Handelshøyskolen BI

GRA 19703 Master Thesis

Thesis Master of Science 100% - W

Predefinert informasjon

Startdato:	16-01-2022 09:00	**Termin:**	202210
Sluttdato:	01-07-2022 12:00	**Vurderingsform:**	Norsk 6-trinns skala (A-F)
Eksamensform:	T		
Flowkode:	202210||10936||IN00||W||T		
Intern sensor:	(Anonymisert)		

Deltaker

Navn:	Isak Adserø og Håkon Wik Heltne

Informasjon fra deltaker

Tittel *:	Exploring the adoption of virtual reality in a business meeting context: Proposal of a conceptual framework
Navn på veileder *:	Carlos Velasco

Inneholder besvarelsen konfidensielt materiale?:	Nei	**Kan besvarelsen offentliggjøres?:**	Ja

Gruppe

Gruppenavn:	(Anonymisert)
Gruppenummer:	164
Andre medlemmer i gruppen:	

MASTER THESIS

EXPLORING THE ADOPTION OF VIRTUAL REALITY IN A BUSINESS MEETING CONTEXT: PROPOSAL OF A CONCEPTUAL FRAMEWORK

BI NORWEGIAN BUSINESS SCHOOL
GRA 19701 - MASTER THESIS
HAND-IN DATE: 26TH OF JUNE 2022
SUPERVISOR: CARLOS VELASCO

Content

Acknowledgments

This paper and the research behind it would not have been possible without the exceptional support of our fantastic supervisor, Carlos Velasco. His passion, knowledge, and fine attention to detail have been a true inspiration and helped us stay motivated and eager from the moment we decided to pursue this project together back in the spring of 2021.

Moreover, this research was partially supported by BI Norwegian Business School, Implement Consulting Group and Norsk Hydro. Therefore, we would like to thank these institutions who all provided insight and expertise that greatly assisted the research, although they may not agree with all the conclusions of this paper. We would also like to thank all the participants who took the time to contribute, and the team at CohereXR (new VR business app) for providing us with their insight and letting us get a preview of what goes on behind the scenes in the development of a new app for business meetings in VR. Furthermore, we would like to thank Frisk Forlag and HR Norge for inviting us to present some of our findings from the thesis in a live-streamed VR meeting during the conference *HR Tech 2022*.

Finally, we would like to show our deepest gratitude to our families and girlfriends whose love and guidance have been instrumental in getting us to where we are today.

Thank you all. Happy reading.

Håkon Wik Heltne & Isak Adserø.

Abstract

This study explores the relatively novel topic of virtual reality (VR) technology in the context of business meetings. Accelerated by the COVID-19 pandemic, businesses have increasingly opened up for remote work, and digital acceleration has climbed its way to the top of the agenda for many corporations. During the past years, there has been a sharp rise in the use of alternative meeting formats such as Zoom and Microsoft Teams. Fuelled by tech giants such as Meta and Microsoft, companies are increasingly also looking into the prospects of VR and augmented reality (AR).

In two studies, we investigate the determinants for behavioural intent to adopt VR in business and compare the perceived meeting quality (PMQ) of meetings in VR, Zoom and face-to-face (F2F). Study 1 is a questionnaire (n = 194) assessing barriers to VR in business and the behavioural intent to adopt VR in the Scandinavian market. This study reveals that VR is perceived as more engaging, interactive, and fun than traditional videoconferencing in Zoom or Teams. On the other hand, the results show a consensus that VR is not fully ready for adoption in the Scandinavian mass-market just yet. Study 2 extends these results through a lab experiment (n = 90) with a 3 (communication mode: VR vs. Zoom vs. face-to-face) x 2 (type of meeting: problem-solving vs. team building) mixed design. The study shows that VR is a superior communication mode to Zoom, and that no significant difference exists between VR and F2F meetings overall. With the only exception being problem-solving meetings, where the perceived meeting quality was slightly higher in F2F than in VR.

The findings of our research have important implications for future research on adoption of VR technology in business, and on managerial decisions for future virtual collaboration. Based on our own research and past studies on technology adoption, we propose a conceptual framework for future researchers and businesses to leverage when investigating the adoption of VR in organizations. In addition, we introduce "*the 9Cs*", a model designed to assist managers in making the right choices for VR adoption in their business. In sum, our studies demonstrate that the current VR technology has already surpassed traditional videoconferencing as a more engaging, fun, and interactive communication mode. Moreover, in line with

media naturalness theory (MNT), we find evidence that VR as a communication mode to a large extent resembles F2F communication, and therefore feels more natural and less dependent on cognitive effort from the participants.

INTRODUCTION

CHAPTER 1

"Gathering – the conscious bringing together of people for a reason – shapes the way we think, feel, and make sense of the world."

- (Parker, 2018)

1. Introduction

On March 11, 2020, the World Health Organization declared COVID-19 as a pandemic and a global health emergency (2020). In the time that followed, countries all over the world went into lockdown, and people were challenged to rethink how they meet and interact with other people and find new ways of working and shopping.

The pandemic has undoubtedly been a tremendous challenge for most businesses (Donthu & Gustafsson, 2020), and with the recent spread of the Omicron COVID-19 virus (Nikel, 2021), the long-term impact on our economy is still uncertain. The other side of the coin, however, is that we have seen a rise in creativity, innovation, and adaptability by many businesses across sectors (SSBR, 2021).

As a result of the pandemic, there has been an acceleration in trends such as virtual-first offices, live commerce, dark stores, escapist retail, and mixed reality (Velasco & Obrist, 2020a). As working from home is quickly becoming the norm in many countries around the world, we are seeing that some countries are going to great lengths to protect home workers' rights. For instance, Germany, Spain, and Ireland are looking into making working from home a legal right where possible, and regulating the number of hours worked (Wunderman Thompson, 2021). This has led to increasing use of alternative meeting formats such as Zoom and Microsoft Teams, and it has also led to the consideration and use of technologies such as virtual reality (Evans, 2020; Karl et al., 2021; Thorp-Lancaster, 2020). Although virtual reality has been around for many decades, it is only until quite recently that it has started to become more mainstream for consumer use (Lee et al., 2017).

In fact, during the pandemic VR has become an increasingly hot topic as a result of Meta (formerly named Facebook) and Microsoft betting on collaborative virtual reality (Gleason, 2021). Meta has already released the beta version of their VR collaboration product, Horizon Workrooms, which lets users of their Oculus Quest 2 VR-headset interact with other remote workers in the same virtual space via 3D avatars. Microsoft has also released a preview of their augmented reality (AR) and VR platform, namely Mesh, which will allow remote workers to meet to discuss a

product design while viewing a full-size 3D model for reference (Gleason, 2021), or even "project yourself as your most lifelike, photorealistic self in mixed reality to interact as if you are there in person" (Microsoft, 2021).

During the past years, several companies have jumped on the *virtual-office* trend, especially within the technology sector. A prime example being Dropbox, which announced in October 2020, they are now a "virtual-first" company and converted all global campuses into spaces for collaboration and community building, not just solo working (Wunderman Thompson, 2021). Another inspiring example of a company jumping on the "virtual-first" trend is WeTransfer, which opened a virtual office in May 2020, in the form of a digital version of its Dutch headquarters. In their virtual office, employees roam around, attend meetings, and join happy hours as avatars (Wunderman Thompson, 2021). Furthermore, the consulting firm Accenture has announced that they strongly believe in the future of VR and is currently using Microsoft's AltspaceVR platform to create the "Nth Floor" – a simulated office space for training, onboarding new employees and hosting company events. So, as employees are becoming increasingly comfortable with the virtual space and working remotely, the lines between the physical and virtual working worlds are becoming increasingly blurred. This opens a great opportunity space for conjuring a "new normal" in the working life.

But what is this so-called "new normal"? This is one of the key questions business leaders of today want answered. Over the past year, the COVID-19 pandemic has disrupted how companies meet with their customers, from a traditional face-to-face meeting to a virtual customer engagement model (Kvedare & Nymand, 2021). For companies to succeed in the "new normal", many have realized that it is critical to provide confidence, skills, and tools for their employees to effectively leverage new technology (Andersen et al., 2020). However, many questions still remain unanswered as to what role new technology will play for businesses in the future. An emerging stream of research within the VR realm has shown great promise for the potential of VR in business. For instance, studies have found that VR is instrumental in enhancing students' learning experience, and in a business classroom context the enjoyment and interest in VR (viewing a 3D, 360° video) are higher than the traditional flat-screen format (viewing a 2D video) (Lee et al., 2017). However, in the past there has been scant effort in investigating the use of VR in a

business meeting context, i.e., how might virtual reality technology be utilized to help facilitate more engaging, meaningful, and effective gatherings in a business context.

In this exploratory study, existing literature on VR technology and on different meeting types and success factors is reviewed, and the current and potential impact of VR in a business meeting context is explored. Through this paper, we aim to provide an increased understanding of what the transition towards virtual reality meetings in business may look like through a conceptual framework. Moreover, critical adoption barriers and what is required for virtual reality technology to 'cross the chasm' in its adoption life cycle is discussed.

LITERATURE REVIEW

CHAPTER 2

2. Literature Review

2.1. The Art of Gathering

Gathering – the conscious bringing together of people for a reason – shapes the way we think, feel, and make sense of our world (Parker, 2018). When planned and executed in the right way, meetings can provide a forum for creative thinking, discussion, debate, information sharing, problem solving and decision making (Karl et al., 2021). Moreover, meetings can help companies meet important employee socio-emotional needs like engagement, empowerment, affiliation, and perceptions of supervisor support (Christian et al., 2011; Karl et al., 2021; Yoerger et al., 2015). On the other hand, when meetings are not structured and managed well, they can lead to negative employee dispositions which tends to lead to lower employee perceptions of their work and well-being, and resultingly it may also negatively impact the firm's financial results (Karl et al., 2021; Rogelberg et al., 2013).

We spend all our lives gathering in different settings and formats, ranging from the informal meeting types such as birthday parties to the more formal and professional settings like board meetings. A large number of studies support the notion that many people find obvious, namely that a lot of the time spent gathering with other people is disappointing to us (Parker, 2018). According to Duncan Green, blogger and specialist in international development, his mood in business conferences tends to swing between boredom, despair, and rage (Green, 2016; Parker, 2018). This notion also extends beyond conferences, as the 2015 State of Enterprise Work survey reported that employees' top obstacle for getting their work done was wasteful meetings (Poll, 2015). In fact, a range of studies provide supportive findings to how meetings frequently are a waste of time. For instance, a previous study found that the cost of ineffective and unproductive meetings for U.S. businesses can be as much as $37 billion every year (Sheridan, 1989). The costs are not just limited to monetary terms, however, they also extend to employee retention, engagement and motivation issues (Leach et al., 2009). Furthermore, different streams of research suggest that ineffective and unproductive meetings can hinder an organization's ability to deliver on their goals, due to various reasons such as diminished effort from attendees or lower meeting attendance (Cohen et al., 2011; Rogelberg et al., 2006; Yoerger et al., 2015).

Priya Parker, who is a professional facilitator trained in group dialogue and conflict resolution shares her lens on gathering, in her manifesto *The Art of Gathering: How We Meet and Why it Matters* (2018). According to Parker, the art of gathering requires; (1) careful *planning*, (2) a clear *purpose*, (3) willingness to *exclude* people, (4) hosts with generous *authority*, (5) set explicit *rules*, (6) *prime* the participants well, (7) encourage *authenticity*, and (8) ensure a crisp *conclusion* to avoid that the event just fizzles out.

In Table 1 on the next page, the key ideas from Parker's book and how these ideas can be applied in a business setting is summarized.

Table 1: The Art of Gathering Key Ideas (Parker, 2018)

Key ideas	Business Application
PLANNING: While gatherings are essential to the human experience, we often don't give them enough thought	When bringing people together we tend to focus on logistical elements, i.e., PowerPoints, AV equipment, table decorations, and menu choices, rather than considering people and human connection
PURPOSE: The first step to creating a meaningful gathering is to commit to a clear purpose for bringing people together	Too many gatherings follow ritualized formats, rather than being built around a clear purpose. This is why we spend so much of our time at work sitting through meetings. Never mind that a quick email exchange could be more effective than a weekly catch-up meeting
EXCLUSION: When you're willing to exclude people, you'll be on the way to building a truly meaningful gathering	The concept of "the more the merrier" is deeply rooted in society. Many of us have been hearing this saying since we were young children. So, when we think about guest lists, we're often focused on inclusion. However, as it turns out, sometimes exclusion is just as important, even if it can feel a little uncomfortable.
AUTHORITY: Hosts who act with generous authority will always deliver better events than hosts who are overly laid-back	It is incredibly important to the overall enjoyment of everyone at your gathering to exercise authority, even when it seems counter-intuitive. It's the best way to ensure that your guests truly get the value they're searching for from gathering with others.
RULES: Making sure that you set explicit rules for your event can be surprisingly liberating	Rules have a bad reputation. Often, they're associated with school, overbearing parents, boredom, and rigidity. However, this is an unfair reputation for them to hold — if you get them right, rules can actually be the gateway for experimentation, playfulness, and even truly meaningful gatherings.
PRIMING: Priming the participants well and honoring them on arrival will help get your gathering off to a great start	It is important to recognize that people will already have an impression of what to expect from an event prior to their arrival. So, prime them with the right expectations. Priming doesn't have to be complicated, and it may mean something as small as making a simple request of your guests. In a business context, a typical example would be to send out an agenda prior to the meeting, allowing participants to prepare on specific topics for discussion.
AUTHENTICITY: Designing gatherings that encourage people to bring out their authentic selves is not only possible, but easy to do!	Too often, we try too hard to present our best selves, rather than our real selves. At business conferences, we tend to talk about our achievements and successes, but avoid talking about our vulnerabilities. This may lead to dull, impersonal conversations.
CONCLUSION: Too many events slowly fizzle out, rather than ending with a bang, but there are simple ways to make sure that your gathering ends well	When planning a meeting, always try to avoid reaching a point where it fizzles out. Moreover, try to make sure that your gathering is remembered, and for the right reasons.

In its most basic sense, meetings are a communication tool used by groups and teams to achieve organizational targets and objectives (Maitlis, 2005), and in organizations, there are few events as universal or influential as workplace meetings (Asmuss & Svennevig, 2009; Holmes & Stubbe, 2015; Perkins, 2009; Yoerger et al., 2015). Typical goals of gatherings in the context of workplace include sharing information with co-workers, discussing problems, and deciding on actions to take moving forward (Leach et al., 2009; Yoerger et al., 2015). In the next section, the

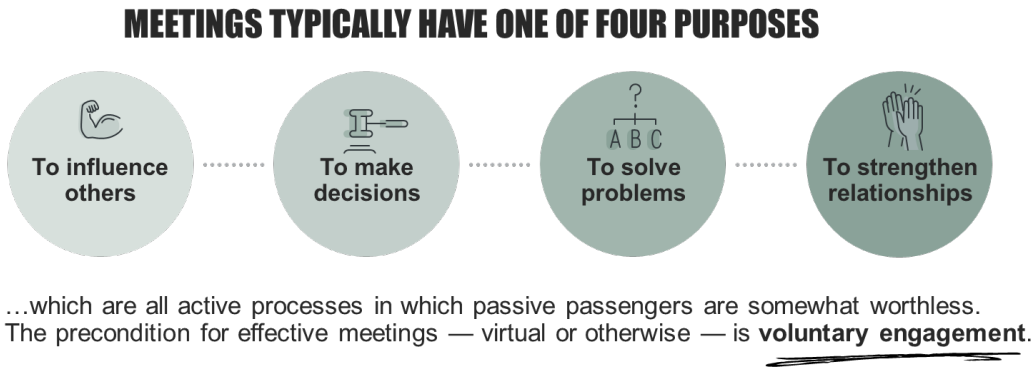
realm of different meeting types will be explored in the context of workplace meetings.

2.1.1. Different Meeting Types

Relevant to the present thesis, meetings are a form of gatherings that are omnipresent in our working life. But how can we conceptualize a meeting? A typology of the purposes of workplace meetings can be found in a Harvard Business Review article by Justin Hale and Joseph Grenny (2020), stating that meetings have typically one of four purposes; (1) to influence others, (2) to make decisions, (3) to solve problems, or (4) to strengthen relationships. And all four purposes are active processes which indicates that if participants are taking a passive role in the meetings, and are not engaged, the meetings will not be effective (Andersen et al., 2020; Kvedare & Nymand, 2021).

See Figure 1 below for a visualization of the typology of the purposes of meetings in the workplace.

Figure 1: Typology of Meeting Purposes (Hale & Grenny, 2020)



Many factors are involved in deciding the types of meetings to achieve these purposes. For instance, the number of people involved, the meeting duration, and the tools used to conduct the meeting should be considered (Allen et al., 2012). And even though meetings are generally intended to set goals, make decisions, and solve problems, many consider meetings as poor use of time and a source of inefficiency (Geimer et al., 2015). Before delving into what is needed to conduct successful meetings and overcome the reputation as an inefficient time-spender, we find it necessary to evaluate literature that provides an overview of relevant business

meeting types with examples and business applications. As meetings vary by hundreds of minor and major elements, classifying all existing meeting types would be an encyclopaedic process with seemingly no end. Therefore, a consolidation of several meeting elements into a set of a few, more general meeting types will be presented.

Some meetings are conducted with the sole purpose of informing the participants about something relevant to their business. Information-sharing meetings are process-oriented meetings where the participants' roles are to update their co-workers on what they are currently doing (Tracy, 2016). Information-sharing meetings are quite commonly held in organizations, as results from a study on almost 1000 meetings showed that over 20% of meetings were categorized as information-sharing meetings (Romano & Nunamaker, 2001). Results from an extensive meta-analysis on information-sharing meetings find that team performance is significantly improved as a result of such meetings (Mesmer-Magnus & Dechurch, 2009), and the majority of the participants from another study found information-sharing meetings as the second most important means of communication after one-to-one meetings (Tracy, 2016).

In other situations where co-workers assemble, the specific purpose can be to identify, define and analyse one or several problems that either have occurred recently or have been dwelling within the organization before ultimately implementing and evaluating a solution (LeBlanc & Nosik, 2019). Problem-solving meetings involve communication towards finding solutions by generating ideas and sharing knowledge within the team (Kauffeld & Lehmann-Willenbrock, 2012). These types of meetings are especially common for consulting businesses, as other businesses reach out to the consultancies to solve specific problems or needs (Lam, 2021). In many circumstances, a meeting as such is labelled as a collaborative workshop which is recognized to be an efficient tool for producing innovative solutions that help solve a client's problem (Choi et al., 2018). Although the methods utilized to generate ideas and solve problems are often similar across businesses, some methodologies are more frequently used than others. For instance, McKinsey's seven-step problem-solving process (2019) or Boston Consulting Group's Growth Share Matrix (2019) are very popular and taught in most business schools. Moreover, another frequently used technique for idea generation and

problem-solving is brainstorming, a group methodology that builds on a foundation of rules first introduced by Alex Osborn in the 1950s (Besant, 2016). Intriguingly, research seems to indicate that traditional brainstorming is not as effective as one might initially think (Putman & Paulus, 2009; Rietzschel & Nijstad, 2020a; Stroebe & Diehl, 1994). Instead, electronic brainstorming, where participants can write and read ideas simultaneously, and brainwriting, a method involving silently sharing written ideas in a group (Heslin, 2011, p. 131), are found to be more successful methods for generating ideas and ultimately solving problems (Rietzschel & Nijstad, 2020b). For instance, results from a study analysing data from 400 employees in the IT sector found that the number of ideas generated was significantly higher for brainwriting versus what it was for brainstorming (Swaminathan & Rajarathinam, 2018).

Despite the fact that some research suggests that team building meetings have no significant effect on performance (Salas et al., 1999), other researchers argue that the aforementioned meeting type is one of the most important investments businesses can do for their employees (Scudamore, 2016; Strnadová et al., 2014). In fact, extending and updating on the findings from Salas et al. (1999), Klein et al. (2009) presents evidence supporting that team building has a positive effect on performance, cognitive, affective, and process outcomes. Defined as the process of diagnosing team dynamics, introducing plans and new subjects for the employees to improve team performance (Dyer Jr, 2015; Tracy, 2016), team building is an increasingly central meeting type that can generate more engagement among employees and ultimately a stronger company culture (Scudamore, 2016). There has since early 2020 been a momentous surge of virtual team building activities due to the COVID-19 pandemic (Baumann & Sander, 2021; Koetsier, 2020), and due to the recent spread of the Omicron variant, we must brace ourselves for a continuation of virtual meetings in the time to come. Fortunately, studies have found that virtual team building activities can have a positive effect on team performance when compared to traditional team building meetings. For instance, results from a study on team video gaming for team building reported a 20 percent improvement in productivity for the teams that participated in team video gaming compared to the team that performed traditional team building activities (Keith et al., 2018). Furthermore, a recent study shows that job resources, such as autonomy and feedback, proved positive effects on team functionality and team building

conditions with high virtuality, for instance not being physically located together (Handke et al., 2020).

In Table 2 below, a typology of the three major meeting types discussed above can be found. That is, team building, problem solving, and information sharing.

Table 2: Typology of Meeting Types

Attendee Involvement	Meeting Type	Purpose	Examples
High ↑ Low	Team Building	• Improving team performance through a range of activities	• Team video gaming, campfire stories, truth and lies, puzzles etc.
	Problem Solving	• Identify, define and analyze problem(s) and find solutions by generating ideas	• Collaborative workshops with techniques like brainstorming or brainwriting
	Information Sharing	• Inform participants about something relevant to the business	• Process oriented meetings such as check-ins, keynotes, presentations

In the present study, the focus will be on problem-solving meetings and team building meetings with the aim of gaining a deeper understanding into the effectiveness of different communication modes for these meeting types (i.e., face-to-face, videoconferencing meetings and virtual reality meetings).

The next section intends to highlight what previous literature within the domain of workplace meetings have found to be the most important success factors and meeting design characteristics before, during, and after business meetings take place.

2.1.2. Meeting Success Factors

Even if our gatherings tend to disappoint us, most of us remain on autopilot when we bring people together, wishing that the chemistry of a good meeting will somehow take care of itself, focusing more on the logistical aspects of the gathering than the people and what happens between them (Parker, 2018). That is not to suggest that the logistical aspects are not important for the success of workplace meetings, as studies have found that agenda use, meeting punctuality, and facility quality are related to meeting effectiveness (Cohen et al., 2011; Leach et al., 2009). However, as research by Yoerger et al. (2015, p. 2) suggests, "it is important to be mindful of not only the meeting structure, but also of the characteristics of the

meeting participants themselves, and how to elicit quality contributions from those participants".

In a previous study on meeting design characteristics and attendee perceptions by Cohen and colleagues' (2011), 9 design characteristics across 4 categories (i.e., temporal, physical, procedural and attendee) were found to significantly predict perceptions of meeting quality. Findings from their study suggest that organizations would experience an increase in the perceived meeting quality by considering how meetings are designed both prior and during meetings. And previous research also suggests that what happens after the meeting has ended is important to accomplish organizational goals (Perlow et al., 2017; Vestal, 2015).

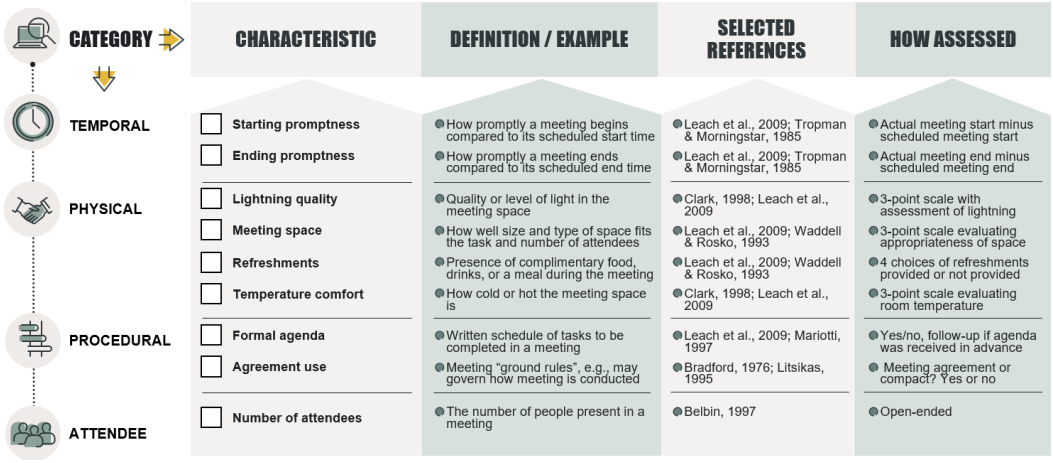
Similar to attending a job interview or getting ready to compete in a sports event, preparation before a meeting is key to ensure engagement and buy-in during the meeting (Kvedare & Nymand, 2021; Swift, 2020). Before the meeting, the organizer should carefully consider the list of participants, and make sure to only invite participants that are central to the meeting's purpose (Belbin, 1997; Cohen et al., 2011; Vestal, 2015). When the list of participants is set, the organizer should find a meeting space that fits the purpose of the meeting, has the right amount of space and suits the technological and practical needs (Cohen et al., 2011; Leach et al., 2009; Waddell & Rosko, 1993). Before the meeting, the organizer should also make sure to set an agenda which outlines the purpose and distribute it to the participants to activate them and give them the chance to prepare (Cohen et al., 2011; Jay, 2009; Kvedare & Nymand, 2021; Mariotti, 1997; Vestal, 2015). Results from a study conducted by Allen et al. (2012) found that employees are displeased with meetings when they lack structure and productivity, but they enjoy them if relevant information and clear objectives are shared in advance. Furthermore, if it is a physical meeting, the organizer should consider the meeting room's temperature and lighting levels to ensure they are within the desired parameters and do not negatively influence the participants' ability to conduct business (Cohen et al., 2011). Not only are poor planning and lack of agenda reported as indicators related to negative associations with meetings, studies also find low relevance to the participants' work (Geimer et al., 2015) to be a key aspect that negatively influences participants' satisfaction with meetings. For instance, an unprepared engineer might not see relevance in attending a sales and marketing meeting, and the meeting merely constrains the engineer's time.

When the meeting starts, the organizer should ensure that the meeting actually follows the predetermined starting time, even if all participants have not yet arrived (Cohen et al., 2011). Various scholars suggest that, during a meeting, keeping track of time and what is said and heard is vital for successful meeting outcomes (Swift, 2020; Vestal, 2015). Moreover, studies suggest that if it is appropriate to serve beverages, snacks, or a meal during the meeting, this should be arranged in advance (Cohen et al., 2011; Leach et al., 2009; Waddell & Rosko, 1993). And participants should be allowed to serve themselves prior to the start of the meeting to ensure that this does not distract participants from the core purpose of the meeting (Cohen et al., 2011). Previous studies also provide evidence that perceived meeting quality is positively correlated with setting forth a meeting agreement at the start of the meeting, i.e., this agreement can be informal, but it should address the meeting "ground rules" (Bradford, 1976; Cohen et al., 2011; Litsikas, 1995).

On average, executives reportedly spend approximately 23 hours a week on meetings, and meetings have over the past years increased in both length and frequency (Perlow et al., 2017). Therefore, in order for the participants to be able to attend the next event on their schedule, meetings should start and end at scheduled times by, for instance, tracking the meeting with a timer (Vestal, 2015; Cohen et al., 2011). Furthermore, by tracking what is said and heard, the meeting leader can ensure that the discussion maintains focus and relevancy (Vestal, 2015). Studies find that more successful meetings are associated with higher team productivity (Kauffeld & Lehmann-Willenbrock, 2012), and the latter mentioned notion is more likely to be achieved if the discussion is sustained on the right track.

In Figure 2 on the next page, the meeting design characteristics that previous research have identified as significantly related to the perceived quality of meetings can be found.

Figure 2: Meeting Design Characteristics (Cohen et al., 2011)



There are countless reasons why the discussions we felt were meaningful and productive during meetings go nowhere and provide little to no results. For instance, participants' attention immediately shifts to new issues after the meeting ends, or the meeting ends without clarification about what was agreed upon (Axtell, 2015). To achieve results and overcome hurdles as such, the content of what was discussed in a meeting should be compiled and summarized in a professional format not long after the meeting's end (Vestal, 2015). As seen in virtually all organizations, regular group debriefs where everything from meeting design to participants' emotions is discussed have been found to be critical for successful meetings (Perlow et al., 2017).

In the next section, the role of a facilitator in meetings, and how a facilitator may play a vital role in ensuring a positive outcome of meetings will be discussed. The next section will also elaborate on *participation in decision making* (PDM) and the link between involvement and employee engagement.

2.1.3. The Role of a Facilitator & Participation in Decision Making

According to Yoerger et al. (2015, p. 2) the leader of a meeting "has a unique role in guiding the meeting while ensuring progress on meeting goals and adherence to the agenda throughout". Furthermore, a meeting leader's presence or actions can aid in setting a more formal tone and distinguishing the meeting from other events in organizational life (Holmes & Stubbe, 2015; Yoerger et al., 2015).

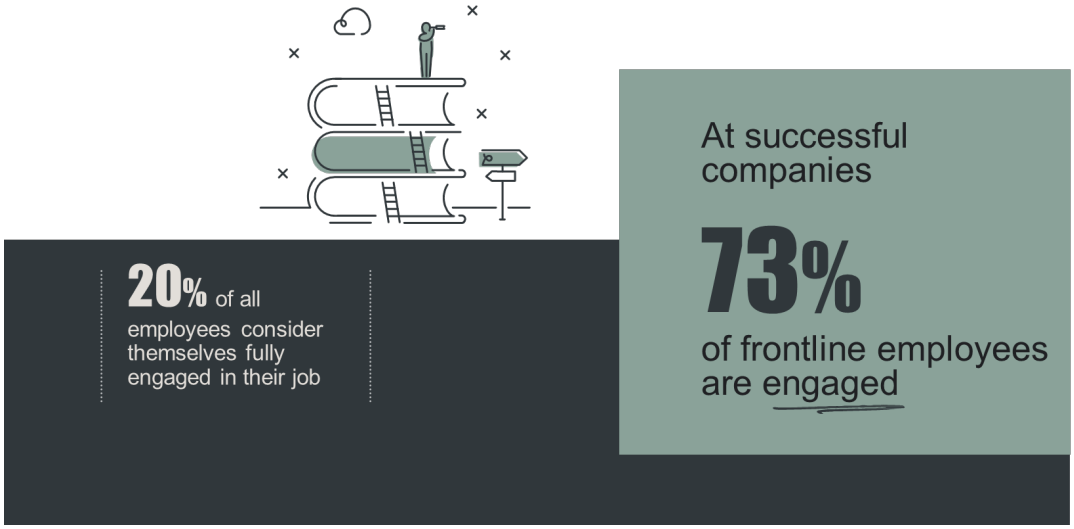
Facilitation, in its purest form, is about helping a group perform better, which can imply helping them reach an outcome more quickly, more efficiently, or even exceeding all expectations (Andersen et al., 2020, p. 2). Pomerantz and Denvir (2013) suggested that the facilitator of a meeting has considerable influence in facilitating turn taking among meeting participants, discouraging inappropriate or counterproductive behaviour, and inspiring positive, constructive contributions from the attendees. Previous studies investigating the features of well-run meetings that can strengthen positive outcomes for organizations, has found that meetings where attendees can openly participate in decision making lead to more favourable outcomes (Hinkel & Allen, 2013) and increased employee engagement is associated with higher degree of participation from meeting attendees in organizational decision making (Yoerger et al., 2015). According to Yoerger and colleagues (2015, p. 3) participation in decision making (PDM) in meetings is defined as "the degree to which employees are encouraged to share their thoughts, feelings, and ideas in the formal meeting setting". Previous studies on PDM have found many positive effects of encouraging participants to actively engage in meetings. For instance, studies have found that when work environments are perceived as safe, and participants have the desire to participate, PDM can influence employee attitudes and behaviours and create a sense of belonging (Long, 1979). Moreover, past studies have found PDM to be positively related to performance and commitment in carrying out tasks agreed upon in the meeting (Rosenberg & Rosenstein, 1980; Sagie & Koslowsky, 2008), as well as jobs satisfaction and job performance (Lam et al., 2002) . Interestingly, studies have also found that the relationship between PDM and employee engagement is more effective when an organization actively encourages participation rather than forcing it (Stohl & Cheney, 2001).

