Conversations, Conferencing and Collaboration:

An Asia-Pacific investigation of factors influencing the effectiveness of distributed meetings

Anna Mieczakowski, Joy Goodman-Deane, Jeff Patmore and John Clarkson

UNIVERSITY OF CAMBRIDGE
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Executive Summary

Modern technology has made great changes to the way businesses work. In particular, business meetings no longer need to be held face-to-face. People from distant locations can communicate through technology, rather than wasting hours or even days in travelling. But are distributed meetings effective? This report investigates the factors that make a distributed meeting more, or less, effective and makes recommendations about how to improve them.

The report examines the factors found in a study of distributed meetings in the Asia-Pacific region. In particular, interviews and surveys were conducted with company professionals in both Australia and China. This allowed a rounded picture to be built up of how culturally different countries in this region use distributed working. This study forms part of a global study, which also examined distributed working in the UK and the US [1, 2].

The study investigated both factors to do with the *Technology* and those associated with the *People*. It reviewed current literature on the subject and interviewed experts in distributed working and audio conferencing. This was followed by interviews with ten experienced professionals in Australia and ten in China, and an online survey of 100 conferencing technology users in Australia and 100 in China.

The research showed that both audio- and video-based conferencing solutions were used on a regular basis, with video interventions being used by more people than audio in the surveyed countries. Video-based solutions were used regularly by 85% of Australian respondents and 95% of respondents from China. In comparison, 69% of those in Australia and 60% in China used audio-based solutions on a regular basis.

Furthermore, high quality sound was seen as a key factor in conferencing. In particular, the top response to the question – what are the factors that impact on the effectiveness of a distributed meeting? – was 'good sound quality', with 85% of Australian respondents and 78% of Chinese respondents rating it as having a medium-high or high impact. In addition, participants were asked to identify improvements that would encourage greater usage of audio conferencing technologies. By far the highest response to this open-ended question was 'better sound quality', indicating the importance of this to the participants in both countries.

A number of specific challenges were found to be associated with traditional distributed meetings relative to face-to-face meetings: (1) difficulties in making oneself heard, particularly when trying to cut into a conversation; (2) difficulties in identifying who is speaking; (3) problems with people getting tired, distracted

Foreword

In today's economy, the best results are achieved by teams that collaborate on a global scale. We are a world leader in communications technology that enables better collaboration. We believe that better quality, readily available and cost effective tools will always deliver a better, more sustainable outcome.

Our partnership with Dolby is testament to our commitment to helping our customers collaborate more efficiently.

Working with the University of Cambridge and other leading experts from around the world, we have understood how to reduce barriers in global collaboration. This is valuable insight into how we work together across widespread teams and how best to deal with the challenges.

As a leader of a global enterprise myself, I am passionate about the use of collaboration technology. They are critical to the efficiency and success of BT Global Services as they are to many other global businesses. But they only work well when they are simple to use and effective at what they do.

or multi-tasking; and (4) the challenge of building good working relationships through distributed meetings. Furthermore, when asked about barriers to adopting new technologies, many of the survey participants expressed concerns about issues such as cost (35% in Australia, 19% in China) and difficulty integrating new technology with existing systems (12% in Australia, 34% in China).

It is clear from this that good quality technology is very important in ensuring an effective meeting. However, it is not the only thing that matters. The study identified issues to do with both *Technology* and *People*. These can be categorised into three main factors: *Technology, Management* and *Team behaviour*. As mentioned above, the *Technology* used in a distributed meeting has a great impact. Poor technology can make meetings ineffective and waste both the valuable time of the participants and company resources. The *Management* of a project and an individual meeting also has a big impact on meeting productivity. Good management can help teams to work well together, cover the important points and make efficient decisions. Lastly, the *behaviour of the participants* can also improve, or detract from, a distributed meeting. This has implications on team work and individual behaviour, both within a particular meeting and across a project more generally.

These three factors can be influenced by people at all levels of an organisation. In particular, we identify three groups that have a part to play in ensuring that distributed meetings are run productively: the *Organisation* as a whole, the *Chairpeople* and the *Participants*. *Organisations* can provide high quality technologies, produce and widely disseminate guidance and training on how the meetings should be run, and can help to build well-gelled teams. *Chairpeople* can choose appropriate technology for their particular meetings, prepare for and manage those meetings well, and encourage good team behaviour. Lastly, the *Participants* in a distributed meeting can improve the meeting by making appropriate use of the technology, considering the needs of others and remaining attentive throughout.

Ultimately, by developing and exploiting the appropriate roles of *Technology* and *People* within distributed meetings – **using high quality communication technology, employing effective management approaches** and **encouraging good team behaviour** – organisations will not only achieve greater productivity in business terms, but also save both time and money.

