustration by how the "...application needs to be clicked 1000 times to get a document you need. (...) this frustrates me because this problem is exactly what computers should solve.".

This data goes well in line with Lazar, Jones & Shneiderman (2006), who states that people are frustrated because of losing almost 40% of their working time due to complexities related to workplace technology. The authors note that managers perceived it as frustrating to lose time when knowing that there is already a technical solution for their issue. While complexities like these have been solved in other contexts, it remains unclear how these issues still persevere in managerial contexts. The authors believe that technology has developed to an extent where the expectations on DCT have increased as well. Namely, frustration still occurs if the DCT does not fulfill its functions, no matter how advanced.

The authors suspect that if the technology does not live up to its expected function, then frustration will follow as a consequence. The authors argue that a push from technology developers has generated a pull effect from the users as a response, where the expectations from users can be set too high. This can turn in turn cause frustration.

The developers creating these DCT may not even intend to live up to the users' expectations. Therefore, if software developers want to reach a high satisfaction rate from users, the authors suggest aligning the user's expected functions with the developers' intended functions.

**Theme 2: Lost/dropped connections**

Manager C and N both found the video-conferencing tools frustrating due to bad internet connection, but for different reasons. Manager C explained how bad internet connection negatively affects their sales presentations as it made their sales product look worse than it is. Manager N, on the other hand, explained that bad internet connection causes low motivation and productivity at the workplace.

The experiences of Manager C and N can be contrasted with previous theory stating that technological developments lead to higher organizational profitability and user motivation (Lazar, Jones & Shneiderman, 2006). Manager C and N indicate that the opposite can also be true in case of those technological enhancements not functioning properly.

These findings highlight the difficulty of discussing other people's frustration. Despite belonging to the same cell and theme, the two managers demonstrate two different reasons for their frustration. One reason being sales-oriented and the other is motivation-oriented. Even if both managers stated that their most dominant frustration is about poor internet connectivity in video-conferencing tools, the intended use could still be different. For this reason, it is unclear to say if their frustration could be the same or not.

## 4.2.2   Human-Related

Figure 7 shows that all the human-related frustrations were concentrated on video-conferencing tools. These nine specific frustrations were analyzed and grouped together, resulting in three common themes, which will be discussed below.
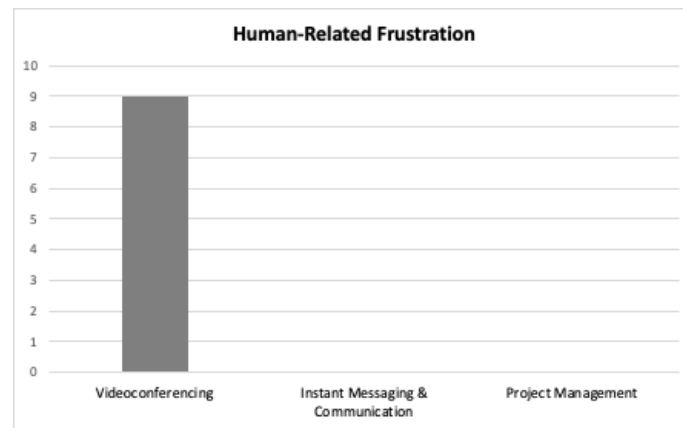
*Figure 5. Diagram showing what DCT category the human-related frustration was connected to.*

**Theme 3: Lack of physical presence**

When asked about their most frustrating experience, five managers mentioned the lack of physical presence in video-conferencing tools. Three of the managers argued that this has an impact on the social aspects of business life.

Manager I explained how they "...love the social aspect of business life, and it is not the same in video calls.". Likewise, Manager V said that "I want to have a social connection with people, not just have business relations with co-workers.". In addition, Manager I and T pointed out how there is no procedure for socializing digitally. Both exemplified how there are no proper coffee breaks or pre-talks before meetings. Manager I said: "In Microsoft Teams, the team-feeling is lost."