Yoerger et al. (2015) argue that since PDM consists of how participants share their ideas, feelings and opinions in meetings, it goes hand in hand with employees' desire to engage in their work more fully. Employee engagement can be thought of as the degree to which individuals bring their whole selves to work and immerse themselves in serving their company (Cowardin-Lee & Soyalp, 2011; Kahn, 1990). Employee engagement can be described as a state of mind, consisting of three components: vigour, dedication, and absorption (Schaufeli & Bakker, 2017). Yoerger et al. (2015) describe *vigour* as having a strong energy for the work, persistence, and resilience. *Dedication* is described as being present when

employees feel that their work is motivating and challenging as well as instilling feelings of pride that strengthen commitment. The authors describe *absorption* as becoming immersed in the work role, so that one's role at work become somewhat inseparable from one's overall identity (Yoerger et al., 2015). In Appendix 1, the Uthrect Work Engagement Scale which consists of 17 items assessing vigour, dedication and absorption can be found (Schaufeli & Bakker, 2017). Over the last decade, there has been a steady rise in employee engagement globally, however, as a result of the pandemic employee engagement has decreased by two percentage points, from 22% in 2019 to 20% in 2020 (Gallup Inc, 2020). But why is employee engagement so important? According to a recent study by McKinsey & Company, 73% of frontline employees at successful companies report being fully engaged (2021). This illustrates the vast potential it might have for facilitators to ensure more active participation in decision making during meetings.

The key employee engagement statistics can be found in Figure 3 below.

Figure 3: Key Employee Engagement Statistics (Gallup Inc, 2020; McKinsey, 2021)

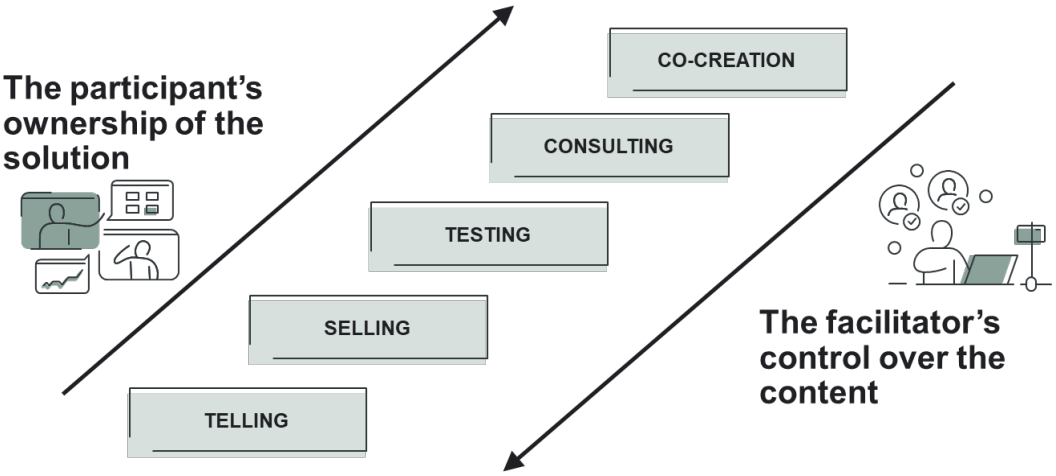


When facilitators plan a meeting, it is therefore important to consider what degree of participation would be ideal for the meeting's purpose and how to achieve the right level of involvement. Andersen and colleagues (2020) suggest a simple model consisting of five levels of involvement to help guide facilitators when preparing for a meeting. The first level, *telling*, is typically applied in an information meeting where the facilitator is mainly looking to inform the participants and not looking

for involvement. The second level, *selling*, is when the facilitator has a preferred solution to a problem in mind, and want participants to engage in dialogue around that solution. The third level, *testing*, is typically when the facilitator approaches the meeting from a perspective with a solution that is almost complete but wants to make sure everything is as good as it can be. Hence, the facilitator is seeking input to improve the solution. The fourth level, *consulting*, is when the facilitator has two or more options for a solution and wants to ask participants for help in choosing an option. The fifth and final level, *co-creation*, is when the facilitator is fully activating the participants and asking for help in finding a solution.

In Figure 4 below, an illustration of the five levels of involvement can be found.

Figure 4: The Five Levels of Involvement (Andersen et al., 2020)



The concept of facilitation can also be extended into the virtual world as we are learning to navigate and realize the full potential of virtual meetings. The next section will be devoted to virtual meetings, how they differ from face-to-face meetings and the benefits of virtual interactions.

2.1.4. Virtual Meetings in Business – the Good, the Bad, and the Ugly

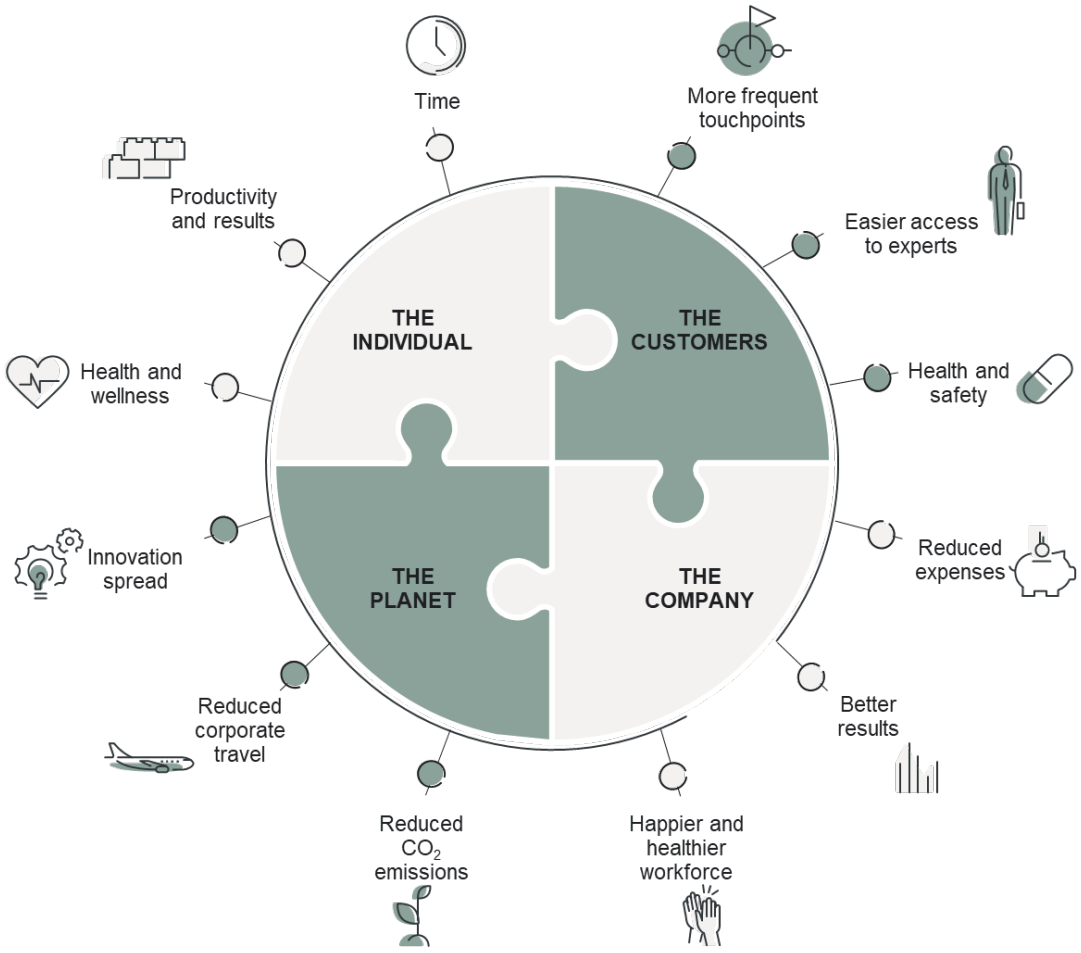
As noted earlier, the COVID-19 pandemic and the restrictions that followed have led to significant changes in the way people work (Karl et al., 2021). One of the major changes involved an increased use of virtual meetings as a means to communicate or conduct meetings. Virtual meetings can be described as "meetings where participants are distributed across physical space or time, yet seek/act as

virtually co-located in a common place" (Scacchi, 2016) These virtual meetings are typically conducted through some of the most sophisticated video conferencing tools, such as Zoom, Microsoft Teams, or Google Meet™ (Karl et al., 2021).

While there are certainly some things in virtual meetings that will never be quite the same as a physical meeting, such as shaking hands or handing over a coffee to your colleague, there are many advantages to virtual meetings as well. Some of the most important ones as suggested by Andersen et al. are the ability to bring the right people together, the opportunity to introduce experts, making training more accessible, providing more frequent touchpoints, enabling more effective sessions, better data access during sessions, easier documentation of the process and outcomes, and more equal contributions from all participants. Kvedare and Nymand (2021) describe the benefits of virtual meetings for businesses in four main areas; (1) for the individual, (2) for the company's customers, (3) for the company, and (4) for the planet. For the individual the key areas where virtual meetings can be beneficial are time, productivity and results, and health and wellness. For the company's customers, virtual meetings can be beneficial because it makes it easier to access experts, to provide more frequent touchpoints, and of course health and safety. The main ways in which virtual meetings can benefit the company itself are through reduced expenses (i.e., travel and stay), better results (i.e., more time to spend in meetings), and healthier and happier workforce (i.e., better work-life balance). Last, but not least, virtual meetings can have a significant positive impact on the planet and the sustainability of the company, it also makes it easier to work globally (i.e., improving innovation spread).

In Figure 5 on the next page, the core benefits of virtual meetings can be found.

Figure 5: Benefits of Virtual Meetings (Kvedare & Nymand, 2021, p. 6)



While technological advances will allow us to have even more meaningful interactions virtually in the future, we know that some clear limitations of virtual meetings exist. Humans are social creatures who need to connect and build relationships on a personal level, which can of course be more challenging in the virtual world (Andersen et al., 2020). As described by David Michels (2021) in a Forbes article, "most of us long to be in person again. Physical proximity tends to foster deeper, more substantial interpersonal connection. It facilitates spontaneous and impromptu interactions…". Michels (2021) argue that, in the future it is likely that the two meeting forms, physical and virtual, will co-exist and we will see more and more of a hybrid approach maximizing the best of virtual experiences while protecting the perks of in-person interactions.

The next section will introduce a theory describing how different communication modes require different cognitive effort from participants, and how virtual reality

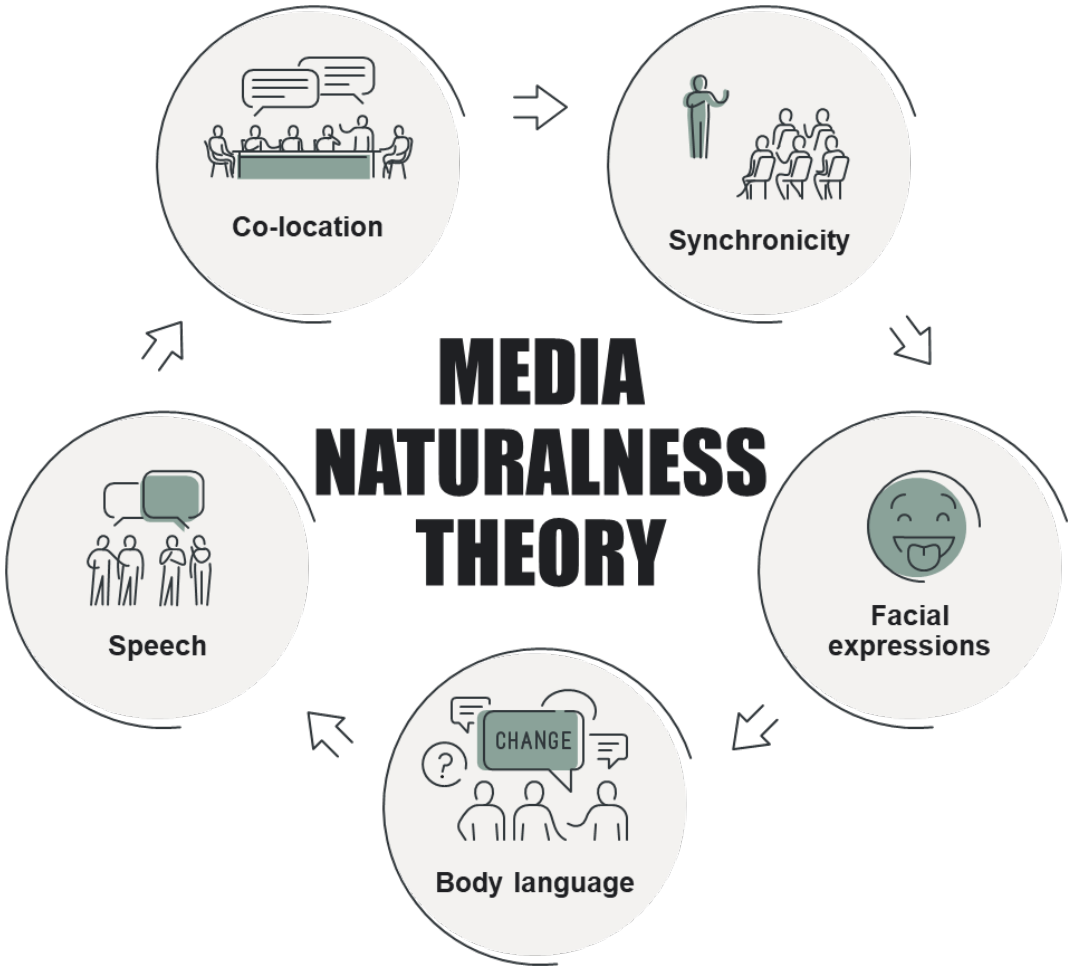
meetings arise as a more immersive and potentially less cognitively demanding communication mode than ordinary video conferencing.

2.1.5. Media Naturalness Theory and the Rise of Virtual Reality in Business

Building on Darwin's evolutionary principles, media naturalness theory (MNT) insinuates that the human brain has developed over time to facilitate face-to-face communication, and the more a communication mode resembles face-to-face communication, the more natural it is and less dependent on cognitive effort from the participants (Karl et al., 2021; Kock, 2004). According to media naturalness theory, there are five key characteristics of media naturalness: (1) co-location, i.e., participants are located in the same physical area, (2) synchronicity, i.e., allowing for immediate and spontaneous exchanges of communicative stimuli, (3) the ability to observe and convey facial expressions, (4) the ability to observe and convey body language, and (5) the ability to convey and listen to speech (Karl et al., 2021). While MNT has many similarities with other theories such as media richness theory (Daft & Lengel, 1983), and social presence theory (Short et al., 1976), studies have found that these earlier theories tend to fail at explaining choice, satisfaction, or effectiveness of computer-mediated modes of communication (Dennis & Kinney, 1998; Trevino et al., 1990). In contrast to media richness theory and social presence theory, MNT suggests that a mode of communication can become too rich, leading to information overload which may cause an individual to be dissatisfied, overwhelmed, and less productive (Hantula et al., 2011).

In Figure 6 on the next page, an illustration of MNT can be found.

Figure 6: Media Naturalness Theory (Karl et al., 2021)



Previous research suggests that virtual meetings lack some of the characteristics described in MNT (e.g., co-location, body language, and sometimes facial expressions if the video is switched off or if there are many participants on the same screen) (Standaert et al., 2016, 2021). In other words, communication between individuals in virtual meetings tends to be less natural and more cognitively demanding (Karl et al., 2021).

Resulting from the pandemic, our senses have been largely under-stimulated, and as humans, we crave stimulation (Friedman, 2020; Petit et al., 2019, 2021). The lacking MNT characteristics of virtual meetings brings an opportunity for technology firms to find solutions to enhance the sensory experience of virtual meetings. For instance, Facebook announced on October 28, 2021, a new vision for the company to build the metaverse as a successor to the mobile internet – a set of interconnected digital spaces that will enable us to do things we cannot do in the physical world (Meta, 2021). Furthermore, the company announced that they will

rebrand as “Meta” to reflect the focus on improving the virtual and augmented reality as we know them today, so that in the future we will have a virtual world where it feels like we are right there with another person, even if that person is on the other side of the world (Meta, 2021). The company still has a long way to go before the full social potential is realized, but several steps taken to get there have been revealed, and one of these steps is to develop a platform for the ‘future of work’. With the official planned launch of ‘Quest for Business’ in 2023, companies can have their employees collaborating, accessing productivity apps and have access to dedicated platform functions they need for work, all through a ‘Oculus Quest 2 headset’ (Meta, 2021).

Since digital technologies were first introduced, the way we experience the world has moved from offline to a combination of both real and digital technology, and ultimately, we have had experiences that are fully virtual. In the next section, a continuum that characterizes the integration of technology in our lives and helps us to understand the nature of different meeting types (i.e., how they may range between a real environment, mixed reality environment, and a fully virtual environment) will be introduced.

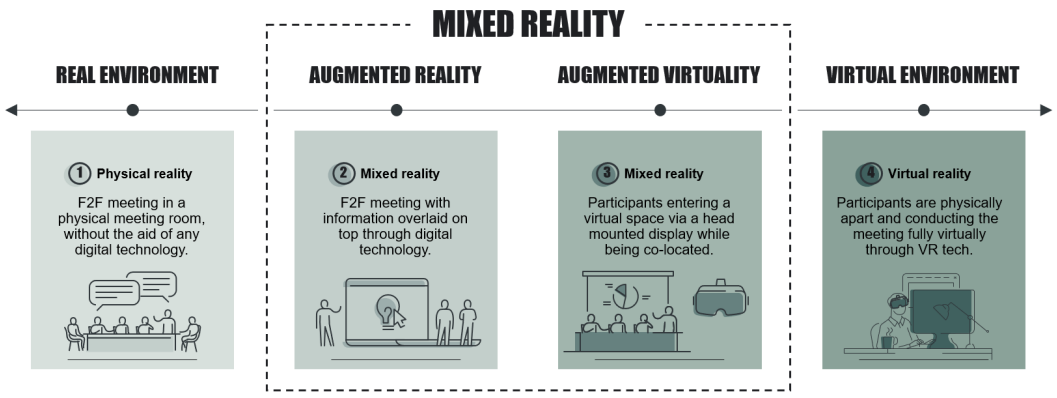
2.1.6. The Reality-Virtuality Continuum and Impossible Experiences

It is quite remarkable to think about what modern digital technologies are allowing us to experience, and today we are seeing that our daily life experiences are becoming a product of both the physical and virtual world (Velasco & Obrist, 2020b). The integration of technology in our lives is often described through the ‘reality-virtuality continuum’, a continuous scale ranging from real environments at one end of the continuum and fully virtual environments at the other end. Through this continuum developed by Milgram et al. (1995), the term *mixed reality* emerged, which describes how real and digital environments interact. It is also interesting to note how these traditionally separate worlds and techniques are increasingly converging, allowing for more immersive experiences (Cacho-Elizondo et al., 2018). To understand the continuum, we find it helpful to illustrate with an example of how it might look in the context of meetings. On the left side of the continuum as depicted in Figure 7 below, a real environment could be a face-

to-face meeting in a physical meeting space, without the aid of any digital technology. In an augmented reality scenario, the participants could be meeting in a physical meeting space while having digital information overlaid on a screen – for instance if it is a product review meeting, it could be information about new features presented through an app on a smartphone or through special glasses like Microsoft HoloLens. In an augmented virtuality scenario, the participants could be wearing a head-mounted display (e.g., Oculus Quest 2 VR-headset) displaying a virtual meeting space, while being present in the same physical space. Lastly, and most relevant to the present research, in a virtual reality scenario, the entire meeting sequence could happen through virtual reality, for instance through Meta's app Horizon Workrooms. As an example of what this might look like, Noel Mack, the Chief Brand Officer of the fitness and apparel accessories brand Gymshark, recently shared a LinkedIn post showing what a meeting in the metaverse looks like. In the post, Mack (2022) describes the metaverse as "the future of remote working", and he also praises the technology for being a truly immersive and high-resolution experience.

See Figure 7 below for an illustration of the reality-virtuality continuum.

Figure 7: The Reality-Virtuality Continuum (Milgram et al., 1995)



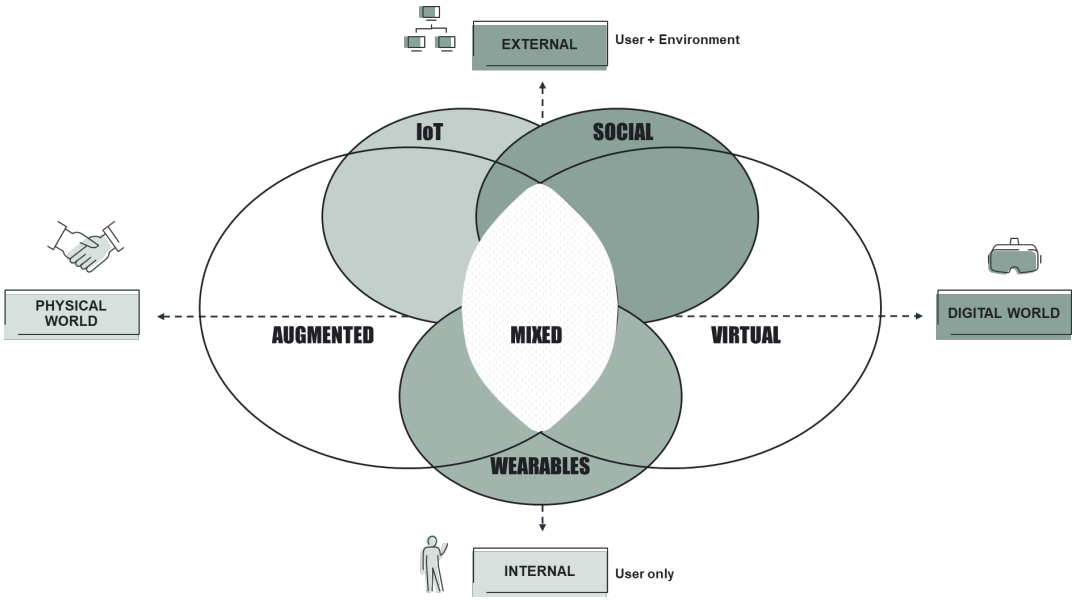
As proposed by Cacho-Elizondo and colleagues (2018), the mixed reality notion can be further extended as new developments and techniques can be combined to achieve more immersive media. As a result of the improved capabilities in combining technologies such as wearables, social media, and internet of things (IoT) with both real and digital environments, users can immerse themselves in every possible perspective and sensorial dimension simultaneously (Baltuttis et al.,

2022). The authors suggest the following description of the additional technologies in the mix:

- **Wearables**, that allow for two-sided communication with an individual's vitals
- **Internet of Things (IoT)**, which enables interaction with real objects
- **Social media**, which breaks the isolation of a single person experiencing this media

In Figure 8 below, an illustration of how Cacho-Elizondo et al. describe the macro-concept of immersive media (2018) can be found.

Figure 8: Macro-Concept of Immersive Media (Cacho-Elizondo et al., 2018)

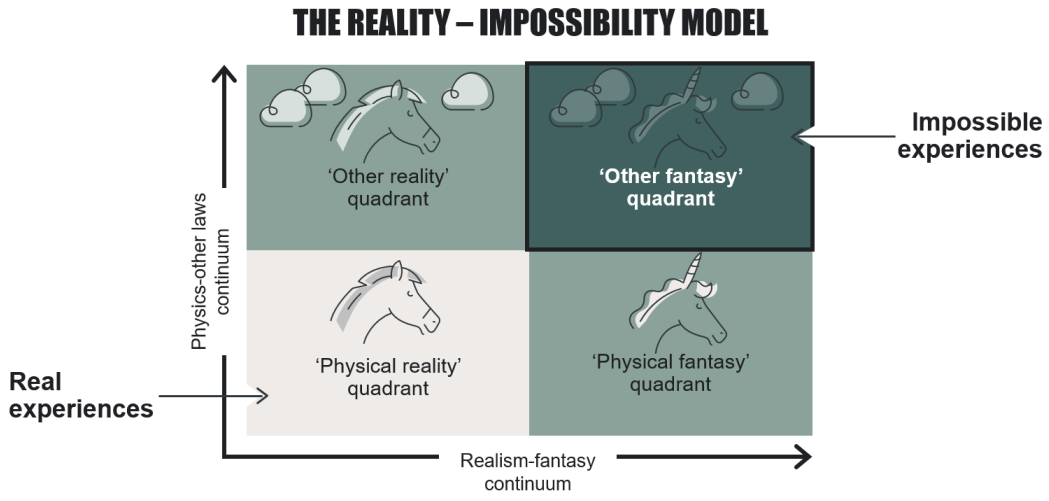


Through immersive, extended reality (XR), technologies like augmented reality, augmented virtuality, and virtual reality, we are increasingly able to facilitate impossible experiences. That is, experiences that cannot occur in the physical world (Velasco et al., 2021). For instance, an impossible experience could be talking to a virtual reality representation of oneself, and typically the experience involves fantasy – like unrealistic magical events from the Harry Potter world. In the context of workplace meetings, an example of an impossible experience could be meeting with your colleagues as 3D avatars in virtual reality while floating around in space. To classify impossible experiences, Velasco et al. has developed the reality-impossibility model which describes an encompassing "impossible experiences"

concept, involving both the realism-fantasy continuum, and a continuum capturing to which extent the objects present in the experience follow the laws of physics (2021). In the first continuum, we focus on whether the elements in the experience correspond to real objects and environments. This could, for instance, be the presentation of a horse that exists in real life on the 'realism' side of the continuum, whereas the 'fantasy' side could be a unicorn that does not exist in real life. In the second continuum, we focus on whether the interactions between the objects are governed by the laws of physics. For instance, if the interaction in the experience is governed by the laws of physics – the lower end of the continuum - it could be both the horse and unicorn running on a grass field, and if it is not, the creatures could be flying.

Together, these two continua make up the reality-impossibility model, which is shown in Figure 9 below.

Figure 9: The Reality-Impossibility Model (Velasco et al., 2021)



By leveraging XR technology, the other quadrants than the 'physical reality' quadrant above can become possible (Velasco et al., 2021). Now, let us look at an example of XR technology that can be used to design experiences within each of the quadrants in the reality-impossibility model. In the 'physical reality' quadrant, the VR app *National Geographic Explore* VR is an example of how virtual reality can allow users to explore some of the most iconic natural locations on the planet, i.e., objects existing in real life, and not defying laws of physics (Velasco et al., 2021). In the 'other reality' quadrant, an example of VR experiences that are real, but do not follow the laws of physics, would be the VR YouTube video tour of six

real exoplanets where you can see the planets from space and from the surface of the planets (other laws) (Exoplanet 360°, 2018). In the 'physical fantasy' quadrant, an example where fantastical elements are included in a world that follows the laws of physics, would be the *Tree* VR experience, in which the "user embodies (fantasy) a forest tree (laws of physics) from seedling to its fully-grown form and lives through different significant events" (Velasco et al., 2021, p. 3). Lastly, the 'other fantasy' quadrant, where fantastical elements that go beyond ordinary laws of physics are present, can be exemplified by the *Dreams of Dáli* experience, in which the user gets to explore a surreal world from within the paintings (fantasy and other laws) (Velasco et al., 2021).

In the subsequent sections, virtual reality technology will be examined in detail. Important topics in question will be the dissemination of virtual reality technology as a communication mode in the context of business meetings, sensory characteristics of virtual reality meetings, adoption barriers for meetings in the virtual world, and ethical considerations when designing virtual reality experiences.

2.2. Virtual Reality Meetings

2.2.1. Applications of Virtual Reality Technology in Business

When the COVID-19 pandemic hit, many organizations all around the world were faced with a severe challenge of how to continue operations, when business as usual stopped abruptly. The use of virtual technology within business was surely accelerated like never before, and organizations were forced to find new ways of delivering results when the pandemic largely prevented us from meeting physically (Andersen et al., 2020). However, the virtual working trend had in fact been on the rise several years prior to the pandemic, with key drivers such as (1) the *climate crisis* encouraging companies to evaluate their carbon footprint, (2) *globalization* implying that collaboration across physical boundaries is more relevant than ever, (3) *cost benefits* by reducing travel expenses, and (4) accessing *expertise* that may not otherwise be easily accessible (Andersen et al., 2020).

According to Biocca and Delaney (1995, p. 58), VR is a medium for the extension of the body and mind, and it can be defined as "the sum of the hardware and

software systems that seek to perfect an all-inclusive, sensory illusion of being present in another environment". Immersion, presence and interactivity are typically regarded as the core characteristics of VR technologies (Ryan & Jarvis, 2019; Walsh & Pawlowski, 2002). *Interactivity* can be defined as the degree to which a user can modify the VR environment in real-time (Steuer, 1992). *Presence* is typically considered "the subjective experience of being in one place or environment, even when one is physically situated in another" (Radianti et al., 2020, p. 3; Witmer & Singer, 1998). According to Radianti et al. (2020) immersion can be defined as "a perception of being physically present in a non-physical world by surrounding the user of the VR system created with images, sound, or other stimuli". In other words, the technology allows the user to feel like he or she is actually there. However, different views exist on the concept of immersion (Radianti et al., 2020). One branch of researchers suggests that it should be viewed as a technological attribute that can be assessed objectively (Slater & Wilbur, 1997), while others argue that immersion is subjective, individual belief, i.e., psychological phenomenon (Witmer & Singer, 1998).

While the adoption of new technologies has certainly been accelerated during the pandemic, VR technology is arguably still in the early stages of its technology adoption life cycle, especially with regards to a business meeting context (Gleason, 2021). However, with recent developments in the technology and multiple technology firms tapping into the trend (Meta, Microsoft, HTC, Sony, Google, Samsung etc.) (Cacho-Elizondo et al., 2018; Gleason, 2021; Lee et al., 2017), it looks as though we are entering a new wave of adoption for the technology. Today, providers of VR technology are making it easier to use and more accessible, with VR equipment in many different price ranges - from the simplest solutions like Google Cardboard or Samsung Gear VR where a smartphone can be used (Google, 2021; Radianti et al., 2020), to the more advanced options like Virtuix Omni One, a VR headset that comes with an omni-directional treadmill that lets users walk and run in 360 degrees inside virtual worlds (Virtuix, 2021). Moreover, the recent developments in immersive technologies (i.e., visualizations and interactions) have led to growth in the popularity of VR (Radianti et al., 2020). In fact, the market for VR head-mounted displays (HMDs) is expected to be valued at USD 25 billion by 2022, with a Compound Annual Growth Rate of 39.52% between 2019 and 2025 (B. I. S. Research, 2019).

Virtual reality technology has the capability of offering truly immersive experiences (Cacho-Elizondo et al., 2018), and the technology can be divided in two types: (1) *Immersive Virtual Reality*, and (2) *Non-Immersive Virtual Reality*. In immersive virtual reality, the user enters a digital, 3D, stereoscopic interactive environment via sophisticated hardware (Cacho-Elizondo et al., 2018), such as an Oculus Quest 2 head-mounted display. The Oculus Quest 2 comes in the form of a cordless HMD, enabling users to move freely while experiencing a high degree of immersion. In non-immersive virtual reality, the user is exposed to a "synthetic environment featuring computer-generated images with the ability to create three-dimensional virtual spaces" (Cacho-Elizondo et al., 2018, p. 94) through a screen.

Studies have found that VR enhances telepresence, meaning that a person can feel physical present in a virtual environment through a communication medium (Klein, 2003; Lee et al., 2017; Steuer, 2000). Moreover, studies have found that VR is a richer medium that generates a higher sense of presence and interactivity than traditional 2D-based flat screen mediums (Lee et al., 2017; Lui et al., 2007). With VR technology, it is possible to create realistic virtual environments that can enable users to immerse themselves into real situations. Moreover, through VR, users can move and interact with a virtual world as they do in reality, or visualize complex 3D dimensional situations (e.g., designing products together in 3D) (Guerra et al., 2015; Kaufmann, 2003; Lee et al., 2017; Microsoft, 2021; Youngblut, 1998). In other words, based on evidence from prior research the prospects for virtual reality in business meetings are promising.

Figure 10 on the next page, provides a list with examples of successful applications of VR technology.

Figure 10: Examples of Successful VR applications (S. Thompson, 2020)

Industry & Examples	Business Application
AUTOMOTIVE INDUSTRY  BMW and Jaguar Land Rover	VR allows engineers and designers to experiment easily with the look and build of a vehicle before commissioning expensive prototypes.
HEALTHCARE  Osso VR – *surgical training & assessment tool*	Healthcare professionals now use virtual models to prepare themselves for working on real bodies and VR has even been used as pain relief for burn injuries. VR can also be used as a treatment for mental health issues, and more.
RETAIL  ASOS, eBay & Myer	With body-scanning technology in VR, consumers can try on clothes in the virtual world to see what they would look like in person. vRetail are using VR to enhance the shopping experience.
TOURISM  Thomas Cook & Google Expeditions	With VR, potential holidaymakers can visit stores in various countries to experience the holiday virtually before booking it. Moreover, users can travel the world from the comfort of their own home, allowing people of all ages and backgrounds to explore coral reefs or the surface of Mars.
REAL ESTATE  Matterport 3D	You can look round properties from the comfort of your [existing] home - no estate agent or sacrificing your weekend needed. This allows people to explore houses online and then only view the ones you're most likely to love in person.
EDUCATION  Unimersiv & ImmersiveVREducation	Apps that allow users to take a tour of Ancient Rome, explore the human brain, and board the Titanic. VR classrooms / meeting room spaces where people can learn from lecturers around the world.

