How Shall We Meet? Understanding the Importance of Meeting Mode Capabilities for Different Meeting Objectives[1]

ABSTRACT

Distributed business meetings can be conducted in a variety of modes, such as audio-conferencing, video-conferencing, and telepresence, and can have different objectives, ranging from routine information sharing to relationship building. This paper examines whether and how differences in meeting mode effectiveness can be explained by the differing functional capabilities offered by each meeting mode (e.g., discerning facial expressions, experiencing co-location). Using data from the organizers of 612 business meetings, we identify the meeting capabilities perceived as important for different meeting objectives, and find multiple sets of meeting objectives that require the same combinations of capabilities. In addition, we examine whether the importance of different capabilities is affected by meeting size and duration. Using the results of the study, guidelines are developed to help meeting organizers select effective meeting modes based on meeting objectives.

Keywords: media capabilities; distributed meetings; meeting objectives; media selection; field study

1. INTRODUCTION

Business meetings are a means to coordinate activities and achieve objectives related to business operations [1,2]. With businesses increasingly having greater geographical scope, the need for distributed business meetings with participants at remote locations, has grown significantly [3]. Moreover, due to the coronavirus disease 2019 (COVID-19) pandemic and the related health safety measures, there was a compulsory and rapid adoption of distributed meetings across most industries worldwide [4,5]. According to Gartner, as much as 75% of meetings will be distributed by 2024, significantly up from the 40% of meetings that were distributed before the pandemic.[2] In recent years, software technologies for distributed meetings have evolved very fast, with most

[1] This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

[2] Gartner 2020 Magic Quadrant for Meeting Solutions (https://searchunifiedcommunications.techtarget.com/feature/Gartner-video-conferencing-Magic-Quadrant-highlights-remote-work).

solutions and platforms supporting one or more of three key meeting modes—audio-conferencing, video-conferencing, and telepresence[3]. Here, the term meeting "mode" refers to the primary means of interpersonal communication for the meeting [6–8].

The choice of a suitable meeting mode is an important consideration when planning a distributed meeting [6], since modes differ significantly in terms of their functional capabilities. For example, audio-conferencing[4] participants can hear each other and share a computer screen [9,10]. Video-conferencing technology subsumes the capabilities of audio-conferencing meetings and adds visual interaction, enabling the observation of other participants' appearance, body language, and facial expressions [11]. In telepresence meetings, each person's voice comes from the direction of their screen image (spatial audio) and participants at different locations see each other in true life size. Moreover, telepresence meeting rooms facilitate the sense of being co-located by matching the furniture and even wall colors across locations, resulting in an immersive experience in which the functional capabilities of a face-to-face meeting are approximated [12,13].

Business meetings are held for different purposes, and typically, are organized to achieve specific objectives. These objectives can vary over a broad range, from routine information exchange and decision-making to relationship-building [1,14,15]. Given multiple options for distributed meetings, a key question is whether certain modes are more effective than others for specific meeting objectives? Here, the effectiveness of a meeting mode can be defined as the extent to which it facilitates the objectives of the meeting to be achieved [16,17]. Towards this end, the perceived effectiveness of a meeting mode for a business meeting was shown to vary with meeting objectives in [15], but the reasons for these perceived differences were note provided.

[3] Telepresence refers to the sense of being in the presence of other people and objects [103–105].
[4] Different terms have been used to refer to audio-conferencing, including tele-conferencing, conference calling, and (tele)-phone conferencing [9,10].

The choice of meeting mode can depend on a number of factors, including cost, availability, participants' prior experience with modes and each other, and symbolic meaning attached to modes [18–22]. The choice may also be influenced by the differing functional capabilities offered by each meeting mode [23]. However, with a variety of possible meeting objectives and various functional capabilities available, recognizing what mode capabilities are important for different objectives is not always clear. For example, when a set of geographically remote colleagues meet to exchange information, they may choose video-conferencing. However, in this situation, the ability to hear each other and share a screen is sufficient. In fact, seeing each other may add little value and perhaps even be a distraction [24]. Thus, an audio-conferencing mode might be adequate. On the other hand, a newly formed team wanting to meet each other and build trust may require capabilities such as seeing body language and facial expressions and therefore should meet face-to-face, rather than through an audio conference call, for instance.

In this paper, we examine whether and how the differences perceived in the effectiveness of different meeting modes for meetings with different objectives can be explained by the importance of the functional capabilities of each meeting mode. More specifically, we address the following research question: *What meeting mode capabilities are important for different business meeting objectives and how can understanding the importance of capabilities for different meeting objectives help in selecting effective meeting modes?*

To address this research question, we first develop a list of meeting mode capabilities, drawn from the literature on communication media. Then, we conduct an empirical study at an international company, which involves the collection of questionnaire responses from meeting organizers. Based on data from 612 real-life business meetings, we analyze the importance of meeting mode capabilities for achieving different meeting objectives.

This is the first empirical study on the role of meeting mode capabilities in meeting mode selection. Our analysis points to multiple sets of meeting objectives for which the same combination of capabilities are perceived to be important. Interestingly, we also find that the sets

of objectives can be ordered in terms of progressively increasing combinations of important capabilities. These results indicate that the important capabilities can serve as a basis for guidelines to help meeting organizers select effective meeting modes once meeting objectives are known. Another interesting finding is that face-to-face meetings are not likely to be more effective than telepresence for any meeting objective, thereby suggesting that telepresence is an effective substitute for face-to-face meetings in most situations.

We also analyze whether the size of a meeting (in terms of the number of participants) and the duration of a meeting impact the perceived importance of different capabilities. In this regard, we do not find a significant relationship between meeting size and the importance of capabilities, but we do find meeting duration to be positively associated with the importance of multiple capabilities, for four types of meeting objectives.

The paper is organized in six sections: In Section 2, we review the literature that provides the theoretical foundation of our study. In Section 3, we explain our research design and develop the conceptual basis for examining business meeting objectives and meeting mode capabilities. We present our data collection approach and analysis in Section 4. In Section 5, we discuss our field study findings on the importance of meeting mode capabilities for different meeting objectives and effective meeting mode selection. We conclude the paper in Section 6, highlighting the key theoretical and managerial contributions of our study and addressing limitations and further research directions.

2. LITERATURE REVIEW

There is a significant body of research on mediated organizational communication—not specific to the business meeting context—that pertains to the three elements that are key to the current study [21,25]: communication objectives, communication media, and media capabilities. The literature on the relationship between the first two elements is reviewed in the first subsection and then media capabilities are discussed in the second subsection.

2.1 Communication Objectives and Media

The theories on communication media are consistent with the task-technology fit paradigm [26,27] according to which effectiveness follows from a match between the requirements of the communication tasks/objectives at hand and the characteristics of the medium. Task-technology fit has been further refined in technology-mediated communication settings [26], sometimes being referred to as "task-media fit." For instance, Mennecke et al. [24] examined the effectiveness of different media for group communication (text-, audio-, or video-based systems and face-to-face) across tasks that involve either collaboration and convergence or conflict and divergence. For the latter type of task, face-to-face and video-based systems were found to be a better fit than text- and audio-based systems. Task-technology fit theory has also been extended, Fuller and Dennis [28] proposed the fit-appropriation model, which complements task-technology fit with technology appropriation, to examine task performance using group support systems with differing communication and information processing features. Likewise, Serrano and Karahanna [29] examined how individual capabilities can compensate for technological limitations in shaping task performance, in the context of technology-mediated doctor consultations.

Other theories have also conceptualized the match between communication media and tasks or objectives. Social presence theory characterizes media in terms of the extent to which they enable communication partners to feel involved and connected on a personal and psychological level [30]. The requirement for such presence is high for tasks that involve interpersonal relationships, the expression and perception of emotions, a great need for timing and coordination of turn taking, and/or a need to manipulate others; and low for tasks that involve simple cognition [30].

The social presence concept is closely related to media richness [31]. According to Media richness theory, "for effective communication to occur, the richness of the medium should match the level of ambiguity" [32, p. 359]. Ambiguous or equivocal messages are non-routine and open to interpretation, whereas for unambiguous and routine messages, a shared meaning is already established. A richer medium enables conveying more cues, uses natural language, and allows for

immediate feedback and a personal focus [32]. The use of richer media more quickly decreases ambiguity and enables the negotiation of a mutual understanding [32]. When the chosen medium is not rich enough, there is a possibility for miscommunication, whereas too much richness is likely to be wasteful [33].

Some other approaches break down the communication tasks into different components. Te'eni [21] developed a cognitive–affective organizational communication model, which proposes that the communication process starts with specific communication goals, which may imply both cognitive and affective complexity[5]. Cognitive complexity involves interdependency between communicators and multiplicity of views in communication, while affective complexity involves different attitudes or changes in disposition among communicators [21]. These different levels of cognitive and affective complexity imply different medium attribute requirements. Similarly, in media synchronicity theory [22,34], the authors reconceptualize tasks and propose two micro-level communication processes of tasks: conveyance and convergence. Conveyance processes involve the transmission of (new) information and therefore often require time for individual processing and, hence, asynchronous media are expected to improve performance. Convergence processes, on the other hand, refer to the discussion of preprocessed information and typically require rapid, back and forth interaction (i.e., synchronous interaction). The authors indicate that most tasks involve both processes and therefore a mix of media should be used [22,34].

2.2 Communication Media Capabilities

The same theories reviewed above also conceptualize different media capabilities. Social presence is defined as a single dimension of the medium, comprising factors, such as the capacity to transmit gestures, facial expressions, direction of looking, posture, dress, and nonverbal vocal cues [30]. The extent to which these factors contribute to the social presence of a medium is subjectively perceived by the user, who holds a mental set towards the medium. The more warm,

[5] Cognitive complexity involves interdependency between communicators and multiplicity of views in communication, while affective complexity involves different attitudes or changes in disposition among communicators [21].

sensitive, personal, and sociable a medium is perceived to be, the higher is its social presence. Communication media can accordingly be ordered on a continuum, with face-to-face providing the highest level of social presence [30]. The richness of a medium comprises four criteria: multiple cues (physical presence, voice inflection, body gestures, words, numbers, and graphic symbols), immediacy of feedback, language variety (numbers or natural language), and personal focus (using feelings and emotions) [32]. Similar to the continuum based on social presence, media can be classified from high to low richness.