This lack of procedure for socializing limits the manager's ability to have a social relationship with co-workers. The natural interactions from coffee breaks or passing each other in the hallway does not happen when working digitally. The authors argue that the problem lies in high expectations of video-conferencing tools. The tools do not live up to physical meetings. Kimmel (2005) explained that frustration from high expectations refers to internal frustration. In some aspects, this kind of frustration appears more manageable than external frustration. The authors' thought process is that expectations are set at an unreasonably high level. The authors challenge these expectations from managers, suggesting to view video-conferencing as an upgraded audio-conferencing tool, instead of a downgraded physical meeting. This could set more reasonable expectations for the video-conferencing tools.

Certain aspects of the role of a manager can also cause frustrations. Kleppestø (2019) explained that the purpose of management is to facilitate collaboration, coordination, and control via communication. The authors want to highlight how managers are becoming frustrated by an inability to fulfill this managerial purpose. The authors view socializing as an important aspect for managers, and point to how Gosling and Mintzberg (2003, p. 7) discuss that "to be in a collaborative mindset means to be inside, involved, to manage throughout." These digital tools push the managers out of the workplace, with the risk of no longer being inside and involved. It appears that some managers feel the need to be physically present to fulfill their managerial role.

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Two managers described the lack of physical presence more in detail by explaining how they lack facial expressions and body language when using video tools. However, this is the problem that video tools are trying to solve. You cannot see the facial and body expressions in a video meeting. Manager D explained that video meetings do not solve this problem, as people "...are more difficult to read when you can't see them in full. I am a people person, and these video tools are making my job more difficult". This is confirmed by Mintzberg (2009), exemplifying how two people can have little basis to judge each other when talking digitally. The authors see that this decreased basis for judging each other has a significant impact on managers. Since two people participate in a digital conversation, it appears that some form of social procedure is needed in order to clarify the context. One person may view the conversation as a digital conversation, and the other person may view it like a physically present conversation, and thereby treat it as such.

Manager D explained potential mitigation for this lack of body language, as their co-workers "...try to over-communicate while on video". Mintzberg (2009) explains how managers can be fooled into believing they understand the situation when working digitally. In an attempt to avoid being fooled, the authors believe that managers simulate physical expressions via digital over-communication. The authors interpret that managers feel a need to do this, as body language and facial expressions are clues that managers need to pick up. The managerial role depends on these subtle clues. Therefore, the authors see issues in executing the managerial role when digitally removed from the action and the traditional working environment. This is problematic because managers need to be digitally present in all other aspects of managing. Therefore, it appears that video tools do not solve the problem of facial expression and body language, which it intends to solve. The outcome thus leads to frustration..

**Theme 4: Inability to use technology**

During the interviews, three managers suggested that their dominant frustration originated from an inability to use technology. Manager A explained that the frustration is coming from "others' inability to adapt new technological tools." Manager U was frustrated in not being able to use the video-conferencing tools and stated that "My own digital inability frustrates me. I have to turn to colleagues for help.".

The authors believe that the frustration from Manager A and U can be discussed more accurately when keeping in mind the managers' personal background. Manager A is an IT manager, whose main task is to get coworkers to adapt to new DCT. Manager U works in an IT company where video-conferencing is common knowledge. The authors argue that because of the managers' role and the sector where characterized so much by technology, the managers become frustrated.

Lastly, Manager Q said, "People don't know how to mute themselves in the online meeting. (...) hearing all the background noises frustrates me. All the voices are overlapping". The manager insisted on this being a human-related frustration, despite the frustration being connected to a technical aspect like audio. If managers feel that coworkers are unable to use technology, their frustration can be projected onto these coworkers. This makes it even more relevant to become acquainted with using DCT, as people will otherwise show frustration towards you.

**Theme 5: Lack of leadership**

One of the other interesting human-related frustrations was a lack of leadership. When asked about the most dominant frustration, Manager Y approached the question differently and stated that:

"There are many frustrations here. But more important than the frustration is asking: Is it a really frustration? In the digital era, changing working habits changed our habits. (...) I have many frustrations. However, my biggest frustration is the lack of leadership. Because these technologies are new. People are frustrated but they do not know why they are frustrated. If leadership would take a bigger place, these frustrations can be managed."