In the next section, different technology adoption frameworks will be presented and discussed as a foundation for choosing the most appropriate model to predict adoption of VR technology for business meetings.

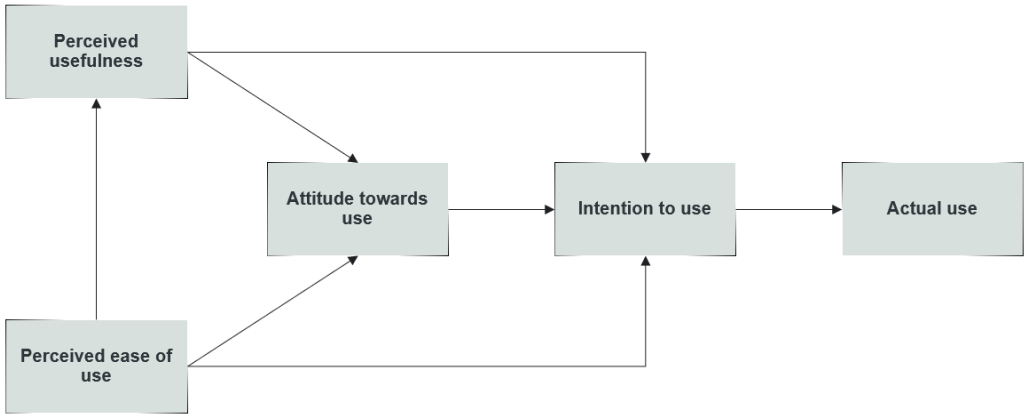
2.2.2. Technology Adoption Frameworks

To help us understand the adoption of VR technology, several technology adoption frameworks could potentially be applied. According to Koul and Eydaghi (2017), the two theoretical frameworks *Technology Acceptance Model (TAM)* and *Theory of Planned Behaviour (TPB),* serve as the foundation of technology adoption studies within various context. However, the *Technology-Organization-Environment (TOE)* framework and Roger's *Diffusion of Innovations (DOI)* are also typically looked to when technology adoption is concerned.

TAM is typically used for the assessment of how people make decisions regarding new technology adoption. For instance, TAM has frequently been utilized to predict the acceptance and use of IT in organizations (Davis, 1989, 1993; Davis & Venkatesh, 1996). The TAM consists of five core elements; (1) perceived usefulness, (2) perceived ease of use, (3) attitude towards use, (4) intention to use, and (5) actual use.

In Figure 11 below, an illustration of the TAM model can be found.

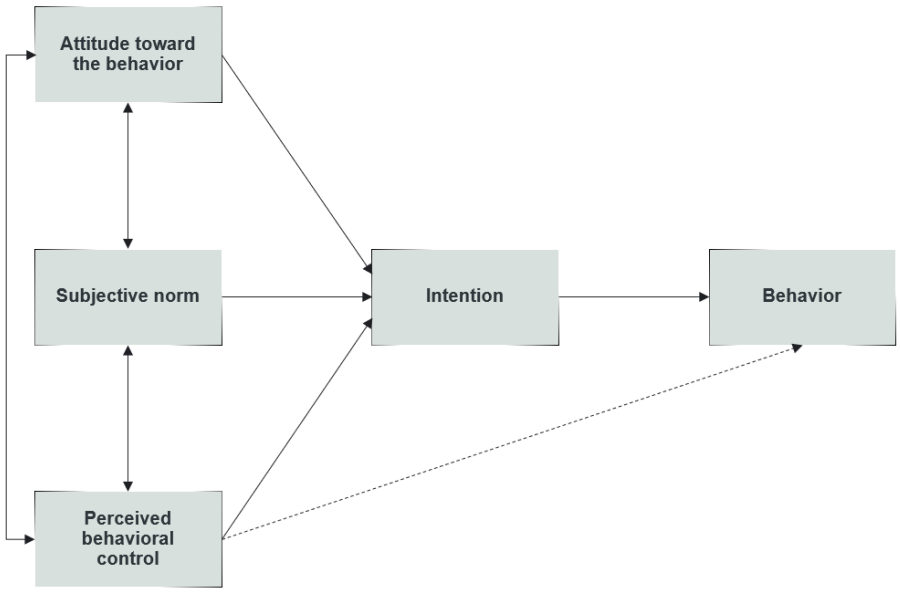
Figure 11: Technology Acceptance Model (Davis, 1989)



TPB is most commonly used for marketing research studies (Koul & Eydgahi, 2017). According to Koul and Eydgahi (2017), the model is suitable for addressing consumer acceptance of new technologies. TPB is an improvement and extension of the *Theory of Reasoned Action (TRA)* (Ajzen, 1991). It focuses mainly on predicting planned human behaviour and it incorporates the construct of perceived behavioural control.

In Figure 12 on the next page, an illustration of the TPB model can be found.

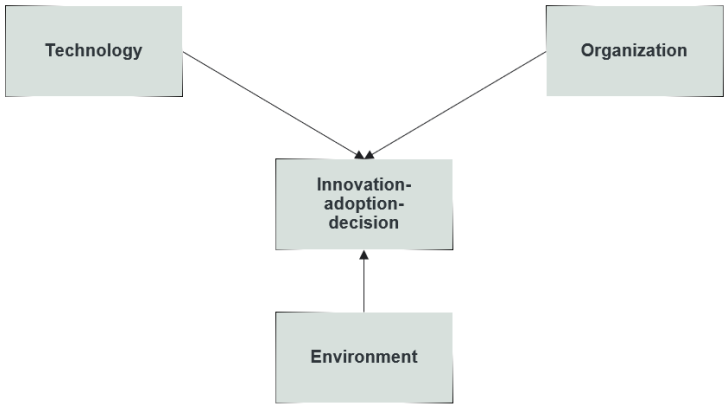
Figure 12: Theory of Planned Behavior (Ajzen, 1991)



TOE extends the analysis of individual adoption to organizations through a considerably more expansive framework than the previously discussed models. Thus, the model captures both the individual and organizational determinants of innovation adoption (Tornatzky & Fleischer, 1990).

In Figure 13 below, an illustration of the TOE framework can be found.

Figure 13: Technology-Organization-Environment Framework

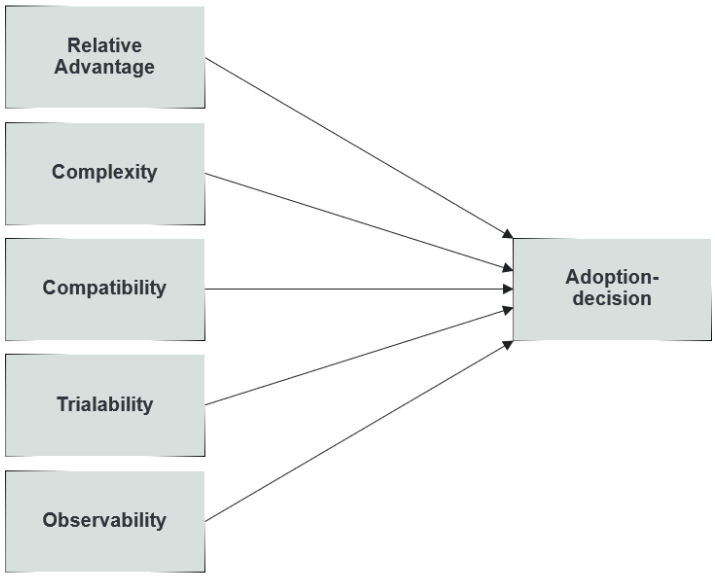


DOI is a market development model commonly known as the *technology adoption lifecycle*. According to the DOI theory (Rogers, 2003), there are five perceived characteristics of innovation that forms a favourable or unfavourable attitude

towards the innovation; (1) compatibility, (2) complexity, (3) observability, (4) trialability, and (5) relative advantage.

In Figure 14 below, an illustration of the DOI model can be found.

Figure 14: Diffusion of Innovations (Rogers, 2003)



The next section elaborates on the chosen technology adoption model for this thesis and looks at the current maturity level of VR technology in a business context.

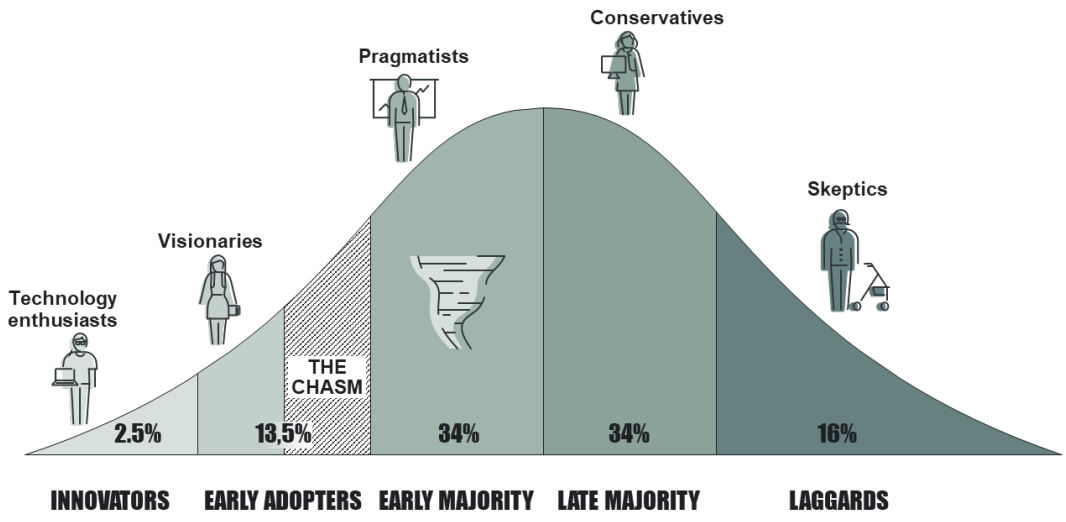
2.2.3. Crossing the Chasm – Adoption of VR Technology in Business

While several theoretical frameworks and models exist to help us explain the adoption of new technology, a theory called *crossing the chasm* will be applied for this thesis. This theory is an adaptation of DOI described above. The technology adoption lifecycle describes a market's acceptance of a new product in terms of the types of consumers it attracts through its useful life (Moore & McKenna, 2006; Schirtzinger, 2020). The model is useful in understanding the stages of market development as it explains how innovations are absorbed in stages into different user segments based on psychological and social profiles. The process of adoption can be represented by a bell curve divided into five stages representing five different segments (Moore & McKenna, 2006): (1) innovators – 2.5% of the population, (2)

early adopters – 13.5% of the population, (3) early majority – 34% of the population, (4) late adopters – 34% of the population, and (5) laggards – 16% of the population. Crossing the chasm is a theory aimed at describing why, how, and at what rate discontinuous technologies are adopted, and the psychological characteristics of buyers (Moore & McKenna, 2006; Schirtzinger, 2020). While the original technology adoption lifecycle assumes a smooth transition from early adopters to the early majority, Lee James and his co-workers in the consulting firm Regis McKenna Inc. found a gap, arising from the vastly different values of early adopters and people in the mainstream. This gap is known as the *chasm*, and according to the theory further developed by Moore and McKenna, VR technology providers will have to completely shift focus to ensure adoption in the mainstream population (Moore & McKenna, 2006).

In figure 15 below, an illustration of the technology adoption life cycle and the crossing the chasm theory can be found.

Figure 15: Technology Adoption Life Cycle (Forth, 2019; Rogers, 2003)



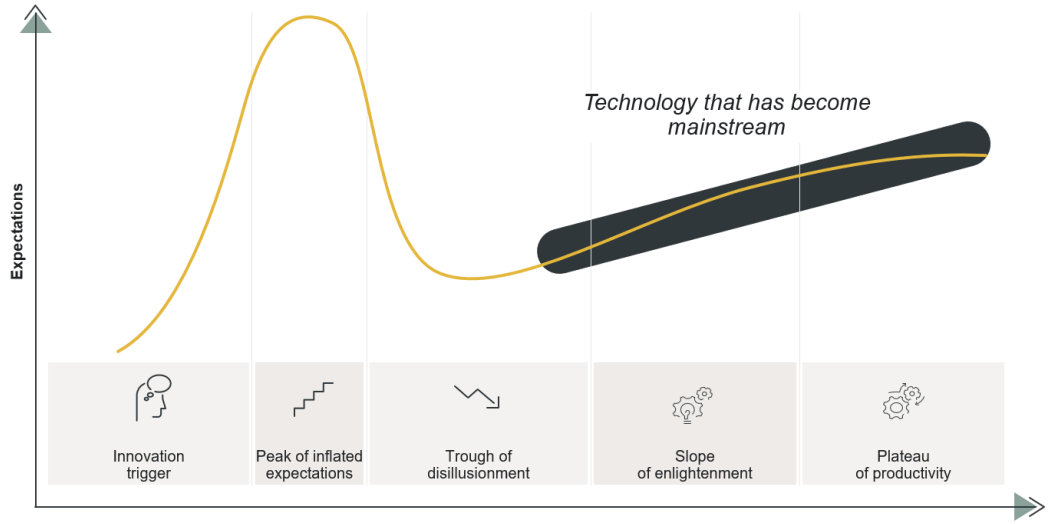
While it is fair to argue that VR technology has not been able to 'cross the chasm' when it comes to adoption of the technology in a business meeting context, Gartner's Hype Cycle[1] states that the technology is ready for mainstream adoption

[1] Gartner's Hype Cycle is a report released every year, illustrating the technology research firm's vision of technology trends every year. The position of said technology will inform you on the potential of the technology (Lasserre, 2020).

(Lasserre, 2020). In fact, after VR climbed its way up on the "slope of enlightenment" in 2017, the technology disappeared from the graphic when the report was published in 2018 (Lasserre, 2020). And the reason Gartner provided for removing VR from the graphic was that VR technologies were almost mature, and therefore did not need to be evaluated as new technology (Lasserre, 2020). See Appendix 1 for Gartner's 2020 Hype Cycle for Emerging Technologies. As far as adoption of meetings go, Gartner predicts that only 25% of business meetings will be face-to-face by 2024 (Standaert et al., 2021), which indicates that virtual meetings have come to stay.

In Figure 16 below, an illustration of the Technology Hype Cycle can be found.

Figure 16: Technology Hype Cycle (Gartner, 2022)



The question that remains is when and whether VR meetings will become the superior virtual communication mode. To further address this catholic question in detail, the following sections will present findings that all have relevance to the field of VR meetings in the future. In the next section, parallels are drawn from a broad base of existing literature on VR in education to the context of VR in business meetings.

2.2.4. Virtual Reality in Education Meets Business

In addition to providing belief in that VR in education generates more attractiveness, motivation, and interesting learning experiences for students of the

future (Passig & Sharbat, 2001), findings from studies on VR in education provide interesting viewpoints on how it can be similarly utilized in business. Some will agree that education not only exists to acquire knowledge about broad topics and one's self (Al-Shuaibi, 2014; Wobbekind, 2012), but also to learn key elements that increases an individual's possibility to succeed in business, such as time management (Bhardwaj, 2016), scientific and technological progress (Sewell & Newman, 2013). and overall cognitive ability (Hatch et al., 2007). Because of this seemingly boundless link between education and VR, the following section contains findings that might help to conceptualize the broad notion of VR and business meetings.

The global market size of VR in education is forecasted to reach approximately $13 billion by 2026, a staggering growth of roughly 1900% from 2018, and a CAGR of 42.9% during the period (Fortune Business Insights, 2019). The environment of business meetings shares numerous similarities with educational environments. For instance, both environments have experts, facilitators, and neutral participants, discussions are frequent, desired outcomes are predefined and ideally achieved, and the social aspects in the physical or virtual room will most likely affect the end result. Thus, we find substantial relevance in a study from Hee Lee and Shvetsova (2019) exploring the differences in overall effect between traditional teaching and VR-based teaching.

As one could expect, VR does not improve all aspects of traditional teaching, but the competencies that are reportedly improved should provide a boost in motivation for those with a desire to implement VR in their own teaching. What is also worth mentioning is that not only is VR utilized as a tool to enhance the outcome of education, but academicians and practitioners now go to great lengths to educate businesses about the usage of VR technology and its many benefits for the workplace (Immerse, 2022; The Leadership Network, 2022; VR Vision, 2022). Moving forward, competencies such as group communication and cooperation, academic and technical skills, interdisciplinary learning, major learning and technical deep learning were all reported to be highly developed in the VR class (Hee Lee & Shvetsova, 2019). The positive effect on group communication and cooperation is highly relevant for businesses as these competencies can often be make-or-break between two or more professional partners due to, for instance,

disagreements in cost or opposing expectations between the sides (Wiencierz et al., 2021). Parallel with some of the findings above, a study on VR in nursing education found that the interactivity of VR boosts students' ability to connect diverse concepts, suggesting that VR enhances knowledge outcome in learning environments (Chen et al., 2020). Analogously, findings from a recent study on VR in anatomy teaching confirm that the technology improves the effectiveness of teaching as the participants reported an enhancement in their level of anatomy knowledge (Zhao et al., 2020). Moreover, a study of almost 200 senior managers found that 70% think that traditional meetings are inefficient and unproductive (Perlow et al., 2017). In sum, these findings may imply that VR could potentially add much value to business meetings.

The findings presented above briefly outline how the use of VR in learning situations boosts various elements, such as cognitive ability and the overall outcome of teaching. Findings from VR in the educational sphere are valuable to further realize VR's great potential in similar areas, but still is not enough to confidently conclude what one should do next. What still needs to be examined is how VR meetings can potentially replicate the media naturalness of face-to-face meetings to a greater extent than traditional virtual meetings, thus, creating a more holistic sensory experience than other virtual formats.

The next section focuses on the sensory characteristics of VR meetings, and how this can enable businesses to have more immersive virtual interactions.

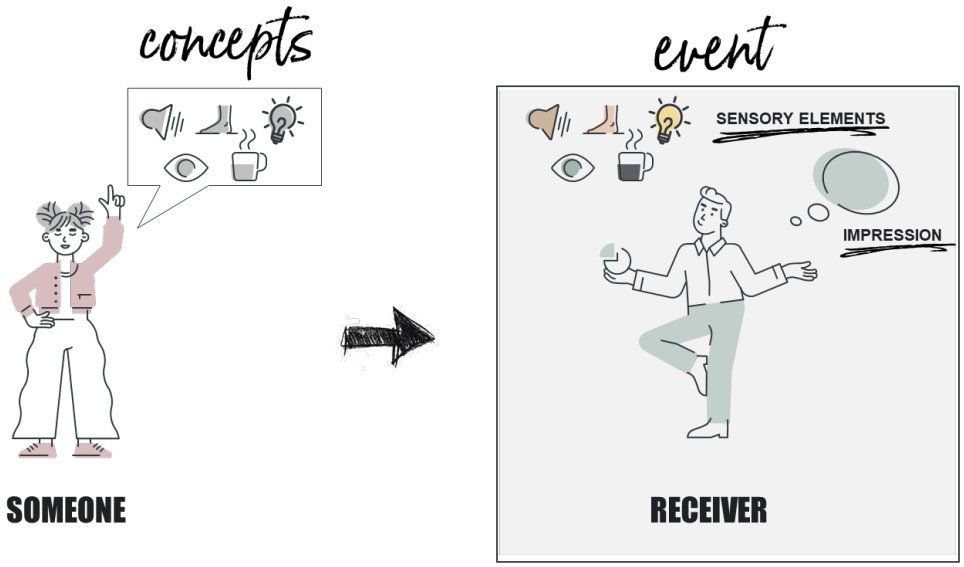
2.2.5. Sensory Characteristics of Virtual Reality Meetings

Our perception of the world around us is formed by all our senses, and the way our brain interprets the interaction of different sensory cues to create experiences. In other words, our perception is a fusion of the senses (Velasco & Obrist, 2020b). According to Velasco and Obrist, multisensory experiences can be defined as "...impressions formed by specific events, whose sensory elements have been carefully crafted by someone" (2020b, p. 15). While most experiences are multisensory per se, multisensory experiences are different because the "design" part is implied (Velasco & Obrist, 2021). In Charles Spence's book *Sensehacking*,

the Oxford professor and renowned expert on multisensory experiences, demonstrates how our senses change how we think and feel, and how by 'hacking' the senses we can become happier, reduce our stress level, and even become more productive (2021).

Figure 17 below illustrates what a multisensory experience is.

Figure 17: Multisensory Experiences (Velasco & Obrist, 2020b)



The five most basic senses which are usually discussed in the context of multisensory experiences are sight (visual), hearing (auditory), touch (haptic), taste (gustatory) and smell (olfactory). However, we note that it is widely accepted by the scientific community that we have more than these five senses (Velasco & Obrist, 2020b). Through VR technology, users can feel as if they are physically present in a virtual world via real time simulations and interactions using distinct auditory, haptic, and olfactory sensory channels (Cacho-Elizondo et al., 2018).

Multisensory experiences is an interdisciplinary term that has been touched upon in multiple research and practice fields, such as psychology, marketing and Human-Computer interaction (HCI). For instance, there is a significant body of literature looking at key concepts of why it is important to consider the way in which our senses interact with each other to form multisensory experiences. For instance, six key concepts that aid us in analysing interactions between the senses and how they affect multisensory experiences are (1) temporal congruence, (2) spatial

congruence, (3) semantic congruence, (4) crossmodal correspondences, (5) sensory dominance, and (6) sensory overload. Nevertheless, multisensory experiences as a concept has not been covered by existing literature until only quite recently (Velasco & Obrist, 2021). In other words, as we are just seeing the first wave of interdisciplinary research in the field, there is still undiscovered ground for future research.

By carefully crafting experiences, combining different sensory stimuli, i.e., multisensory experiences, studies have found positive results on both the isolated and total effects of different stimuli, meaning that the overall experience is strengthened (Bulkin & Groh, 2006; Krishna, 2012, 2019; Krishna et al., 2016; Quittner et al., 1994; Russell, 2002). Furthermore, previous studies have also documented the effect of sensory cues on our impressions, judgments, and behaviours associated with brands. For instance, consumers associate different levels of beer premiumness with the sounds of the opening and pouring of bottles and cans (Almiron et al., 2021), people also associate tastes and visual shapes in a certain manner (Motoki & Velasco, 2021), and through synaesthetic marketing, or transfer of sensations, we can create specific user experiences (Velasco, 2020).

Our sight very often dictates the other senses in terms of what we perceive (Spence, 2021, p. 13). An example of this, as described by Charles Spence, is that of how people typically perceive the actor's voice at the cinema to come from the lips of the actor on the screen, and not the loudspeakers where it is actually coming from. In fact, studies have found that during human development, our brains learn to rely on the most dependable, or accurate, sense, namely our sight (Gori et al., 2008; Raymond, 2000).

In virtual meetings, however, it can be more challenging to let the sight dictate our perception, as the visual stimuli can be of lower quality in a virtual environment (Sander & Bauman, 2020). For instance, in comparison with face-to-face meetings, virtual meetings "do not allow for life-size presence in a shared space, the transmission of haptic (touch) or olfactory (scent) cues" (Karl et al., 2021, p. 3; Standaert et al., 2016). Furthermore, virtual meetings make it difficult to observe what participants are looking at, to see participants' body language and gestures, to have side conversations with participants, or to examine and/or manipulate specific physical objects such as prototypes (Karl et al., 2021; Standaert et al., 2021). On

the other hand, VR meetings have the potential to provide much more immersive experiences and a sense of being present in a way that cannot be achieved through traditional videoconferencing tools (Radianti et al., 2020). This entails that VR technology also has the potential of creating more holistic sensory experiences than traditional virtual meetings.

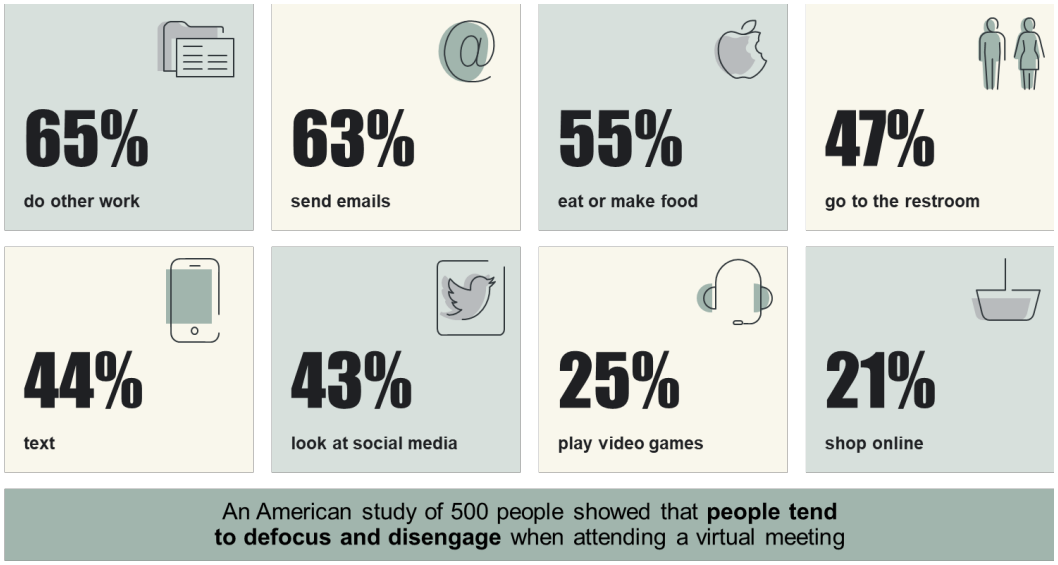
The following sections will first examine the barriers to the success of virtual meetings in general, after which the barriers for the adoption of VR in the context of business meetings will be discussed.

2.2.6. Barriers to the Success of Virtual Meetings in General

Despite the fact that the popularity of virtual meetings in general has been rising over the past years, research still suggests that participants are largely feeling disengaged and defocused in the ordinary virtual meetings conducted via videoconferencing tools such as Microsoft Teams or Zoom (Karl et al., 2021; Kuzminykh & Rintel, 2020a). In fact, an American study suggests that 65% of participants do other work-related tasks, and 47% even go to the restroom while in a virtual meeting (Gavett, 2014). Moreover, research by Kuzminykh and Rintel (2020a) found participants to be less motivated to engage both behaviourally and cognitively when participating in a virtual meeting compared to a face-to-face meeting. They also found turning one's video on or off to be a crucial signal of engagement, with camera on signalling high engagement and camera off signalling low engagement. Furthermore, the rules of building trust in a virtual setting are different from the way we build trust in a physical setting, which is reflected in a study by Deloitte reporting that the perceived level of trust is likely to drop by 83% when interacting virtually (Deloitte Denmark, 2020; Kvedare & Nymand, 2021).

Figure 18 on the next page illustrates key statistics from Gavett's (2014) *study discussed above.*

Figure 18: Virtual Disengagement (Gavett, 2014)

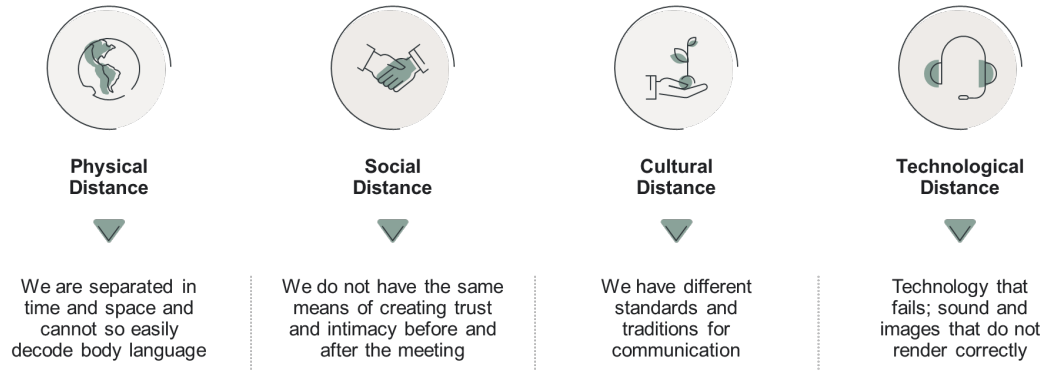


The term "Zoom fatigue" has gained a lot of attention during the past years, and a quick google search generates a long list of results. But why is it that we find video calls so draining, and feel more exhausted after virtual meetings than face-to-face ones? According to Sander and Bauman (2020), virtual meetings increase our cognitive load due to several factors. First, we need to work harder to process nonverbal cues, meaning that it is tiring to rely predominantly on verbal information to infer other people's emotions – and studies have found that only 7% of the impact of a message comes from our words, and 55% is shared nonverbally, through our body language (Kvedare & Nymand, 2021). Secondly, we tend to feel anxious about our remote workspace and unexpected events such as family members interfering which might make us look bad to our colleagues. Moreover, when working remotely, we tend to skip the act of relocating to a different room, grabbing a cup of coffee like we normally would at the office, or we might even skip breaks, which drains even more energy. In addition, looking at our own face and viewing our own negative facial expressions can be stressful. Finally, Sander and Bauman (2020), discuss how silence in real-life conversations is important and creates a natural rhythm, while in virtual meetings silence can make us anxious. In fact, a study by Schoenenberg et al. (2014) found that even a 1.2 second delay in responding virtually made people perceive the person talking as less friendly or focused.

Kvedare and Nymand (2021) suggest that the barriers of videoconferencing meetings can be divided into four categories; (1) physical distance, (2) social distance, (3) cultural distance, and (4) technological distance. In Figure 14 below, these barriers are summarized. The physical barriers are related to how participants are physically separated in virtual meetings and therefore cannot easily decode each other's body language. The social barriers have to do with humans being social animals, and that trust building does not come as naturally in the virtual world as it does in the physical. In terms of cultural barriers, people have different standards and traditions for communication based on cultural context which may be amplified and more difficult to interpret in a virtual context. For instance, participants may have different backgrounds, personality, and corporate differences that are difficult to spot. Finally, the technological barriers concern issues such as technological delays or troubleshooting, poor Wi-Fi connection, sound, or image issues, failing technology, meeting participants lacking technical skills etc.

In Figure 19 below, the barriers for virtual meetings are summarized.

Figure 19: Barriers in Virtual Meetings (Kvedare & Nymand, 2021)



The next section addresses how the barriers described above can translate into VR meetings and/or how they may be addressed by the implementation of VR meetings.