In Te'eni's Organizational Communication Model [21, p. 271], media are characterized in terms of interactivity ("potential for immediate feedback"), channel capacity ("potential to transmit a high variety of cues and language"), and adaptiveness ("potential to adapt a message to a particular receiver"). Likewise, media synchronicity is determined by five capabilities: transmission velocity, naturalness and appropriateness of symbol sets, parallelism, rehearsability, and reprocessability [22]. While the first two capabilities are positively related to the synchronicity capacity of a medium, the latter three are negatively related to it. Dennis et al. [22] also provide a synchronicity ordering of media, as follows (from high to low): face-to-face, video-conference, telephone conference, synchronous instant messaging, synchronous electronic conferencing, asynchronous electronic conferencing, asynchronous electronic mail, voice mail, fax, and documents.

In sum, prior research has often compared the selection and effectiveness of both synchronous and asynchronous technology-enabled media with the face-to-face setting [20,30,33,35,36]. Although there is a widespread belief that face-to-face is the gold standard for communication, relative to which technology-enabled communication is deficient [22,37,38], prior research has also suggested that face-to-face interaction is not necessarily more effective in every situation [39,40]. In addition, there is a large body of literature on group support systems [41–43], which studies mechanisms for temporally and spatially dispersed group interaction that are complementary to the use of meetings [31,44]. However, research on the effective selection of

several, synchronous meeting modes is sparse. Notable exceptions include Fish et al. [45], who compared the appropriateness of a video-conferencing system with that of the telephone and face-to-face for a set of communication tasks, and Standaert et al. [15], who studied the effectiveness of audio-conferencing, video-conferencing, telepresence, and face-to-face for various meeting objectives.

3. RESEARCH DESIGN

Business meetings involve dynamic communication and coordination [46] among multiple participants who generally observe, exchange, discuss, and/or develop some type of content [14]. The content can be in the form of interactive dialog, and can also include text, spreadsheets, images, slide decks, videos, or physical or digital artifacts. Through the exchange of subjective views and opinions, the meeting participants can establish a common frame of reference and build consensus [3,32]. Such interpersonal communication in synchronous meetings involves two-way interaction that can be verbal and/or non-verbal [22,36]. In scheduled meetings that involve a set date, time, participant list, duration, location(s), and agenda [1,47], two issues are typically determined in advance. First, an important element of the planning process for such purposeful meetings is determining the objectives of the meeting [1]. Second, the selection of an effective meeting mode also has to be made, particularly when meeting participants are geographically distributed [6] [6].

To evaluate the effective selection of communication media, prior studies have relied on theories, such as social presence, media richness, or media synchronicity that integrate multiple communication media capabilities into a single concept.[7] These integrated concepts are useful to compare the effectiveness of media at the low-end of the medium spectrum (e.g., e-mail, fax) with media at the high-end of the spectrum (e.g., video-conferencing, face-to-face). However, meeting

[6] Impromptu distributed meetings (e.g., in the hallway or coffee corner) are also possible and several systems have been designed for this purpose [47,106,107], however, they are outside the scope of this study.

[7] A notable exception is the theoretical work by Maruping and Agarwal [23], in which the authors develop propositions about the fit between interpersonal processes (conflict management, motivating/confidence building, and affect management) and specific synchronicity functionalities in virtual teams.

modes are all at the high-end of the communication medium spectra that are proposed by these theories, meaning they provide high social presence, media richness, and synchronicity [22,30,32,37]. In keeping with [21,22], we argue that instead of considering integrated concepts, researchers could examine what each meeting mode capability affords separately.

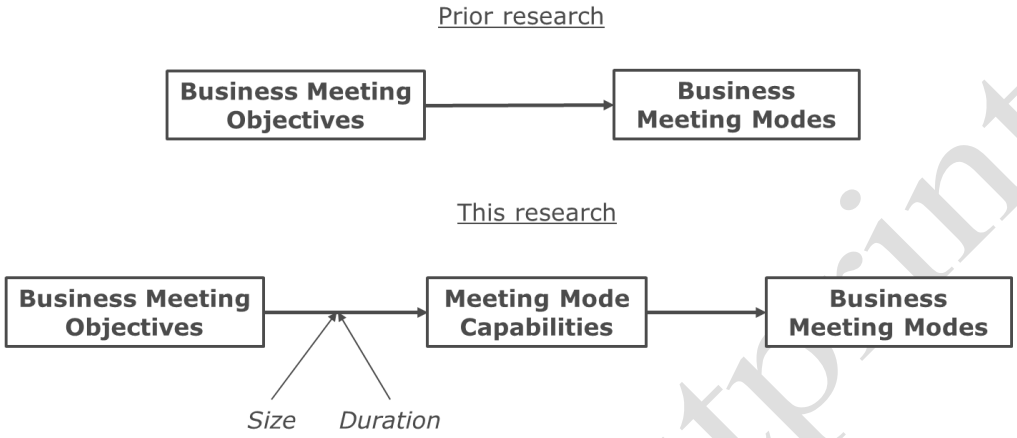

Figure 1. Research Design

The relationships between meeting objectives and meeting modes, as studied in prior research (e.g., [15,45]) can be characterized by the model in the upper part of Figure 1. In the current study, we extend this model as shown in the lower part of Figure 1, by considering the functional capabilities relevant to different meeting objectives, as well as the moderating impact of meeting size and meeting duration.

As shown in Figure 1, our research design starts from meeting objectives. In the next subsection, we organize the relatively large set of possible business meeting objectives into four categories. The key relationships we examine in this paper are those between meeting objectives and meeting mode capabilities. In the second subsection, we develop a list of functional capabilities relevant to meeting modes by drawing from the literature.

3.1 Business Meeting Objectives

Meetings can serve a large variety of possible objectives. We adopt a broad list of objectives developed in a study that assesses meeting mode effectiveness [15] and draw upon the literature to organize the objectives into four categories. Therefore, we briefly review various, prior

categorizations of objectives from research on communication in general and on business meetings specifically.

In research on communication in general, several categories of tasks or objectives have been proposed. For instance, in the theory of communicative action [48], four broad communication purposes are described: reaching understanding, coordinating action, managing relationships, and influencing. While these purposes relate to interpersonal interaction in society in general, they can be adapted to the context of organizational communication [21]. In addition, McGrath [49] identified four task quadrants related to group activities: generate (planning and creativity tasks), choose (intellective and decision-making tasks), negotiate (cognitive conflict and mixed-motive tasks), and execute (contests / battles / competitive and performance / psychomotor tasks). Furthermore, Campbell [50] delineated different task types based on the underlying complexity dimensions: simple tasks, problem tasks, decision tasks, judgment tasks, and fuzzy tasks. Finally, Watson-Manheim and Bélanger [36,51] explored five communication purposes: conflict resolution, coordination, information gathering, knowledge sharing, and relationship development.

In the specific context of business meetings, Leach et al. [52] indicated that there are three broad goals meetings can serve (p. 2): "information sharing, decision making, and problem solving." Similarly, Tracy and Dimock [53] state that (p. 123): "[the] primary purpose in assembling is to (a) give and get information, (b) coordinate and plan future actions, or (c) deliberate, problem solve, and make decisions." Others have distinguished between only two kinds of communication in meetings: informational and relational [54]. Jay [55] states that what is key in meetings is to make sure (p. 48): "[e]veryone is committed to what the group decides and is collectively responsible […] as well as individually answerable for his own part in it." Evidence from practice also suggests broad categories are used—for instance at Intel, meetings are held to inform about, discuss, and/or decide on topics [56].

Although prior research has asserted that there is no single, straightforward way to classify meeting objectives [14,15], we have identified four categories of meeting objectives, combining the different ideas of the above review. The first category of meeting objectives involves exchanging (providing and obtaining) information, which has oftentimes been referred to as a key communication and meeting objective [30,57]. The second category refers to objectives that go beyond sharing factual information and involve communicating emotions, sentiments or personal values [33,38]. The third category includes objectives closely related to making decisions in meetings [14,49,55,58]. The fourth category of meeting objectives is based on the notion that meetings can also have social, relationship-building-related objectives [1,54], which is consistent with the broader organizational communication literature that identifies relationship-related in addition to task-related objectives [16,21,24,59,60]. Table 1 shows the different objectives identified in [15], organized in these four categories: exchanging information, communicating sentiments, making decisions, and building relationships.

Categories	Meeting objectives
Exchanging information [32,48,49,61]	Routine exchange of information
	Non-routine exchange of information
	Generate ideas on products, projects, or initiatives
	Clarify a concept, issue, or idea
	Give or receive orders
Communicating sentiments [20,35,45]	Give or receive feedback
	Exchange/share opinions or views on a topic or issue
	Communicate positive or negative feelings or emotions on a topic or issue
	Show personal concern about or interest in a particular issue or situation
	Exchange confidential, private, or sensitive information
	Assert and/or reinforce your authority, status, position to your team, or others
Making decisions [14,49,55,58]	Make a decision
	Find a solution to a problem that has arisen
	Generate buy-in or consensus on an idea
	Negotiate or bargain on a deal or contract
Building relationships [16,21,24,59,60]	Build trust and relationships with one or more individuals
	Maintain relationships with one or more other people and stay in touch
	Assemble a team and/or motivate teamwork on a project
	Resolve conflicts and disagreements within a group

Table 1. Categories of Business Meeting Objectives[8]

[8] Adapted from [15, p. 392.

3.2 Meeting Mode Capabilities

We consider four synchronous meeting modes in this study, as discussed in the introduction of this paper. The first three are technology-enabled—audio-conferencing, video-conferencing, and telepresence—and the fourth is face-to-face. As described earlier in this section, meeting interaction involves the transmission of auditory, visual, and physical cues by multiple meeting participants. While such cues are a given in a face-to-face meeting, support for them has to be designed into technology-mediated modes.

Drawing from the extant literature on synchronous group interactions and on mediated organizational communication, we assemble a list of capabilities relevant to the business meeting context, as shown in Table 2.