The authors could not find a direct relation between DCT frustration and leadership. However, the authors believed that a discussion around leadership could create new perspectives. According to Mintzberg (2009, p. 8), "leadership is effectively embedded in management." Furthermore, the author discussed that the internet could affect management practice, and management could become dysfunctional. Considering the quote from Manager Y, the authors believe that the high use of DCT could cause a more frustrating workplace, as there is a lack of clear direction and leadership.

Considering the substantial increase in digital information sharing (Baldwin, 2016), it can be assumed that the use of DCT will only increase. Therefore, it can be necessary in the future to understand these frustrations from technology, as a leader needs to be able to relate to the concerns of co-workers. For the authors it remains uncertain whether more effective leadership could help inn managing frustration at a digital workplace. However, the authors believe that different perspectives can help increase the understanding of DCT frustrations.

### 4.2.3   Way of Working-Related

For the final type of frustration, eleven managers answered that their most dominant frustration was related to the way of working, as seen in Figure 8. The frustration was spread out over different DCT categories, with a peak of five managers connecting their frustration to Instant Messaging and Communication. These frustrations were categorized into four common themes, which are explained below
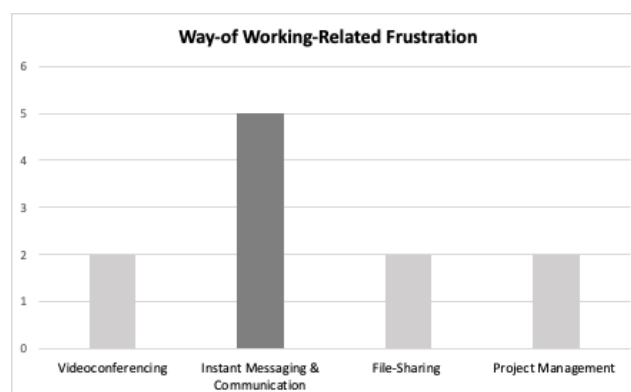
**Theme 6: Confusing work process**

Five managers attributed their frustration to a confusing work process. From interviews, the authors see a notion from managers that DCT is supposed to help save them time each day. Manager S, L, and O experienced frustration in the large variety of DCT in use. Manager O works for a consultancy company and explained "I have to spend 30 minutes each day logging in to all digital tools in use", referring to how it is frustrating considering how the client gets billed for this time. Manager L explains their frustration as:

"Everyone has a different way of working, and there is not one single tool that everyone is using. There is information on Trello, Excel, Google Keep, and Confluence. I have to coordinate this information over and over again. It is time-consuming to keep up to date, as I can spend three hours coordinating all the tools."

From this, the authors gather external frustration. As mentioned by Kimmel (2015), external frustration comes from events outside of one's own capacity, such as physical obstacles. A frustration coming from the way of working is more elusive than a physical obstacle. The authors believe that managers can become frustrated by way of working, considering how there is no clear DCT or person to blame. If a manager experiences problems with the process, frustration can arise because of perceiving the issue as less manageable compared to a physical obstacle.

To illuminate the complexity of frustrations from the use of DCT, it appears that dealing with one frustration can lead to more frustration elsewhere. Manager E attributes their frustration to a confusing IT process to register errands. In an effort to decrease their frustration, the manager stopped using the DCT that was frustrating. The mitigation was to go around the issue and instead use chat functions to register errands unofficially. The authors investigated whether the mitigation of one frustration would cause another frustration to appear somewhere else. When avoiding dealing with the issue of a confusing work process, the manager would use a different DCT tool. This can reinforce the frustration mentioned by managers S, L and O above. If one manager refuses to work with one DCT, they can start to use a different tool for the same purpose. This causes a wide variety of tools to be in use at the office, causing even more frustration.

**Theme 7: Company culture**

The authors found company culture as another aspect in the way of working-related frustrations. Manager P argued, "I do not feel my company trusts me. There are restrictions in sharing information via digital tools. I get frustrated during most of the online meetings, as I still do not know what I am allowed to share with customers".