2.2.7. Opportunities & Barriers to the Success of Virtual Reality Meetings

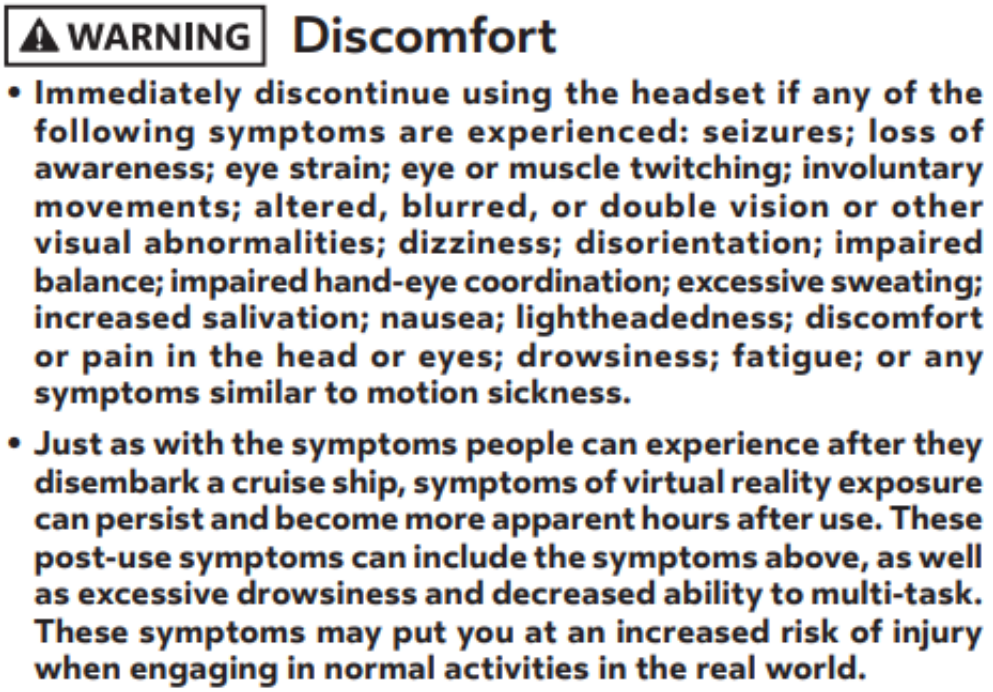
As previously discussed, VR technology has the capability of offering truly immersive experiences. Thus, the physical distance barrier presented in the section

above might be less of a concern in a VR meeting than an ordinary videoconferencing meeting. Moreover, with recent developments such as business applications like Horizon Workrooms, users can more easily decode body language and have interactions that to a greater extent resemble face-to-face communication (Mack, 2022; Meta, 2021). And while videoconferencing meetings tend to lead to lower motivation to engage both behaviourally and cognitively than meeting face to face (Kuzminykh & Rintel, 2020b), VR technology provide the opportunity to decrease some of the social barriers experienced in videoconferencing meetings. For instance, VR makes users feel like they are actually "there" (Radianti et al., 2020) and it is typically associated with games (Agbo et al., 2021) which may also lower the social barriers through making the experience more fun and engaging. According to Jeremy Bailenson, professor of communication at Stanford University and founder of the Virtual Human Interaction Lab, immersive VR is better than traditional videoconferencing for doing an action or having small group conversations (Basu, 2021). In fact, this finding is based on an experiment with 102 students, spending over 60,000 minutes on both Zoom and the VR platform Engage (Basu, 2021). Through the study, Bailenson and his colleagues found that "VR was a better way for people to read nonverbal cues like leaning in or making eye contact, which are crucial to establishing trust and understanding".

In terms of the cultural and technological barriers that apply for virtual meetings, most of the cultural and technological barriers listed in the section above may also apply for VR meetings. However, for virtual reality meetings, other barriers may apply than the ones discussed for videoconferencing, some of which are described in user manuals and safety warnings from the providers of the VR-headsets. For instance, in the health and safety warnings for the Oculus Quest 2 by Meta (2021, p. 7), there are clear warnings around how the device may cause discomfort for the user.

See Figure 20 on the next page for an excerpt from the health and safety warnings for Oculus Quest 2.

Figure 20: Health & Safety Precautions VR-headser (Oculus, 2021, p. 7)



Cacho-Elizondo and colleagues (2018) divide the main barriers preventing a more widespread proliferation of VR technology into two categories: (1) barriers from the consumers' perspective, and (2) barriers from the companies' perspective.

In terms of the consumer perspective, the authors suggest that *price* is an important barrier, and while the technology is significantly more affordable today than it was when this article was published, this may still be considered a barrier for widespread adoption. For reference, Meta charges $799 for the enterprise version of its Oculus VR headset, and Microsoft's HoloLens 2 starts at $3,500 which makes it questionable whether businesses will buy the devices on a large scale (Gleason, 2021). Second, *device comfort* can be seen as a barrier for the adoption of VR technology, the main variable affecting this being the weight of the head-mounted displays (Cacho-Elizondo et al., 2018), and skin irritation is another issue some users have experienced (BBC, 2021). Third, *aesthetics* may be considered as a barrier for the adoption of the technology as users might reject the device due to the way it looks, this is particularly relevant for AR technology, and potentially not as much for VR (Cacho-Elizondo et al., 2018). Another potential barrier for VR-tech is *quality of experience* where nausea is one of the biggest challenges VR providers faces, along with improved user experience, e.g., improved hand tracking technology. Finally, *content availability* is clearly a barrier to consider for the

adoption of VR, especially in the early stages of the technology adoption life cycle. However, with the growing availability of consumer-grade 360° cameras (Cacho-Elizondo et al., 2018) content will be more and more accessible in the metaverse going forward.

From the company perspective, the first barrier discussed by Cacho-Elizondo et al. is *strategic alignment*, which considers how companies need to move from experimentation to actively seeking applications that fit their overall business strategy for the adoption to be successful (2018). Second, companies need to pay attention to the *addressable market* and gain a deeper understanding of emerging user segments (Cacho-Elizondo et al., 2018). Moreover, the skillset needed to produce VR content is unique and not easily accessible, meaning that the *talent pool* can be a barrier to the adoption of VR technology for companies (Cacho-Elizondo et al., 2018). In addition, for companies it will be critical to find the right *key performance indicators* to justify providing funding for ambitious VR projects (Cacho-Elizondo et al., 2018). Lastly, *market fragmentation* is a barrier for content creators with the continuous emergence of new platforms and incompatibility between the platforms making development cumbersome and not cost-effective (Cacho-Elizondo et al., 2018).

In Table 3 below, the adoption barriers are summarized.

Table 3: AR & VR Adoption barriers (Cacho-Elizondo et al., 2018)

AR & VR ADOPTION BARRIERS	
CONSUMER	**COMPANY**
Price	Strategic Alignment
Device Comfort	Addressable Market
Aesthetics	Talent Pool
Quality of Experience	Key Performance Indicators
Content Availability	Market Fragmentation

While the list of barriers for the adoption of VR technology listed above is certainly one that may prevent some companies from investing in it, many firms recognize the potential VR technology has and are willing to experiment with the use of the

technology in meetings despite the barriers it might have. For instance, XR Simulations and Experience Lead at Volvo Cars, Timmy Ghiurau, stated in a testimonial published by VR business meeting app MeetinVR (2022) that the app was “the most relevant VR collaboration platform – relevant in our automotive use cases, in the way we design, build, experience and sell cars but also enabling remote collaboration seamlessly and intuitively. It is environment friendly – avoiding air travel while also boosting productivity”. Moreover, according to a recent survey “virtual reality could leak into the workplace over the next year as office returns get pushed back” (Halverson, 2021, p. 1).

METHODOLOGY

CHAPTER 3

3. Methodology

As previous sections review shows, prior academic research has persuasively documented what meeting design characteristics have an effect on the overall perceived meeting quality (PMQ) (Cohen et al., 2011; Leach et al., 2009), and that participation in decision making (PDM) is associated with employee engagement (Yoerger et al., 2015). Past studies have also convincingly shown that virtual meetings lack some of the characteristics described in the media naturalness theory (MNT) and that the human brain has developed to prefer communication modes that resemble face-to-face communication (Karl et al., 2021; Kock, 2004). Moreover, existing literature shows that VR technology has the potential to deliver truly immersive experiences that generate a higher sense of presence and interactivity than traditional 2D-based flat screen mediums (Lee et al., 2017; Lui et al., 2007; Radianti et al., 2020).

Extending on previous streams of research, this thesis aims to test the following set of hypotheses presented in Figure 21 on the next page.

Figure 21: Research hypotheses

Categories		Hypotheses
COMMUNICATION MODE 	H1	**A:** VR meetings to have **higher** perceived meeting quality (PMQ) than traditional videoconferencing meetings.
		B: VR meetings to have **lower** PMQ than face-to-face meetings.
		C: Face-to-face meetings to have **higher** PMQ than traditional videoconferencing meetings.
TYPE OF MEETING 	H2	Team building meetings to have **no significant difference** in PMQ from problem-solving meetings.
INTERACTION: PROBLEM-SOLVING 	H3	**A:** For problem-solving meetings, VR will have **higher** PMQ than traditional videoconferencing meetings.
		B: For problem-solving meetings, VR will have **lower** PMQ than face-to-face meetings.
		C: For problem-solving meetings, face-to-face meetings will have **higher** PMQ than traditional videoconferencing meetings.
INTERACTION: TEAM BUILDING 	H4	**A:** For team building meetings, VR will have **higher** PMQ than traditional videoconferencing meetings.
		B: For team building meetings, VR will have **higher** PMQ than face-to-face meetings.
		C: For team building meetings, face-to-face meetings will have **higher** PMQ than traditional videoconferencing meetings.

The core aim of this thesis is to create a model that can help guide and answer academic and managerial questions as well as suggest propositions for further research within VR meetings for business. In the following sections, the experimental design of Study 2 and the structure of the questionnaire in Study 1 - used to assess the likelihood adoption of VR in business meetings – is presented. Following that, the results of Study 1 and Study 2 is presented, which will serve as the foundation for the development of a conceptual framework for VR business meetings.

3.1. Experimental Design

In Study 1, the aim was to gain a deeper understanding of the determinants of behavioural intent to adopt VR technology in business meetings. In Study 2, the hypotheses presented in the section above were tested through a field experiment.

As the way of conducting business vary across cultures (Thanetsunthorn & Wuthisatian, 2019), the geographical scope of both Study 1 and Study 2 was limited to people studying or doing business in Scandinavia.

3.1.1. Study 1

3.1.1.1. Participants

A total of 282 established professionals and students from higher education participated in the study, but only 68.8% of these responses were complete, thus the final sample used for the analysis consisted of 194 respondents. Our professional network in Implement Consulting Group, Hydro, and BI Norwegian Business School, along with social networks were utilized to acquire respondents for the questionnaire. Most of the respondents were residents of Norway (43.8%) or Denmark (41.2%), while the remaining respondents were from Sweden, Switzerland, UK, Germany, US, Spain or Singapore. The vast majority of the respondents were employed full-time (79.9%) and had either a master's degree (68.6%) or a bachelor's degree (20.6%). The gender split in the sample was fairly even, but somewhat skewed towards male (57.7%). The mean age was 37.39 (SD = 12.53).

3.1.1.2. Questionnaire & Sampling

To evaluate people's behavioural intent to adopt VR technology for business meetings, a questionnaire (self-completed) based on a research model adapted from Chung's (2014) study on behavioural intent to adopt mobile commerce was utilized. The model contains the five generalized attributes of innovations from DOI theory (Rogers, 2003):

(1) *Compatibility:* "The degree to which an innovation is perceived as consistent with the existing values, past experiences, and the needs of potential adopters. An idea that is incompatible with the values and norms of a social system will not be adopted as rapidly as an innovation that is compatible" (Chung, 2014, p. 745).

(2) *Complexity:* "The degree to which an innovation is perceived as being relatively difficult to understand and use. New ideas that are simpler to understand are adopted more rapidly than innovations that require the adopter to develop new skills and understandings" (Chung, 2014, p. 745).

(3) *Observability:* "The degree to which the use and benefits of the innovation is visible to others, and therefore act as a further stimulus to uptake by others" (Chung, 2014, p. 745).

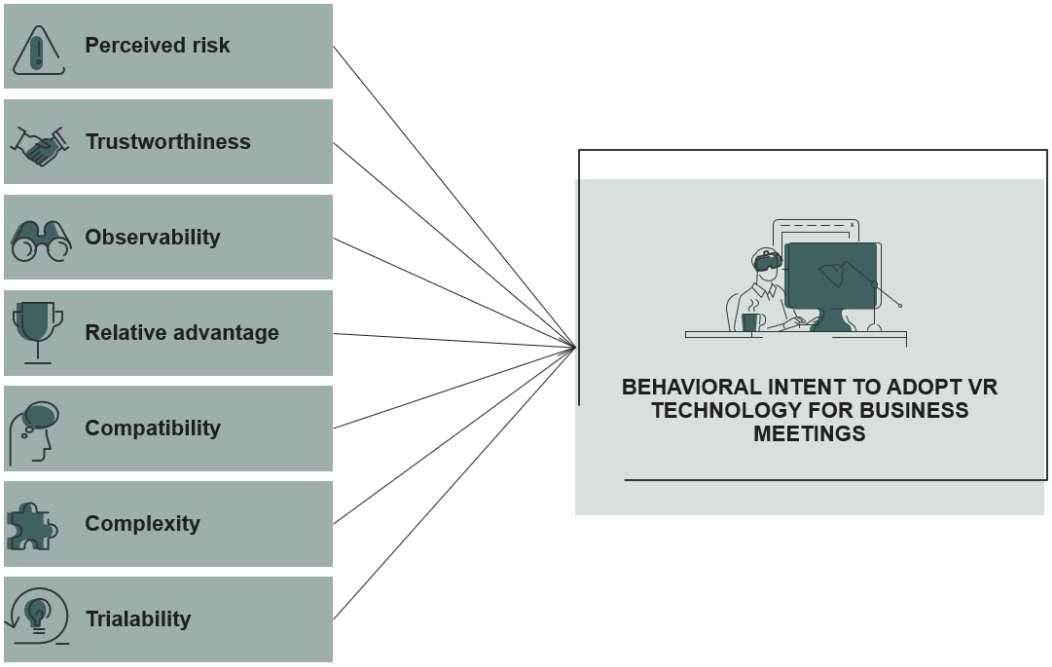
(4) *Trialability:* "The degree to which an innovation may be experimented with on a limited basis. An innovation that is trialable represents less uncertainty to the individual who is considering it for adoption, who can learn by doing" (Chung, 2014, p. 745).

(5) *Relative advantage:* "The greater the perceived relative advantage of an innovation (than the one it supersedes), the more rapid its rate of adoption will be" (Chung, 2014, p. 745).

The limitation of Rogers' DOI (2003), as discussed by Chung (2014), is that it does not include *trustworthiness* and *perceived risk*. According to Anderson and Naurus (1990), trust characterises the expectation that a party's word or promise is reliable, and that one party will fulfil its obligations in an exchange relationship. Trustworthiness serves as an important addition to DOI as it helps consumers overcome perceptions of uncertainty, and it can also lead to appropriate favourable expectations of performance and other desired benefits. On the other hand, perceived risk creates uncertainty regarding the possible negative consequences of using a product or service (Bauer et al., 2005). Perceived risk is relevant in the context of adoption of VR technology for business meetings because perceived risk is a necessary antecedent for trust to be operative and the result of building trust can be a reduction in perceived risk (Mitchell, 1999). Based on the discussion above, we have decided to include perceived risk and trustworthiness in the research model.

In figure 22 below, the research model used to test behavioural intent to adopt VR technology in business meetings is visualized.

Figure 22: Behavioural intent to adopt VR for business meetings



A seven-point Likert scale was used in the questionnaire, with 1 being the least agreed to and 7 being the most agreed to. The measure used in the study was adapted from Chung's (2014) study and the following associated scales:

(1) Behavioural intention scale: Nysveen et al. (2005)
(2) Trustworthiness: Hupcey et al. (2002)
(3) Perceived risk: Bauer et al. (2005)
(4) Rogers' (2003) five perceived characteristics of innovation
(5) Perceived meeting quality: Cohen et al. (2011)

Furthermore, the questionnaire contained the following demographics: age, gender, nationality, education, and employment status. Moreover, the participants were asked questions about how familiar they are with VR technology and the barriers they see for using it.

3.1.1.3. Statistical Analysis

The analysis of the questionnaire consisted of four phases, where the statistical software IBM SPSS 28 was utilized.

The first phase entailed removing incomplete responses and checking for normality and outliers.

The second phase of the statistical analysis consisted of interpreting the demographic questions and questions about the perceived barriers of using VR.

Phase 3 in the statistical analysis involved running descriptive statistics and aggregating the underlying measurement items into its factors in our conceptual model presented in Figure 22. All the measurement variables in the study were also subjected to an exploratory factor analysis (EFA) with principal component analysis (PCA) and varimax rotation. Independent Samples T-tests were also run to look for meaningful differences.

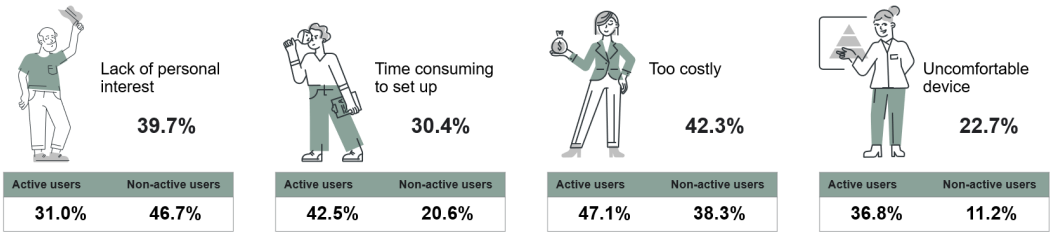
The final and fourth phase in the statistical analysis of Study 1 involved running linear regression models with behavioral intent as the dependent variable, and all the seven factors (perceived risk, trustworthiness, observability, relative advantage, compatibility, complexity and trialability) as independent variables.

3.1.1.4. Results

All measurement variables were found to have reasonable normal distribution (bell-shaped curve) after inspecting the histograms of the data distribution.
More than half of the sample were aware of VR technology but had never used it (54.1%) – these were denoted as non-active users. The active users consisted of the respondents that used VR sometimes (40.7%) and those that used it on a regular basis (4.1%). For further analysis, the results of the active and non-active users were compared to look for significant differences. When asked about the barriers for using VR technology, the respondents overall found the price (42.3%), personal interest (39.7%), set-up time (30.4%) and comfort of the device (22.7%) to be the main barriers. Interestingly, significant differences in the perceived barriers across the active and non-active users were identified. For instance, on average non-active users find the time it takes to set up the VR device less problematic than active users, and the same goes for the comfort of the device.

In Figure 23 below, the top barriers for using VR in business is visualized.

Figure 23: Top barriers for using VR in Business



The results of the EFA suggested five factors instead of the eight in the original conceptual model in Figure 17. For instance, the EFA suggested that items belonging to *perceived risk* and *trustworthiness* could be combined into one factor. Furthermore, *relative advantage* and *compatibility* showed high factor loadings on the same construct. In addition, the items belonging to the *observability* measure were convergent with the behavioural intent items according to the EFA. See Appendix 3 for the full varimax factor analysis component scores. Despite the fact that the EFA procedures extracted five factors instead of the eight original ones, the decision to proceed with the original conceptual model of eight factors was made after seeing that the adjustments did not alter the outcome of the regression analysis (Phase 4). In fact, the explanatory power of the model was higher with the original model than the five-factor solution. So, in proceeding to diagnose the behavioural intent of VR in business meetings the original conceptual model was utilized.

See Figure 24, 25 and 26 on the subsequent pages with descriptive statistics across the full sample (N=194), the active users (n=87) and the non-active users (n=107).

Figure 24: Diagnosing behavioral intent – full sample, N=194

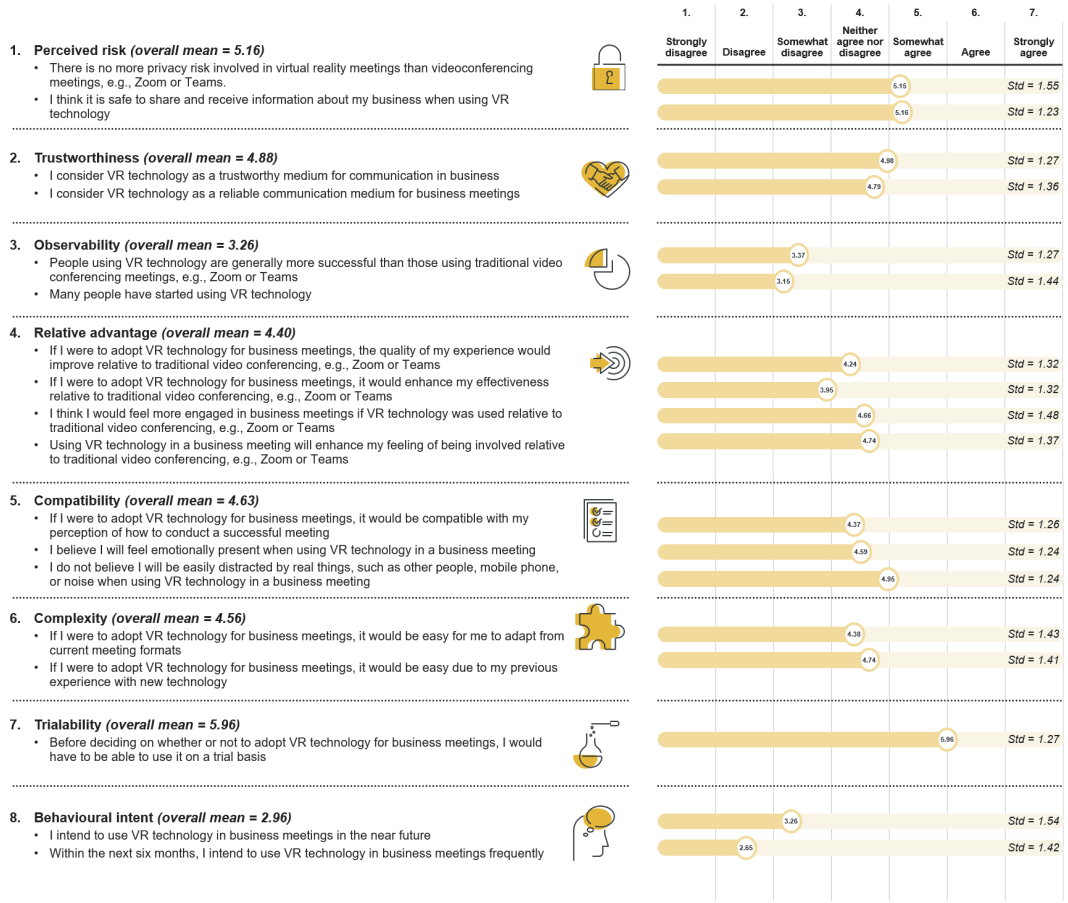


Figure 25: Diagnosing behavioral intent – active users, n=87

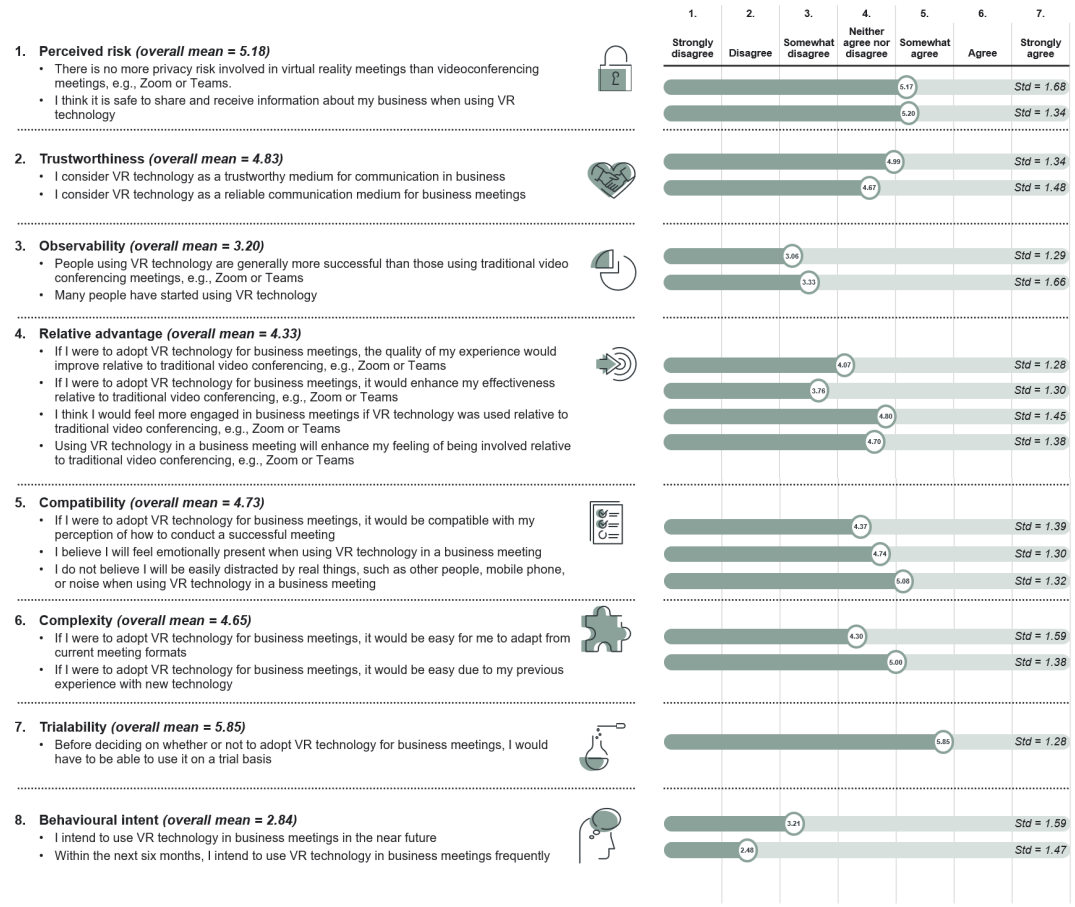
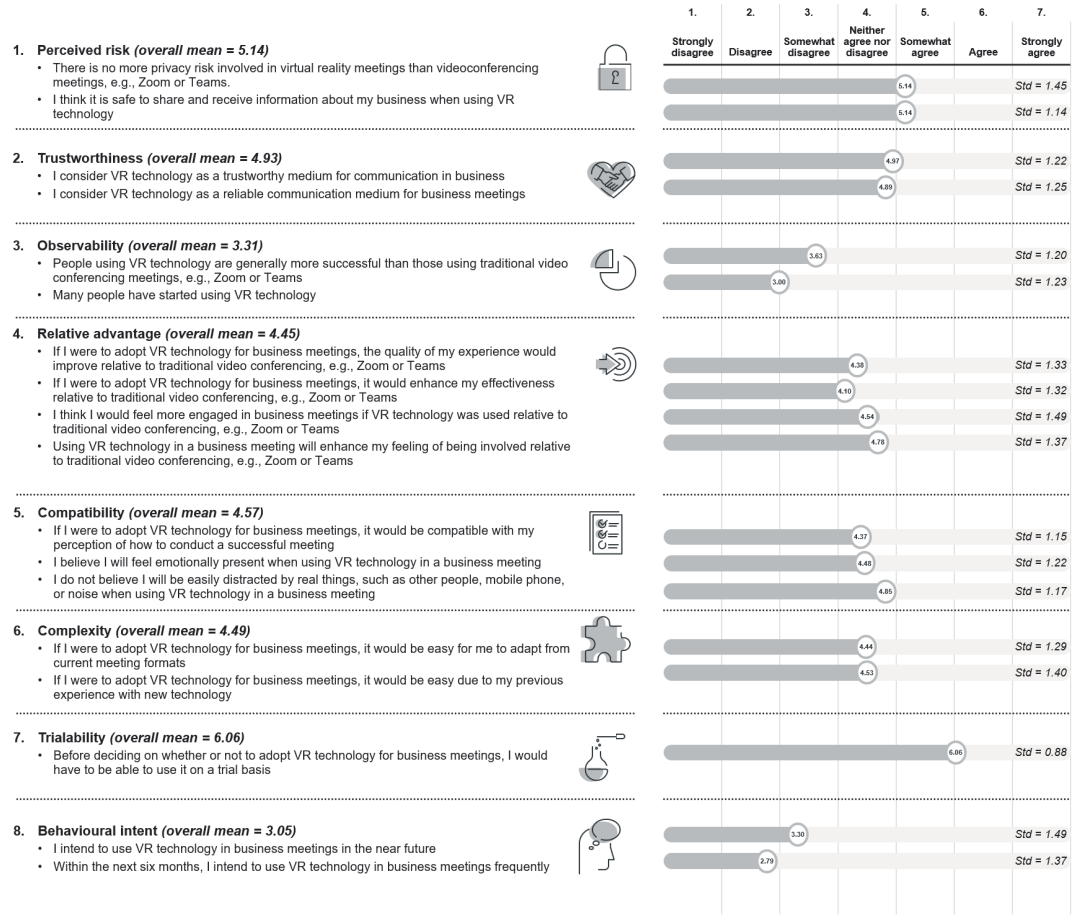


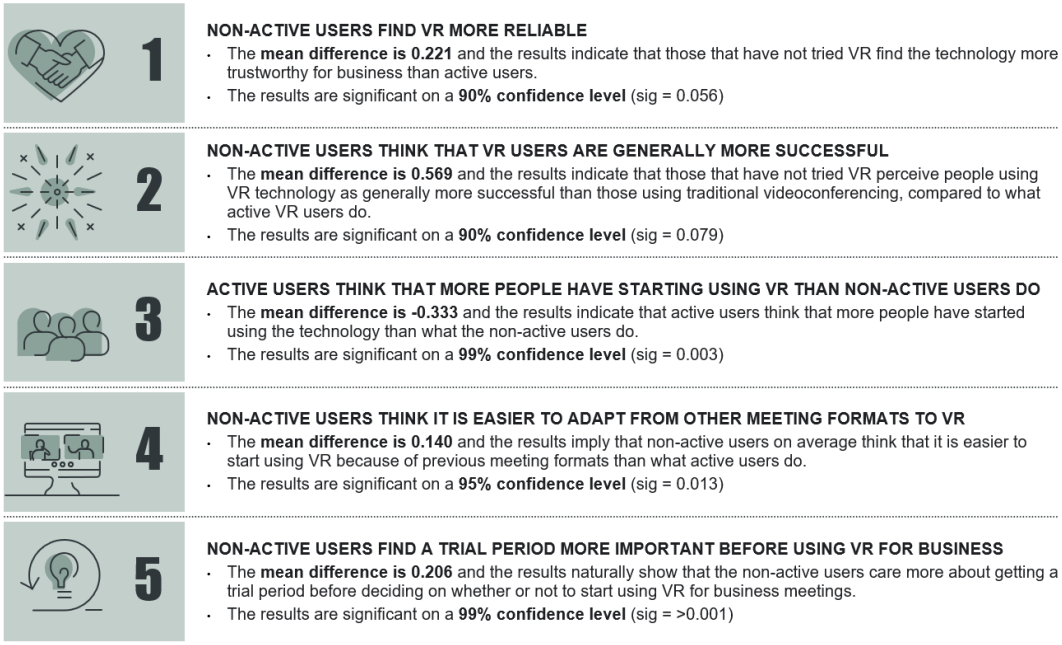
Figure 26: Diagnosing behavioral intent – non-active users, n=107



After generating the descriptives above, Independent-Samples T-tests were conducted to look for meaningful differences across the active and non-active users. The analysis demonstrated five significant differences, (1) non-active users find VR more reliable, (2) non-active users think that VR users are generally more successful, (3) active users think that more people have started using VR than non-active users do, (4) non-active users think it is easier to adapt from other meeting formats to VR, and (5) non-active users find a trial period more important before starting to use VR for business meetings.

See Figure 27 on the next page for an illustration of the findings from the Independent Samples T-test.

Figure 27: Independent-Samples T-test, Active Users vs. Non-active Users

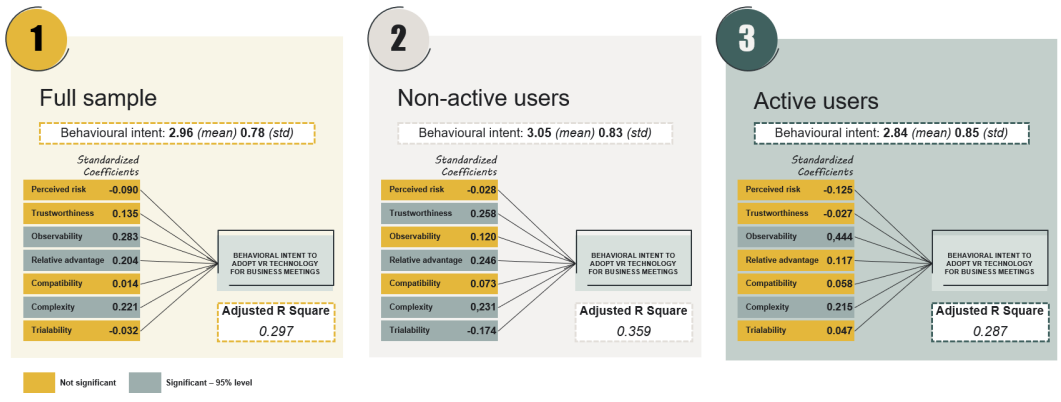


To explain behavioral intent to adopt VR according to the previously described conceptual model (Figure 22), the following regression model was run separately across the full sample (N=194), the active users (n=87) and the non-active useres (n=107).

$$Behavioral\ Intent = \beta_0 + \beta_1 Perceived\ Risk + \beta_2 Trustworthiness + \beta_3 Observability + \beta_4 Relative\ Advantage + \beta_5 Compatibility + \beta_6 Complexity + \beta_7 Trialability + \varepsilon$$

In Figure 28 below, the regression results can be found.