Capability	**References**
Hear attendees' voices (speech and vocal tone)	[22,30,32,37]
Observe appearance (posture, clothing, etc.) of attendees	[30,32]
See attendees' body language and gestures	[30,32,37]
Discern attendees' facial expressions	[30,37]
Observe what attendees are looking at	[30,62]
Experience co-location (the sense of being in the same physical location)	[37,63]
Have side conversations with one or more attendees	[63,64]
Use shared computer screens and/or work spaces	[32,64]
Do side-tasks that other attendees are unaware of	[36,65]
Examine and/or manipulate specific physical objects (e.g., prototypes or samples)	[66]
Use ancillary resources such as a flip-chart	[63]
Have ancillary interaction before or after the formal meeting	[45,67]

Table 2. Meeting Mode Capabilities Identified in the Literature

Capabilities, such as hearing each other's voices and transmitting nonverbal vocal cues, body gestures, facial expressions, and direction of looking incorporate audible, visible, and physical cues relating to the sensory information available in a face-to-face setting [30,32,68]. On the other hand, the capability of creating local co-presence is based on a collective sense of being in the same physical location [30,37,63] (see the first six capabilities in Table 2). Capabilities specific to synchronous group interactions include the ability to "Have side conversations" [63,64], the ability to "Use shared computer screens and/or work spaces" [32,64], and the ability to "Do side-tasks that others are unaware of" [36,65] (see the next three capabilities in Table 2). Finally, we

include capabilities, such as the ability to "Examine physical objects" [66], the ability to "Use ancillary resources" [63], and the ability to "Have ancillary interaction" [45,67] (see the last three capabilities in Table 2).

Prior to starting the actual field data collection, the relevance and sufficiency of this list of capabilities from the literature (see Table 2) was assessed [69]. A set of eight business managers with varying functional roles and responsibilities were contacted and asked to review the list. Based on their feedback, none of the capabilities was found to be irrelevant, and no additional capabilities were identified.

4. ANALYSIS AND RESULTS

In this section, we first describe our field study's data collection approach. Then, we present the results of an assessment of capability importance across individual objectives and an examination of the relationship between meeting size/duration and capability importance, across the different objectives[9]. We end this section by summarizing the empirical findings on meeting mode capability importance and relating these findings to our categorization of meeting objectives.

4.1 Data Collection

A research collaboration was established with a company that designs, manufactures, and delivers connected components, systems, and solutions. The company is publicly traded on the New York Stock Exchange, active in 150 countries, and employs over 90,000 people worldwide. The data for this field study were obtained from questionnaires completed by organizers of actual business meetings at this company, providing "a realistic context and point of reference" [70, p. 169]. A list of employees of the company who had recently organized an internal business meeting using one of four meeting modes (audio-conferencing, video-conferencing, telepresence, or face-to-face)[10] was compiled, based on company log records of meetings.

[9] For clarity, business meeting objectives are italicized and meeting mode capabilities are put between quotation marks.
[10] For business meetings with remote participants, employees at the company have access to audio-conferencing, using AT&T Conferencing™ or Microsoft Lync™, video-conferencing, using Intercall™ or Microsoft Lync™, and to telepresence, using Cisco TelePresence™, as alternatives to a face-to-face meeting.

For meetings in each mode, e-mail invitations were sent to the organizer (9,938 in total), requesting them to complete an online questionnaire for that meeting (see Appendix A). In the questionnaire, the respondents were asked to identify the key objectives for the specific meeting from the list of 19 business meeting objectives (see Table 1) and to rate the importance of each of the 12 capabilities listed in Table 2, for achieving the key objectives of the meeting. In keeping with Webster & Trevino [71], who use a single-item scale to measure the importance of media choice factors, we use a scale of 1: "Not at all important" to 5: "Very important" to measure capability importance. Since respondents could select multiple objectives as key to the meeting, the capability importance scores were at the level of the meeting. The questionnaire additionally asked the respondents to provide information on the number of meeting participants and on the meeting duration.

Several measures were taken to minimize the influence of biases. To reduce the influence of socially desirable responses, respondents were ensured anonymity [72], and to minimize recall decay bias, respondents were requested to refer to a specific recently organized meeting [73]. Also, to remove a potential order effect [74], the lists with objectives and capabilities were presented in a randomized order for each respondent.

Participation in the field study was motivated in two ways. First, the invitation e-mails indicated endorsement by senior management of the company. Second, the invitation e-mails included a commitment to post a summary of the study results on the company's intranet. Data were obtained from 925 respondents, an effective response rate of 9.3% (similar to that in [75]). This response rate is reasonable, given the sensitivity of the subject due to concerns about "interactional privacy" [76] and the difficulty of obtaining data concerning real-life business meetings [77]. While anonymity was assured in our study, managerial psychology research on response rates for sensitive topics (e.g., [78]) suggests that the impact of anonymity can be mixed.

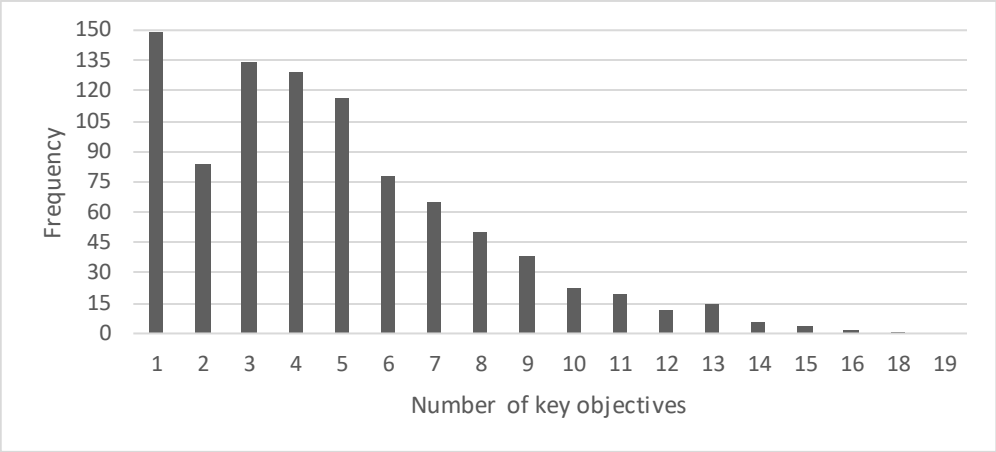

Figure 2. Frequency of the Number of Key Meeting Objectives

The number of selected objectives was not limited and we observed that the range of objectives chosen by the respondents was large, up to 18 objectives as shown in Figure 2. In meetings with large numbers of objectives, assessing the importance of individual capabilities for each objective is difficult, as there are many relationships among the different objectives [79,80]. Therefore, it is likely that the conclusions from an analysis of meetings with a very large number of objectives are less reliable and less differentiating. Furthermore, as Figure 2 shows, far fewer meetings had one objective compared with the number that had a single objective, and the drop in frequency from five to six objectives in a meeting was also quite large. In addition, the distribution of the number of meetings across the four modes for a subset of meetings with up to five objectives was similar to the distribution for the full data set, as shown in Table 3. Based on these observations, we focused our analysis on the reduced data set of 612 responses representing meetings with up to five objectives.

Meeting mode	**Full data set**	**Reduced data set**
Audio-conferencing (AC)	277	187
Video-conferencing (VC)	235	151
Telepresence (TP)	137	88
Face-to-face (FTF)	276	186
Total	**925**	**612**

Table 3. Distribution of Respondents across Business Meeting Modes

Furthermore, only objectives for which there were sufficient observations (over 30) were included for further analysis. On this basis, four objectives were excluded,[11] and the remaining 15 objectives were considered for further analysis.

4.2 Analysis of Capability Importance for Different Meeting Objectives

To examine the importance of different capabilities for a meeting based on its objectives, we first analyzed the Pearson correlations among the remaining 15 objectives in the reduced data set, to examine whether there is a high co-occurrence of certain pairs of objectives in meetings. Only 5 out of 105 possible pairs of objectives had significant pairwise correlations, corrected for multiple testing (critical p-value of 0.00095 (=0.10/105) [81]). Four pairs show significant, positive correlations[12], and one pair shows a significant, negative correlation (*routine exchange of information* and *non-routine exchange of information*). As only few significant correlated pairs of objectives were identified, an analysis of capability importance at the level of individual objectives is suitable.

We then computed the mean importance scores of the meeting mode capabilities for each of the 15 business meeting objectives, as shown in Table 4. To indicate whether or not a capability was important for achieving an objective, the midpoint of the scale was used as a cut-off criterion [82]. Since, meeting mode capability importance was measured on a scale of 1: "Not at all important" to 5: "Very important," the mean scores at or above the midpoint of the scale (3) were considered important. We choose a scale midpoint split rather than a mean or median split, because we wanted the dichotomization to be theoretically based instead of being determined by the characteristics of the sample. Given that the scale midpoint is higher than the mean (2.91) and median (2.80), it is more discriminating, meaning there is more variety in importance among capabilities and across meeting objectives [83].

