TELEPRESENCE IN BUSINESS MEETINGS

Research-in-Progress

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Abstract

Telepresence is a technology that combines the cost- and time-saving advantages of technology mediated communication with the lifelike experience of a face-to-face meeting. This paper describes the initial stage of an ongoing research project examining the role and relevance of telepresence in business meetings. We study whether and how telepresence can be used effectively and efficiently, and build several hypotheses from theory about the appropriateness of and justification for the use of this technology. In particular, we identify the following factors as key to the selection of telepresence as a business meeting mode: meeting purpose, active participation, topic sensitivity, and ancillary interaction. We also describe our ongoing empirical study to validate our hypotheses, and discuss some initial evidence from the study.

Keywords: e-collaboration, business meetings, telepresence, media choice, meeting outcomes
Introduction

Telepresence\(^1\) combines the cost- and time-saving advantages of computer-mediated communication (CMC) with the lifelike experience of a face-to-face (FTF) meeting. It is a technology for conducting distributed meetings, that is being adopted by a variety of organizations, across the world. Meeting rooms are set up in a manner that resembles precisely the setting of a FTF meeting. Participants at different locations see each other in true life size, they can look each other in the eye, and the direction of speaking is accounted for (spatial audio). In addition, lighting in the rooms is adjusted, furniture is similar across locations and colors are matched for a seamless look and feel. Participants in such meetings report an immersive experience in which it seems that their co-participants are present in the same location. The following quote from a user illustrates the immersive experience of telepresence:

“The detail you can see is that high, that when a cup of coffee is spilled in the one room, you can see every drop on the table from the other room, and you feel the urge to go and clean it up. It is that lively.”

A relatively cutting-edge technology, it comes at a significant price. For instance, full-fledged telepresence rooms built using Cisco TelePresence\(^*\) cost several hundred thousand dollars each, in 2011. This raises the question of when such a meeting mode is justified from a value standpoint. This question is relevant for businesses that consider investing in the installment of such technology. Despite the large investment, the return could still be significantly positive in situations where the costs of FTF meetings are substantial. It is also relevant for organizations considering the paid use of telepresence facilities from service providers. In addition, the question arises whether and how telepresence meetings differ from other technology mediated business meetings in terms of effectiveness and efficiency\(^2\).

This study is part of an ongoing research project in which we address the following questions:

- When is telepresence an effective choice and for what applications? (business meeting, mass communication, distance learning, etc.)
- What is a business value framework for effective use of telepresence?

Theoretical Foundation

In this section we first examine relevant theories on communication media that provide the theoretical underpinnings of our study. We then describe the key characteristics of telepresence as a business meeting mode, and build hypotheses with relation to the appropriateness and justification for its use relative to alternative modes such as instant messaging, teleconferencing and video-conferencing.

**Media Richness and Social Presence Theory**

Media Richness theory states that media differ in the extent to which they enable the transmission of rich information. Richness consists of four criteria: feedback, multiple cues, language variety, and personal focus (Daft et al. 1987). Based on these attributes, every communication media possesses distinct, objective richness capacities and these media can be arrayed along a continuum. A medium is considered to be richer if it has the capacity to convey multiple verbal and nonverbal cues, allows for immediate feedback, uses natural language, and has personal focus. FTF communication is regarded as the richest way to interact and is therefore the standard relative to which technology mediated communication is deficient (Daft et al. 1987). Furthermore, oral media are generally believed to be richer than written media, and synchronous media are believed to be richer than asynchronous media (Markus 1994). The theory posits that ambiguous (or equivocal) messages are open to interpretation, and therefore richer media are needed to communicate effectively (Daft et al. 1987).

Social Presence theory, just like Media Richness theory, arrays media on a continuum and considers FTF as the “gold standard” for communication. Social presence is defined as the extent to which a medium enables the experience of communication partners to be present physically and/or psychologically (Fulk et al. 1987; Short et al. 1976). Social presence of a medium is comprised of several factors such as capacity to

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\(1\) We use this term to describe a class of technology rather than a specific product such as Cisco TelePresence\(^*\).