Figure 28: Regression Results – Full Sample, Active & Non-Active Users



For the full sample (N = 194), observability, relative advantage and complexity had a significant effect (95% confidence level) on behavioural intent to adopt VR for business meetings. And judging from the average mean score of behavioural intent (2.96), VR for business meetings is not perceived as mature for adoption yet. For the non-active users (n = 107), trustworthiness, relative advantage, complexity and trialability had a significant effect (95% confidence level) on behavioural intent to adopt VR for business meetings. When looking at the average value of behavioural intent for the non-active users, it becomes apparent that the non-active users are more optimistic towards adopting VR than active users. For the active users (n = 87), only observability and complexity had a significant effect (95% confidence level) on behavioural intent to adopt VR for business meetings.

To summarize, the most important findings of Study 1 suggest that the Scandinavian market is generally quite fascinated about the prospects of what VR can enable us to do in a business context. Moreover, there seems to be a consensus that in comparison with 2D-videoconferencing tools such as Zoom and Teams, VR creates more engagement, feeling of presence and delivers better interaction capabilities. On the other hand, Study 1 also identifies critical barriers to adoption of VR, such as price, personal interest, time consuming configuration, and device comfort.

Study 1 may imply that VR is not yet mature for mass adoption in Scandinavia, and that more stories from successful applications are needed before VR will 'cross the chasm' in a business context. That said, the presumably high level of optimism in the market indicates that it is only a question of time before more businesses take the leap into the metaverse.

Finally, Study 1 demonstrated that the Scandinavian market in general is relatively unfamiliar with VR in business, and that people find it important to obtain more explicit evidence that VR lives up to its expectations before investing in it. In other words, Study 1 lays a good foundation for assessing how VR performs compared to other communication modes in Study 2.

3.1.2. Study 2

3.1.2.1. Participants

90 students and young professionals participated in the study voluntarily. The gender split in the sample was balanced, with 47.8% male and 52.2% female respondents. The participants were also fairly evenly balanced between the age categories 18-24 (47.8%) and 25-34 (52.2%). The mean age was 25.44 (SD = 4.26). The majority of the sample (63.3%) were employed part-time, 11.1% were seeking opportunities, and 25.6% were employed full-time. The sample consisted of slightly more participants with a bachelor's or in their bachelor's (52.2%) than master's (47.8%). The sample showed large variation in terms of which departments they were working in or planning to work in after studies, but *marketing operations* (36.7%), *branding* (13.3%), and *strategy & business development* (11.1%) were the most represented.

Participants were recruited through the participants' own social networks via social media (Facebook and LinkedIn) and by approaching students and young professionals directly on BI's campus. The only requirement for participating in the study was either being a student or a young professional, with young professionals being defined as millennials. To encourage sign-ups for the experiment, a raffle was run, with the prices being as follows: 1st price = 3000 NOK, 2nd price = 2000 NOK, 3rd price = A Sonos Speaker worth approximately 2000 NOK.

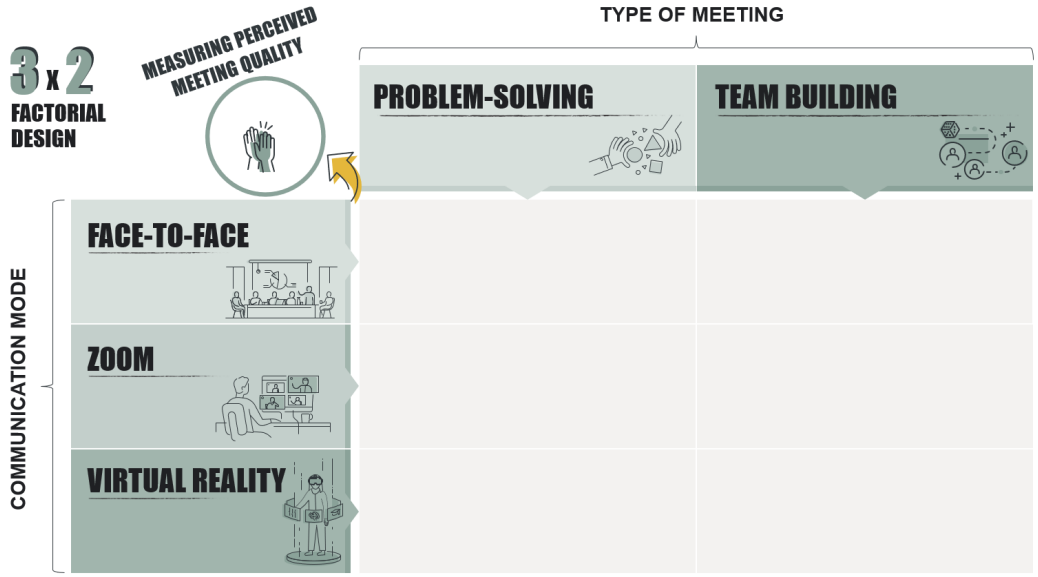
Participants were told that the purpose of the study was to assess the drivers of success in business meetings, both in the context of problem-solving and team building, and that we hoped to use the learnings to help organizations improve how they use meetings. For the study, business meetings were defined as follows: (a) a scheduled gathering of two or more individuals for the purpose of a work-related interaction, (b) primarily attended by employees of their organization and those with whom they work regularly (e.g., in their work group, team, etc.), (c) scheduled in advance. The definition of a business meeting was adapted from existing meeting literature (Cohen et al., 2011; Luong & Rogelberg, 2005).

3.1.2.2. Design and Procedure

The experiment had a 3 (communication mode: virtual reality vs. Zoom vs. face-to-face) x 2 (type of meeting: problem-solving vs. team building) mixed design, and participants were randomly assigned to one of three communication modes, i.e., two conditions per participant. The dependent variable measured in the experiment was the Perceived Meeting Quality (PMQ) scale. The PMQ and how it was operationalized is explained later in subsequent sections.

In Figure 29 below, the experimental design is visualized.

Figure 29: Experimental Design – 3x2 Factorial Design



After the participants were randomly assigned to their conditions, they were given instructions by a supervisor and guided to the room where the experiment would be conducted.

3.1.2.3. Procedure

For the introduction, the same lobby was used across all conditions. The participants were asked to stand in a half circle to listen to our instructions presented with an agenda on a flipchart. Most of the instructions were the same for all participants:

- Detailing the purpose of the study and what they would be asked to do; (1) a team building meeting, and (2) a problem-solving meeting
- Providing practical information about the length of the experiment (30 min total), how to complete the survey given after each meeting by scanning a QR code on their desks, describing the data protection policy (how data would be anonymized), and getting the participants to sign a consent form, provide their contact information for the raffle, and answer some simple demographic questions.
- The participants were also told they would sign a General Data Protection Regulation (GDPR) form once the experiment was over.
- Finally, across all scenarios participants were told that they would be assessing the quality of the meeting, and not the performance of the facilitator.

The sequence of the team building, and problem-solving meeting was changed for every meeting, i.e., we took turns in having the groups start with the team building or the problem-solving meeting. The questionnaire contained the following demographics: age, gender, education, employment status, and which department they worked in or planned to work in after their studies (i.e., accounting, HR, marketing etc.). Moreover, the participants were asked about how often they generally take part in problem-solving and team building meetings. Finally, all the participants were asked about how frequently they attend meetings in VR, videoconferencing (Zoom) and physical.

In Figure 30 on the next page, the lobby where the participants were given the introductions and signed the consent forms with screening and demographic questions is shown.

Figure 30: Introduction room and agenda for experiment

For the participants assigned to the VR communication mode, a short introduction video was also shown to ensure a more seamless user experience and avoid time wasted in learning how to use the technology. The video shown demonstrated how to use the controllers and the core functionality needed for the students to understand how to operate the headset. On the next page is the transcript and a link to the video:

> *When entering your meeting room, you will be given an Oculus Quest 2 headset, similar to what I'm currently wearing.*
>
> *There are three things you need to know when putting on the headset.*
>
> *First, you need to sit down on the desk you are given. The desk is already configured in the app Horizon Workrooms that we will be using, and where I'm currently seated right now, so you don't have to worry about setting up anything.*
>
> *Second, grab the controllers before putting on the headset and make sure you have the right controller in the right hand and vice versa. During the meeting, the instructor will ask you to try the hand tracking function. When this happens, just put down your controllers carefully on the desk in front of you.*

Third, to activate the whiteboard on your desk, look down to your right, and select the whiteboard function using the controller. You can then use the controller as your pen by flipping it around like this. If you want, you can also try changing your set or standing up by the large whiteboard which can be done through the menu section.

Enjoy the VR experience!

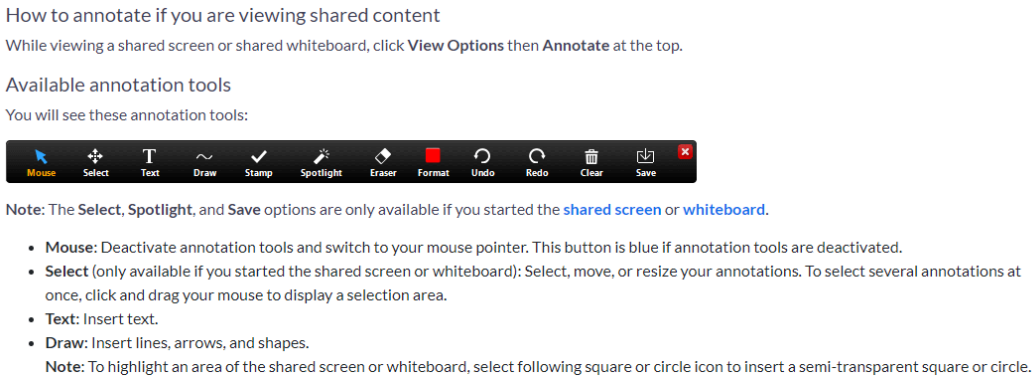
To see the onboarding video, click on the frame below, or open this link: https://vimeo.com/702523277/0597595355

To avoid losing time in teaching the participants how to use the different functionality in the app Horizon Workrooms (such as changing seats and standing by the whiteboard), the participants were told that they had to stay seated during the entire meeting sequence. Moreover, they were instructed to follow the guidelines provided from the instructor on how to use the basic functionality needed for the meeting. Essentially, the only functionality needed was the desk whiteboard where the controllers are used as a pen.

For the participants assigned to the videoconferencing meeting, a PowerPoint slide giving the participant a refresher on how to use the annotation/whiteboard function was shown. The participants were encouraged to only use the *text* or *draw* function.

In Figure 31 below, the instructions for the annotation tool on Zoom which was printed and given to the participants is shown.

Figure 31: Instructions for Annotation Tools on Zoom



How to annotate if you are viewing shared content

While viewing a shared screen or shared whiteboard, click **View Options** then **Annotate** at the top.

Available annotation tools

You will see these annotation tools:

Mouse Select Text Draw Stamp Spotlight Eraser Format Undo Redo Clear Save

Note: The **Select**, **Spotlight**, and **Save** options are only available if you started the shared screen or whiteboard.

- **Mouse:** Deactivate annotation tools and switch to your mouse pointer. This button is blue if annotation tools are deactivated.
- **Select** (only available if you started the shared screen or whiteboard): Select, move, or resize your annotations. To select several annotations at once, click and drag your mouse to display a selection area.
- **Text:** Insert text.
- **Draw:** Insert lines, arrows, and shapes.
  Note: To highlight an area of the shared screen or whiteboard, select following square or circle icon to insert a semi-transparent square or circle.

After instructions were given, the participants were guided to their meeting room depending on which communication mode they were assigned to.

The participants assigned to the VR communication mode were guided to separate rooms. All the rooms were the same – small cubicles with a desk, an Oculus Quest 2 headset, and a chair. When putting on the headset the virtual meeting environment was pre-configured with the app Horizon Workrooms displaying two posters with images from the BI Norwegian Business School campus, a BI logo on the wall, and large windows with a view of a city with skyscrapers. The avatars that the participants were given were also pre-configured to match their gender. However, since it is time consuming to design the avatars and that each avatar created needs to be linked to a Facebook profile, the avatars were given the standardized appearance provided by Oculus. Therefore, each of the participants' headsets had one male character and one female character with random names (*Lisa Nordmann, Ola Nordmann, John Roe, Jane Roe, Noah Hansen and Nora Hansen*). The meeting facilitator was the only avatar in the meeting room with resembling looks. The participants were informed about this, before starting the experiment.

See Figure 32 on the next pages with illustrations of the meeting room, how we adjusted the avatars, a screenshot from the meeting room with the three female avatars we created, and the actual meeting room.

Figure 32: Horizon Workrooms – Meeting Room & Avatars

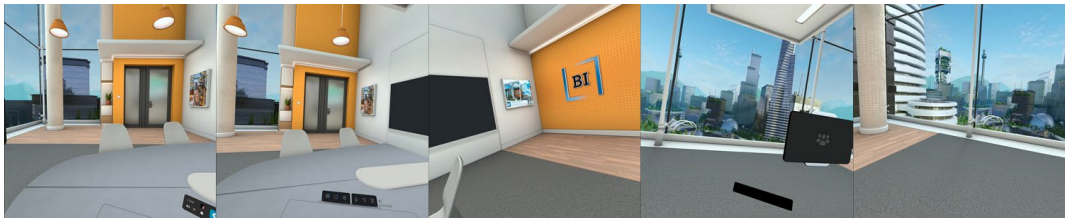


Figure 32 A: The meeting room in Horizon Workrooms, with BI logo and images

Figure 32 B: Designing avatars in Oculus Quest 2

Figure 32 C: Screenshot from one of the problem-solving experiments in VR

Figure 32 D: Picture from the cubicle where the participants did the experiments in VR

The participants assigned to the face-to-face (F2F) meeting were all guided to the same large meeting room with a big table, four chairs, and the poster for the exercises on the wall (PS! Only the poster for the meeting they were assigned to first was on the wall when the participants entered. The second poster was mounted after the participants had completed the first meeting). To resemble the VR scenario as much as possible, a large poster with an image of a city with skyscrapers was mounted on the wall. All participants were given a pen, a marker and index cards to use for the exercises. For the intro of the team building exercise, the instructors also played music from a portable speaker – see explanation of the exercise in the next section.

In Figure 33 on the next page an image of the meeting room for the F2F meeting can be found.

Figure 33: F2F Meeting Room

Finally, in the videoconferencing communication mode, the popular videoconferencing tool Zoom was used, where a virtual background with a photo of the exact same image used on the flat screen of the physical meeting space was used (PS! Both for the participants and the experimenter). The participants in this condition were similarly to the VR condition guided to separate rooms – the same room type as in the VR condition – and the laptop was already installed on the desk with the Zoom meeting open and a simple headset and web camera to ensure quality sound with no echo from the surrounding rooms.

In Figure 34 on the next page, a picture of the meeting room for the Zoom condition can be found.

Figure 34: Zoom Meeting Room with Virtual Background

3.1.2.4. *Apparatus and Materials*

Perception of meeting quality was measured with a 14-item scale of adjectives modelled after and adapted from the Job Descriptive Index (JDI) (Smith et al., 1969) and the work of Cohen et al. (2011). The content of the scale was decided by carefully evaluating what attributes complement each other to realize what key dimensions characterize a high-quality meeting, and in addition how many attributes are perceived as needed. To do so, the adjectives used were either taken directly from the existing literature or were similar to the types of adjectives used by Smith et al. (1969) or Cohen et al. (2011). In selecting the adjectives, we

considered attributes that academicians and practitioners frequently use to describe meeting quality, such as efficiency, time, workflow, quality, and engagement (Goff-Dupont, 2022; Hailey, 2022; Hyken, 2022; Swift, 2020). Additionally, since VR is the main topic of the research, attributes used to measure a VR experience, such as immersion and sense of presence (Ryan & Jarvis, 2019; Servotte et al., 2020; Walsh & Pawlowski, 2002) are included. Thus, the following adjectives are utilized to measure perceived meeting quality:

(1) Efficient
(2) Useful
(3) Worthwhile
(4) Helpful
(5) Waste of time
(6) Enjoyable
(7) Poor
(8) Immersive
(9) Superior
(10) Challenging
(11) Pleasant
(12) Fascinating
(13) Satisfying
(14) Sense of presence

After completing each meeting, the participants were asked to report whether the adjective described their meeting using a seven-point Likert scale with 1 being the least agreeable and 7 being the most agreeable. All negatively worded items were reverse coded, i.e., higher numbers indicated more positive ratings. These words were “waste of time”, “poor”, and “challenging”. The 14 items were factor analysed using a principal axis factor analysis with varimax rotation, and based on the scree plot and the eigenvalues, a three-factor solution was suggested. However, since the three-factor solution did not provide any meaningful groupings, it was decided to proceed with a single factor solution where 10 out of 14 items showed factor loadings above the retention criteria of .60. In this solution, all items were retained except for *efficient*, *immersive*, *challenging*, and *fascinating*. Consequently, the final scale consisted of 10 items ($\alpha = 0.88$), and like Cohen et al., it was named the

Perceptions of Meeting Quality (PMQ) scale (2011). The PMQ score is the mean across all the 10 items. All individual items were also tested, i.e., the 4 items left out of the PMQ score were also compared across meeting types and communication modes to look for significant differences.

The team building exercise started off with a 1-minute casual hangout with music and encouragement to move around and small talk. After the minute had passed, the participants did a rose/thorn challenge. In this exercise, the participants each had two minutes to share their rose (any positive that made them feel grateful, happy, etc.) and their thorn (a challenge). Both the rose and the thorn can be work or non-work related. The exercise is a revised, simplified version of "Rose, Thorn, and Bud" (Gonzalez, 2020), and was chosen due to our previous experience with the exercise as well as the exercise's simple implementation, universality, and use of time.

Examples of what a rose and a thorn can be:

Work Related:

- *Rose*: I was put on a new and exciting project today!
- *Thorn*: I really don't like the project I am currently working on.

Non-Work Related:

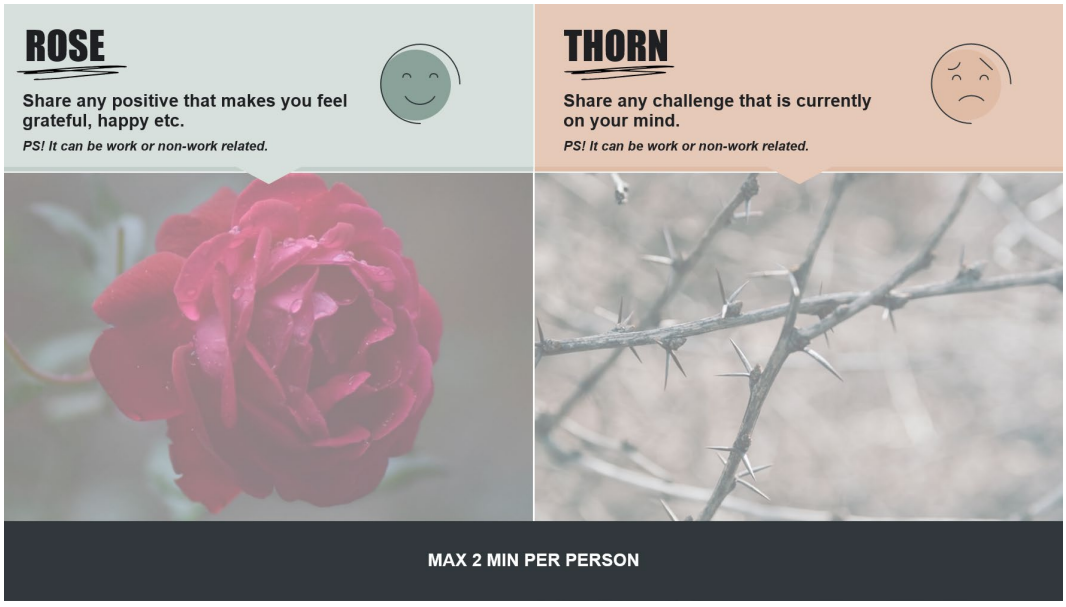
- *Rose*: I found time to go for a walk today.
- *Thorn*: There was no time to go for a walk today.

Figure 35 on the next page displays the templates used for the team building exercises and a link to the music played for the intro.

Figure 35: Exercise for Team Building Meeting

Link to music:

https://drive.google.com/file/d/1_oKJxsPLylEPujYw042RzdFMC3JHYbj5/view?usp=sharing



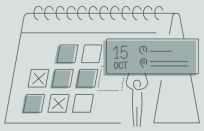
For the problem-solving meeting, the participants were asked to do a short and simple 5-minute calendar exercise to figure out "*Who can be scheduled on any day of the week – Håkon, Isak, both or none?"* based on a calendar and instructions provided by the facilitator. Most of the options considered for the problem-solving exercise involved typical case studies normally used in interview processes (Bain & Company, 2022; Boston Consulting Group, 2022), but the calendar exercise was

ultimately chosen due to our experience with it, its level of difficulty, and the predicted time a group would need to solve it (<5 minutes).

Below is a screenshot from a 'dry run' of the experiment and in Figure 36 on the next page the exercise template can be found.

Figure 36: Exercise for Problem-Solving Meeting

CALENDAR EXERCISE



Who can be scheduled on any day of the week – Håkon, Isak, both or none?

Use the information provided below to answer

The following is the schedule of Carlos, Matilda, and Sarah:

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Carlos	Matilda	Carlos	Matilda	Carlos	Sarah	Carlos
	Sarah	Matilda	Sarah	Matilda		

Håkon can work on any day either Sarah or Isak are scheduled. Isak can work on any day either Carlos or Matilda are scheduled.

MAX 5 MIN TO SOLVE – USE WHITEBOARD

3.1.2.5. Statistical Analysis

Like Study 1, the analysis in Study 2 consisted of four phases, where the statistical software IBM SPSS 28 was utilized.

The first phase entailed exploring and structuring the data, plotting the demographic variables and the results of the questions about the perceived barriers for using VR into SPSS manually and checking for normality and outliers.

The second phase of the statistical analysis consisted of interpreting the results of the 'barriers for using VR' and demographic questions.

Phase 3 in the statistical analysis involved running descriptive statistics on all the measurement items, and as described in the section above, performing principal axis factor analysis with varimax rotation to generate the PMQ scale. See Appendix 4 for the factor analysis component scores using a forced single factor solution. Reliability tests were also conducted.

Phase 4 consisted of analyzing the results of phase 1-3 further by conducting a repeated measures mixed-model factorial ANOVA to test the hypotheses and look for meaningful differences across the communication modes and meeting types. First, the PMQ-score was tested across communication modes and meeting types to assess simple and main effects. Second, the independent measurement items were tested across communication modes and meeting types.

3.1.2.6. Results

All measurement variables in Study 2 were found to have reasonable normal distribution (bell-shaped curve) after inspecting the histograms of the data distribution. Not surprisingly, it was found that very few of the participants have used VR technology for business meetings. In fact, 78.9% responded that they have never used VR for business meeting. However, for videoconferencing with platforms like Zoom, 86,7% attend business meetings frequently (55.6%) or occasionally (31.1%). Most of the participants were also highly familiar with physical meetings, with 37.8% attending them occasionally and 47.8% frequently. During a normal week of work or studies, the participants reported that they typically participate in problem-solving meeting 0-2 times (46.1% or 2-4 times (34.8%). And for team building, most participants attend this type of meeting 0-2 times a month (69.3%) or (20.5%).

A Cronbach's alpha of 0.88 was found for the PMQ-scale, which demonstrates that the scale is reliable, as values above 0.7 is considered acceptable (Cortina, 1993). On a scale from 1 to 7 (higher numbers indicate more positive ratings), PMQ had a mean of 5.70 (SD = 0.81) overall. These results suggest that participants in general found the meeting experiences to be relatively positive. This is consistent with existing literature published on perceived quality of meetings (Cohen et al., 2011; Rogelberg et al., 2006). Interestingly, the results show that for videoconferencing meetings in Zoom, older participants (25-34) reported significantly lower PMQ than the younger age group (18-24) (M = 5.11, SD = 1.17; M = 5.83, SD = 0.83, respectively), $t(56) = 2.78$, $p < .05$. For the other communication modes (F2F and VR), no significant difference between age groups was found. On the other hand, the results showed that participants who are employed part-time report significantly higher PMQ for meetings in VR than participants employed full-time (M = 5.95, SD = 0.56; M = 5.63, SD = 0.82, respectively), $t(50) = -1.683$, $p = < .1$. We note that this was only significant on a 90% confidence level.

To look for simple and main effects on the Perceived Meeting Quality (PMQ) score across communication modes and meeting types through a two-factor mixed-design ANOVA was conducted. The results of the Two-Way Mixed ANOVA showed that there was no significant main effect of communication mode ($F(2, 87) = 1.820$, $p = .168$, $\eta\rho^2 = .040$) on PMQ scores, despite F2F (M = 5.85, SD = .127), Zoom (M = 5.51, SD = .127), and VR (M = 5.75, SD = .127) having relatively different PMQ scores. However, one assumption that has to be met when conducting an ANOVA with any between-participants variables is that the groups being compared have a similar dispersion of scores (Lærd Statistics, 2022). In this case, the assumption is violated as both the p-value for problem-solving and for team building are significant ($p < 0.05$).

In addition, there was also no significant main effect of meeting type ($F(1, 87) = 1.066$, $p = .305$, $\eta\rho^2 = .012$) on PMQ scores, with problem-solving (M = 5.66, SD = .08) and team building (M = 5.75, SD = .087) scoring similarly overall. Moreover, there was no significant interaction between meeting type and communication mode ($F(2, 87) = .417$, $p = .660$, $\eta\rho^2 = 0.009$).

In Table 4-6, and Figure 37 on the next pages, the findings reported above can be found.

Table 4: Tests of Within-Subject Effects

	df	F	Sig.	Partial Eta Squared
Meeting Type	1	1.066	.305	.012
Meeting Type* Communication mode	2	.417	.660	.009
Error (Meeting Type)	87			

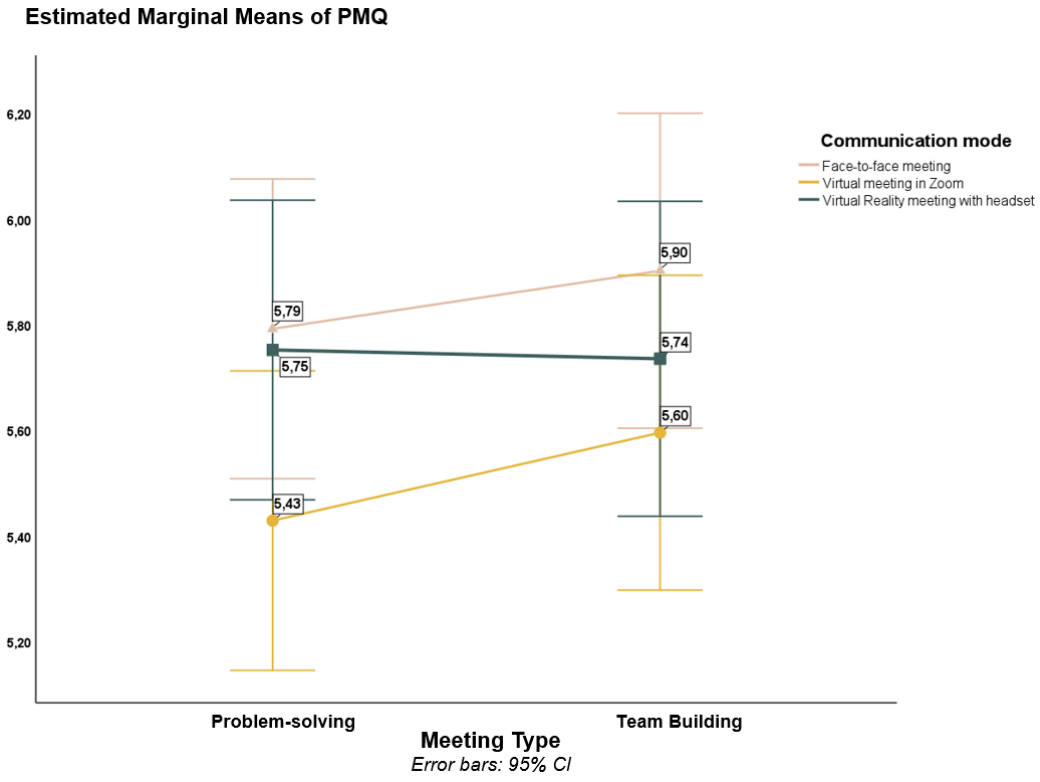
Table 5: Levene's Test of Equality of Error Variances

	Levene's Statistic	df1	df2	Sig.
Problem-solving	5.214	2	87	.007
Team building	3.777	2	87	.027

Table 6: Test of Between-Subject Effects

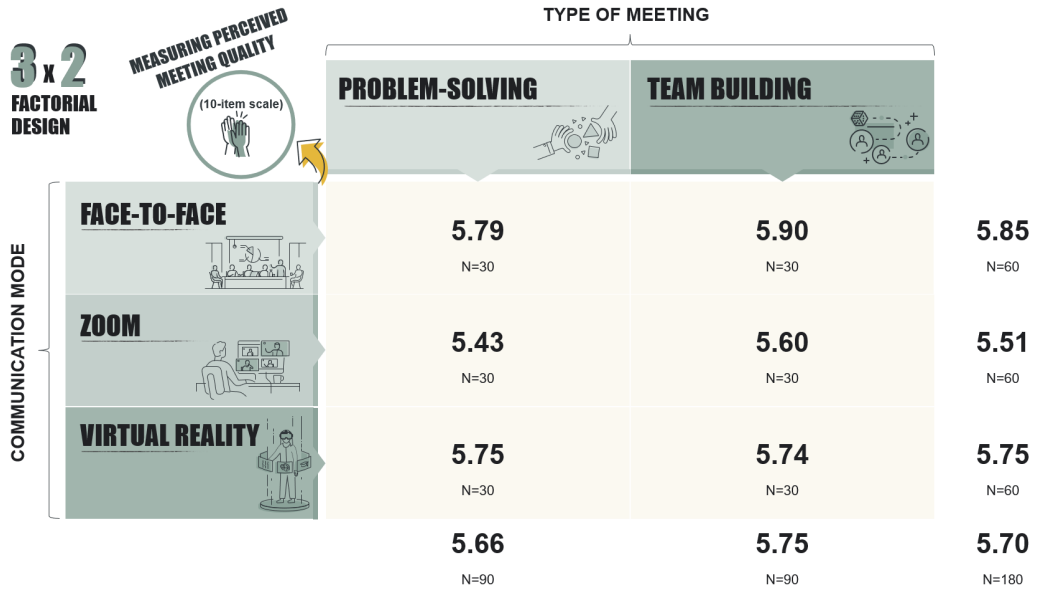
	df	F	Sig.	Partial Eta Squared
Intercept	1	6033.226	<.001	.986
Communication mode	2	1.820	.168	.040
Error	87			

Figure 37: Graphical Plot with Estimated Marginal Means of PMQ



The descriptive statistics of the Two-Way Mixed ANOVA can be found in Figure 38 below.

Figure 38: Two-Way Mixed ANOVA Descriptive Statistics



Due to the assumption violations of the mixed-design ANOVA, t-tests were conducted to look for meaningful differences and to test the presented hypotheses. From the results of the t-tests, when looking at the main effects of communication mode, we find a main effect of -0.23 between virtual meetings in Zoom and virtual meetings with a VR headset, i.e., the results show a significantly lower score for Zoom than VR (M = 5.51, SD = 1.03; M = 5.75, SD = 0.72, respectively), $t(118) = -1.43$, $p < 0.05$. This implies that hypothesis $H1_A$ is supported. For face-to-face meetings compared to VR meetings, a main effect of 0.10 can be found, but this is only significant on a 90% confidence level. Therefore, hypothesis $H1_B$ is not supported. When comparing F2F and virtual meetings in Zoom, the results show a significant main effect of 0.34. In other words, the results show a significantly higher score for F2F than Zoom (M = 5.85, SD = 0.57; M = 5.51, SD = 1.03, respectively), $t(118) = 2.20$, $p < 0.01$. This implies that hypothesis $H1_C$ is supported.

Hypothesis 2 states that "team building meetings to have no significant difference in PMQ from problem-solving meetings", which is supported through the Levene's Test for Equality of Variances showing a high p-value, $t(118) = -0.72$, $p = 0.90$.