[11] Assert and/or reinforce your authority, status, position; give or receive orders; communicate positive or negative feelings or emotions on a topic or issue; and negotiate or bargain on a deal or contract

[12] Make a decision and find a solution to a problem; make a decision and resolve conflicts and disagreements; build trust and relationships and maintain relationships and stay in touch; build trust and relationships and show personal concern

	Business Meeting Objectives	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1	Routine exchange of information	**4.16**	**4.20**	2.91	2.70	2.54	2.49	1.99	2.14	2.19	2.43	1.98	1.87
2	Non-routine exchange of information	**4.24**	**3.79**	2.78	2.84	2.86	2.41	2.07	2.02	2.08	2.61	2.01	1.82
3	Clarify a concept, issue, or idea	**4.09**	**4.17**	2.95	2.88	2.68	2.75	2.19	2.25	2.62	2.72	2.26	2.05
4	Exchange/share different opinions or views of a topic or issue	**4.19**	**3.99**	2.97	2.90	2.77	2.65	2.19	2.30	2.28	2.66	2.23	1.99
5	Find a solution to a problem that has arisen	**4.08**	**3.93**	2.96	2.89	2.79	2.64	2.28	2.46	2.44	2.76	2.24	2.04
6	Generate ideas on products, projects, or initiatives	**4.13**	**3.99**	**3.36**	2.99	2.86	2.71	2.15	2.64	2.65	2.80	2.49	2.09
7	Show personal concern about or interest in a particular issue or situation	**4.26**	**3.63**	**3.17**	2.89	2.94	2.71	2.11	2.31	2.14	2.54	2.31	1.66
8	Make a decision	**4.08**	**3.99**	**3.10**	2.94	2.79	2.77	2.28	2.49	2.53	2.67	2.32	1.95
9	Give or receive feedback	**4.12**	**3.96**	**3.15**	**3.02**	2.91	2.60	2.24	2.23	2.42	2.61	2.29	1.87
10	Generate buy-in or consensus on an idea	**4.20**	**4.07**	**3.03**	**3.03**	2.96	2.55	2.28	2.17	2.20	2.57	1.91	1.79
11	Assemble a team and/or motivate teamwork on a project	**4.09**	**4.00**	**3.10**	**3.04**	2.91	2.60	2.23	2.41	2.41	2.67	2.26	2.06
12	Exchange confidential, private, or sensitive information	**4.18**	**3.71**	**3.47**	**3.20**	**3.06**	2.65	2.51	2.31	2.27	2.65	1.76	1.94
13	Maintain relationships with one or more other people and stay in touch	**4.02**	**3.78**	**3.55**	**3.40**	**3.24**	2.90	2.81	2.52	2.30	2.65	2.24	2.05
14	Resolve conflicts and disagreements within a group	**4.15**	**3.67**	**3.46**	**3.46**	**3.48**	**3.27**	2.58	2.92	2.65	2.92	2.63	2.35
15	Build trust and relationships with one or more individuals	**4.10**	**3.65**	**3.49**	**3.56**	**3.45**	**3.17**	2.82	2.33	2.58	2.55	2.23	1.86

1	*Hear attendees' voices (speech and vocal tone)*	*7*	*Observe appearance (posture, clothing, etc.) of attendees*
2	*Use shared computer screens and/or work spaces*	*8*	*Have side conversations with one or more attendees*
3	*Experience co-location (the sense of being in the same physical location)*	*9*	*Examine and/or manipulate specific physical objects (e.g., prototypes or samples)*
4	*See attendees' body language and gestures*	*10*	*Have ancillary interaction before or after the formal meeting*
5	*Discern attendees' facial expressions*	*11*	*Use ancillary resources such as a flip-chart*
6	*Observe what attendees are looking at*	*12*	*Do side-tasks that other attendees are unaware of*

Table 4. Mean Business Meeting Mode Capability Importance Scores for Achieving Business Meeting Objectives

Across the different meeting objectives, six capabilities were evaluated as important for achieving one or more of them, as shown in Table 4: "Hear attendees' voices," "Use shared computer screens and/or work spaces," "Experience co-location," "See attendees' body language and gestures," "Discern attendees' facial expressions," and "Observe what attendees are looking at." This implies that the other six capabilities were not important for any objective ("Examine and/or manipulate specific physical objects," "Observe appearance of attendees," "Have side conversations with one or more attendees," "Have ancillary interaction before or after the formal meeting," "Use ancillary resources," and "Do side-tasks that other attendees are unaware of").

From the analysis presented in Table 4, there are some key observations worth noting. First, the perceived importance of capabilities varied substantially across the objectives. While for objectives 1–5, only two capabilities were found to be important, six capabilities were considered important for objectives 14–15. Second, there were significant similarities among sets of objectives in terms of capability importance: the 15 objectives could be classified into five sets with the same combination of important capabilities. Third, we observe a cumulative increase in important capabilities, from objectives 1 to 15 (or sets 1–5) in Table 4. In other words, while additional capabilities became important for subsequent sets of objectives, the important capabilities of previous sets remained. For instance, for objectives 6–15, "Use shared computer screens and/or work spaces" remained important as additional visual cues also became important.

4.3 Effect of Meeting Size and Duration

We also wanted to examine whether the importance of different capabilities was affected by the size and/or duration of a distributed meeting. For the six meeting mode capabilities that were identified as important in the first analysis step (see Table 4), the relationships with both meeting size (number of meeting participants) and meeting duration were examined, by means of correlation analyses[13]. Correlations were computed for each of the 15 objectives. After applying a

[13] For meeting size, a Pearson correlation analysis was conducted and for meeting duration, which was measured on an ordinal scale (see Appendix A), a Spearman rank-order correlation analysis was conducted.

correction for multiple testing (*6* capabilities * *15* objectives) the critical p-value becomes 0.001 (= 0.10/(*6***15*) [81].

	Business Meeting Objectives		*1*	*2*	*3*	*4*	*5*	*6*
1	Routine exchange of information	Size	0.047	0.084	0.055	0.023	0.077	–0.078
		Duration	–0.052	–0.009	0.264*	0.260*	0.256*	0.225
2	Non-routine exchange of information	Size	–0.03	0.107	0.132	0.193	0.095	0.244
		Duration	0.065	0.053	0.239	0.221	0.301	0.111
3	Clarify a concept, issue, or idea	Size	0.04	0.115	0.06	–0.019	–0.009	–0.077
		Duration	0.108	–0.016	0.286*	0.283*	0.289*	0.267*
4	Exchange/share different opinions or views of a topic or issue	Size	–0.102	0.017	0.1	–0.062	–0.061	–0.111
		Duration	–0.142	–0.166	0.310*	0.17	0.194	0.125
5	Find a solution to a problem that has arisen	Size	–0.23	0.053	0.018	0.011	0.125	–0.079
		Duration	–0.052	0.044	0.162	0.192	0.217	0.224
6	Generate ideas on products, projects, or initiatives	Size	–0.086	0.026	0.028	–0.044	–0.004	–0.025
		Duration	–0.042	–0.017	0.244	0.198	0.233	0.151
7	Show personal concern or interest	Size	–0.092	0.087	0.256	0.066	0.092	0.164
		Duration	–0.276	0.093	0.11	0.179	0.157	0.171
8	Make a decision	Size	–0.047	0.034	0.033	0.053	0.086	–0.043
		Duration	–0.147	–0.063	0.198	0.236	0.244	0.193
9	Give or receive feedback	Size	–0.055	0.101	–0.054	–0.187	–0.163	0.063
		Duration	0.018	–0.005	0.074	0.155	0.182	0.18
10	Generate buy-in or consensus on an idea	Size	–0.03	0.122	0.042	–0.029	–0.122	–0.048
		Duration	0.015	0.195	0.318	0.363	0.315	0.23
11	Assemble a team and/or motivate teamwork on a project	Size	0.089	0.086	0.163	0.019	–0.006	–0.043
		Duration	0.161	0.034	0.357*	0.274	0.284	0.258
12	Exchange confidential, private, or sensitive information	Size	–0.156	0.261	0.02	–0.1	–0.03	–0.084
		Duration	0.003	0.139	0.089	0.157	0.147	0.094
13	Maintain relationships and stay in touch	Size	0.046	0.097	0.09	0.006	0.016	–0.005
		Duration	–0.068	0.026	0.315	0.224	0.179	0.2
14	Resolve conflicts and disagreements within a group	Size	–0.291	0.131	0.045	0.043	–0.047	0.228
		Duration	–0.123	0.153	0.138	0.333	0.103	0.484
15	Build trust and relationships with one or more individuals	Size	–0.042	0.095	0.196	0.01	0.014	–0.023
		Duration	–0.069	–0.085	0.349	0.168	0.235	0.096

* $p < 0.001$

1	*Hear attendees' voices (speech and vocal tone)*

2	*Use shared computer screens and/or work spaces*
3	*Experience co-location (the sense of being in the same physical location)*
4	*See attendees' body language and gestures*
5	*Discern attendees' facial expressions*
6	*Observe what attendees are looking at*

Table 5. Correlations between the Importance of Meeting Mode Capabilities and Meeting Size and Meeting Duration

For the number of meeting participants, no statistically significant relationships were found for any of the meeting objectives at the 0.001 significance level. Hence, meeting size was not found to correlate with capability importance at all. For meeting duration, Table 5 shows that for four capabilities significant relationships were found at the 0.001 significance level, namely for: "Experience co-location," "See attendees' body language and gestures," "Discern attendees' facial expressions," and "Observe what attendees are looking at." All four of these capabilities became more important in longer meetings for *Clarify a concept, issue or idea.* The relationship with duration was significant for the same capabilities for *Routine exchange of information*, with the exception of "Observe what attendees are looking at." For two other objectives (i.e., *Exchange/share different opinions or views of a topic or issue* and *Assemble a team and/or motivate teamwork on a project*), only the relationship with "Experience co-location" was significant.

It is of interest to note that we observed significant correlations between the importance of a specific capability and meeting duration for four objectives, although the above analysis did not find the specific capability to be important (i.e., above the scale midpoint 3). This indicates that the capability importance score could exceed the cut-off criterion for meetings with a duration above a certain threshold. As an example, consider the objective *Clarify a concept, issue or idea*, for which significant correlations with meeting duration were found for four capabilities that were not generally found to be important (see Table 4). Table 6 shows the mean importance scores of these four capabilities for five categories of meeting duration and shows that these capability scores were above the cut-off criterion for meetings of over 1 hour.

	Experience co-location	See attendees' body language and gestures	Discern attendees' facial expressions	Observe what attendees are looking at
Less than 15 minutes	3.00	2.80	2.60	1.80
15–30 minutes	2.63	2.47	2.38	2.44
30–60 minutes	2.72	2.73	2.46	2.57
1–2 hours	**3.64**	**3.55**	**3.45**	**3.27**
over 2 hours	**4.00**	**3.71**	**3.36**	**3.43**

Table 6. Mean Capability Importance across Meeting Duration (for Clarify a concept, issue or idea)

5. DISCUSSION AND IMPLICATIONS

The approach taken in this study—examining what each meeting mode capability affords separately instead of considering integrated concepts—has important implications in at least three ways. First, it explains the relationships between objectives and capabilities in a consistent and comprehensive way. Second, differences in media effectiveness found in prior research can be explained at a higher level of granularity. Third, guidelines for effective meeting mode selection can be developed.