\(2\) For the purpose of this study, effectiveness refers to the extent to which the goals set for the meeting are met (Hoegl and Gemuenden 2001; Westmyer et al. 1998). On the other hand, the efficiency of a meeting can be measured by the amount of resources and costs associated with it.
transmit information about tone of voice, gestures, facial expression, direction of looking, posture, touch, and nonverbal cues. These factors determine the level of presence, which involves the extent to which a medium is perceived as sociable, warm, sensitive, personal, and/or intimate when it is used to interact with other people. This is consistent with Biocca et al. (2004), who conceptualize social presence in terms of three dimensions: co-presence, psychological involvement, and behavioral engagement. According to Social Presence theory, the level of interpersonal involvement that is needed should be matched with the social presence of the medium, in order to communicate effectively.

**Telepresence**

Telepresence has been defined as “the use of technology to establish a sense of shared presence or shared space among geographically separated members of a group” (Buxton, 1992, p. 27). This class of technology is designed to provide a natural and immersive meeting environment in which participants, although geographically separated, can meet as if they are in the same physical location. Therefore, the social presence enabled by telepresence distinguishes it from other business meeting modes such as instant messaging, tele- and video-conferencing, while still not being at the same level as in a FTF meeting. At the same time, all these modes are synchronous and (except for instant messaging/chat) all support oral communication, which have been identified as more rich modes than asynchronous, written media (Markus 1994).

The cost of a meeting mode can refer to travel-related expenditures, time investment, the cost of hardware installment, and software usage. The cost of a FTF meeting varies significantly by location of participants and can thus be higher or lower than the cost of a telepresence meeting\(^3\). However, a telepresence meeting is invariably much more expensive than other technology-mediated meeting modes. In Figure 1, we characterize the major meeting modes in terms of social presence and cost\(^4\).

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\(^3\) Anecdotal evidence from Cisco Systems Inc. shows it costs about 300 000 dollars to set up a dedicated Cisco TelePresence™ room and operating costs of several hundred dollars per hour during meetings.

\(^4\) The positioning of the business meeting modes is not to scale for both cost and social presence.
Hypotheses

In the rest of this section, we discuss four factors that we identify as key considerations when assessing the justification of telepresence as a meeting mode. These are as follows:

- The extent to which the purpose of the meeting is to
  - Gather and/or share information
  - Build relationships and trust
- The need for active participation of all meeting participants
- The sensitivity of the topics to be discussed in the meeting
- The importance of ancillary interaction outside the formal meeting.

We demonstrate that the choice of these factors is consistent with relevant literature, and postulate a set of hypotheses about the impact of these factors in the choice of telepresence for distributed meetings. For ease of exposition, the factors are discussed in the order of increasing social presence needed.

1. **Sharing and Gathering of Information or Knowledge**

Culnan and Markus (1987) suggest that the intended meeting outcomes drive mode selection. Watson-Manheim and Bélanger (2002; 2007) explored five communication purposes and the associated norms and rules for media selection within work groups in sales divisions of two Fortune 100 IT companies. They found that knowledge sharing was done either through teleconference followed up by e-mail or telephone, or through FTF meetings. Information gathering on the other hand, was initiated often via e-mail, and then continued via telephone or FTF; it was done through one-on-one FTF contact, or information was searched for on the intranet.

In general, research on CMC indicates that a high level of social presence is not desirable for every business meeting, as too many cues may distract communicating partners' attention for a routine message (Daft et al. 1987; Ferran and Watts 2008). For example, video-mediated communication (VMC) is associated with a higher cognitive load compared to other CMC because of higher social presence, in which case the latter may even become a distraction (Robert and Dennis 2005; Yoo and Alavi 2001). Consequently, VMC is expected to lead to inferior outcomes compared to other CMC modes when simple tasks, such as sharing and gathering of information or knowledge between people that already know each other. Hence, we hypothesize the following:

**Hypothesis 1:** Both low and high social presence meeting modes are effective for sharing and gathering of information or knowledge.