The third group of hypotheses deals with the interaction between communication mode and problem-solving meetings. When comparing the PMQ of problem-solving meetings in Zoom and problem-solving meetings with a VR headset, a simple effect of -0.32 is found. This means that the results show a lower PMQ for problem-solving meetings in Zoom than for VR (M = 5.43, SD = 0.98; M = 5.75, SD = 0.78, respectively). However, the t-test shows that the results are not significant, $t(58) = -1.41$, $p = 0.20$, which entails that $H3_A$ is not supported. For $H3_B$ the results show a slightly higher PMQ for problem-solving meetings in F2F than for VR (M = 5.79, SD = 0.51; M = 5.75, SD = 0.78, respectively). This result is significant on a 95% confidence level, $t(58) = 0.24$, $p < 0.05$. Hence, $H3_B$ is supported, but we note that the difference in the means is only marginal. The last hypothesis in the third category states that "for problem-solving meetings, face-to-face meetings will have higher PMQ than traditional videoconferencing meetings". This hypothesis is supported, as the results show a significantly higher PMQ for problem-solving meetings in F2F than for Zoom (M = 5.79, SD = 0.51; M = 5.43, SD = 0.98, respectively), $t(58) = 1.79$, $p < 0.01$.

Finally, the fourth group of hypotheses look at the interaction between communication mode and team building meetings. The first hypothesis, $H4_A$, is supported since the results show a significantly lower PMQ for team building meetings in Zoom than in VR (M = 5.60, SD = 1.09; M = 5.74, SD = 0.66, respectively), $t(58) = -0.60$, $p < 0.05$. The second hypothesis, stating that "for team building meetings, VR will have higher PMQ than face-to-face meetings" is not supported. Instead, no significant difference in PMQ for team building meetings in VR and face-to-face can be found, $t(58) = 0.996$, $p = 0.568$. For the final hypothesis, $H4_C$, the results show a significantly higher PMQ for F2F team building meetings than in Zoom (M = 5.90, SD = 0.63; M = 5.60, SD = 1.09, respectively), $t(58) = 1.33$, $p < 0.05$. In other words, $H4_C$ is supported.

In Figure 39 on the next page, the results of the hypotheses are summarized.

Figure 39: Summary of Hypotheses Results

Categories		Hypotheses	Result
COMMUNICATION MODE 	H1	**A:** VR meetings to have **higher** perceived meeting quality (PMQ) than traditional videoconferencing meetings.	✓
		B: VR meetings to have **lower** PMQ than face-to-face meetings.	✗
		C: Face-to-face meetings to have **higher** PMQ than traditional videoconferencing meetings.	✓
TYPE OF MEETING 	H2	Team building meetings to have **no significant difference** in PMQ from problem-solving meetings.	✓
INTERACTION: PROBLEM-SOLVING 	H3	**A:** For problem-solving meetings, VR will have **higher** PMQ than traditional videoconferencing meetings.	✗
		B: For problem-solving meetings, VR will have **lower** PMQ than face-to-face meetings.	✓
		C: For problem-solving meetings, face-to-face meetings will have **higher** PMQ than traditional videoconferencing meetings.	✓
INTERACTION: TEAM BUILDING 	H4	**A:** For team building meetings, VR will have **higher** PMQ than traditional videoconferencing meetings.	✓
		B: For team building meetings, VR will have **higher** PMQ than face-to-face meetings.	✗
		C: For team building meetings, face-to-face meetings will have **higher** PMQ than traditional videoconferencing meetings.	✓

✓ Supported ✗ Not supported

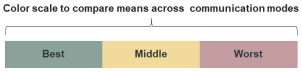
After running the t-tests for PMQ across the communication modes and meeting types described above, we also decided to look for meaningful differences in the individual measurement items of PMQ.

In Table 7 on the next page, the descriptive statistics for the individual measurement items across the communication modes and meeting types can be found.

Table 7: Descriptive Statistics Study 2 – Individual Items

	TOTAL (N=180)		F2F (N=60)		ZOOM (N=60)		VR (N=60)		TEAM BUILDING (N=90)		PROBLEM-SOLVING (N=90)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Efficient	5,75	1,08	6,07	0,88	5,63	1,15	5,55	1,13	5,67	1,10	5,83	1,05
Useful	5,72	1,16	5,83	1,04	5,58	1,20	5,75	1,24	5,77	1,25	5,68	1,07
Worthwhile	5,79	1,05	5,93	0,90	5,68	1,19	5,75	1,04	5,89	1,00	5,69	1,09
Helpful	5,68	1,04	5,78	0,94	5,63	1,21	5,63	0,97	5,69	1,06	5,68	1,04
Waste of time	5,88	1,19	5,88	1,12	5,80	1,33	5,97	1,12	6,01	1,07	5,76	1,29
Enjoyable	6,02	1,03	6,13	0,70	5,67	1,22	6,25	1,02	6,03	1,11	6,00	0,95
Poor	5,83	1,17	6,15	0,90	5,75	1,10	5,60	1,42	5,92	1,14	5,74	1,20
Immersive	5,19	1,42	5,63	1,33	4,87	1,50	5,08	1,34	5,21	1,50	5,18	1,35
Superior	4,62	1,30	4,65	1,20	4,47	1,41	4,75	1,28	4,51	1,33	4,73	1,27
Challenging	4,33	1,61	4,48	1,51	4,33	1,72	4,18	1,59	4,77	1,51	3,90	1,59
Pleasant	5,94	0,93	6,07	0,76	5,73	1,10	6,02	0,89	6,08	0,85	5,80	1,00
Fascinating	5,55	1,44	5,02	1,08	4,98	1,58	6,65	0,90	5,52	1,49	5,58	1,40
Satisfying	5,81	1,06	5,87	1,07	5,65	1,10	5,92	1,01	5,82	1,04	5,80	1,08
Sense of presence	5,72	1,39	6,18	0,87	5,17	1,80	5,82	1,16	5,73	1,48	5,71	1,30

	F2F/PROBLEM (N=30)		F2F/TEAM (N=30)		ZOOM/PROBLEM (N=30)		ZOOM/TEAM (N=30)		VR/PROBLEM (N=30)		VR/TEAM (N=30)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Efficient	6,20	0,81	5,93	0,94	5,83	0,95	5,43	1,30	5,47	1,25	5,63	1,00
Useful	5,67	1,12	6,00	0,95	5,50	1,04	5,67	1,35	5,87	1,04	5,63	1,43
Worthwhile	5,77	1,04	6,10	0,71	5,63	1,13	5,73	1,26	5,67	1,12	5,83	0,95
Helpful	5,70	1,02	5,87	0,86	5,70	1,09	5,57	1,33	5,63	1,03	5,63	0,93
Waste of time	5,80	1,16	5,97	1,10	5,50	1,53	6,10	1,03	5,97	1,16	5,97	1,10
Enjoyable	6,07	0,58	6,20	0,81	5,60	1,19	5,73	1,26	6,33	0,84	6,17	1,18
Poor	6,10	0,76	6,20	1,03	5,63	1,13	5,87	1,07	5,50	1,55	5,70	1,29
Immersive	5,47	1,38	5,80	1,27	4,77	1,43	4,97	1,59	5,30	1,15	4,87	1,50
Superior	4,73	1,26	4,57	1,17	4,50	1,31	4,43	1,52	4,97	1,25	4,53	1,31
Challenging	4,20	1,54	4,77	1,45	3,93	1,72	4,73	1,66	3,57	1,48	4,80	1,47
Pleasant	6,10	0,55	6,03	0,93	5,43	1,17	6,03	0,96	5,87	1,07	6,17	0,65
Fascinating	5,00	0,98	5,03	1,19	4,97	1,61	5,00	1,58	6,77	0,50	6,53	1,17
Satisfying	5,90	1,24	5,83	0,87	5,70	0,92	5,60	1,28	5,80	1,10	6,03	0,93
Sense of presence	6,10	0,66	6,27	1,05	5,10	1,81	5,23	1,81	5,93	0,94	5,70	1,34



*Note that the degree of significance when running t-test for Equality of Means differ across the communication modes and the meeting types.

When comparing F2F and VR meetings on the all the individual items measured, siginficant differences in means can be found on the following items; *efficient*, *worthwhile*, *enjoyable*, and *poor*. On the first item, *efficient*, the results show a significantly higher score for F2F than VR (M = 6.07, SD = 0.88; M = 5.55, SD = 1.13, respectively), $t(118) = 2.80$, $p < 0.05$. Similarly, for the second item, *worthwhile*, the results also show a significantly higher score for F2F than VR (M = 5.93, SD = 0.90; M = 5.75, SD = 1.04, respectively), $t(118) = 1.04$, $p < .05$. On the other hand, for the third item, *enjoyable*, the results show a significantly lower score for F2F than VR (M = 6.13, SD = 0.70; M = 6.25, SD = 1.02, respectively), $t(118) = -.73$, $p < .05$. Finally, on the fourth item, *poor*, the results show a significantly higher score for F2F than VR (M = 6.15, SD = 0.90; M = 5.60, SD =

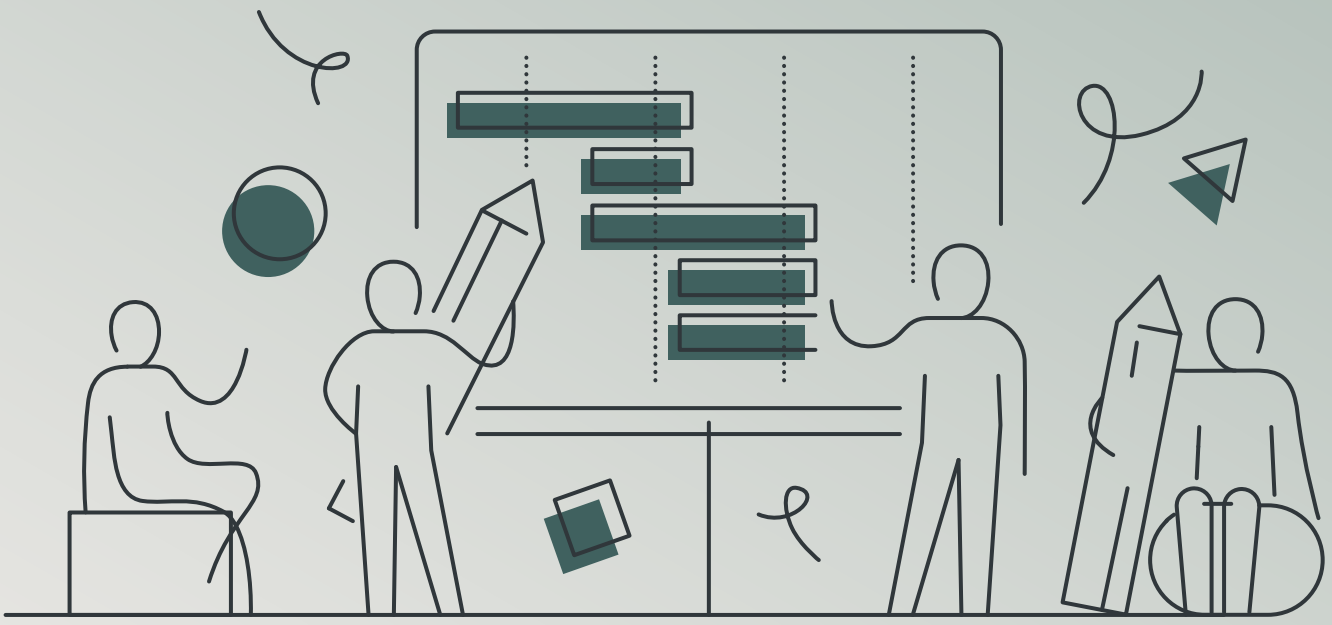
1.42, respectively), $t(118) = 2.54$, $p < 0.05$. Note that the score for this item (*poor*) is reverse coded, i.e., a higher score indicates a more positive rating.

When comparing videoconferencing (Zoom) and VR meetings on the different dimensions measured, siginficant differences in means can be found on the following items; *waste of time*, *enjoyable*, *fascinating* and *sense of presence*. On the first item, *waste of time*, the results show a significantly lower score on a 90% confidence level for Zoom than for VR (M = 5.80, SD = 1.33; M = 5.97, SD = 1.11, respectively), $t(118) = -.74$, $p < 0.05$. Note that the score for this item (*waste of time*) is reverse coded, i.e., a higher score indicates a more positive rating. For the second item, *enjoyable*, the results again show a significantly lower score for Zoom than VR (M = 5.67, SD = 1.22; M = 6.25, SD = 1.02, respectively), $t(118) = -2.85$, $p < .05$. Similarly, for the third item, *fascinating*, the results show a significantly lower score for Zoom than VR (M = 4.98, SD = 1.56; M = 6.65, SD = 0.90, respectively), $t(118) = -7.11$, $p < .01$. Finally, on the fourth item, *sense of presence*, the results also show a significantly lower score for Zoom than VR (M = 5.17, SD = 1.80; M = 5.82, SD = 1.16, respectively), $t(118) = -2.36$, $p < 0.01$.

Lastly, when comparing physical (F2F) and videoconferencing (Zoom) meetings on the different dimensions measured, siginficant differences in means can be found on the following items; *efficient*, *worthwhile*, *enjoyable*, *poor*, *pleasant*, *fascinating*, and *sense of presence*. On all these items, the results show a significantly higher for F2F than for Zoom, and all of the results are signifant on a 95% confidence level, except for *efficient* which is only significant on a 90% confidence level, $p = .067$.

GENERAL DISCUSSION

CHAPTER 4



4. General Discussion

4.1. Development of Conceptual Framework

As reported in the methodology sections, the current study has successfully demonstrated behavioural intent to adopt VR in business in the Scandinavian market through Study 1 and user acceptance of VR in business meetings through Study 2 with students and young professionals in Norway. By combining these two studies and existing literature on technology adoption frameworks (Koul & Eydgahi, 2017) we propose a conceptual framework for future researchers and businesses to leverage when investigating the adoption of VR in organizations. Previous literature on technology adoption in organizations captures organizational and environmental characteristics, and while these dimensions have not been tested in the current study, we find these dimensions to be critical determinants for adoption of VR in organizations.

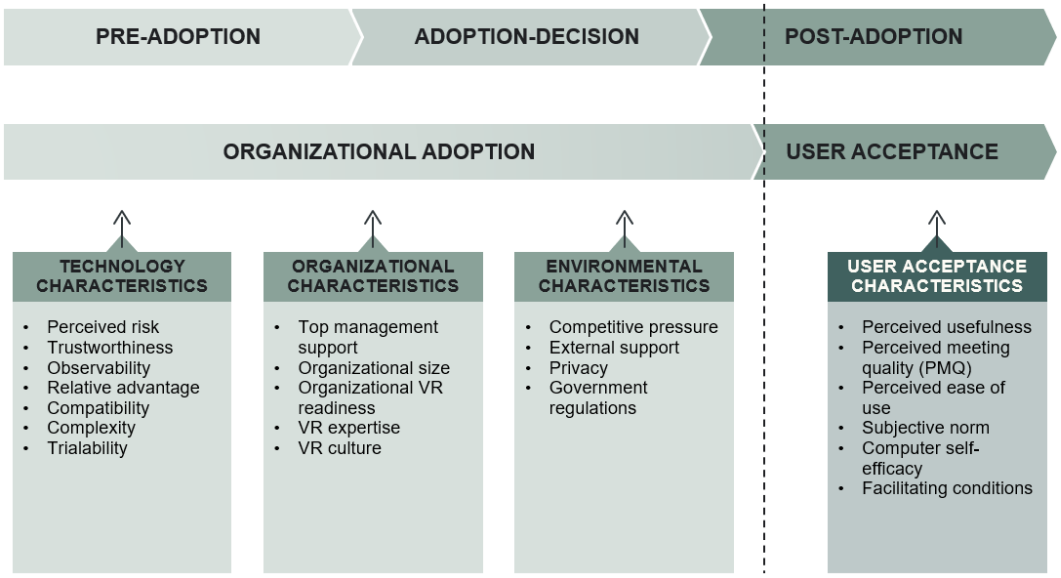
In our proposed conceptual framework, we consider the VR adoption process in organizations as a three-stage process of pre-adoption, adoption-decision, and post-adoption, inspired by previous work by Hameed and Arachchiliage (2020). The pre-adoption stage entails activities such as recognizing a need for VR, acquiring knowledge or awareness about VR in business, forming an attitude towards VR and proposing to invest in VR. The adoption-decision stage involves the decision to accept VR in the business and the evaluation of VR from a technical, financial and strategic perspective, along with resource allocation in acquiring and implementing the technology. The third and final stage, post-adoption, reflects the acquisition of VR, preparing the organization for use of VR in meetings, testing and piloting the new technology, and acceptance and continued use of VR in meetings.

Similar to Hameed and Arachchiliage's (2020) previous work, our proposed model is an integrated combination of DOI, TAM, TPB models, along with the TOE framework. Since DOI only considers pre-adoption and the individual level adoption process, combining DOI with TAM and TBP helps us derive a model that covers all three stages of the adoption process. The TOE model captures both the individual and organizational determinants of innovation adoption. Hence, our hypothesis is that combining DOI, TAM, TPB, and TOE will allow us to fully explain the adoption of VR in organizations.

The rationale behind the individual elements related to technology, organizational, environmental, and user acceptance characteristics is based on our interpretation of the critical elements in the adoption of VR. For instance, the technology characteristics are equal to the ones used for Study 1. The organizational characteristics are based on our understanding of critical determinants that might affect the adoption-decision in businesses. The environmental characteristics are typical considerations adapted from Porter's five basic forces (Porter, 1979). Finally, the user acceptance characteristics include the PMQ as a measurement item as well as other critical dimensions from TAM and TPB.

Figure 40 below, illustrates our proposed conceptual framework for the adoption of VR in business.

Figure 40: Conceptual Framework for Adoption of VR in Business



In the next section, the theoretical implications from the current study will be discussed.

4.2. Theoretical Implications

This research was inspired by existing literature on determinants of effective business meeting (Cohen et al., 2011; Karl et al., 2021; Kock, 2004; Leach et al., 2009; Yoerger et al., 2015), on technology adoption (Ajzen, 1991; Cacho-Elizondo et al., 2018; Davis, 1989, 1993; Davis & Venkatesh, 1996; Koul & Eydgahi, 2017; Rogers, 2003), and on VR technology (Lee et al., 2017; Lui et al., 2007; Radianti et al., 2020). The findings of this research are coherent with prior academic research

suggesting that VR as a communication mode facilitates more immersive experiences that generate a higher sense of presence and interactivity than traditional 2D-based flat screen mediums. Moreover, in line with media naturalness theory (MNT) suggesting that the more a communication mode resembles F2F communication, the more natural it is and less dependent on cognitive effort from the participants, this research provides evidence that VR as a communication mode to a large extent resembles F2F communication. In other words, this research finds VR to be the superior communication mode to traditional videoconferencing meetings, especially for group work, which has also been supported by other research (Basu, 2021).

Words and concepts like immersion and sense of presence flourish around virtual reality technology, but one must not neglect the notion of engagement that the technology seemingly provides. Nick Clegg, President of Global Affairs in Meta, even goes so far to say that being in a virtual room together gives a feeling of breathing the same air (World Economic Forum, 2022). This description suggests that VR in meetings could imply an equal or possibly even better engagement level than in a F2F meeting. Moreover, the participants who used VR could overcome known barriers found when using Zoom, such as lack of body language and gestures, talking over each other, and being distracted by the phone (Fouts, 2021). Adding to this, the positive surprise many participants expressed that they had with VR would definitely be part of justifying the outcome of the research due to the direct link that exists between positive surprises and satisfaction (Vanhamme, 2010).

As previous sections review shows, prior academic research has persuasively documented what meeting design characteristics have an effect on the overall perceived meeting quality (PMQ) (Cohen et al., 2011; Leach et al., 2009), and that participation in decision making (PDM) is associated with employee engagement (Yoerger et al., 2015). Past studies have also convincingly shown that virtual meetings lack some of the characteristics described in the media naturalness theory (MNT) and that the human brain has developed to prefer communication modes that resemble face-to-face communication (Karl et al., 2021; Kock, 2004). Moreover, existing literature show that VR technology has the potential to deliver truly immersive experiences that generates a higher sense of presence and

interactivity than traditional 2D-based flat screen mediums (Lee et al., 2017; Lui et al., 2007; Radianti et al., 2020).

The next section presents managerial implications that have emerged through the current study. Moreover, the section proposes a tool to help managers make the right decision for their company, namely "*the 9Cs*".

4.3. Managerial Implications

From this research, several important managerial guidelines follow that can help businesses have more meaningful interactions in the future.

First, Study 1 demonstrates that VR technology will most likely not be utilized at a large scale for business meetings in the Scandinavian market in the near future. This is supported by external research showing a consensus that neither the tech nor the employees are ready for a fully immersive virtual workplace (Basu, 2021). That said, it is becoming increasingly apparent that workers are feeling isolated and becoming more cliquey in the videoconferencing environment which calls for new and more engaging ways of working remotely. Moreover, the findings of Study 2 suggest that VR is more mature for business meetings than most people think. And while the current VR technology is only the tip of the iceberg, it already has several impressive use cases, such as marketing opportunities through VR Tours, training apps that revolutionize eLearning, prototyping in product and service development, and improving shopper experiences in retail (Pickens, 2019). The question for managers is whether to be an early adopter or sit back and wait.

Second, through both Study 1 and Study 2 it became apparent that VR is perceived as a more engaging and immersive communication medium than traditional videoconferencing (i.e., Zoom or Teams) which is also supported by extensive research on the technology (Guerra et al., 2015; Kaufmann, 2003; Klein, 2003; Lee et al., 2017, 2017; Lui et al., 2007; Microsoft, 2021; Steuer, 2000; Youngblut, 1998). According to Michel Buchner (2020), some of the key advantages of VR include the feeling of presence and togetherness, a true spatial experience through the use of 3D sound, interactivity through the use of body language, the freedom to move around, and no visual distractions. For managers, this indicates that VR technology could be the potential solution to avoid that employees get "Zoomed

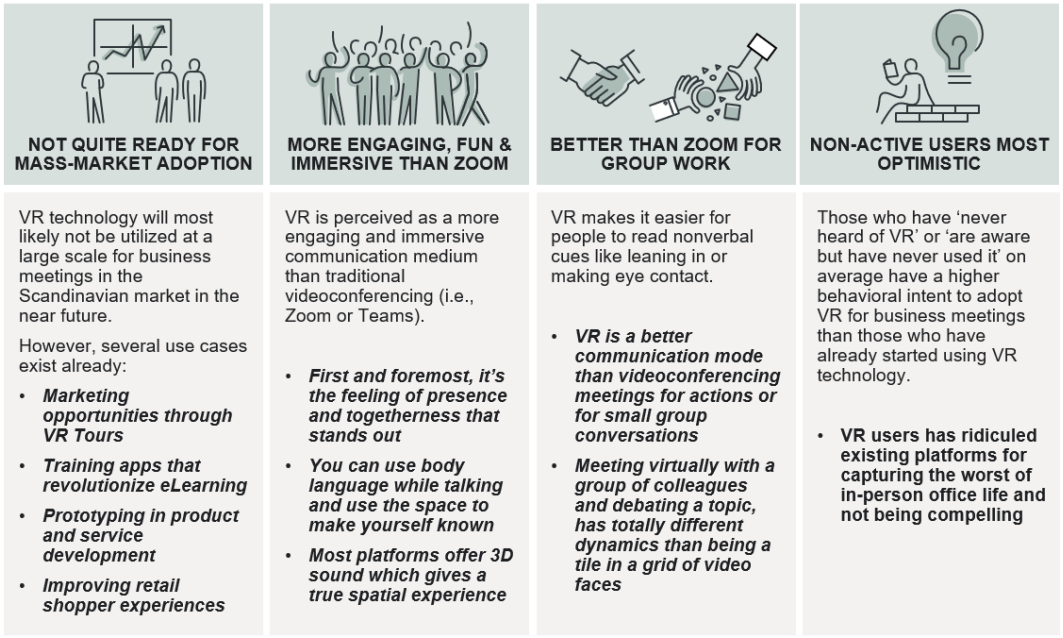
out" during virtual meetings. While some may argue that a fully immersive VR environment might not be quite ready to replace Zoom or Teams yet, this is clearly a sign that VR has the potential to overcome some of the key barriers of traditional videoconferencing. And the companies that have already invested in VR technology without utilizing it properly for their business might find reasons to start investing more time and energy in implementing it fully in their company.

Third, the findings of the conducted studies show that people will feel emotionally present in VR and that the format is compatible with how to perform successful meetings. As previously mentioned, a recent study found that VR is a better communication mode than videoconferencing meetings for actions or for small group conversations, and that VR makes it easier for people to read nonverbal cues, like leaning in or making eye contact (Basu, 2021). Moreover, Buchner (2020) claims that VR is the next big thing to a real meetup as "meeting virtually with a group of colleagues and debating a topic, has totally different dynamics than being a tile in a grid of video faces".

Finally, people that have 'never heard of VR' or 'are aware, but have never used it' on average have a higher behavioural intent to adopt VR for business meetings than those who have already started using VR technology. According to Tanya Basu (2021), the app used for our experiment, Horizon Workrooms, was widely ridiculed after it was demoed. Basu (2021), describes how the app was described as capturing "the worst of in-person office life," and "not compelling." We note that a lot has happened since the demo was launched, and Meta is continuously working to improve the experience in Horizon Workrooms. In any event, the results of our study could imply that people who have not tried the technology are generally quite excited about it and would have a positive attitude towards experimenting with it. On the other hand, the fact that active users are not that optimistic indicate that they are not fully content with their experiences so far.

In Figure 41 on the next page, the four managerial guidelines presented above are summarized.

Figure 41: Four Managerial Guidelines



Although several criteria may be relevant for managers to assess adoption of VR in their business, we propose "the 9Cs" as a tool to help managers make the right decision for their company. So, the core purpose and rationale for developing the 9C model is to provide a practical guide for managers to assess their needs and how VR might benefit their business. The 9Cs consist of customer, competitor, cost, capital, capacity, country, complexity, capability, and carbon.

Customer – a good place to start when considering introducing VR in business is to root the decision in a deep understanding of customer needs, customer segments, customer journeys and how VR could potentially be used to increase relevancy.

Competitor – when looking into introducing VR in a business, we also suggest considering how to optimally position the business in the market to differentiate and win customers in a competitive situation.

Cost – in setting the VR strategy for a business, we also suggest building an impact case highlighting the overall ambition of introducing VR tech, the desired business impact, and the behavioural impact.

Capital – managers need to carefully align capital investments with short- and long-term goals, therefore we suggest planning for the timing and allocation of investments in VR equipment in relation to other business critical decisions.

Capacity – with the expectation that virtual collaboration will continue to grow in many industries going forward, we suggest for managers to consider how much time and capacity their business will save through more productive meetings, and also time for commuting.

Country – in the aftermath of COVID-19, it has become more important than ever for businesses to collaborate across borders, therefore we suggest for managers to investigate how VR might help their business foster a more collaborative environment across countries.

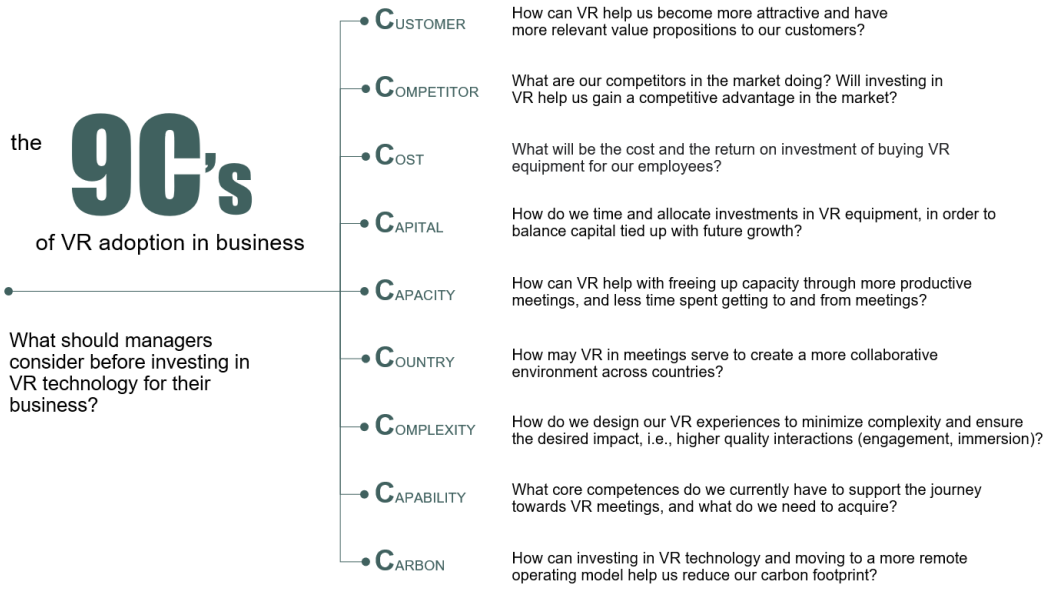
Complexity – most employees will not be familiar with VR in business, and the purpose and desired use cases therefore need to be clearly defined. To make the adoption of VR as seamless as possible, we suggest for managers to consider how to reduce complexity and identify use cases that provide the desired impact of higher quality meetings.

Capability – many companies face issues as they consider how to make their businesses fit for the future, and it becomes important for managers to assess whether they have already the core capabilities or competencies needed to support the journey towards VR meetings inhouse, or whether they need to acquire it from outside.

Carbon – increasingly we are seeing that managers have sustainability high on the agenda. Therefore, we believe an important criterion for managers to consider when evaluating the adoption of VR is how the technology might help reduce their firm's carbon footprint.

In Figure 42 on the next page, the 9Cs are presented with associated questions for managers to address before embarking on their VR journey.

Figure 42: The 9Cs of VR Adoption in Business

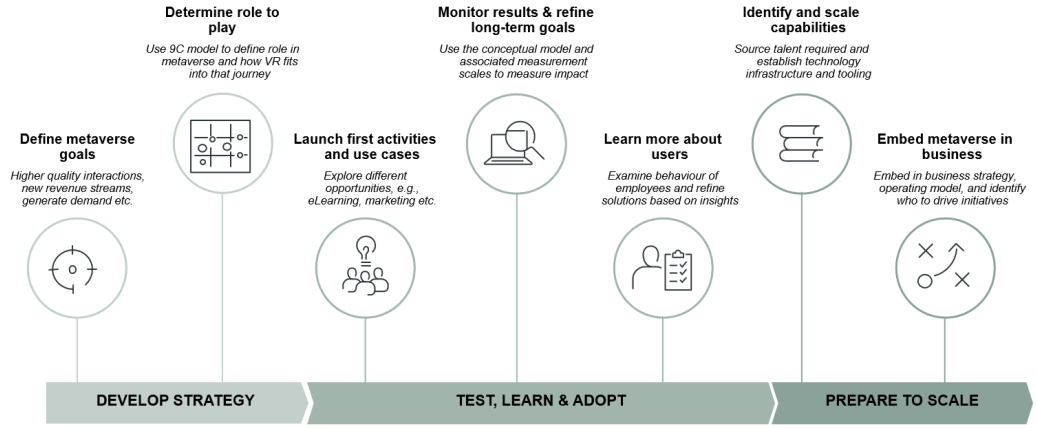


According to a recent McKinsey report, not participating in the metaverse may result in a significant competitive disadvantage as its potential to generate up to $5 trillion in value by 2030 "is simply too big to be ignored" (2022, p. 57). Thus, leaders should figure out what role their firm wants to play, and how to prepare. McKinsey (2022) suggests a step-by-step approach that we have adapted based on the insights from our research.

The first step is to develop a value-focused strategy through clearly defining goals and the role to play. We suggest leveraging the 9C model as support in this first step as it may help to define which role to play in metaverse and how specifically VR might fit into that journey. The second step is to test, learn and adopt by launching activities, testing, and monitoring different use cases. For this step, we suggest utilizing our conceptual model and the associated adoption measurement scales, such as the PMQ-scale. The third and final step involves preparing to scale through identifying and starting to scale capabilities and embedding the metaverse in the firm's business strategy and operating model.

In Figure 43 on the next page, our suggested steps for leaders to prepare for the metaverse can be found.

Figure 43: Step-by-step approach to prepare for the metaverse



In the next section, the ethical challenges of VR and reflections for what managers ought to consider when designing VR experiences will be discussed.

4.4. The Ethical Challenges with Virtual Reality

Despite all the benefits VR technology brings, it also raises several important ethical questions for managers to consider. Slater et al. (2020) consider many of the ethical challenges that comes with VR technology.

In Table 8 on the next page, the ethical challenges with VR are presented in the form of a series of questions.

Table 8: Ethical Challenges with VR (Slater et al., 2020)

ETHICAL CHALLENGES WITH VIRTUAL REALITY TECHNOLOGY
1. Do people trust virtual characters more if they are more realistic?
2. Does greater realism lead to greater confusion between the real and the virtual?
3. Does greater realism lead to greater behavioral and emotional impact?
4. Does greater realism lead to a greater chance of negative after-effects?
5. Can people already today be confused between reality and virtual reality?
6. Will there be greater plausibility (illusion that the events are really happening) in interactions with superrealistic characters?
7. What, if any, are public perceptions of these issues today?
8. How can there be longer term follow-ups of the effects of a virtual experience?
9. What are the long-term cultural effects of superreal XR usage?