This aspect was not covered in detail by the literature review. Cascio (2000) argued that a key point to the success of a digital workplace is trust in workers. This finding illustrates that companies that have policies which are too strict can make a manager lose their confidence

online. This is confirmed by Maier, Laumer & Weitzel, (2017), who state that companies send out signals of distrust when having policies around the use of DCT that are too strict.

The authors discussed that when the company interferes with the use of DCT, the manager's higher goals in the intended use is blocked. According to Baron (1977 in Lazar, Jones & Shneiderman, 2016, p. 241), "if individuals perceive that the thwarting was justified by socially acceptable rules, as opposed to being arbitrary, the frustration response may be minimized." From this perspective, if a manager finds the company policies reasonable, then they can be more likely to lower the expectations. This could decrease the frustration when using DCT, instead of making the manager lose their self-confidence.

**Theme 8: Removing boundaries between work time and free time**

As Barnard (1938, p. 218, cited in Mintzberg, 2009, p. 54) suggests, a manager should become the "best-informed member" in the unit. The authors believe that this kind of responsibility can cause a manager to be pushed to a point where the lines between work time and free time become blurred. Manager F and M argued that their workflow is interrupted by notifications, causing them to work overtime. This creates a dilemma for managers on whether they should turn off the notifications. By turning off the notifications, frustration can be decreased. Nevertheless, in doing this, the manager will risk no longer being the best-informed member in the unit. This leaves the authors wondering whether the managerial role is prone to these types of frustrations.

Manager F argued that DCT contributes with the "upside of having the opportunity of flexible hours..." but then highlights their frustration "... but I need to know when I work and when I don't". In an effort to explain this type of frustration, Manager F said, "I grew up with instant messenger for social use, so it is natural for me to check notifications even when I am home." With the young managers being used to being connected to social media, there is a future risk that young managers will be prone to erasing the boundary between work and leisure life.

With the great increase in information sharing illustrated by Baldwin (2016), the authors suspect that future managers will have access to even more information than they can currently process. This can be combined with Mintzberg's (2009) speculations of an increased pace of managing. The combination of increased information sharing and an increased pace of managing puts pressure on a manager to stay updated. Manager M explains how there is "too much information; it is barely manageable." Manager M continues stating how the workload often pushes the manager to work late hours. The authors believe that this can cause frustrations as DCT were only recently introduced to the workplace of Manager M. Before, it was not possible for Manager M to work late nights, because the manager left the office at 5 pm. Therefore, the way digital tools unlock potential alternation in the way that managers work, can cause frustration.

**Theme 9: Lack of training**

The last theme in the way of working was a lack of training. Three managers pinpointed this frustration, but for three different reasons. Manager B said that the "...company did not manage

the digital workplace transition well. They were weak in introducing new technologies". Manager J stated that "I am afraid that my current tech-ignorance will be projected onto myself and my capabilities." All three managers addressed how their frustration would be mitigated by further training of DCT.

These findings are consistent with the research of Townsend, Demarie & Hendrickson (1998) which argued that training helps the user to improve their style of interaction with technology. As a mitigation, Maier, Laumer & Weitzel (2017) suggested that training to increase mindfulness in the use of DCT can help workers experience less frustration.

The authors also considered the work of Lazar, Jones & Shneiderman (2006), who concluded that training activities would accelerate the users' knowledge about reporting issues and whom to suggest improvements to. The authors argue that training would help increase the managers' understanding of where their frustration really is, thereby becoming more able to manage it.

Lastly, the authors find that a company should strive to have everyone at the same level of digital competence. Increasing workplace knowledge of DCT would make users more comfortable is using it to the fullest extent. The software programs have an intended function, and managers should strive to match this intention with the expectation.

## 4.3    Personal Background of Respondents

The generalizability of this study is low, considering the use of convenience sampling. However, a brief look into the personal background of the respondents can provide valuable information for future research. The results that are shown in Figure 9, illustrate how the respondent selection process has induced biases in this study. Nearly half of the managers matched the personal background of one of the authors, considering that the age distribution of the manager was between 26-35 years. This provided an unrepresentative view of the population, and it is important to keep this in mind while analyzing the data.