2. **Active Participation in the Meeting**

When convening in telepresence, people are taken away from their day-to-day work setting for a meeting. Therefore, they have less access to other communication media (e-mail, instant messaging, telephone, smartphone) or feel inhibited to consult them. In addition, central to social presence theory is the belief that higher social presence leads to higher social pressure and normative influence on message recipients (Lowry et al. 2010; Miranda and Saunders 2003). Bordia (1997) synthesizes published experimental studies and concludes that in CMC, there is reduced normative pressure and poorer comprehension of the discussion compared to FTF. Also, the choice for a medium carries symbolic meaning in a social setting (Trevino et al. 1987; Trevino et al. 2000). For example, a letter signals formality while an e-mail may signal unimportance. To the extent that individuals are conscious of such symbolic meaning, they can influence media choice (Trevino et al. 2000). Because of the cost of a telepresence meeting, selecting this mode signals importance to the participants. To conclude this reasoning, we hypothesize:

**Hypothesis 2:** High social presence modes such as telepresence and FTF are needed for meetings in which active participation of all participants is critical.

3. **Sensitivity of Meeting Topics**

Previous research indicated that media perceived to be low in social presence are not well suited for the transmission of sensitive messages (Daft et al. 1987; Markus 1994, Watson-Manheim and Bélanger 2007). Daft et al. (1987) stated that emotion-laden messages, which are personal and subjective, are open to misinterpretation, and therefore lean media are not well suited for transmission of such messages. For
example, Markus (1994) found e-mail was deemed appropriate for all work-related communication, except for personnel matters, which are regarded as either confidential, or as requiring delicate handling of the other person’s emotions. Likewise, Bordia (1997) found support in experimental research for the idea that CMC groups perform better in tasks requiring less social-emotional interaction, while FTF groups perform better in tasks involving more social-emotional interaction. Finally, Watson-Manheim and Bélanger (2007) found FTF and the telephone to be more appropriate than e-mail to transmit sensitive information. Because of the high social presence of the telepresence meeting mode, we formulate the following:

Hypothesis 3: High social presence modes such as telepresence and FTF are needed for meetings in which highly sensitive topics have to be discussed.

4. Relationship and Trust Building

Building trust is one of the major challenges in distributed work groups (Zolin et al. 2004), because of the lack of social cues CMC media provide (Jarvenpaa and Leidner 1999). Indeed, FTF encounters are considered irreplaceable for both building trust and repairing shattered trust. Therefore, there has been an ongoing debate on the notion that “trust needs touch” (Jarvenpaa and Leidner 1999), and whether trust engendered by the FTF encounter can be accomplished by video instead of FTF communication (Olsen and Olsen 2000).

Riordan and Kreuz (2010) examine channel choice for building and maintaining relationships through (one of) three channels: asynchronous email, synchronous instant messaging (IM), and FTF communication. The authors associate the development of social ties with the transmission of socio-emotional communication and hypothesize that emotion valence of the message may play a role in selecting a channel. The main reason for choosing FTF over email or IM was the ability to convey nonverbal cues, making the communication more effective. These cues are also available in CMC (emoticons, underlining, punctuation,...), but the authors argue that users are less acquainted with them. In addition, Watson-Manheim and Bélanger (2002; 2007) found that for the purposes of relationship development and conflict resolution, FTF was preferred within work groups, although telephone conversations were also considered a possibility.

Previous research indicated that more social presence is associated with more trust building capabilities (Bente et al. 2008; Gefen and Straub 2003; Hassanein and Head 2007; Lowry et al. 2010). We argue that telepresence enables “the type of communication cues that individuals use to convey trust, warmth, attentiveness, and other interpersonal affections” (Jarvenpaa and Leidner 1999, p. 793). Therefore, we revisit the trust needs touch axiom and hypothesize:

Hypothesis 4: High social presence modes such as telepresence and FTF are needed for meetings intended to build trust and relationships.