4.4.1. The Three Laws of Multisensory Experiences

While these questions are certainly multifaceted and need further reflection, Velasco and Obrist's (2020b) three laws of multisensory experiences could be a good place to start when designing virtual reality experiences. The three laws of multisensory experiences are as follows:

I. Multisensory experiences should be used for good and must not harm others
II. Receivers of multisensory experiences must be treated fairly
III. The someone and the sensory elements must be known

The first law aims to guide how we think about what impressions and events we want to design for, and why. While this question does not have a clear answer, the general rule is that we should try to design experiences that do good and do not harm others. The second law looks at whom we are designing the experience for, and whether we should design the experience differently for different receivers. According to Velasco and Obrist "Not only should we treat receivers fairly by balancing their differences and giving them the same opportunities, but also we must empower them through giving them a voice in multisensory experiences" (2020b, p. 81). The third and final law aims to address two questions: (1) who is

designing the multisensory experience, and (2) what sensory elements do we select, and why? With this law, the authors propose that the designer of the experience and the sensory elements used must be known and subject to public debate (2020b).

In the next section, limitations and potential future research areas will be discussed.

4.5. Limitations & Future Research

The aim of this research was to create a study setting that would blend insight into critical determinants of behavioural intent to adopt VR technology with stated preference and a field-based experiment comparing VR with F2F and Zoom meetings providing insight into actual preference. The marriage of these two approaches allowed relatively holistic insight into adoption patterns of VR in a business meeting context. However, the study design was not without its limitations. For instance, the sample of Study 1 and Study 2 were relatively different, as Study 1 had a sample consisting of Scandinavian participants across all ages, while Study 2 only had participants residing in Norway in the age between 18 and 34. Furthermore, it is likely that the outcome of Study 1 was affected by familiarity effects, also known as mere-exposure effects (Hekkert et al., 2013). This implies that VR might have been ranked as less favourable by the participants due to lack of familiarity for the technology, which is reflected in the fact that more than half of the participants had never tried VR.

Other caveats of the research worth mentioning are largely related to Study 2. For instance, while we did what we could to ensure a controlled environment, hidden variables such as how well the participants knew the facilitators, and technical difficulties in Zoom or VR could potentially have affected the results. Furthermore, it would be ideal to replicate Study 2 with (1) a larger sample size, and (2) a broader span in generations. By doing so, the study ensures to follow the rules of reliability in which the results would be more representative of the total study population as well as consistent over time (Golafshani, 2003). It is also expected that the results are affected by novelty effects, meaning that people favour new technology not because of its performance but rather by their own curiosity (Thompson, 2014). This indicates that the participants using VR as the communication mode might have given high ratings concerning meeting quality because they got to try something they have not done before. Finally, the meetings in VR would have been

more realistic if the avatars looked like and had the same names as the participants. It is assumed that this would have led to an even greater perception of the meeting quality, based on our own experience and through expert interviews with early adopters.

An important future research area is naturally to validate the usefulness and logic of the conceptual model suggested for explaining businesses' adoption of VR technology for meetings. Furthermore, for future research we suggest examining the organizational and environmental characteristics to adoption of VR as the current study only looked at these dimensions through secondary data. Through a deeper understanding of the organizational and environmental characteristics of adoption, a more holistic view on adoption of VR in business may be achieved. For instance, top management support is presumed to be a critical factor for implementation of VR in an organization. Thus, it would be interesting to see how top management support for VR differs across firms, industries, and functions. Moreover, competitive pressure could be an important dimension that drives adoption of VR in businesses. For instance, it would be interesting to see if businesses in industries characterised by high competition are more likely to adopt VR for their meetings.

In the next section, the general conclusions from the current study will be discussed.

4.6. Conclusion

Although virtual reality may still be seen as a relatively new technology (Arango, 2022), one must look all the way back to 1968 to discover the inception of the technology, where computer scientist Ivan Sutherland created a head-mounted mechanical tracking system anchored to the ceiling because of its weight and size (Bush, 2016). Engineers have come a long way since Sutherland's behemoth of a headset, and the same technology already exists in the size of slightly oversized sunglasses with a drastically improved technology (Bezmalinovic, 2022a). The latter referenced VR headset, MeganEx from Panasonic, is only one of the many headsets that either exist or are announced to be launched in the future.

Meta is currently at the forefront of VR technology, and it is therefore not a surprise that they have numerous new VR systems in their workings as we speak. Project

Cambria, an upcoming VR headset that features eye tracking and facial expression recognition is expected to be available on the market in Q4 2022. Work will be the focus for this headset, where collaboration, meetings and replacing laptops are some of its goals (Bezmalinovic, 2022b). However, there are also several other exciting new product launches from the other tech giants such as Apple and Sony (Playstation, 2022; Pritchard, 2022).

In Table 9 below, a list of the major new product launches (not exhaustive) expected in the next 12-24 months can be found.

Table 9: Major New AR/VR Product Launches

COMPANY	CATEGORY	DEVICE	EXP. LAUNCH	DESCRIPTION	PRICE	TOP USE CASES
Panasonic	VR	Shiftfall MeganEx 	Q2 2022	Ultra-lightweight and compact. Built to be foldable with built in speakers, and compatible with SteamXR	Headset: ~$900 Full Kit: N/A	Gaming
Meta	VR	Project Cambria 	Q4 2022	One of four new releases in Meta's pipeline and features eye tracking and facial expression recognition	>$1,000	Focused on work, wanting to replace laptops
	VR	Meta Quest 3/4 	2023-2024	Meta plans to release two new versions of their popular Meta Quest 2	N/A	Socializing and gaming
	AR	Project Aria 	2024	Expands on Ray Bans Stories glasses. Referred to as a research device for future AR devices	N/A	Research and everyday life assistance
DECAGEAR	VR	DecaGear PC VR 	Q4 2022	Expected to feature both face and hip tracking	Headset: ~$700 Full Kit: N/A	Socializing and gaming
	AR/VR	Headset 	2022-2023	Not officially announced. The main feature is a mixed reality experience. Rumored smart rings	$1,000-$3,000	Enterprise focus
	AR	Glass 	2023+	Expected to launch after the AR headset. Intended to bring information from your phone directly to your face	~$499 plus prescription fees	General consumer use
SONY	VR	Sony PSVR3 	N/A	Expected to include eye tracking and haptic feedback built into the headset and controllers	Headset: $399 Full Kit: N/A	Gaming

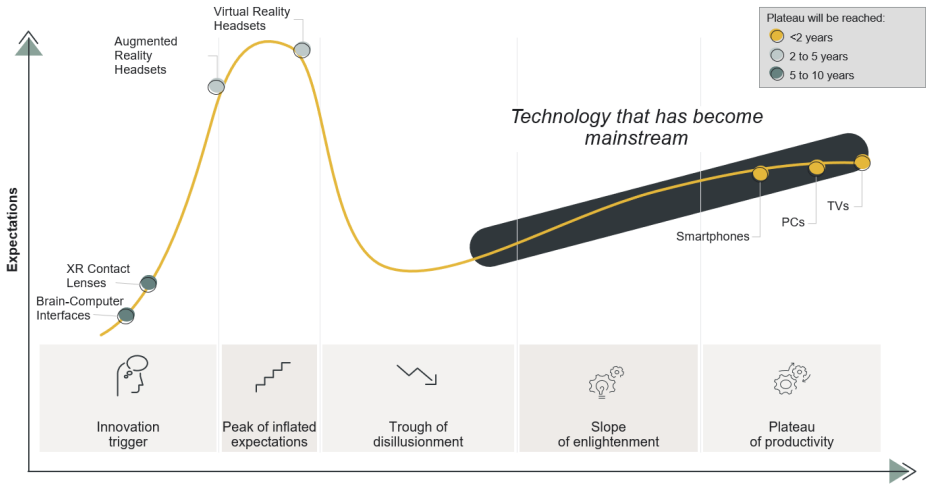
When looking into the future of remote work, there seems to be fierce competition between the technology giants to take virtual conferencing to an even more interactive level. From the outside, the race seems to be largely driven by the two powerhouses Meta and Microsoft, where other tech giants such as Sony and Panasonic are also joining the movement. Nevertheless, while there seems to be a competition to develop the best products that can take remote work to the next level, one may also argue that the tech companies are in this together as Meta's vision has been to "help bring the Metaverse to life" and they call it a "collective project that goes beyond a single company" (Meta, 2022). As mentioned, Microsoft is one of the tech firms that is strongly committed to this "collective project". For instance, their $69 billion acquisition of Activision Blizzard solidifies their desire to be in the driver's seat of the movement (Kelley, 2022; Sullivan, 2022). The CEO of

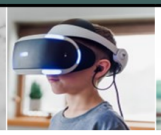
Microsoft, Satya Nadella, seems convinced that the Metaverse is the next big thing in personal computing (Sullivan, 2022). According to Sullivan (2022), given that Microsoft is a major force in both gaming and productivity, it is likely that a 3D virtual business meeting in Microsoft Teams could be far less strange than one in Meta's Horizon Workrooms. Especially considering that the resources and data you might need for the meeting already reside in Microsoft apps. Mesh for Microsoft Teams is Microsoft's solution to make collaboration in the metaverse personal and fun (Roach, 2021). This collaboration could for instance involve one of their VR headsets or their HoloLens 2 with immersive mixed reality capabilities. Moreover, Microsoft has developed a technology called *holoportation* that may supplement existing technology. According to Microsoft, "Holoportation is a new type of 3D capture technology that allows high-quality 3D models of people to be reconstructed, compressed and transmitted anywhere in the world in real time. When combined with mixed reality displays such as HoloLens, this technology allows users to see, hear, and interact with remote participants in 3D as if they are actually present in the same physical space. Communicating and interacting with remote users become as natural as face-to-face communication."(Microsoft, 2022).

In Figure 44 on the next page, our take on which types of devices can be used to access the metaverse today and in the long run can be found placed into a Technology Hype Cycle[2].

[2] Gartner Hype Cycle provide a graphic representation of the maturity and adoption of technologies and applications, and how they are potentially relevant to solving real business problems and exploiting new opportunities (Gartner, 2022). In the example above, we have used the model to make our own representation of which devices will be utilized to access the metaverse in the future.

Figure 44: Technology Hype Cycle & Transition Towards Seamless XR

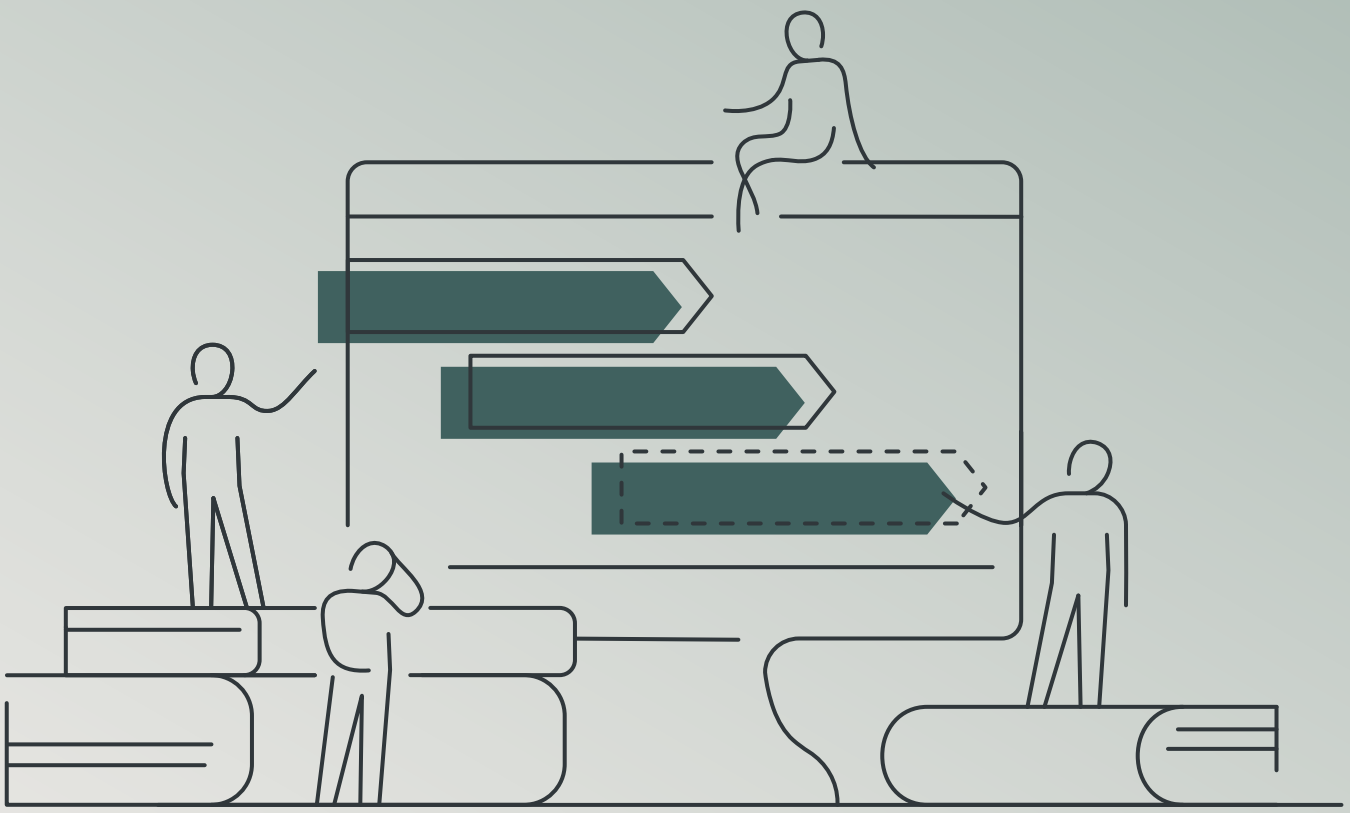


	FLAT SCREENS			EXTENDED REALITY DEVICES		EMBEDDED INTERFACES	
							
	TVs	**PCs**	**Smartphones**	**Virtual Reality Headsets**	**Augmented Reality Headsets**	**XR Contact Lenses**	**Brain-Computer Interfaces**
Distance from Eyes	5-15 m	15-30 cm	2-15 cm	1-2 cm	1-2 cm	0 cm	0 cm
Global Devices	1.8 billion	1.2 billion	6.3 billion	15 million	<1 million	0	0
What metaverse access can look like	• **Experience:** 2D access to 3D virtual worlds – users navigate avatars using touch controls or peripheral controllers (primarily for gaming use cases) • **Quality:** Wide range of graphical fidelity – with TVs connected to gaming consoles and high-end PCs providing high visual fidelity and smartphones offering much lower performance • **Physical / Digital Integration:** Embedded cameras and sensors provide limited XR use cases – overlaying virtual objects in physical spaces or inserting low-res scans of physical objects into virtual worlds			• **Experience:** Immersive 3D access to virtual worlds and augmented real-world environments. Users navigate using peripherals or natural body movements – mimicking real-world motions • **Quality:** High graphical fidelity with advanced GPUs creates a feeling of immersion and reality in unreal environments • **Physical / Digital Integration:** VR uses external cameras and sensors to render accurate movements in virtual worlds whereas AR directly interacts with and overlays onto the dynamic external reality		• **Experience:** The full combination of digital and physical reality, the connection between the two is effectively imperceptible. Users navigate virtual and augmented spaces as naturally as they do real-world spaces • **Quality:** Photorealistic fidelity creates full immersion • **Physical / Digital Integration:** Physical and digital realities are fully intertwined, with users moving between virtual and augmented spaces seamlessly	

Conclusively, while virtual reality technology may not have progressed as quickly as VR enthusiasts had hoped, the technology remains one of the largest potential long-term growth opportunities in the market today (Duggan, 2022). In other words, one can expect VR for business meetings to continue evolving and allow business to have even more interactive remote meetings in the future. This thesis has demonstrated that the current VR technology has already surpassed traditional videoconferencing as a more engaging, fun, and interactive communication mode. However, before businesses embark on a journey to make their remote meetings more engaging through VR, it is recommended to clearly define which use cases the technology will be used for and what the purpose of replacing existing ways of gathering is.

REFERENCES

CHAPTER 5



5. References

Agbo, F. J., Sanusi, I. T., Oyelere, S. S., & Suhonen, J. (2021). Application of virtual reality in computer science education: A systemic review based on bibliometric and content analysis methods. *Education Sciences*, *11*(3), 142. https://doi.org/10.3390/educsci11030142

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Allen, J., Sands, S., Mueller, S., Frear, K., Mudd, M., & Rogelberg, S. (2012). Employees' feelings about more meetings: An overt analysis and recommendations for improving meetings. *Management Research Review*, *35*, 405–418. https://doi.org/10.1108/01409171211222331

Almiron, P., Barbosa Escobar, F., Pathak, A., Spence, C., & Velasco, C. (2021). Searching for the sound of premium beer. *Food Quality and Preference*, *88*, 104088. https://doi.org/10.1016/j.foodqual.2020.104088

Al-Shuaibi, A. (2014). *The importance of education*.

Andersen, H. H., Nelson, I., & Ronex, K. (2020). *Virtual facilitation: Create more engagement and impact* (1st edition). Wiley.

Anderson, J. C., & Narus, J. A. (1990). A model of distributor firm and manufacturer firm working partnerships. *Journal of Marketing*, *54*(1), 42–58. https://doi.org/10.2307/1252172

Arango, B. (2022, May 6). *Virtual reality: Current state and future challenges*. Wondershare. https://filmora.wondershare.com/virtual-reality/virtual-reality-technology-current-state-and-future-challenges.html

Asmuss, B., & Svennevig, J. (2009). Meeting talk: An introduction. *Journal of Business Communication*, *46*, 3–22. https://doi.org/10.1177/0021943608326761

Axtell, P. (2015, November 26). Two things to do after every meeting. *Harvard Business Review*. https://hbr.org/2015/11/two-things-to-do-after-every-meeting

B. I. S. Research. (2019, April 12). *Global augmented reality (AR) and virtual reality (VR) market in healthcare market to reach $11.14 billion by 2025*. PR Newswire. https://www.prnewswire.com/news-releases/global-augmented-reality-ar-and-virtual-reality-vr-market-in-healthcare-market-to-reach-11-14-billion-by-2025--300831306.html

Bain & Company. (2022, June 13). *Case Interview*. Bain. https://www.bain.com/careers/interview-prep/case-interview/

Baltuttis, D., Häckel, B., Jonas, C. M., Oberländer, A. M., Röglinger, M., & Seyfried, J. (2022). Conceptualizing and assessing the value of internet of things solutions. *Journal of Business Research*, *140*, 245–263. https://doi.org/10.1016/j.jbusres.2021.10.063

Basu, T. (2021, September 8). *Meetings suck. Can we make them more fun?* MIT Technology Review. https://www.technologyreview.com/2021/09/08/1035081/facebook-horizons-oculus-zoom-fatigue/

Bauer, H., Reichardt, T., Barnes, S., & Neumann, M. (2005). Driving consumer acceptance of mobile marketing: A theoretical framework and empirical study. *Journal of Electronic Commerce Research*, *6*.

Baumann, O., & Sander, E. (2021). Psychological impacts of remote working under social distancing restrictions. In *Handbook of research on Remote Work and Worker Well-Being in the Post-COVID-19 Era*.

BBC. (2021, July 28). Oculus recalls Quest 2 headset pads after skin rashes. *BBC News*. https://www.bbc.com/news/technology-57997112

BCG. (2019). *What Is the growth share matrix?* BCG Global. https://www.bcg.com/about/overview/our-history/growth-share-matrix

Belbin, M. (1997). Conventional wisdom. *People Management*, *3*(23), 34–38.

Besant, H. (2016). The journey of brainstorming. *Journal of Transformational Innovation*, *2*(1), 1–7.

Bezmalinovic, T. (2022a, January 5). *MeganeX: Super-compact PC VR glasses with 2.5K displays*. MIXED. https://mixed-news.com/en/meganex-super-compact-pc-vr-glasses-with-2-5k-displays/

Bezmalinovic, T. (2022b, May 22). *Project Cambria: Sorry, but this won't be for you!* MIXED. https://mixed-news.com/en/project-cambria-sorry-but-this-wont-be-for-you/

Bhardwaj, A. (2016). Importance of education in human life: A holistic approach. *International Journal of Science and Consciousness*, *2*(2), 23–28.

Biocca, F., & Delaney, B. (1995). Immersive Virtual Reality. In *Communication in the Age of Virtual Reality*. Routledge.

Boston Consulting Group. (2022, June 13). *Case Interview Preparation*. BCG. https://careers.bcg.com/case-interview-preparation

Bradford, L. P. (1976). *Making meetings work: A guide for leaders and group members*. Pfeiffer & Co.

Buchner, M. (2020, May 19). *Virtual collaboration vs video conferencing: Why being an Aspiring Avatar is better than being a Zoom Zombie | LinkedIn*. LinkedIn. https://www.linkedin.com/pulse/virtual-collaboration-vs-video-conferencing-why-being-michel-buchner/

Bulkin, D. A., & Groh, J. M. (2006). Seeing sounds: Visual and auditory interactions in the brain. *Current Opinion in Neurobiology*, *16*(4), 415–419. https://doi.org/10.1016/j.conb.2006.06.008

Bush, J. (2016, December 19). *The sword of Damocles gets a reboot*. Electronicspecifier. https://www.electronicspecifier.com/products/vr-ar/the-sword-of-damocles-gets-a-reboot

Cacho-Elizondo, S., Lázaro, J.-D., & Garcia Sanchez, V. E. (2018). Exploring the adoption of augmented and virtual reality in the design of customer experiences: Proposal of a conceptual framework. *Journal of Marketing Trends*, *5*, 91–102.

Chen, F.-Q., Leng, Y.-F., Ge, J.-F., Wang, D.-W., Li, C., Chen, B., & Sun, Z.-L. (2020). Effectiveness of virtual reality in nursing education: Meta-analysis. *Journal of Medical Internet Research*, *22*(9), e18290. https://doi.org/10.2196/18290

Choi, H., Jeon, Y., Park, H., & Nah, K. (2018). Collaborative workshop between client and agency for open innovation. *Journal of Open Innovation : Technology, Market, and Complexity*, *4*(1), 1–23. http://dx.doi.org/10.1186/s40852-018-0082-7

Christian, M., Garza, A., & Slaughter, J. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology*, *64*, 89–136. https://doi.org/10.1111/j.1744-6570.2010.01203.x

Chung, K.-C. (2014). Gender, culture and determinants of behavioural intents to adopt mobile commerce among the Y Generation in transition economies: Evidence from Kazakhstan. *Behaviour & Information Technology*, *33*(7), 743–756. https://doi.org/10.1080/0144929X.2013.805243

Cohen, M., Rogelberg, S., Allen, J., & Luong, A. (2011). Meeting design characteristics and attendee perceptions of staff/team meeting quality.

Group Dynamics: Theory, Research, and Practice, *15*, 90–104. https://doi.org/10.1037/a0021549

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, *78*(1), 98–104. https://doi.org/10.1037/0021-9010.78.1.98

Cowardin-Lee, N., & Soyalp, N. (2011). Improving organizational workflow with social network analysis and employee engagement constructs. *Consulting Psychology Journal: Practice and Research*, *63*, 272–283. https://doi.org/10.1037/a0026754

Daft, R., & Lengel, R. (1983). *Information richness. A new approach to managerial behavior and organization design*. https://doi.org/10.21236/ada128980

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Davis, F. D. (1993). User acceptance of information technology: System characteristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies*, *38*(3), 475–487. https://doi.org/10.1006/imms.1993.1022

Davis, F. D., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments. *International Journal of Human-Computer Studies*, *45*(1), 19–45. https://doi.org/10.1006/ijhc.1996.0040

Deloitte Denmark. (2020). *Virtual facilitation: The art of building trust on virtual platforms* (Human Capital, p. 17).

https://www2.deloitte.com/content/dam/Deloitte/dk/Documents/human-capital/Deloitte-Virtual-Facilitation-Guide-March-2020-External.pdf

Dennis, A. R., & Kinney, S. T. (1998). Testing media richness theory in the new media: The effects of cues, feedback, and task equivocality. *Information Systems Research*, *9*(3), 256–274. https://doi.org/10.1287/isre.9.3.256

Donthu, N., & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of Business Research*, *117*, 284–289. https://doi.org/10.1016/j.jbusres.2020.06.008

Duggan, W. (2022, March 16). *7 Top Virtual Reality Stocks to Watch in 2022 | Stock Market News | US News*. US News. https://money.usnews.com/investing/stock-market-news/slideshows/virtual-reality-stocks-to-watch

Dyer Jr, W. G. (2015). Team building. In *Wiley Encyclopedia of Management* (pp. 1–2). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118785317.weom110270

Evans, B. (2020, June 4). *The Zoom revolution: 10 eye-popping stats from tech's new superstar*. Acceleration Economy. https://accelerationeconomy.com/cloud/the-zoom-revolution-10-eye-popping-stats-from-techs-new-superstar/

Exoplanet 360°. (2018). *Exoplanet 360°*. University of Exeter Research and Innovation Blog. https://researchandinnovation.co.uk/exoplanet-360/

Forth, S. (2019, June 3). *Pricing strategy for the technology adoption lifecycle*. Ibbaka. https://www.ibbaka.com/ibbaka-market-blog/pricing-for-the-technology-adoption-lifecycle

Fortune Business Insights. (2019, November). *Virtual reality (VR) in education market size, research, growth report 2026*. Fortune Business Insights.

https://www.fortunebusinessinsights.com/industry-reports/virtual-reality-in-education-market-101696

Fouts, M. (2021, September 30). *Council post: Body language in a virtual world: How to communicate your message effectively*. Forbes. https://www.forbes.com/sites/forbescoachescouncil/2021/09/30/body-language-in-a-virtual-world-how-to-communicate-your-message-effectively/

Friedman, R. A. (2020, August 21). Is the Lockdown Making You Depressed, or Are You Just Bored? *The New York Times*. https://www.nytimes.com/2020/08/21/opinion/sunday/covid-depression-boredom.html

Gallup Inc. (2020). *State of the global workplace report*. Gallup.Com. https://www.gallup.com/workplace/349484/state-of-the-global-workplace.aspx

Gartner. (2022, June 5). *Gartner Hype Cycle Research Methodology*. Gartner. https://www.gartner.com/en/research/methodologies/gartner-hype-cycle

Gavett, G. (2014, August 19). What people are really doing when they're on a conference call. *Harvard Business Review*. https://hbr.org/2014/08/what-people-are-really-doing-when-theyre-on-a-conference-call

Geimer, J. L., Leach, D. J., DeSimone, J. A., Rogelberg, S. G., & Warr, P. B. (2015). Meetings at work: Perceived effectiveness and recommended improvements. *Journal of Business Research*, *68*(9), 2015–2026. https://doi.org/10.1016/j.jbusres.2015.02.015

Gleason, M. (2021, August 30). *Facebook, Microsoft bet on collaborative virtual reality*. SearchUnifiedCommunications.

https://www.techtarget.com/searchunifiedcommunications/news/252506019/Facebook-Microsoft-bet-on-collaborative-virtual-reality

Goff-Dupont, S. (2022, February 24). *How to run effective meetings in the era of hybrid work*. Work Life by Atlassian. https://www.atlassian.com/blog/teamwork/how-to-run-effective-meetings

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, *8*, 597–607. https://doi.org/10.46743/2160-3715/2003.1870

Gonzalez, A. (2020, June 21). A mindful way to reflect: Rose, thorn, and bud. *Mindful Schools*. https://www.mindfulschools.org/inspiration/mindful-reflection/

Google. (2021). *Google Cardboard – Google VR*. Arvr.Google. https://arvr.google.com/cardboard/

Gori, M., Del Viva, M., Sandini, G., & Burr, D. C. (2008). Young children do not integrate visual and haptic form information. *Current Biology: CB*, *18*(9), 694–698. https://doi.org/10.1016/j.cub.2008.04.036

Green, D. (2016, June 2). Conference rage: "How did awful panel discussions become the default format?" *The Guardian*. https://www.theguardian.com/global-development-professionals-network/2016/jun/02/conference-rage-how-did-awful-panel-discussions-become-the-default-format

Guerra, J. P., Pinto, M. M., & Beato, C. (2015). *Virtual reality—Shows a new vision for tourism and heritage*. https://doi.org/10.19044/ESJ.2015.V11N9P%P

Hailey, L. (2022, February 16). *6 Tips to Run a Highly Effective Meeting, Backed by Science*. Science of People. https://www.scienceofpeople.com/run-a-meeting/

Hale, J., & Grenny, J. (2020, March 9). How to get people to actually participate in virtual meetings. *Harvard Business Review*. https://hbr.org/2020/03/how-to-get-people-to-actually-participate-in-virtual-meetings

Halverson, A. (2021, August 24). *Adoption of VR in the workplace expected to accelerate as pandemic wears on*. Puget Sound Business Journal. https://www.bizjournals.com/seattle/news/2021/08/23/virtual-reality-workplace-technology-hybrid-work.html

Hameed, A. M., & Arachchilage, N. (2020). *A conceptual model for the organizational adoption of information system security innovations* (pp. 317–339). https://doi.org/10.4018/978-1-5225-9742-1.ch014

Handke, L., Klonek, F. E., Parker, S. K., & Kauffeld, S. (2020). Interactive effects of team virtuality and work design on team functioning. *Small Group Research*, *51*(1), 3–47. https://doi.org/10.1177/1046496419863490

Hantula, D. A., Kock, N., D'Arcy, J. P., & DeRosa, D. M. (2011). Media compensation theory: A darwinian perspective on adaptation to electronic communication and collaboration. In G. Saad (Ed.), *Evolutionary Psychology in the Business Sciences* (pp. 339–363). Springer. https://doi.org/10.1007/978-3-540-92784-6_13

Hatch, S. L., Feinstein, L., Link, B. G., Wadsworth, M. E. J., & Richards, M. (2007). The continuing benefits of education: Adult education and midlife cognitive ability in the british 1946 birth cohort. *The Journals of*

Gerontology: Series B, *62*(6), S404–S414. https://doi.org/10.1093/geronb/62.6.S404

Hee Lee, J., & Shvetsova, O. A. (2019). The impact of vr application on student's competency development: A comparative study of regular and vr engineering classes with similar competency scopes. *Sustainability*, *11*(8), 2221. https://doi.org/10.3390/su11082221

Hekkert, P., Thurgood, C., & Whitfield, T. W. A. (2013). The mere exposure effect for consumer products as a consequence of existing familiarity and controlled exposure. *Acta Psychologica*, *144*(2), 411–417. https://doi.org/10.1016/j.actpsy.2013.07.015

Hinkel, H., & Allen, J. (2013). Speaking up and working harder: How participation in decision-making in meetings impacts overall engagement. *Journal of Psychological Inquiry*, *18*, 7–16.