The authors noted that five out of twenty-five managers worked outside of their country of origin. Interestingly, three of these pointed out that human-related frustrations were their most dominant experiences, and four of them identified the most frustrations in video-conferencing tools. Lazar, Jones & Shneiderman (2006) state that cultural differences could change the experienced level of frustration. When a person uses video-conferencing tools, it needs advanced communication skills (Cascio, 2000). To collaborate with a foreigner in this system could make communication much harder. This suggests that more research is needed in this topic, as cultural differences need to be managed over digital collaboration platforms.
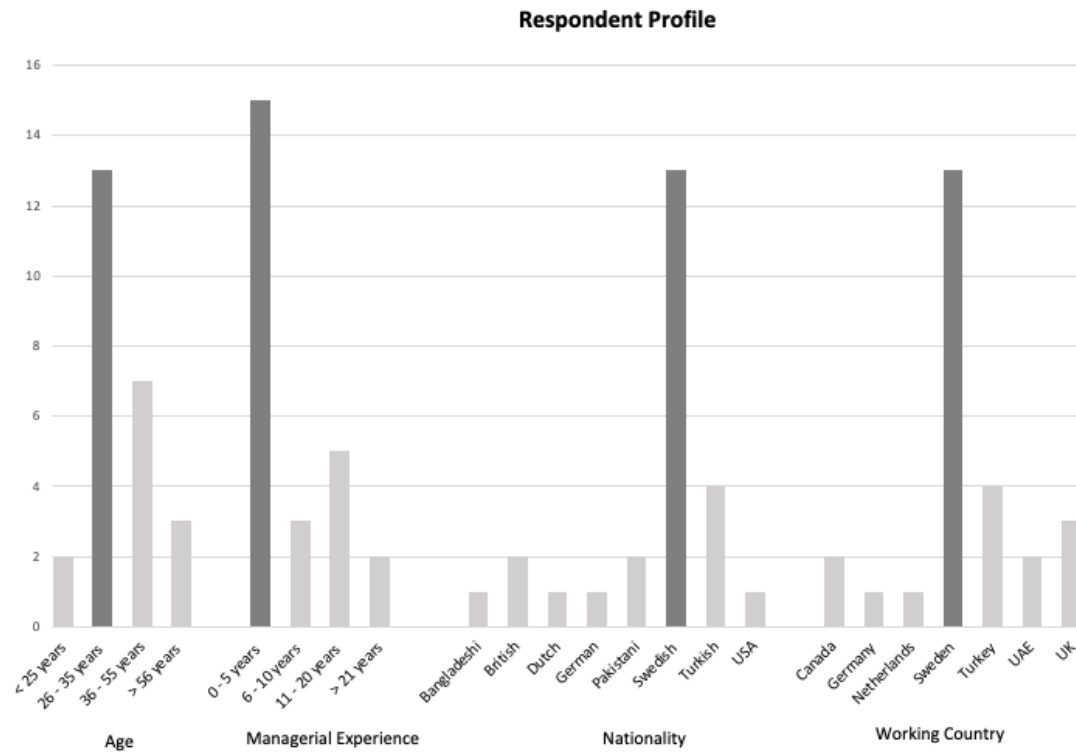
*Figure 7. Diagram showing the profile variation of the respondents.*

The authors also looked at age as a variable in frustration. Interestingly, only two out of 15 managers below 35 years old, stated the technical aspect as their most dominant frustration. This finding is well in line with William & Murugesh (2016), who discussed that younger people have fewer difficulties in using modern technologies, even if the complexity increases. According to Thayer & Ray (2006, cited in Kim, 2018), millennials have more interaction with technology and spend more time on online applications. With the finding and theory in mind, the authors argue that spending more time with the use of technology at younger ages increases intuition towards technology. If young people use DCT more intuitively, their frustration towards these tools can differ from people who are less intuitive about DCT.