5. Need for Ancillary Interaction

Informal interaction can be characterized as brief and unplanned, spontaneous (without arranged agenda), synchronous (with true interactivity) conversations which are valuable for sharing social and cultural knowledge, team building, coordination, and execution (Whittaker et al. 1994). Because of its distinct characteristics, Fish et al. (1990) argue that it requires rich communication channels and co-presence. Indeed, when meeting FTF this kind of interaction often occurs naturally when participants grab a cup of coffee together, or have lunch/dinner after a business meeting. In addition, several technologies have been developed with the purpose of enabling informal and spontaneous communications with distant others (Fish et al., 1990), but they did not provide the same degree of social intimacy as FTF does. In a telepresence meeting, informal interaction is supported, but often some spontaneity is lost due to the agenda being full and the composition of participants being pre-arranged.

Hypothesis 5: When informal ancillary interaction is important, even high social presence modes such as telepresence are not suitable alternatives for FTF meeting.

In Figure 2, we summarize our hypotheses, in terms of the adequacy of various technology-enabled meeting modes for the situations characterized by each hypothesis (indicated by whether the range bar for each hypothesis covers the meeting mode). For example, in meetings intended to gather and share information, all five modes are feasible, whereas when ancillary interaction is needed, FTF is the only option.
Case Study

This section describes our approach to empirically testing the above hypotheses. Given that telepresence in business meetings is a new and complex phenomenon in an organizational setting, we have adopted the case study methodology (Yin 2009).

Our empirical analysis is based on data from a publicly traded company headquartered in the United States and employing over 70,000 people worldwide. In this company, every employee has access to rooms equipped with telepresence technology. However, the number of such rooms is limited and priority is given to customer-facing meetings. Employees also have easy access to a desktop online conferencing system that provides real-time data-, application-, voice-, and video-sharing capabilities. The video interaction is limited to a low resolution view of the participants’ faces, and is often turned off.

The data collection process is ongoing. The company has given us extensive access to information systems that log and track various types of e-meetings, as well as to forms and reports that the company requires of participants in telepresence meetings. In addition, we have been able to examine meeting agendas, announcements and minutes of meetings, and even recordings of video-conferences. We have also been allowed to attend meetings and make observations. Finally, we have been able to conduct semi-structured interviews with open-ended questions with several participants for each meeting to minimize response bias. These interviewees are given the opportunity to review the interview and observation reports afterwards and make comments or corrections. Through a process of triangulation and corroboration of the findings coming from multiple sources, we have developed converging lines of inquiry with relation to our hypotheses. In the subsections below, we present examples of some initial observations and feedback.

1. Sharing and Gathering of Information or Knowledge

Comments about meetings geared towards sharing information or knowledge include the following:

“If a meeting is purely informational, it’s perfectly possible to do this via the telephone (audio only). If some presentations or figures are to be shared, the online conferencing system comes in very handy. However, if you would want to persuade someone, or sell something, you would choose telepresence.”

A follow-up meeting of a telepresence session with people in Europe and in North America was via the online conferencing system, with the meeting convener commenting:

“Some rather technical details were discussed in the follow-up meeting. As the people already know each other, it was no longer required to see each others’ faces, rather, the focus was on the content.”

That being said, usually content is shared in a telepresence meeting as well. In addition, a lot of teams have weekly meetings via video-conferencing to keep everyone on the same page. If the team manager announces there will be a team meeting in telepresence, this signals importance to the team members.

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5 As the users within the organization do not pay for booking a telepresence room for a meeting, this rule that prioritizes revenue-generating meetings is a surrogate for its cost.
2. Active Participation in the Meeting

Multiple employees noted that their level of attention is not always high in an online conferencing meeting, and that they are multitasking instead. The following quote illustrates this:

“Your attention depends on your involvement in the meeting. If involvement is small, you tend to not pay attention and work instead, so the focus is not there. If there is a big group of people you just put yourself on mute and continue working, then you probably only get 10% of the conversation.”

On the other hand, managers report they choose telepresence for a meeting, specifically because they want the attendee’s attention. In addition, a manager noted:

“For a meeting that takes multiple hours, telepresence is needed because it is impossible to keep the participants’ attention for more than 2 hours in an online conferencing meeting.”

On the other hand, we observed people in a telepresence meeting checking their e-mails on a mobile phone or laptop as well. The more people attend a telepresence meeting, the less interactivity was observed, especially if multiple telepresence sites are involved. This relates to the factor of group size in meetings (Miranda and Saunders 2003).