Holmes, J., & Stubbe, M. (2015). *Power and politeness in the workplace. A sociolinguistic analysis of talk at work* (2nd ed.). http://www.routledge.com/books/details/9781138809055/

Hupcey, J., Penrod, J., Morse, J., & Mitcham, C. (2002). An exploration and advancement of the concept of trust. *Journal of Advanced Nursing*, *36*, 282–293. https://doi.org/10.1046/j.1365-2648.2001.01970.x

Hyken, S. (2022, May 10). *Six Ways To Have Effective And Successful Meetings*. Forbes. https://www.forbes.com/sites/shephyken/2020/05/10/six-ways-to-have-effective-and-successful-meetings/

Immerse. (2022). *Vr training software for enterprise | Create, scale and measure vr learning & training*. Immerse.Io. https://immerse.io/

Jay, A. (2009). *How to run a meeting*. Harvard Business Review Press. http://ebookcentral.proquest.com/lib/bilibrary/detail.action?docID=5183128

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, *33*(4), 692–724. https://doi.org/10.5465/256287

Karl, K. A., Peluchette, J. V., & Aghakhani, N. (2021). Virtual work meetings during the covid-19 pandemic: The good, bad, and ugly. *Small Group Research*, 10464964211015286. https://doi.org/10.1177/10464964211015286

Kauffeld, S., & Lehmann-Willenbrock, N. (2012). Meetings matter effects of team meetings on team and organizational success. *Small Group Research*, *43*, 130–158. https://doi.org/10.1177/1046496411429599

Kaufmann, H. (2003). Construct3D: An augmented reality application for mathematics and geometry education. *Proceedings of the ACM International Multimedia Conference and Exhibition*. https://doi.org/10.1145/641007.641140

Keith, M., Anderson, G., Gaskin, J., & Dean, D. (2018). Team gaming for team-building: Effects on team performance. *AIS Transactions on Human-Computer Interaction*, 205–231. https://doi.org/10.17705/1thci.00110

Kelley, K. (2022, February 4). *Microsoft & metaverse: How Activision Blizzard acquisition will impact industries everywhere*. Simplilearn.Com. https://www.simplilearn.com/microsoft-and-the-metaverse-article

Klein. (2003). Creating Virtual Product Experiences: The Role of Telepresence. *Journal of Interactive Marketing*, *17*, 41–55. https://doi.org/10.1002/dir.10046

Klein, C., DiazGranados, D., Salas, E., Le, H., Burke, S., Lyons, R., & Goodwin, G. (2009). Does team building work? *Small Group Research*, *40*, 181–222. https://doi.org/10.1177/1046496408328821

Kock, N. (2004). The psychobiological model: Towards a new theory of computer-mediated communication based on darwinian evolution. *Organization Science*, *15*(3), 327–348. https://doi.org/10.1287/orsc.1040.0071

Koetsier, J. (2020, October 25). *Social Censorship: Should Social Media's Policy Be Free Speech?* Forbes. https://www.forbes.com/sites/johnkoetsier/2020/10/25/social-censorship-should-social-medias-policy-be-free-speech/

Koul, S., & Eydgahi, A. (2017). A systematic review of technology adoption frameworks and their applications. *Journal of Technology Management & Innovation*, *12*(4), 106–112. https://doi.org/10.4067/S0718-27242017000400011

Krishna, A. (2012). An integrative review of sensory marketing: Engaging the senses to affect perception, judgment and behavior. *Journal of Consumer Psychology*, *22*(3), 332–351. https://doi.org/10.1016/j.jcps.2011.08.003

Krishna, A. (2019, March 1). *Note on Sensory Marketing: Shaping Consumer Perception and Behavior*. Harvard Business Publishing. https://hbsp.harvard.edu/product/W01C76-PDF-ENG

Krishna, A., Cian, L., & Sokolova, T. (2016). The power of sensory marketing in advertising. *Current Opinion in Psychology*, *10*, 142–147. https://doi.org/10.1016/j.copsyc.2016.01.007

Kuzminykh, A., & Rintel, S. (2020a). Low engagement as a deliberate practice of remote participants in video meetings. *Extended Abstracts of the 2020 CHI*

Conference on Human Factors in Computing Systems, 1–9. https://doi.org/10.1145/3334480.3383080

Kuzminykh, A., & Rintel, S. (2020b). Low engagement as a deliberate practice of remote participants in video meetings. *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–9. https://doi.org/10.1145/3334480.3383080

Kvedare, M., & Nymand, C. M. (2021). *The virtual sales handbook: A hands-on approach to engaging customers* (1st edition). Wiley.

Lærd Statistics. (2022, June 13). *Mixed ANOVA using SPSS Statistics*. Laerd Statistics. https://statistics.laerd.com/spss-tutorials/mixed-anova-using-spss-statistics.php

Lam, Chen, X.-P., & Schaubroeck, J. (2002). Participative decision making and employee performance in different cultures: The moderating effects of allocentrism/idiocentrism and efficacy. *The Academy of Management Journal*, *45*(5), 905–914. https://doi.org/10.2307/3069321

Lam, S. (2021). *What is consulting?* Deloitte Canada. https://www2.deloitte.com/ca/en/pages/careers/articles/what-is-consulting.html

Lasserre, S. (2020, November 10). *VR Gartner hype cycle: Is virtual reality hype or hope?* https://blog.techviz.net/gartner-hype-cycle-virtual-reality-hype-or-hope

Leach, D. J., Rogelberg, S. G., Warr, P. B., & Burnfield, J. L. (2009). Perceived meeting effectiveness: The role of design characteristics. *Journal of Business and Psychology*, *24*(1), 65–76. https://doi.org/10.1007/s10869-009-9092-6

LeBlanc, L. A., & Nosik, M. R. (2019). Planning and leading effective meetings. *Behavior Analysis in Practice*, *12*(3), 696–708. https://doi.org/10.1007/s40617-019-00330-z

Lee, S. H. (Mark), Sergueeva, K., Catangui, M., & Kandaurova, M. (2017). Assessing google cardboard virtual reality as a content delivery system in business classrooms. *Journal of Education for Business*, *92*(4), 153–160. https://doi.org/10.1080/08832323.2017.1308308

Litsikas, M. (1995). Overcome team problems. *Quality*, *34*(9), 26–28, 30, 32.

Long, R. J. (1979). Desires for and patterns of worker participation in decision making after conversion to employee ownership. *The Academy of Management Journal*, *22*(3), 611–617. https://doi.org/10.2307/255749

Lui, I., Piccoli, G., & Ives, B. (2007). Marketing strategies in virtual worlds. *DATA BASE*, *38*, 77–80. https://doi.org/10.1145/1314234.1314248

Mack, N. (2022, January 11). Gymshark Metaverse Meeting. *LinkedIn*. https://www.linkedin.com/feed/update/urn:li:activity:6886579105790234625/

Maitlis, S. (2005). The social processes of organizational sensemaking. *The Academy of Management Journal*, *48*(1), 21–49. https://doi.org/10.2307/20159639

Mariotti, J. (1997). Had any good hallway meetings lately? *Industry Week*, *246*(22), 50.

McKinsey. (2019, September 13). *How to master the seven-step problem-solving process*. https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-to-master-the-seven-step-problem-solving-process

McKinsey. (2021, December 7). *Losing from day one: Why even successful transformations fall short*. McKinsey & Company. https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/successful-transformations

McKinsey. (2022). *Value creation in the metaverse: The real business of the virtual world* (p. 77). McKinsey & Company. https://www.mckinsey.com/business-functions/growth-marketing-and-sales/our-insights/value-creation-in-the-metaverse

MeetinVR. (2022). *MeetinVR - Business Meetings & Collaboration in VR*. MeetinVR. https://www.meetinvr.com/

Mesmer-Magnus, J., & Dechurch, L. (2009). Information sharing and team performance: A meta-analysis. *The Journal of Applied Psychology*, *94*, 535–546. https://doi.org/10.1037/a0013773

Meta. (2021, October 28). *Connect 2021: Our vision for the metaverse*. Facebook Technology. https://tech.fb.com/connect-2021-our-vision-for-the-metaverse/

Meta. (2022, June 5). *Welcome to Meta*. https://about.facebook.com/meta/

Michels, D. (2021, February 1). *What meetings will look like in the future*. Forbes. https://www.forbes.com/sites/davidmichels/2021/02/01/what-meetings-will-look-like-in-the-future/

Microsoft. (2021). *Mesh for Microsoft Teams*. Microsoft. https://www.microsoft.com/en-us/mesh

Microsoft. (2022, June 5). Holoportation™. *Microsoft Research*. https://www.microsoft.com/en-us/research/project/holoportation-3/

Milgram, P., Takemura, H., Utsumi, A., & Kishino, F. (1995). Augmented reality: A class of displays on the reality-virtuality continuum. *Telemanipulator*

and Telepresence Technologies, *2351*, 282–292. https://doi.org/10.1117/12.197321

Mitchell, V.-W. (1999). Consumer perceived risk: Conceptualisations and models. *European Journal of Marketing*, *33*, 163–195. https://doi.org/10.1108/03090569910249229

Moore, G. A., & McKenna, R. (2006). *Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers* (Revised edition). HarperBusiness.

Motoki, K., & Velasco, C. (2021). Taste-shape correspondences in context. *Food Quality and Preference*, *88*, 104082. https://doi.org/10.1016/j.foodqual.2020.104082

Nikel, D. (2021, September 2). *Coronavirus in Norway: The Latest News on the COVID-19 Outbreak*. Life in Norway. https://www.lifeinnorway.net/coronavirus-in-norway/

Nysveen, H., Pedersen, P., & Thorbjørnsen, H. (2005). Intentions to use model services: Antecedents and cross-service comparisons. *Journal of the Academy of Marketing Science*, *33*, 330–346. https://doi.org/10.1177/0092070305276149

Oculus. (2021, December). *Oculus quest warnings*. Health & Safety Warnings. https://support.oculus.com/

Parker, P. (2018). *The art of gathering: How we meet and why it matters* (1st edition). Riverhead Books.

Passig, D., & Sharbat, A. (2001). The why and how VR in schools: A preferred future pedagogic mission by a group of worldwide experts in VR and education. *International Journal of Virtual Reality*, *5*(1), 133–145. https://doi.org/10.20870/IJVR.2001.5.1.2675

Perkins, R. (2009). How executive coaching can change leader behavior and improve meeting effectiveness: An exploratory study. *Consulting Psychology Journal: Practice and Research*, *61*, 298–318. https://doi.org/10.1037/a0017842

Perlow, L. A., Hadley, C. N., & Eun, E. (2017, July 1). Stop the Meeting Madness. *Harvard Business Review*. https://hbr.org/2017/07/stop-the-meeting-madness

Petit, O., Javornik, A., & Velasco, C. (2021). We eat first with our (digital) eyes: Enhancing mental simulation of eating experiences via visual-enabling technologies. *Journal of Retailing*. https://doi.org/10.1016/j.jretai.2021.04.003

Petit, O., Velasco, C., & Spence, C. (2019). Digital sensory marketing: Integrating new technologies into multisensory online experience. *Journal of Interactive Marketing*, *45*, 42–61. https://doi.org/10.1016/j.intmar.2018.07.004

Pickens, A. (2019, March 12). *The business case for virtual reality*. Concept3D. https://concept3d.com/blog/tour-builder/the-business-case-for-virtual-reality/

Playstation. (2022, June 5). *PlayStation®VR2 | The next generation of VR gaming on PS5*. PlayStation. https://www.playstation.com/en-us/ps-vr2/

Poll, H. (2015). *The state of enterprise work*. Workfront. https://www.workfront.com/resources/the-state-of-enterprise-work

Pomerantz, A., & Denvir, P. (2013). Chapter 2: Enacting the institutional role of chairperson in upper management meetings: The interactional realization of provisional authority. In *Interacting and Organizing: Analyses of a Management Meeting*. Routledge.

Porter, M. E. (1979, March 1). How competitive forces shape strategy. *Harvard Business Review*. https://hbr.org/1979/03/how-competitive-forces-shape-strategy

Pritchard, T. (2022, June 5). *Apple VR/AR headset—Everything we know so far*. Tom's Guide. https://www.tomsguide.com/news/apple-vr-and-mixed-reality-headset-release-date-price-specs-and-leaks

Putman, V., & Paulus, P. (2009). Brainstorming, Brainstorming Rules and Decision Making. *The Journal of Creative Behavior*, *43*. https://doi.org/10.1002/j.2162-6057.2009.tb01304.x

Quittner, A. L., Smith, L. B., Osberger, M. J., Mitchell, T. V., & Katz, D. B. (1994). The impact of audition on the development of visual attention. *Psychological Science*, *5*(6), 347–353. https://doi.org/10.1111/j.1467-9280.1994.tb00284.x

Radianti, J., Majchrzak, T. A., Fromm, J., & Wohlgenannt, I. (2020). A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. *Computers & Education*, *147*, 103778. https://doi.org/10.1016/j.compedu.2019.103778

Raymond, J. E. (2000). Attentional modulation of visual motion perception. *Trends in Cognitive Sciences*, *4*(2), 42–49.

Rietzschel, E. F., & Nijstad, B. A. (2020a). Group creativity. In M. Runco & S. Spritzker (Eds.), *Encyclopedia of Creativity* (Vol. 1, pp. 562–568). Academic Press. https://doi.org/10.1016/B978-0-12-809324-5.06200-3

Rietzschel, E. F., & Nijstad, B. A. (2020b). Group creativity. In M. Runco & S. Spritzker (Eds.), *Encyclopedia of Creativity* (Vol. 1, pp. 562–568). Academic Press. https://doi.org/10.1016/B978-0-12-809324-5.06200-3

Roach, J. (2021, November 2). *Mesh for Microsoft Teams aims to make collaboration in the 'metaverse' personal and fun*. Innovation Stories. https://news.microsoft.com/innovation-stories/mesh-for-microsoft-teams/

Rogelberg, S., Leach, D., Warr, P., & Burnfield, J. (2006). "Not another meeting!" Are meeting time demands related to employee well-being? *The Journal of Applied Psychology*, *91*, 83–96. https://doi.org/10.1037/0021-9010.91.1.83

Rogelberg, S., Scott, C., Agypt, B., Williams, J., Kello, J., McCausland, T., & Olien, J. (2013). Lateness to meetings: Examination of an unexplored temporal phenomenon. European Journal of Work and Organizational Psychology. *European Journal of Work and Organizational Psychology*, *23*. https://doi.org/10.1080/1359432X.2012.745988

Rogers, E. M. (2003). *Diffusion of innovations, 5th Edition* (5th edition). Free Press.

Romano, N. C., & Nunamaker, J. F. (2001). Meeting analysis: Findings from research and practice. *Proceedings of the 34th Annual Hawaii International Conference on System Sciences*, 13 pp.-. https://doi.org/10.1109/HICSS.2001.926253

Rosenberg, R. D., & Rosenstein, E. (1980). Participation and productivity: An empirical study. *Industrial and Labor Relations Review*, *33*(3), 355–367. https://doi.org/10.2307/2522572

Russell, C. A. (2002). Investigating the effectiveness of product placements in television shows: The role of modality and plot connection congruence on brand memory and attitude. *Journal of Consumer Research*, *29*(3), 306–318. https://doi.org/10.1086/344432

Ryan, M.-L., & Jarvis, L. (2019). Narrative as virtual reality 2: Revisiting immersion and interactivity in literature and electronic media. *International Journal of Performance Arts and Digital Media*, *15*(2), 239–241. https://doi.org/10.1080/14794713.2019.1637100

Sagie, A., & Koslowsky, M. (2008). International replication note decision type, organisational control, and acceptance of change: An integrative approach to participative decision making. *Applied Psychology*, *45*, 85–92. https://doi.org/10.1111/j.1464-0597.1996.tb00850.x

Salas, E., Rozell, D., Mullen, B., & Driskell, J. E. (1999). The effect of team building on performance: An integration. *Small Group Research*, *30*(3), 309–329. https://doi.org/10.1177/104649649903000303

Sander, L., & Bauman, O. (2020, May 19). Zoom fatigue is real—Here's why video calls are so draining. *Ideas.Ted.Com*. https://ideas.ted.com/zoom-fatigue-is-real-heres-why-video-calls-are-so-draining/

Scacchi, W. (2016). *Virtual meetings* (pp. 517–530). https://doi.org/10.1007/978-3-319-07052-0_31

Schaufeli, W., & Bakker, A. (2017). *The utrecht work engagement scale (UWES). Test manual.* Utrecht University. http://www.schaufeli.com

Schirtzinger, W. (2020, September 19). Crossing the chasm summary. *High Tech Strategies*. https://www.hightechstrategies.com/crossing-the-chasm-summary/

Schoenenberg, K., Raake, A., & Koeppe, J. (2014). Why are you so slow? – Misattribution of transmission delay to attributes of the conversation partner at the far-end. *International Journal of Human-Computer Studies*, *72*(5), 477–487. https://doi.org/10.1016/j.ijhcs.2014.02.004

Scudamore, B. (2016, March 9). *Why team building is the most important investment you'll make*. Forbes. https://www.forbes.com/sites/brianscudamore/2016/03/09/why-team-building-is-the-most-important-investment-youll-make/

Servotte, J.-C., Goosse, M., Campbell, S. H., Dardenne, N., Pilote, B., Simoneau, I. L., Guillaume, M., Bragard, I., & Ghuysen, A. (2020). Virtual Reality Experience: Immersion, Sense of Presence, and Cybersickness. *Clinical Simulation in Nursing*, *38*, 35–43. https://doi.org/10.1016/j.ecns.2019.09.006

Sewell, K., & Newman, S. (2013). Chapter 1: What is education? In *Education Studies: An Issue Based Approach* (pp. 3–11). Learning Matters.

Sheridan, J. H. (1989, September 4). A $37 billion waste. *Industry Week*, *28*, 11–12.

Short, J., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications*. Wiley.

Slater, M., Gonzalez-Liencres, C., Haggard, P., Vinkers, C., Gregory-Clarke, R., Jelley, S., Watson, Z., Breen, G., Schwarz, R., Steptoe, W., Szostak, D., Halan, S., Fox, D., & Silver, J. (2020). The ethics of realism in virtual and augmented reality. *Frontiers in Virtual Reality*, *1*, 1. https://doi.org/10.3389/frvir.2020.00001

Slater, M., & Wilbur, S. (1997). A framework for immersive virtual environments (five): Speculations on the role of presence in virtual environments. *Presence: Teleoperators and Virtual Environments*, *6*(6), 603–616. https://doi.org/10.1162/pres.1997.6.6.603

Smith, P. C., Kendall, L., & Hulin, C. L. (1969). *The measurement of satisfaction in work and retirement: A strategy for the study of attitudes*. Rand McNally.

Spence, C. (2021). *Sensehacking: How to use the power of your senses for happier, healthier living*. Penguin.

SSBR. (2021, June 16). 6 ways that COVID 19 has had a positive impact on business. *Swiss School of Business Research*. https://www.ssbr-edu.ch/6-ways-that-covid19-has-had-a-positive-impact-on-businesses/

Standaert, W., Muylle, S., & Basu, A. (2016). An empirical study of the effectiveness of telepresence as a business meeting mode. *Information Technology and Management*, *17*(4), 323–339. https://doi.org/10.1007/s10799-015-0221-9

Standaert, W., Muylle, S., & Basu, A. (2021). How shall we meet? Understanding the importance of meeting mode capabilities for different meeting objectives. *Information & Management*, *58*(1), 103393. https://doi.org/10.1016/j.im.2020.103393

Steuer, J. (1992). Defining virtual reality: Dimensions determining telepresence. *Journal of Communication*, *42*(4), 73–93. https://doi.org/10.1111/j.1460-2466.1992.tb00812.x

Steuer, J. (2000). Defining virtual reality: Dimensions determining telepresence. *Journal of Communication*, *42*. https://doi.org/10.1111/j.1460-2466.1992.tb00812.x

Stohl, C., & Cheney, G. (2001). Participatory processes/paradoxical practices. *Management Communication Quarterly - MANAG COMMUN Q*, *14*, 349–407. https://doi.org/10.1177/0893318901143001

Strnadová, I., Cumming, T. M., Knox, M., & Parmenter, T. (2014). Building an inclusive research team: The importance of team building and skills training. *Journal of Applied Research in Intellectual Disabilities*, *27*(1), 13–22. https://doi.org/10.1111/jar.12076

Stroebe, W., & Diehl, M. (1994). *Why Groups are less Effective than their Members: On Productivity Losses in Idea-generating Groups*. https://doi.org/10.1080/14792779543000084

Sullivan, M. (2022, January 27). *Microsoft's metaverse vision is becoming clear—And makes sense*. Fast Company. https://www.fastcompany.com/90716389/microsoft-activision-metaverse

Swaminathan, G., & Rajarathinam, M. (2018). *Idea generation techniques help to increase quantitatively more ideas to solve business problems in information technology (it)organizations*.

Swift, W. (2020). How to run successful meetings in person and virtually. *In Practice*, 466–468. https://doi-org.ezproxy.library.bi.no/10.1136/inp.m1550

Thanetsunthorn, N., & Wuthisatian, R. (2019). Understanding trust across cultures: An empirical investigation. *Review of International Business and Strategy*, *29*(4), 286–314. https://doi.org/10.1108/RIBS-12-2018-0103

The Leadership Network. (2022). *Leading the factory of the future VR- the leadership network*. The Leadership Network. https://theleadershipnetwork.com/course/leading-the-factory-of-the-future-vr

Thompson, C. (2014, June 6). The novelty effect. *The Message*. https://medium.com/message/the-novelty-effect-cf606715ae62

Thompson, S. (2020, December 11). *VR applications: 21 industries already using virtual reality*. VirtualSpeech. https://virtualspeech.com/blog/vr-applications

Thorp-Lancaster, D. (2020, April 29). *Microsoft Teams hits 75 million daily active users*. Windows Central. https://www.windowscentral.com/microsoft-teams-hits-75-million-daily-active-users

Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.

Tracy, B. (2016, February 24). Meetings that get results (the brian tracy success library). *HarperCollins Leadership*. https://www.harpercollinsleadership.com/9780814437063/meetings-that-get-results-the-brian-tracy-success-library

Trevino, L., Daft, R., & Lengel, R. (1990). Understanding Managers' Media Choices: A Symbolic Interactionist Perspective. In *Organizations and Communication Technology* (pp. 71–94). SAGE Publications, Inc. https://doi.org/10.4135/9781483325385

Vanhamme, J. (2010). The link between surprise and satisfaction: An exploratory research on how best to measure surprise. *Journal of Marketing Management*, *16*(6), 565–582. https://doi.org/10.1362/026725700785045949

Velasco, C. (2020, November 16). *Synaesthetic marketing in action*. BI Business Review. https://www.bi.edu/research/business-review/articles/2020/11/synaesthetic-marketing-in-action/

Velasco, C., Barbosa Escobar, F., Petit, O., & Wang, Q. J. (2021). Impossible (food) experiences in extended reality. *Frontiers in Computer Science*, *3*, 77. https://doi.org/10.3389/fcomp.2021.716846

Velasco, C., & Obrist, M. (2020a, April 2). *Life after corona and the rapid digitisation of human experiences*. BI Business Review. https://www.bi.edu/research/business-review/articles/2020/04/life-after-corona-and-the-rapid-digitisation-of-human-experiences/

Velasco, C., & Obrist, M. (2020b). *Multisensory Experiences: Where the Senses Meet Technology*. Oxford University Press.

Velasco, C., & Obrist, M. (2021). Multisensory experiences: A primer. *Frontiers in Computer Science*, *3*. https://doi.org/10.3389/fcomp.2021.614524

Vestal, K. (2015). Setting standards for successful meetings. *Nurse Leader*, *13*(6), 14–15. https://doi.org/10.1016/j.mnl.2015.09.010

Virtuix. (2021, December 8). *Virtuix | The Future of Gaming*. Omni by Virtuix. https://invest.virtuix.com/

VR Vision. (2022). *Virtual reality training applications for the enterprise*. VR Vision Group. https://vrvisiongroup.com/

Waddell, W. C., & Rosko, T. A. (1993). Conducting an effective off-site meeting. *Management Review*, *82*(2), 40–45.

Walsh, K. R., & Pawlowski, S. D. (2002). Virtual reality: A technology in need of IS research. *Communications of the Association for Information Systems*, *8*(20). https://doi.org/10.17705/1CAIS.00820

WHO. (2020, March 11). *WHO Director-General's opening remarks at the media briefing on COVID-19—11 March 2020*. World Health Organization. https://www.who.int/director-general/speeches/detail/who-director-

general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020

Wiencierz, C., Röttger, U., & Fuhrmann, C. (2021). Agile cooperation between communication agencies and companies. *International Journal of Strategic Communication*, *15*(2), 144–158. https://doi.org/10.1080/1553118X.2021.1898144

Witmer, B. G., & Singer, M. J. (1998). Measuring presence in virtual environments: A presence questionnaire. *Presence: Teleoperators and Virtual Environments*, *7*(3), 225–240. https://doi.org/10.1162/105474698565686

Wobbekind, R. (2012). On the Importance of Education. *Business Economics*, *47*, 90–96. https://doi.org/10.1057/be.2012.5

World Economic Forum. (2022, June 10). *The Metaverse, Explained*. World Economic Forum. https://www.weforum.org/videos/the-metaverse-explained/

Wunderman Thompson. (2021). *100 trends and change to watch in 2021* (p. 217). https://www.wundermanthompson.com/insight/the-future-100-2021

Yoerger, M., Crowe, J., & Allen, J. (2015). Participate or else!: The effect of participation in decision-making in meetings on employee engagement. *Consulting Psychology Journal: Practice and Research*, *67*. https://doi.org/10.1037/cpb0000029

Youngblut, C. (1998). Educational uses of virtual reality technology. *Undefined*. https://www.semanticscholar.org/paper/Educational-Uses-of-Virtual-Reality-Technology.-Youngblut/dd4aea86abe7e279d7e2005ebba0b4fe1a4bcf8a

Zhao, J., Xu, X., Jiang, H., & Ding, Y. (2020). The effectiveness of virtual reality-based technology on anatomy teaching: A meta-analysis of randomized controlled studies. *BMC Medical Education*, *20*(1), 127. https://doi.org/10.1186/s12909-020-1994-z

APPENDICES

CHAPTER 6

6. Appendices

6.1. Appendix 1

Appendix 1: Uthrecht Work Engagement Scale (Schaufeli & Bakker, 2017)

Work & Well-being Survey (UWES) ©

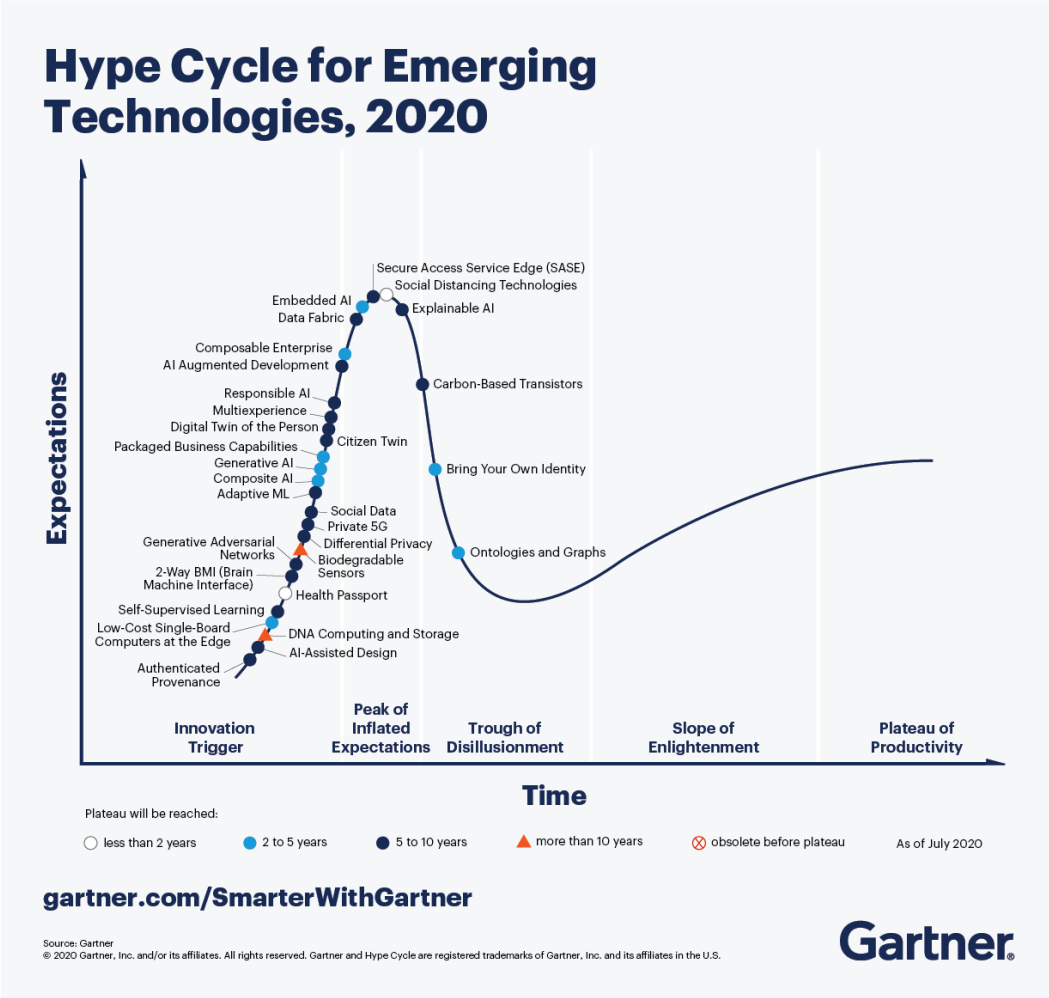
The following 17 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the "0" (zero) in the space after the statement. If you have had this feeling, indicate how often you feel it by crossing the number (from 1 to 6) that best describes how frequently you feel that way.

	Almost never	Rarely	Sometimes	Often	Very often	Always
0	1	2	3	4	5	6
Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

1. _____ At my work, I feel bursting with energy
2. _____ I find the work that I do full of meaning and purpose
3. _____ Time flies when I'm working
4. _____ At my job, I feel strong and vigorous
5. _____ I am enthusiastic about my job
6. _____ When I am working, I forget everything else around me
7. _____ My job inspires me
8. _____ When I get up in the morning, I feel like going to work
9. _____ I feel happy when I am working intensely
10. _____ I am proud of the work that I do
11. _____ I am immersed in my work
12. _____ I can continue working for very long periods at a time
13. _____ To me, my job is challenging
14. _____ I get carried away when I'm working
15. _____ At my job, I am very resilient, mentally
16. _____ It is difficult to detach myself from my job
17. _____ At my work I always persevere, even when things do not go well

6.2. Appendix 2

Appendix 2: Hype Cycle for Emerging Technologies (Lasserre, 2020)



6.3. Appendix 3

Appendix 3: Varimax Factor Analysis Component Scores

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
Perceived Risk #1: There is no more privacy risk involved in virtual reality meetings than videoconferencing meetings, e.g., Zoom or Teams.	-,008	,735	,098	-,085	,121

Perceived Risk #2: I think it is safe to share and receive information about my business when using VR technology	,114	,880	-,107	,049	,050
Trustworthiness #1: I consider VR technology as a trustworthy medium for communication in business	,207	,851	,064	,128	-,044
Trustworthiness #2: I consider VR technology as a reliable communication medium for business meetings	,289	,505	,333	,231	-,246
Observability #1: People using VR technology are generally more successful than those using traditional video conferencing meetings, e.g., Zoom or Teams	,399	,093	,489	-,149	,108
Observability #2: Many people have started using VR technology	,064	,027	,640	-,023	-,116
Relative Advantage #1: If I were to adopt VR technology for business meetings, the quality of my experience would improve relative to traditional video conferencing, e.g., Zoom or Teams	,658	,099	,327	-,039	,212
Relative Advantage #2: If I were to adopt VR technology for business meetings, it would enhance my effectiveness relative to traditional video conferencing, e.g., Zoom or Teams	,650	,092	,439	,056	,183
Relative Advantage #3: I think I would feel more engaged in business meetings if VR technology was used relative to traditional video conferencing, e.g., Zoom or Teams	,836	-,020	,141	,011	-,044

Relative Advantage #4: Using VR technology in a business meeting will enhance my feeling of being involved relative to traditional video conferencing, e.g., Zoom or Teams	,853	,092	,161	-,006	,107
Compatibility #1: If I were to adopt VR technology for business meetings, it would be compatible with my perception of how to conduct a successful meeting	,693	,192	,124	,260	-,057
Compatibility #2: I believe I will feel emotionally present when using VR technology in a business meeting	,728	,149	,068	,150	-,158
Compatibility #3: I do not believe I will be easily distracted by real things, such as other people, mobile phone, or noise when using VR technology in a business meeting	,494	,107	-,093	,380	-,170
Complexity #1: If I were to adopt VR technology for business meetings, it would be easy for me to adapt from current meeting formats	,171	,032	,212	,816	,061
Complexity #2: If I were to adopt VR technology for business meetings, it would be easy due to my previous experience with new technology	,009	,053	,078	,872	,002
Trialability #1: Before deciding on whether or not to adopt VR technology for business meetings, I would have to be able to use it on a trial basis	,033	,069	-,089	,037	,917
Behavioral Intent #1: I intend to use VR technology in business meetings in the near future	,206	,025	,714	,306	-,019

Behavioral Intent #2: Within the next six months, I intend to use VR technology in business meetings frequently	,163	,031	,819	,214	-,012

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

6.4. Appendix 4

Appendix 4: Factor analysis for Perceived Meeting Quality Scale

Factor Matrix[a]

	Factor 1
How much do you agree that the meeting you were just part of can be described by the following adjectives?	
Efficient	,545
Useful	,698
Worthwhile	,755
Helpful	,697
Waste of time	,644
Enjoyable	,710
Poor	,610
Immersive	,556
Superior	,646
Challenging	,077
Pleasant	,657
Fascinating	,406
Satisfying	,693
Sense of presence	,634

Extraction Method: Principal Axis Factoring.
a. 1 factors extracted. 4 iterations required.