Lastly, the authors also discussed how the level of experience affects frustration. Seven out of 15 managers who have five or less years working experience, connected their most dominant failure related to their way of working. On the other hand, four out of 10 managers, who have a more work-life experience, found the way of working-related frustration as the most dominant one. The working experience can represent the knowledge and expertise of tasks that have improved from task fulfillment and practice (Tesluk and Jacobs, 1998). According to Lazar, Jones & Shneiderman (2006), the level of maturity plays a role in the level of frustration. The authors speculated with how the more experienced a manager is, the more they direct their frustrations towards technology, considering that DCT is so newly integrated into their work life. On the other hand, the less experienced managers directed their frustration towards the way of working. This could be interpreted as directing frustration mostly towards their organizations, due to being new in their managerial roles, and not to DCT. The authors further argue that the level of experience a manager possess could affect

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their most dominant frustration type. The degree of this frustration depends on how confident the manager feels in their abilities towards the new situations.

## 4.4 Matrix Framework

The authors discussed how well the matrix framework lived up to the purpose of supporting the semi-structured interview format, as well as helping the authors analyze the interview data. During pre-interviews, the authors realized difficulties in maintaining a discussion within the frame of the study. The discussion was hard to follow, as the interviewees talked about many various frustration types. The authors, therefore, created the matrix framework to facilitate interviews.

The authors agree the matrix framework helped facilitate interviews, as it enabled clear notetaking. Managers were asked about perceived unclarities during the interviews. Many of which expressed that it was easy to follow the structure and that the short interview introduction helped in setting the scene. Therefore, the matrix framework helped in creating a quick format for the interviews.

However, when analyzing the interview data, concerns were raised as it was difficult to put some managers in specific cells. Notably, numerous managers discussed how constant notifications interrupt their workflow. What type of frustration do these managers belong to? Considering how the managers can technically turn off the notifications, is it technical related? Considering how managers can blame other people for CC:ing them too much, is it human related?? Considering how the manager's team has decided that a manager should receive so much information, is it the way of working related? This indicates difficulties in organizing the data. Therefore, the matrix framework did not live up to the MECE principle.

The same is true for the DCT. Today, software programs have many functions outside of only e.g., video-conferencing. During interviews, it became apparent that specific programs include all functions of video-conferencing, messaging and communication, file-sharing as well as project management tools. This created difficulties during the interviews, as the categories were not mutually exclusive. It was unclear in which function the manager experienced frustration, when discussing a particular software program.

It was therefore concluded that the matrix framework facilitated an interview format that was valuable with guiding the discussion but lacked distinct categories which created difficulties during the analysis. The authors attempted to create an improved matrix framework. However, due to the time constraints of this study, the authors were unable to suggest improvements.

# 5  Conclusion

This chapter introduces the conclusions and will summarize the findings from the research. The answer to the research questions will be presented, followed by promoting the practical implications of the research. Lastly, the limitations and suggestions for future research are emphasized.

## 5.1  Conclusions

A push and pull effect provide incentives to becoming more digitally dependent on workplace technology. This increases the use of digital collaboration tools. Previous research shows that users become frustrated by these tools. Notably, studies in human-technology interaction disciplines exemplify how there are indications of a lack of consideration of all the dynamics regarding the use of digital collaboration tools. The managerial role is seen as key in facilitating a digital collaboration platform, considering how the manager is expected to be the best-informed member of the unit. This study aimed to contribute towards facilitating higher utility in available digital collaboration tools by exploring the managers' various frustrations when using them. Based on a literature review and interviews with managers, this thesis aimed to answer the research question:

- What types of frustrations do managers experience when using digital collaboration tools?

Based on pre-interviews, the authors realized difficulties in maintaining a discussion within the frames of the paper. Therefore, a literature review was performed to design a matrix framework. The purpose of this 4x3 matrix was to facilitate an interview format that enabled an improved analysis of the data. During the interviews, the most dominant frustration was pinpointed by each manager, referring to the type of frustration and category of digital collaboration tool. These dominant frustrations were then grouped together according to common themes.

Before sharing the results, it is essential to state that this thesis does not focus on understanding why frustration is experienced in the use of digital collaboration tools. The paper merely focuses on understanding what the frustrations are in available interaction between humans and digital collaboration tools. Another reason for this study was to increase understanding of these frustrations while taking into consideration variables such as age, nationality, and sector. For this reason, the authors discussed expectations and goal attainment, but only on a surface level. Therefore, this paper did not go to a deep level in finding the drivers of the frustration.