5.1 Meeting Mode Capability Importance across Objectives

The goal of this study is to provide detailed insight on the importance of different meeting mode capabilities for a broad variety of meeting objectives. Our empirical results highlight the relevance of considering distinct capabilities, as their importance was found to vary largely across objectives. While this finding is consistent with the literature that highlights how different objectives are affected differently by the medium used, our results provide insight that goes beyond integrated, one-dimensional communication media concepts, such as social presence, media richness, and media synchronicity. In this section, we summarize the findings according to the importance ordering of meeting mode capabilities (see Table 4). We discuss the six capabilities that were generally found to be important and also briefly discuss the other capabilities, as well as the impact of meeting size and duration.

The first two meeting mode capabilities "Hear attendees' voices" and "Use shared computer screens and/or work spaces" were found to be important for achieving all of the business meeting objectives. For the capability "**Hear attendees' voices**," all mean importance

scores were above 4 on a scale of 1–5 (see Table 4). This finding is consistent with the literature that highlights speech as the primary basis for interpersonal communication [22,30,32,84]. The capability "**Use shared computer screens and/or work spaces**" was found to be especially important for achieving meeting objectives involving exchanging information, multiplicity of views, and different frames of reference (i.e., *Routine exchange of information*, *Clarify a concept, issue, or idea*, and *Generate buy-in or consensus on an idea*). While this capability has been recognized as important for such objectives in prior research [32,64,84], our findings strongly suggest that using shared computer screens and/or work spaces is fundamental for supporting any of the business meeting objectives.

"**Experience co-location**" was the third most significant capability, found to be important for objectives 6–15 in Table 4. Consistent with prior research [30,37], this capability was found to be especially important (the highest scores were found) for communication in which interpersonal relationships are important (see objectives 12–15 in Table 4). This suggests that while non-task-related, social interaction comes spontaneously in face-to-face interaction [85], it requires experiencing a sense of co-location in technology-enabled meetings. Also, a distinguishing factor relative to the first set of objectives (1–5 in Table 4) seems to be that objectives 6–15 involve relatively more mutual interaction and higher engagement of all participants [20], which is facilitated by the capability "Experience co-location." Indeed, the ordering of objectives seems to be such that there is a "successive level of interdependence" [86, p. 313].

Two visual capabilities ("**See attendees' body language and gestures**" and "**Discern attendees' facial expressions**") were also found to be important for multiple objectives (see objectives 9–15 in Table 4). The lack of importance of visual capability for the preceding objectives suggests that visual capabilities could be a distraction that leads meeting participants to focus on the people rather than the information, opinion, or problem [24]. Indeed, relative to the preceding objectives, objectives 9–15 involve relatively more communication of emotions and differing personal values or attitudes, which is consistent with the literature [86]. Also, the

objectives that involve relationships and conflict (see objectives 13–15 in Table 4) have the highest importance scores relative to the other objectives, which is consistent with literature that suggests richer media are appropriate for objectives that "allude to the nature of the social relationship between the communicators" [33, p. 519]. Finally, the capability "Observe what attendees are looking at" was found to be important only for *Build trust and relationships* and *Resolve conflicts and disagreements*, two objectives for which observing group dynamics are key and interpersonal relationships are salient [23,30,87].

The **remaining six capabilities** (7–12 in Table 4) were not found to be important, suggesting that they may be "nice-to-haves" in particular situations, but not important in general. For instance, "Do side-tasks that other attendees are unaware of" was found to be the least important capability for achieving objectives in business meetings. This finding can be related to the fact that our analysis was based on responses from meeting organizers. As the meeting organizer sets the meeting objectives and invites others to attend the meeting, he or she would expect everyone's attention to be with the objectives during the meeting. Nevertheless, we did observe that some of these remaining capabilities had a relatively high importance score for some objectives, which was also close to the cut-off criterion of 3. For instance, the capability "Have ancillary interaction before or after the formal meeting" was relatively more important (with an importance score of 2.80) for *Generate ideas on products, projects or initiatives*. This is consistent with prior research that suggests it could be valuable to prepare in smaller groups for this objective, before a plenary discussion [88]. This same capability ("Have ancillary interaction before or after the formal meeting") as well as "Have side conversations with one or more attendees" were relatively more important for *Resolve conflicts and disagreements within a group* (both with scores of 2.92). This observation is consistent with earlier research that pointed out that side conversations, ancillary to the meeting or not, could be useful among allied participants [89].

With regard to the impact of **meeting size and duration**, our study only found duration to moderate the relationship between the perceived importance of specific capabilities and meeting

objectives. While prior exploratory research on face-to-face meetings did not find any effect of size or duration on meeting effectiveness [52], we did identify some relationships with duration at the level of specific objectives. For two objectives (*Routine exchange of information* and *Clarify a concept, issue, or idea*), significant relationships were found between meeting duration and the importance of "Experience co-location" and of multiple visual capabilities. This is consistent with the notion that in longer meetings, more capabilities are required to keep meeting participants focused [11]. Furthermore, the capability "Experience co-location" was found to have the most significant relationships with meeting duration, namely for four objectives, which could indicate that it is harder to maintain a sense of co-location among participants as technology-enabled meetings last longer.

5.2 Explaining Differences in Media Effectiveness

The detailed level of the analysis in this study with respect to the importance of capabilities during meetings helps explain the findings from prior studies on the relationships between meeting objectives and meeting modes (e.g., [15,45]). For instance, if video-conferencing was found to be more effective than audio-conferencing, it was unclear which of the additional capabilities (e.g., "See attendees' body language," "Discern attendees' facial expressions") that video-conferencing offers could explain this difference. To illustrate how such explanation can be provided based on the findings of this study, we relate the capabilities identified as important for business meetings to the four meeting modes considered (audio-conferencing, video-conferencing, telepresence, and face-to-face), as shown in Table 7.

	Audio-conferencing	Video-conferencing	Telepresence	Face-to-face
Hear attendees' voices (speech and vocal tone)	X	X	X	X
Use shared computer screens and/or work spaces	X	X	X	X
See attendees' body language and gestures		X	X	X
Discern attendees' facial expressions		X	X	X
Experience co-location			X	X
Observe what attendees are looking at			X	X

Table 7. Capabilities Supported by Each Meeting Mode

As Table 7 shows, the meeting modes can be ordered in terms of their progressive capabilities: video-conferencing provides the capabilities of audio-conferencing and two additional capabilities. Similarly, telepresence provides the capabilities of video- and audio-conferencing as well as two additional capabilities. However, note that face-to-face does not provide any additional capabilities relative to telepresence. Moreover, the breadth and depth to which the capability is supported may differ. For instance, video quality in telepresence is much higher than in video-conferencing, therefore, the ability to see body language and discern facial expressions will be better supported.

By integrating the capabilities supported by the meeting modes (see Table 7) with the analysis of capability importance for meeting objectives (see Table 4), we can explain earlier findings on (the lack of) differences in meeting mode effectiveness. For instance, for *Routine exchange of information* no difference in effectiveness was found between audio-conferencing and video-conferencing [45] or between video-conferencing and telepresence [15]. Our findings indicated that for this objective, only two capabilities are important, which are supported by all these meeting modes. As another example, for *Build trust and relationships*, video-conferencing was found to be more effective than audio-conferencing [45] and telepresence more effective than video-conferencing [15]. This can be explained by video-conferencing supporting additional important capabilities for this objective relative to audio-conferencing, such as "See attendees' body language" and "Discern attendees' facial expressions" and telepresence providing additional important capabilities relative to video-conferencing, such as "Experience co-location" and "Observe what attendees are looking at."

Moreover, a key outcome of our analysis is that it provides support for the notion that novel technologies, such as telepresence that closely resembles the face-to-face setting, can also be effective for *Build trust and relationships* [15]. Indeed, none of the capabilities that were identified as important in the above analysis, differentiates face-to-face from telepresence (see Table 7). A widespread notion is that "trust needs touch" [90], yet our findings suggest that the

telepresence mode is more closely related to face-to-face in terms of capabilities and effectiveness for business meetings than it is to other technologies, such as video-conferencing.

5.3 Guidelines for Effective Meeting Mode Selection

While prior research has examined the impact of many factors on communication media selection [33,36,71,91–93], we are the first to empirically examine the role of functional mode capabilities, in the context of business meetings. As the examples in the introduction illustrated, meeting organizers previously had to make assumptions about the importance of capabilities for achieving meeting objectives, in order to select an effective meeting mode. Yet the integration of the analysis of capability importance for meeting objectives (see Table 4) with the capabilities supported by the meeting modes (see Table 7), allows identifying the meeting mode with the least capabilities that is expected to be effective for each meeting objective.

Figure 3 proposes effective meeting modes, also taking into account meeting duration, based on which we present meeting mode selection guidelines. The objectives are grouped in three sets in this table, based on the integration of the capabilities empirically found to be important for achieving them and whether these capabilities are supported by meeting modes. Note that the empirical findings did not perfectly match the four categories of meeting objective identified from the literature (see Section 3.1). However, the observed pattern of capability importance across objectives seems to suggest that an increasing number of capabilities is important going from the first category exchanging information, over communicating sentiments, making decisions, and finally to building relationships.

As shown in Figure 3, audio-conferencing is suggested to be sufficient for objectives 1–5. Additional capabilities are not expected to further increase meeting mode effectiveness and could even "overcomplicate the communication and distract the receiver's attention" [32, p. 359]. In longer meetings, "Experience co-location" became more important for three of the objectives in this set and visual capabilities also became more important for two of these objectives. Hence, a meeting organizer could consider the selection of video-conferencing or telepresence for longer

meetings with these objectives. For objectives 6–13, “Experience co-location” and visual capabilities also became important and therefore video-conferencing and telepresence are proposed as effective meeting modes. Here again, the selection of telepresence is recommended especially for longer meetings, as the visual capabilities are of higher quality in this mode. For objectives 14–15, an additional capability became important: “Observe what attendees are looking at,” which is only available in the telepresence and face-to-face meeting modes (see Table 7).