Finally, for true interactive meetings, such as a brainstorming session, FTF remains the preferred meeting mode even if it involves a lot of travelling.

3. Sensitivity of Meeting Topics

A series of meetings was organized in telepresence to review executives and directors per region within Europe. For every meeting, the Executive Vice-President in Europe and an HR executive were attending, each time along with the regional VP and with his/her HR manager. The only other mode in which these meetings could be held, was FTF because of the sensitivity of the subject. However, the only practical way for FTF meetings would have been if the Executive VP in Europe met with the HR executive for 2 days at some location, and for every regional VP and HR manager to travel to that location in order to organize all of the meetings successively. However, the executive HR manager reported this would have been detrimental:

“Attending these meetings is very intense and causes fatigue in the thinking process, you need time in between these meeting to renew oxygen.”

In addition, a manager noted that:

“It’s ten times easier to give negative feedback in a telepresence meeting compared to in other mediated meetings, because you can immediately see how someone is affected by your message.”

However, telepresence was deemed to be unsuitable for a meeting in which a manager had to fire an employee, and the manager flew to the employee’s location for a FTF meeting.

Sensitive topics are also discussed in lower social presence media when other factors come into play. For example, several employees remarked they pick up the telephone to call someone when something is urgent, especially when they are well acquainted. In addition, telepresence rooms are reported to be hard to book on short notice, especially on multiple sites. Furthermore, participants of mediated meetings report having side discussions simultaneously on a private instant messaging platform on which they discuss sensitive topics such as their opinion on the topic at hand. Finally, it was mentioned that the lack of visual cues engenders less inhibition to ask tough and sensitive questions in a meeting. These contrary findings can be explained by theories that propose medium accessibility (Allen 1977; Culnan 1984; Markus 1987; O’Reilly 1982), temporal availability of the participants (Straub and Karahanna 1998), and urgency (Steinfield and Fulk 1986; Trevino et al. 1987; Watson-Manheim and Bélanger 2007) as factors for a meeting mode choice. In addition, research comparing CMC to FTF communication has associated CMC with less social inhibition, more depersonalization, more hostile communication (flaming), and status equalization (Dennis et al. 1988; Sproull and Kiesler 1986; Tyran et al. 1992).
4. Relationship and Trust Building

The following are some observations regarding meetings where the purpose was to build trust and develop relationships. For job interviews, telepresence is used widely. A high-level HR manager, who was relatively new to the company, reported:

“For me it’s important to have as much meetings with telepresence as possible, in order to get to know the people I talk to. FTF contact still is the preferred choice for building relationships, however, within the context of a global international company, I believe telepresence is number one because of efficiency and ROI reasons.”

In another instance, a presentation and demo of the company’s products was given via telepresence to a customer as well as a representative of a partner company. The underlying purpose was for everyone to get to know each other. The decision makers of the customer were located in Europe and North America. According to the partner:

“We are in a negotiation phase with the customer right now, facing one more competitor. Therefore, in this stage it is important to see the customer in the best possible way. Of course, it would be far too expensive for all of us to travel to Toronto, as this investment would be lost if the deal goes to the competitor.”

In another example of telepresence meetings to develop relationships, the CEO of the company happened to meet the CEO of a relatively small European partner at a trade fair. One year later they had a satisfactory follow-up telepresence meeting, and, agreed to interact more frequently via telepresence.

Still, for many face-to-face is preferred for building relationships. For example, someone who closely works with partners reported:

“There is still a difference between meeting face-to-face and meeting with telepresence. Aspects like shaking hands or grabbing a coffee together do have some impact, often unconscious, on creating trust in a relationship and things like that.”

However, evidence shows people work together in teams without having built mutual trust and relationships. Virtual teams are assembled with people that have not met FTF or in a telepresence meeting before. Jarvenpaa and Leidner (1999) refer to “swift” trust that is developed between distributed workers.