The research found that the most mentioned frustration types were human-related and way of working-related. Managers selected video-conferencing tools as the category of digital collaboration tools that caused the most dominant frustration. Numerous different reasons for

being frustrated were presented, and this paper made an effort to reorganize these frustrations into nine different themes. Three of these themes had previously been identified in the literature, and six themes were added after analyzing interviews. The most reoccurring themes mentioned by the managers were *lack of physical presence* and *confusing work process*.

## 5.2    Practical Implications

This study aimed to contribute towards facilitating higher utility in available digital collaboration tools. Inside this, this research aimed to contribute by exploring the managers' various frustrations in the use of digital collaboration tools. At the end of this study, 25 managers have been interviewed to explore their various frustrations. Nine common themes of frustrations were identified and reasoned from the perspectives of the managers. This provided valuable insights for managers and their continued digital collaboration. Finally, this research has contributed towards facilitating higher utility in available digital collaboration tools. Therefore, the purpose of this research has been fulfilled.

## 5.3    Limitations and Future Research

This study includes a few limitations that should be considered, all of which could be a basis for future research. First, the generalizability would increase by increasing the limited sample size. Additional studies would be needed with larger samples and a randomized selection of managers. This study made an effort to gather a wide variety of managers, but the majority of managers were matching the characteristics of the authors themselves in terms of age and country. Also, many of the managers volunteering for an interview already had a genuine interest in digital collaboration. This could have affected the results.

Second, the matrix framework had advantages and disadvantages. The matrix contributed to an interview format that was easy to follow for the interviewers and managers. However, the categories of this matrix were not distinct enough to separate during analysis. This created difficulties when analyzing the data as some managers were difficult to place in a particular category. However, the researchers did find the matrix framework helpful during interviews but recommend finding new distinct categories for future research.

Third, there are limitations in the provided taxonomy on digital collaboration tools. The authors are aware that the interviews did not cover everything that could be categorized as a digital collaboration tool. For instance, the interviews did not discuss audio-conferencing as the focus was directed to video-conferencing. These interviews have, therefore, missed out on digital collaboration methods that managers use every day.

Fourth, the recent worldwide pandemic situation may have caused a recent change in responses from managers. Organizations suddenly implemented new practices in their workplaces and changed their way of working due to the arising global situation (Sarkis et al., 2020). Samuels

(2020) stated that digital collaboration technologies are gaining popularity in this during the outbreak. Numerous managers were not used to using specific digital collaboration tools at the point of the interview. Mainly, this could have caused the weight of frustration directed towards video-conferencing tools. Also, this sudden change in working methods could have been caused respondents to connect their frustration to a way of working-related. According to the authors, it only further increases the relevance of this topic but is not considered any further in this thesis.

Finally, the time period for this study was constrained to 12 weeks. This imposed limitations on the appropriate methods and quality of the analysis. A longer time frame would allow for a more substantial data set to be gathered.

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# Appendix A – Interview Questions

**Interview Questions:**

| | |
|---|---|
| Manager's variable information to get a pattern later on | **1)** How old are you?<br>**2)** Where are you from?<br>**3)** In which country are you working?<br>**4)** In which industry your company active?<br>**5)** What is your specific position in this company?<br>**6)** How many years of managerial experience you have in total? |
| Updating Preliminary List of DCTs in the workplace | **7)** Can you give us the name of collaboration tools that you use in each category?<br>  a) For Videoconferencing?<br>  b) For Communication & Messaging?<br>  c) For File Sharing?<br>  d) For Project Management? |
| Exploring the source of frustration in the use of different types of DCTs | **8)** Can you tell us about your experiences? What are your frustrations in the use of these collaboration tools?<br>  a) You told us that you get frustrated with this specific videoconferencing DCT because of its complex structure in its technicality. Is this correct?<br>  b) You mentioned this specific communication-messaging DCT causes frustration because your company limits its use in the office? Am I right?<br>  c) Also, I realized. You got frustrated while using this specific file-sharing DCT due to your workers use that DCT wrongly. Did I understand correctly?<br>  d) You referred that project management DCT that you used in the office is a source of frustration because your workers are not capable enough? Is it correct?<br><br>**9)** I share screen with you, and you can see your frustrations in use of specific DCT. Which one of them frustrate you the most?<br>  a) You said that the Room 1 that means videoconferencing DCT and its technical complexity frustrates you the most. Can you confirm?<br>  b) If we dig into this one. Why you think it causes most frustration for you?<br>  c) What could be the mitigation of this frustration? |
| Additional questions | **10)** Do you think this frustration can be generalized in your sector or could it be different in other sectors?<br><br>**11)** Do you think this frustration can be generalized amongst different generations? Young vs Old<br><br>**12)** Do you think this frustration can be cultural and varies depending on nationality? Or can you assume it's a worldwide problem?<br><br>**13)** Anything else? Do you want to add something more? |