	Business Meeting Objective	Important Capabilities						Proposed Meeting Mode
		Hear attendees' voices (speech and vocal tone)	Use shared computer screens and/or work spaces	Experience co-location (the sense of being in the same physical location) (1, 3, 4, 11)	See attendees' body language and gestures (1, 3)	Discern attendees' facial expressions (1, 3)	Observe what attendees are looking at (3)	
1	Routine exchange of information							Audio-conferencing (or video-conferencing for longer meetings)
2	Non-routine exchange of information							
3	Clarify a concept, issue, or idea							
4	Exchange/share different opinions or views of a topic or issue							
5	Find a solution to a problem that has arisen							
6	Generate ideas on products, projects, or initiatives							Video-conferencing or telepresence
7	Show personal concern or interest							
8	Make a decision							
9	Give or receive feedback							
10	Generate buy-in or consensus on an idea							
11	Assemble a team and/or motivate teamwork on a project							
12	Exchange confidential, private, or sensitive information							
13	Maintain relationships and stay in touch							
14	Resolve conflicts and disagreements within a group							Telepresence or face-to-face
15	Build trust and relationships with one or more individuals							

Note: the numbers in parentheses in the columns with the important capabilities indicate the objectives (numbered in the left-hand column) for which a significant, positive relationship was found with meeting duration

Figure 3. Business Meeting Objectives, Important Capabilities, and Proposed Meeting Modes

To effectively achieve multiple objectives in one meeting, an organizer can consider the capability importance across the relevant objectives, and use a meeting mode that provides all the necessary capabilities. Alternatively, the meeting organizer may opt to set up separate meetings, using modes that provide distinct capabilities needed to achieve different objectives. However, a noteworthy observation is that the two meeting mode capabilities ("Hear attendees' voices" and "Use shared computer screens and/or work spaces") that were consistently found to be the two utmost important capabilities for achieving all of the meeting objectives, are supported by all the meeting modes examined.

6. CONCLUSION

The goal of this paper was to examine what meeting mode capabilities are important for different business meeting objectives and how understanding the importance of capabilities for different meeting objectives can help in selecting effective meeting modes. We found that the importance varies across objectives and that sets of objectives can be identified for which the same combination of capabilities are perceived to be important, that the important capabilities progressively increase across these sets of meeting objectives, and that the combinations of important capabilities align with the capabilities provided by different meeting modes. In addition, we examined the impact of meeting size and duration on capability importance and found meeting duration to have a moderate impact. These results suggest that functional capabilities can indeed be used as a helpful basis for selecting effective meeting modes for distributed meetings, depending on the intended meeting objectives.

6.1 Theoretical and Managerial Contributions

We focused on the importance of the functional capabilities that the meeting modes support as a basis for selecting an effective meeting mode. Although some earlier work has referred to examining individual communication capabilities [21–23], this is the first empirical study to systematically examine the relationship between meeting objectives and the capabilities important for achieving them. While our study is consistent with theories such as task-technology fit, social

presence, media richness, and media synchronicity that integrate multiple communication media capabilities into a single concept, our contribution lies in a systematic, granular, and empirical analysis that explains effectiveness of meeting modes for different meeting objectives in terms of the capabilities needed. This study provides empirically validated guidelines on when and how to use different meeting modes and specific design guidance for different communication technologies in distributed meetings.

The results of this study also have significant managerial implications for organizers of distributed business meetings, for whom the selection of an effective meeting mode is a non-trivial question. In other words, our analysis and results indicate that meeting modes should be chosen thoughtfully, rather than simply picking whatever is least expensive or most convenient. Meeting modes can be regarded as bundles of capabilities, which users can pick and choose from, in order to achieve objectives [21,94]. The guidelines in Section 5.3 can serve as an important basis for meeting organizers that need to make a meeting mode selection, based on the intended objectives and the duration of the meeting, and avoids the need to consider the need for each individual capability in that choice process. In addition to a lasting shift to more distributed meetings, an expected consequence of easing measures related to the COVID-19pandemic is the increased prevalence of so-called hybrid meetings [4], in which different participants use different combinations of meeting mode capabilities concurrently [31]. The ability to use functional capabilities in hybrid meetings adds to the significance of understanding capability importance for achieving objectives. The insights of this study could also be applied in the design of a meeting planning system, serving as a useful decision support aid in organizations.

6.2 Limitations and Future Research Directions

Our focus was on the analysis of the relationships between meeting objectives and the importance of meeting mode capabilities. However, perceived media characteristics can be influenced by coworkers' attitudes, statements, and behavior concerning a medium [95], as well as by the choice set of media available [96]. Other contextual factors could have an impact, such as prior

experience with the medium, with the other user(s), with the message topic at hand, and with the organizational context [97,98]. As to the latter, conducting our study in a single organization provides the advantage of consistency in meeting culture, in access to and experience with modes, and in social norms concerning technology use [59], but it also limits the generalizability of the results. For instance, there may be organizational factors constraining the use of the mode that is most effective, such as cost or availability. For example, cost considerations can render face-to-face meetings for which significant travel is required infeasible, necessitating the use of technology-enabled meeting modes regardless of the meeting's objectives [99]. Future research about the influence of additional factors and other organizational contexts would be of value.

Furthermore, in the empirical studies, respondents were asked to choose a business meeting that they had organized recently, and to base their answers on this specific meeting. Since it is human nature to recall memorable events, the choice of meetings might have been biased towards those that were most successful or unsuccessful [100]. Also, the meeting organizer was asked to evaluate the importance of meeting mode capabilities for achieving business meeting objectives, as this person is usually the one that selects a meeting mode. However, different participants in a business meeting may have different objectives for the meeting [101]. Hence, it is possible that an organizer evaluates a capability as important, while other attendees feel it is not important, or vice versa. Having multiple attendees of a meeting respond could offer additional insight.

Current Web-conferencing software enables the flexible use of capabilities in meetings, so that users can choose whether or not to share video, computer screens, or applications. Also, a novel feature of video-conferencing software is the ability to split up a larger meeting into sub-meetings and going back and forth between the large meeting and smaller sub-meetings. A related, common practice in today's workplace is multi-communicating, "the use of technology to participate in several interactions at the same time" [65,102]. Hence, the flexibility of

contemporary technologies challenges the notion of a single focus of cognitive attention in meetings [58]. These topics offer interesting avenues for further research on how technology changes workplace communication practices.

In our research design, we examined how meeting objectives relate to the importance of capabilities for a meeting. The opposite direction of these relationships could also be studied, for instance how the (un)availability of capabilities in distributed meetings may relate to the relevance and frequency of objectives. Prior research has suggested that there should be more focus on establishing common ground and creating redundancy in the exchange of information in technology-mediated meetings with limited capabilities, relative to face-to-face meetings [3]. The list of capabilities and the categories of objectives developed in this paper could serve as a basis to examine how the distributed nature of meetings potentially changes the content of meetings.

While three significant, broadly used technology-enabled meeting modes were considered in this paper, additional technologies for distributed business meetings continue to emerge and offer novel capabilities [5]. For instance, augmented reality technology can enable multiple participants to observe and manipulate a virtual object, artificial intelligence technology can help to automatically generate meeting minutes and action points, and virtual reality and holographic software can offer meeting participants new types of immersive experiences. Interesting avenues for future research include investigating the effectiveness of these emerging technologies for business meetings, including the importance of their novel capabilities.

REFERENCES

[1] H. Schwartzman, The Meeting: Gatherings in Organizations and Communities, Springer, 1989.

[2] S.G. Rogelberg, Why Your Meetings Stink - And What To Do About It, Harv. Bus. Rev. (2019) 140–143.

[3] E. Keating, S.L. Jarvenpaa, Words Matter: Communicating Effectively in the New Global Office, University of California Press, Oakland, California, 2016.

[4] A. Richter, Locked-down digital work, Int. J. Inf. Manage. In Press (2020). https://doi.org/10.1016/j.ijinfomgt.2020.102157.

[5] P. Marks, Virtual collaboration in the age of the coronavirus, Commun. ACM. 63 (2020) 21–23. https://doi.org/10.1145/3409803.

[6] J.M. Denstadli, T.E. Julsrud, R.J. Hjorthol, Videoconferencing as a Mode of Communication: A Comparative Study of the Use of Videoconferencing and Face-to-Face Meetings, J. Bus. Tech. Commun. 26 (2011) 65–91.

[7] J. Fjermestad, An Analysis of Communication Mode in Group Support Systems Research, Decis. Support Syst. 37 (2004) 239–263.

[8] M.H. Zack, Interactivity and Communication Mode Choice in Ongoing Management Groups, Inf. Syst. Res. 4 (1993) 207–239.

[9] R. Pye, E. Williams, Teleconferencing: is Video Valuable or is Audio Adequate?, Telecomm. Policy. (1977) 230–241.

[10] G. Radford, B. Morganstern, The Impact of Four Conferencing Formats on the Efficiency and Quality of Small Group Decision Making in a Laboratory Experiment Setting, Telemat. Informatics. 11 (1994) 97–109.

[11] C. Kydd, D. Ferry, Managerial Use of Video Conferencing, Inf. Manag. 27 (1994) 369–375.

[12] J. Bartlett, Telepresence: Beautiful and Expensive, Bus. Commun. Rev. 37 (2007) 20–25.

[13] J. Conti, Technology Telepresence: I See Live People, Eng. Manag. J. 17 (2007) 12–16.

[14] J. Allen, T. Beck, C. W. Scott, S. G. Rogelberg, Understanding Workplace Meetings, Manag. Res. Rev. 37 (2014) 791–814.

[15] W. Standaert, S. Muylle, A. Basu, An Empirical Study of the Effectiveness of Telepresence as a Business Meeting Mode, Inf. Technol. Manag. 17 (2016) 323–339.

[16] M. Hoegl, H.G. Gemuenden, Teamwork Quality and the Success of Innovative Projects: A Theoretical Concept and Empirical Evidence, Organ. Sci. 12 (2001) 435–449.