5. Need for Ancillary Interaction

An example in which telepresence is a suitable and more cost efficient substitute for FTF is a subject matter expert presenting to a customer. An account manager reported that it would make no difference if the expert was physically present, as he would probably not interact with the customer before or after the meeting anyway.

However, the following quotes illustrate that ancillary interaction can play an important role:

“After the meeting, you can talk 1:1 with someone from the meeting, for example with someone you want buy-in from. If you want to convince that one person, or if you want to build on the engagement, the informal meeting right after the meeting (for example during lunch) can help you get there.”

“Telepresence is usually limited to the formal interaction. And it’s not by doing an agenda, that you build relationships. You build relationships by having a coffee around the corner, while laughing during dinner, so this requires physical presence.”

“The difference between FTF and telepresence comes from all the side discussion during the break and all of that, where you actually get a lot accomplished. All of the influencing game is usually outside the meeting.”

However, a telepresence meeting does not rule out ancillary interaction, as people at the same side of the telepresence meeting of course do have the opportunity to talk informally FTF. In addition, a manager noted that it is very common to have a debriefing meeting via audio-conference with colleagues after they attended a telepresence meeting together.
Conclusion

This research project investigates the role and relevance of telepresence as a business meeting mode. Telepresence is a novel technology that enables communication partners to feel mutual physical presence, even across vast geographical distances. Drawing on social presence and several other theories on communication media, we formulate five hypotheses with respect to factors that impact the selection of a business meeting mode. The preliminary evidence in our case study research largely supports our hypotheses and is a first step in understanding the appropriateness and justification of telepresence as a business meeting mode.

An emerging outcome is that telepresence enables meetings that would be impossible without the technology. For example, the telepresence meeting between the two CEOs we have mentioned before, would not have taken place if the technology was not available. Both CEOs have a very busy schedule, especially on trade fairs or when they travel abroad – at the same time, they would probably not have settled for a lower social presence meeting mode. But thanks to the flexibility of telepresence, it was only a matter of finding an available time slot for both in order to arrange this meeting. In addition, more people could be involved in this meeting, as a regional VP also attended from a third location. At the same time, telepresence meetings may not be appropriate for very large groups and we are currently exploring this issue. Another observation about online conferencing that emerged in our case study research was the issue of too many meetings: multiple employees reported they were frequently in back-to-back meetings all day long to the point they thought it may become unproductive. Some say they feel there is too much ‘collaboration’ and that they spend too much time in meetings. An interesting question that we are examining is whether the availability of telepresence has similar effects.

Implications

For practitioners, our research calls attention to a novel class of technology with distinct characteristics, the introduction of which raises questions on its usefulness and appropriateness for business meetings. Our results can provides guidance on when distributed groups should consider telepresence-based meetings, rather than either lower social presence modes on the one hand and possibly expensive travel for FTF meetings on the other. In addition, our work also contributes to understanding when and how the investment in telepresence is justified within an organization.

This research has implications for the future study of communication media, e-collaboration, and business meeting modes. Our hypotheses serve as a starting point for exploring the role and relevance of telepresence as a communication medium and for the development of usage norms for the technology in e-collaboration. Our study further highlights the importance of considering the purpose of the meeting when selecting a particular mode. We hope that our initial exploration of telepresence usage will stimulate further research on its applicability.

Limitations and Further Research

Telepresence is not wide spread within organizations yet, and thus our empirical study was limited to a relatively atypical organization. Hence, the external validity of our findings still has to be established, and an important next step will be to study telepresence usage across a variety of organizational settings. In addition, as adoption of this technology increases and interoperability between systems enhances, it will be interesting to investigate further how telepresence is deployed in interorganizational collaboration.

Beyond the completion of the case studies, we plan to use our hypotheses as a foundation for future quantitative studies. These will consist of a more structural approach in which the different factors will be dimensionalized. Our goal is to build a business meeting mode selection model and to validate this model at multiple research sites. Also, in addition to studying the role and value of telepresence as a business meeting mode, we plan to study other applications of the technology, such as mass communication and distance learning, as well as specialized applications such as telematics and telemedicine. The insights from these investigations will form the basis of the development of a business value framework for telepresence.
References