# Appendix B – Respondent Profile

| Nr | Manager | Age | Specific Position | Sector | Total Managerial Experience | Nationality | Working Country |
|---|---|---|---|---|---|---|---|
| | | | | **Respondent Details** | | | |
| 1 | A | > 56 years | Senior IT Project Manager | Retail | > 21 years | Swedish | Sweden |
| 2 | B | 36 - 55 years | R&D Manager | Metal&Mining | 6 - 10 years | Swedish | Sweden |
| 3 | C | 36 - 55 years | Co-Owner | Testing & Manufacturing | 6 - 10 years | Dutch | Netherlands |
| 4 | D | 26 - 35 years | Software Business Manager | IT | 0 - 5 years | Swedish | UK |
| 5 | E | 26 - 35 years | Sales Manager | Finance/Banking | 0 - 5 years | Swedish | Sweden |
| 6 | F | 26 - 35 years | Product Manager | Energy | 0 - 5 years | Swedish | Sweden |
| 7 | G | < 25 years | Tech Manager | IT | 0 - 5 years | Bangladeshi | Canada |
| 8 | H | 26 - 35 years | Project Manager | Chemical Technology | 0 - 5 years | British | UK |
| 9 | I | 26 - 35 years | Business Manager | IT | 0 - 5 years | Swedish | Sweden |
| 10 | J | > 56 years | HR Manager | Energy | 11 - 20 years | Swedish | Sweden |
| 11 | K | 36 - 55 years | Regional Manager | Real Estate | > 21 years | Swedish | Sweden |
| 12 | L | 26 - 35 years | Medical Operations Manager | Health Care | 0 - 5 years | German | Germany |
| 13 | M | 36 - 55 years | Sales Manager | Enviromental Services | 11 - 20 years | Swedish | Sweden |
| 14 | N | 26 - 35 years | Audit Manager | Finance/Banking | 0 - 5 years | Pakistani | Canada |
| 15 | O | < 25 years | Project Manager | Construction | 0 - 5 years | Swedish | Sweden |
| 16 | P | 36 - 55 years | R&D Laboratory Manager | Manufacturing | 6 - 10 years | Turkish | Turkey |
| 17 | Q | 26 - 35 years | International Area Sales Manager | Pharmaceutical | 0 - 5 years | Turkish | Turkey |
| 18 | R | 26 - 35 years | Senior Solution Architect | IT | 0 - 5 years | Turkish | Turkey |
| 19 | S | 26 - 35 years | HR Manager | Telecom - Finance | 0 - 5 years | Pakistani | UAE |
| 20 | T | 26 - 35 years | Product Manager | Health Care | 0 - 5 years | USA | Sweden |
| 21 | U | 36 - 55 years | CFO | E - commerce | 11 - 20 years | Swedish | Sweden |
| 22 | V | 26 - 35 years | CEO | Food tech | 0 - 5 years | Swedish | Sweden |
| 23 | W | > 56 years | HR Manager | Construction Entrepreneur | 11 - 20 years | Swedish | Sweden |
| 24 | X | 26 - 35 years | Service Manager | IT | 0 - 5 years | British | UK |
| 25 | Y | 36 - 55 years | Sales Director | Cooling Systems Automation | 11 - 20 years | Turkish | Turkey |