[17] S.A. Westmyer, R.L. DiCioccio, R.B. Rubin, Appropriateness and Effectiveness of Communication Channels in Competent Interpersonal Communication, J. Commun. 48 (1998) 27–48.

[18] A.M. Curtis, A.R. Dennis, K.O. McNamara, From Monologue to Dialogue: Performative Objects to Promote Collective Mindfulness in Computer-Mediated Team Discussions, MIS Q. 41 (2017) 559–581.

[19] M.B. O'Leary, J.M. Wilson, A. Metiu, Beyond Being There: The Symbolic Role of Communication and Identification of Perceptions of Proximity to Geograpichally Dispersed Colleagues, MIS Q. 38 (2014) 1219–1243.

[20] R. King, W. Xia, Media Appropriateness: Effects of Experience on Communication

Media Choice, Decis. Sci. 28 (1997) 877–910.

[21] D. Te'eni, Review: A Cognitive-Affective Model of Organizational Communication for Designing IT, MIS Q. 25 (2001) 251–312.

[22] A. Dennis, R. Fuller, J. Valacich, Media, Tasks, and Communication Processes: A Theory of Media Synchronicity, MIS Q. 32 (2008) 575–600.

[23] L.M. Maruping, R. Agarwal, Managing Team Interpersonal Processes through Technology: A Task-Technology Fit Perspective, J. Appl. Psychol. 89 (2004) 975–990. https://doi.org/10.1037/0021-9010.89.6.975.

[24] B. Mennecke, J. Valacich, B. Wheeler, The Effects of Media and Task on User Performance: A Test of the Task-Media Fit Hypothesis, Gr. Decis. Negot. 9 (2000) 507–529.

[25] J.F. George, J.R. Carlson, J.S. Valacich, Media Selection as a Strategic Component of Communication, MIS Q. 37 (2013) 1233–1251.

[26] I. Zigurs, D. Khazanchi, From Profiles to Patterns: A New View of Task-Technology Fit, Inf. Syst. Manag. 25 (2008) 8–13.

[27] D. Goodhue, R. Thompson, Task-Technology Fit and Individual Performance, MIS Q. 19 (1995) 213–236.

[28] R.M. Fuller, A.R. Dennis, Does Fit Matter? The Impact of Task-Technology Fit and Appropriation on Team Performance in Repeated Tasks, Inf. Syst. Res. 20 (2009) 2–17. https://doi.org/10.1287/isre.1070.0167.

[29] C. Serrano, E. Karahanna, The Compensatory Interaction between User Capabilities and Technology Capabilities in Influencing Tesk Performance: An Emperical Assessment in Telemedicine Consultations, MIS Q. 40 (2016).

[30] J. Short, E. Williams, B. Christie, The Social Psychology of Telecommunications, John Wiley & Sons, London, 1976.

[31] L. Chidambaram, B. Jones, Impact of Communication Medium and Computer Support on Group Perceptions and Performance: A Comparison of Face-to-face and Dispersed Meetings, MIS Q. 17 (1993) 465–491.

[32] R. Daft, R. Lengel, L.K. Trevino, Message Equivocality, Media Selection, and Manager Performance: Implications for Information Systems, MIS Q. 11 (1987) 355–366.

[33] M.L. Markus, Electronic Mail as the Medium of Managerial Choice, Organ. Sci. 5 (1994) 502–527.

[34] A.R. Dennis, J.S. Valacich, C. Speier, M.G. Morris, Beyond Media Richness: An Empirical Test of Media Synchronicity Theory, 31st Annu. Hawaii Int. Conf. Syst. Sci. (1998) 48–57.

[35] R.E. Rice, Media Appropriateness: Using Social Presence Theory to Compare Traditional and New Organizational Media, Hum. Commun. Res. 19 (1993) 451–484.

[36] M.-B. Watson-Manheim, F. Bélanger, Communication Media Repertoires: Dealing with the Multiplicity of Media Choices, MIS Q. 31 (2007) 267–293.

[37] N. Kock, The Psychobiological Model: Towards a New Theory of Computer-Mediated Communication Based on Darwinian Evolution, Organ. Sci. 15 (2004) 327–348.

[38] L.K. Trevino, R.H. Lengel, R.L. Daft, Media Symbolism, Media Richness, and Media Choice in Organizations: A Symbolic Interactionist Perspective, Communic. Res. 14 (1987) 553–574. https://doi.org/10.1177/009365087014005006.

[39] N. Kock, Compensatory Adaptation to a Lean Medium: an Action Research

Investigation of Electronic Communication in Process Improvement Groups, IEEE Trans. Prof. Commun. 44 (2001) 267–285. https://doi.org/10.1109/47.968108.

[40] J.B. Walther, Interpersonal Effects in Computer-Mediated Interaction: A Relational Perspective, Communic. Res. 19 (1992) 52–90. https://doi.org/10.1177/009365092019001003.

[41] A.R. Dennis, M.J. Garfield, The Adoption and Use of GSS in Project Teams: Toward More Participative Processes and Outcomes, MIS Q. 27 (2003) 289–323.

[42] J.F. Nunamaker, A.R. Dennis, J.S. Valacich, D.R. Vogel, Information Technology for Negotiating Groups: Generating Options for Mutual Gain, Manage. Sci. 37 (1991) 1325–1346.

[43] A. Dennis, J. George, L. Jessup, J.F. Nunamaker, D.R. Vogel, Information Technology to Support Electronic Meetings, MIS Q. 12 (1988) 591–624.

[44] I. Zigurs, B. Buckland, A Theory of Task/Technology Fit and Group Support Systems Effectiveness, MIS Q. 22 (1998) 313–334.

[45] R. Fish, R. Kraut, R. Root, R. Rice, Evaluating Video as a Technology for Informal Communication, in: Proc. SIGCHI Conf., 1992: pp. 37–48.

[46] A.H. Van De Ven, A.L. Delbecq, R. Koenig Jr., Determinants of Coordination Modes within Organizations, Am. Sociol. Rev. 41 (1976) 322–338. http://www.jstor.org/stable/2094477 .

[47] R. Fish, R. Kraut, B. Chalfonte, The VideoWindow System in Informal Communication, in: Proc. 1990 ACM Conf. CSCW, 1990.

[48] J. Habermas, The Theory of Communicative Action, Heinemann Education, London, 1987.

[49] J. McGrath, Groups: Interaction and Performance, Prentice-Hall, Englewood Cliffs, N.J., 1984.

[50] D.J. Campbell, Task Complexity: A Review and Analysis, Acad. Manag. Rev. 13 (1988) 40–52.

[51] M.-B. Watson-Manheim, F. Bélanger, Support for Communication-Based Work Processes in Virtual Work, E-Service J. 1 (2002) 61–82. https://doi.org/10.1353/esj.2002.0014.

[52] D.J. Leach, S.G. Rogelberg, P.B. Warr, J.L. Burnfield, Perceived Meeting Effectiveness: The role of Design Characteristics, J. Bus. Psychol. 24 (2009) 65–76. https://doi.org/10.1007/s10869-009-9092-6.

[53] K. Tracy, A. Dimock, Meetings: Discursive Sites for Building and Fragmenting Community, Ann. Int. Commun. Assoc. 28 (2004) 127–165. https://doi.org/10.1080/23808985.2004.11679034.

[54] K.A. McComas, Citizen Satisfaction with Public Meetings Used for Risk Communication, J. Appl. Commun. Res. 31 (2003) 164–184. https://doi.org/10.1080/0090988032000064605.

[55] A. Jay, How to Run a Meeting, Harv. Bus. Rev. (1976) 43–57.

[56] M. Mankins, C. Brahm, G. Caimi, Your Scarcest Resource, Harv. Bus. Rev. 92 (2014) 74–80.

[57] K.A. McComas, Theory and practice of public meetings, in: Commun. Theory, 2001: pp. 36–55. https://doi.org/10.1111/j.1468-2885.2001.tb00232.x.

[58] N.C. Romano, J.F. Nunamaker, Meeting Analysis: Findings from Research and Practice, in: 34th Hawaii Int. Conf. Syst. Sci., 2001: pp. 1–13.

[59] W.J. Kettinger, V. Grover, The Use of Computer-mediated Communication in an Interorganizational Context, Decis. Sci. 28 (1997) 513–555. https://doi.org/10.1111/j.1540-5915.1997.tb01321.x.

[60] V.L. Bartelt, A.R. Dennis, Nature and Nurture: The Impact of Automaticity and the Structuration of Communication on Virtual Team Behavior and Performance, MIS Q. 38 (2014) 521–538.

[61] R.H. Lengel, R.L. Daft, The Selection of Communication Media as an Executive Skill, Acad. Manag. Exec. 2 (1989) 225–232.

[62] R. Vertegaal, The GAZE Groupware System: Mediating Joint Attention in Multiparty Communication and Collaboration, in: Proc. SIGCHI Conf. Hum. Factors Comput. Syst., 1999.

[63] G.M. Olson, J.S. Olson, Distance Matters, Human-Computer Interact. 15 (2000) 139–178.

[64] W.A.S. Buxton, Telepresence: Integrating Shared Task and Person Spaces, in: Proc. Groupw., 1991: pp. 27–36.

[65] N.L. Reinsch, J.W. Turner, C.H. Tinsley, Multicommunicating: A Practice Whose Time Has Come?, Acad. Manag. Rev. 33 (2008) 391–403.

[66] A. Sellen, Remote Conversations: The Effects of Mediating Talk with Technology, Human-Computer Interact. 10 (1995) 401–444.

[67] P. Hinds, M. Mortensen, Understanding Conflict in Geographically Distributed Teams: The Moderating Effects of Shared Identity, Shared Context, and Spontaneous Communication, Organ. Sci. 16 (2005) 290–307.

[68] J.A.A. Sillince, A Media-Attributes and Design-Choices Theory of the Information Technology -Organization Relation, J. Organ. Comput. Electron. Commer. 7 (1997) 279–303. https://doi.org/10.1207/s15327744joce0704.

[69] M. Rosemann, I. Vessey, Toward Improving the Relevance of Information Systems Research to Practice: The Role of Applicability Checks, MIS Q. 32 (2008) 1–22.

[70] L.K. Trevino, J. Webster, E.W. Stein, Making Connections: Complementary Influences on Communication Media Choices Attitudes, and Use, Organ. Sci. 11 (2000) 163–182.

[71] J. Webster, L.K. Trevino, Rational and Social Theories as Complementary Explanations of Communication Media Choices: Two Policy-capturing Studies, Acad. Manag. J. 38 (1995) 1544–1572.

[72] P.M. Podsakoff, S.B. MacKenzie, J.-Y. Lee, N.P. Podsakoff, Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies, J. Appl. Psychol. 88 (2003) 879–903.

[73] E.M. Hufnagel, C. Conca, User Response Data: The Potential for Errors and Biases, Inf. Syst. Res. 5 (1994) 48–73.

[74] J.A. Krosnick, D.F. Alwin, An Evaluation of a Cognitive Theory of Response-Order Effects in Survey Measurement, Public Opin. Q. 51 (1987) 201–219.

[75] J.M. Denstadli, M. Gripsrud, R. Hjorthol, T.E. Julsrud, Videoconferencing and Business Air Travel: Do New Technologies Produce New Interaction Patterns?, Transp. Res. Part C Emerg. Technol. 29 (2013) 1–13. https://doi.org/10.1016/j.trc.2012.12.009.

[76] H. Cho, R. LaRose, Privacy issues in internet surveys, Soc. Sci. Comput. Rev. 17 (1999) 421–434. https://doi.org/10.1177/089443939901700402.

[77] R. Volkema, F. Niederman, Planning and Managing Organizational Meetings: An

Empirical Analysis of Written and Oral Communications, J. Bus. Commun. 33 (1996) 275–296.

[78] J. Barnett, Sensitive questions and response effects: An evaluation, J. Manag. Psychol. 13 (1998) 63–76. https://doi.org/10.1108/02683949810369138.

[79] Y.D. Edwards, G.M. Allenby, Multivariate Analysis of Multiple Response Data, J. Mark. Res. 40 (2003) 321–334. https://doi.org/10.1509/jmkr.40.3.321.19233.

[80] J. a McCarty, L.J. Shrum, The Measurement of Personal Values in Survey Research: A Test of Alternative Rating Procedures, Public Opin. Q. 64 (2000) 271–298. https://doi.org/10.1086/317989.

[81] J. Neter, M. Kutner, C. Nachtsheim, W. Wasserman, Applied Linear Statistical Models, 4th ed., McGraw-Hill/Irwin, New York, 1996.

[82] D.D. Rucker, B.B. McShane, K.J. Preacher, A Researcher's Guide to Regression, Discretization, and Median Splits of Continuous Variables, J. Consum. Psychol. 25 (2015) 666–678.

[83] G. Donà, J.W. Berry, Acculturation Attitudes and Acculturative Stress of Central American Refugees, Int. J. Psychol. 29 (1994) 57–70. https://doi.org/10.1080/00207599408246532.

[84] S. Whittaker, Theories and Methods in Mediated Communication, in: A. Graesser, M. Gernsbacher, S. Goldman (Eds.), Handb. Discourse Process., Lawrence Erlbaum Associates, Mahwah, NJ, 2003: pp. 243–286.

[85] P. Bordia, Face-to-face versus Computer-mediated Communication: A Synthesis of the Experimental Literature, J. Bus. Commun. 34 (1997) 99–120.

[86] A.B. Hollingshead, J.E. Mcgrath, K.M. O'Connor, Group Task Performance and Communication Technology: A Longitudinal Study of Computer-Mediated Versus Face-to-Face Work Groups, Small Gr. Res. 24 (1993) 307–333. https://doi.org/10.1177/1046496493243003.

[87] A. Katz, D. Te'eni, The Contingent Impact of Contextualization on Computer-Mediated Collaboration, Organ. Sci. 18 (2007) 261–279.

[88] L. Tung, E. Turban, A Proposed Research Framework for Distributed Group Support Systems, Decis. Support Syst. 23 (1998) 175–188. https://doi.org/10.1016/S0167-9236(98)00040-2.

[89] L. Wainfan, P.K. Davis, Challenges in Virtual Collaboration, 2004.

[90] C. Handy, Trust and the Virtual Organization, Harv. Bus. Rev. 73 (1995) 40–50. https://doi.org/10.1016/0024-6301(95)94284-6.

[91] P.J. Carlson, G.G.B. Davis, An Investigation of Media Selection Among Directors and Managers: From "Self" to "Other" Orientation, MIS Q. 22 (1998) 335–362.

[92] Y. Yoo, M. Alavi, Media and Group Cohesion: Relative Influences on Social Presence, Task Participation, and Group Consensus, MIS Q. 25 (2001) 371–390.

[93] D. Straub, E. Karahanna, Knowledge Worker Communications and Recipient Availability: Toward a Task Closure Explanation of Media Choice, Organ. Sci. 9 (1998) 160–175.

[94] G. DeSanctis, M. Poole, Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory, Organ. Sci. 5 (1994) 121–147.

[95] J. Fulk, C.W. Steinfield, J. Schmitz, J.G. Power, A Social Information Processing Model of Media Use in Organizations, Communic. Res. 14 (1987) 529–552.

[96] J.B. Walther, N.N. Bazarova, Validation and Application of Electronic Propinquity

Theory to Computer-Mediated Communication in Groups, Communic. Res. 35 (2008) 622–645.

[97] J.R. Carlson, R. Zmud, Channel Expansion Theory and the Experiential Nature of Media Richness Perceptions, Acad. Manag. J. 42 (1999) 153–170.

[98] S.A. Brown, A.R. Dennis, V. Venkatesh, Predicting Collaboration Technology Use: Integrating Technology Adoption and Collaboration Research, J. Manag. Inf. Syst. 27 (2010) 9–54. https://doi.org/10.2753/MIS0742-1222270201.

[99] V. Venkatesh, H. Bala, Technology Acceptance Model 3 and a Research Agenda on Interventions, Decis. Sci. 39 (2008) 273–315.

[100] U. Arnold, H. Kärner, M. Schnabel, Target-Oriented Use of Strategic Sourcing Tools: A Critical Analysis Creating Process Awareness for Electronic Reverse Auctions, J. Purch. Supply Manag. 11 (2005) 116–128.

[101] R.O. Briggs, G.-J. de Vreede, B.A. Reinig, A Theory and Measurement of Meeting Satisfaction, in: 36th Hawaii Int. Conf. Syst. Sci., IEEE, 2003.

[102] A.-F. Cameron, J. Webster, Multicommunicating: Juggling Multiple Conversations in the Workplace, Inf. Syst. Res. 24 (2013) 352–371. https://doi.org/10.1287/isre.1120.0446.

[103] M. Lombard, T. Ditton, At the Heart of It All: The Concept of Presence, J. Comput. Commun. 3 (1997).

[104] M. Minsky, Telepresence, Omni. (1980) 45–51.

[105] J. Steuer, Defining Virtual Reality: Dimensions Determining Telepresence, J. Commun. 42 (1992) 73–93.

[106] R.W. Root, Design of a Multi-Media Vehicle for Social Browsing, in: Proc. 1988 ACM Conf. Comput. Coop. Work, 1988: pp. 25–38. https://doi.org/10.1145/62266.62269.

[107] H. Nakanishi, C. Yoshida, T. Nishimura, I. T, FreeWalk: A 3D Virtual Space for Casual Meetings, MultiMedia. 6 (1999) 20–28.

APPENDIX A. QUESTIONNAIRE

Thank you for cooperating in this *Company*-supported research project on the use of technology-mediated business meetings. This survey will take less than five minutes to complete. All data will be treated confidentially and anonymously, and presented in the aggregate only.

To answer the questions below, please think of a specific *Company*-internal meeting you organized recently using audio-conferencing/video-conferencing/telepresence/face-to-face[14].

1. **For this specific meeting, please select from the following list one or more key objectives of the meeting:** [15]

	Exchange/share opinions or views on a topic or issue
	Make a decision
	Give or receive orders
	Find a solution to a problem that has arisen
	Generate ideas on products, projects or initiatives
	Generate buy-in or consensus on an idea
	Resolve conflicts and disagreements within a group
	Build trust and relationships with one or more individuals
	Maintain relationships with one or more other people and stay in touch
	Negotiate or bargain on a deal or contract
	Routine exchange of information
	Non-routine exchange of information
	Communicate positive or negative feelings or emotions on a topic or issue
	Show personal concern about or interest in a particular issue or situation
	Assert and/or reinforce your authority, status, position to your team or others
	Give or receive feedback
	Assemble a team and/or motivate teamwork on a project
	Clarify a concept, issue or idea
	Exchange confidential, private or sensitive information

[14] Only one option was shown here.
[15] The ordering of objectives was randomized.

2. **Please select how important the following capabilities were for achieving the key objectives of this specific meeting[16]:**

	1: Not at all important	2	3	4	5: Very important
Have side conversations with one or more attendees	O	O	O	O	O
Discern attendees' facial expressions	O	O	O	O	O
Examine and/or manipulate specific physical objects (e.g. prototypes or samples)	O	O	O	O	O
Experience co-location (the sense of being in the same physical location)	O	O	O	O	O
Have ancillary interaction before or after the formal meeting	O	O	O	O	O
Use shared computer screens and/or work spaces	O	O	O	O	O
Observe appearance (posture, clothing, etc.) of attendees	O	O	O	O	O
Use ancillary resources such as a flip-chart	O	O	O	O	O
Observe what attendees are looking at	O	O	O	O	O
See attendees' body language and gestures	O	O	O	O	O
Do side-tasks that other attendees are unaware of	O	O	O	O	O
Hear attendees' voices (speech and vocal tone)	O	O	O	O	O

3. **How many people attended this meeting?**

4. **What was the approximate duration of this meeting?**

   - Less than 15 minutes
   - 15 to 30 minutes
   - 30 to 60 minutes
   - 1 to 2 hours
   - over 2 hours

[16] The ordering of capabilities was randomized.