Acknowledgements

Contents

CHAPTER 1

Introduction

Business meetings no longer need to be held face-to-face. It is now possible for people and teams dispersed all around the world to work together through communications technology. These distributed meetings are increasingly a crucial part of business affairs today. However, they are not always as efficient as they could be. All too often they are too long to keep the participants focused and extract their valuable thinking, and for various other reasons generally do not achieve their business objectives. Therefore, further investigation was needed to examine why this is the case and how the situation can be improved.

The University of Cambridge in the UK, sponsored by British Telecom (BT) and Dolby, carried out an investigation into this important problem in three international regions – the UK, the US and the Asia-Pacific region. Given the cultural diversity in the Asia-Pacific area, two countries – Australia and China – were selected to provide both Western and Eastern perspectives on the way in which distributed meetings are performed in this region. Three separate but related reports were published to document this work in the three international regions. This report documents only the research carried out in the Asia-Pacific region. Details of the findings for the UK and the US can be found in separate reports [1, 2].

The technological landscape is currently changing in Australia and China, with both countries in the process of rolling out major broadband access programmes [3, 4]. As a result, both governments are quickly realising the significance of this intervention in transforming how businesses and people work. For example, the Australian Government aims to increase the amount of distance workers to at least 12% by 2020 [5]. In China, the use of teleconferencing is already well integrated into business life, and in June 2013 Peter Quinlan, Vice President of Integrated Business Video Services at Tata Communications [6], said: *"China is currently the world's second largest economy and one of the fastest growing*

markets globally. The desire for convenient, immersive and professional business communications with this market has never been stronger".

The study in this report used a variety of methods to examine the factors impacting on the effectiveness of conferencing meetings in Australia and China, and their associated significance. A factor is anything that improves, or reduces, the productivity of a distributed meeting. It may be a characteristic of the technology, something to do with the way the meeting is managed, or other external, or internal, variables that have an effect on the meeting.

An initial literature review identified the main issues. This was followed by interviews with experts (Section 2.1), interviews with representatives of ten companies in Australia and ten in China (Section 2.2), and an online survey with 100 participants in Australia and 100 in China (Section 2.3).

1.1   Types of factors

There are a large number of disparate factors that influence the effectiveness of a distributed meeting. To assist in the identification and analysis of these influencing factors, it was important to identify a small number of key categories to describe them. However, despite there being a number of different ways reported which categorise such factors [e.g. 7, 8, 9], none of these covered all the factors identified in the literature. The categorisation proposed below is based on examining the set of issues as a whole, including those identified in the literature and interviews with experts and company professionals.

1. *Technology*
    (i.e. issues to do with the video, audio or other technology used):
    •   Usability and ease of set-up;
    •   Sound quality;
    •   System quality;
    •   Technology features.

2. People

(i.e. how the team and project are managed and how the participants behave):

- Project management and the wider organisation;
- Participant and team characteristics;
- Meeting facilitation;
- Participant behaviour.

1.2   Technology factors

Technical issues can have a large impact on the effectiveness of a distributed meeting and are associated with a range of different factors, including:

1. Usability and ease of set-up

The ease of use of a system influences how well and effectively it is used in practice [10]. For distributed meeting technology, this covers how easy it is to book and set up a meeting, as well as how easy it is to operate the technology during the meeting.

2. Sound quality

The quality of the audio and video in a distributed meeting can have a large impact on the meeting, with audio quality being a particular challenge. Surveys of problems with distributed meetings found many complaints about audio quality, including lack of audio clarity, disruptive background noise, problems with speaker identification, and difficulty understanding when more than one person speaks at the same time [9, 11, 12]. Yankelovich *et al.* [9] found that such issues were highly correlated with meeting effectiveness.

3. System quality

Other aspects of system quality also influence the effectiveness of a distributed meeting. In particular, reliability of connections and software can be a problem. Other technical issues include the difficulty of managing the different pieces of equipment [13] and getting people online and heard [11].

4. Technology features

The choice of technology, including the choice of communication medium, is also an important factor. Studies have shown that the addition of good quality video can improve meeting effectiveness for some types of tasks and situations, while audio-only solutions can be just as effective in other settings [11, 14, 15]. There are also additional technology features which can add to the meeting, including: facilities to share and view documents and visual materials (e.g. Cisco WebEx); icons that identify the current speaker [e.g. 16]; and lists of who is currently on the call [e.g. 17, 18]. Improvements to audio can also improve meetings. For example, studies show that spatial audio, which makes speakers' voices appear to come from different locations in space around the listener, can improve people's ability to identify speakers [19, 20, 21]. It also enhances speech intelligibility [22], particularly when multiple speakers talk at once [23] and there is background noise [24].

1.3   People factors

There are many factors relating to people that influence the effectiveness of a distributed meeting, including wider organisational issues, such as how the team and project are managed, and individual issues associated with how meeting facilitators and participants behave.

1. Project management and the wider organisation

Project management plays an important role. Ding *et al*. [18] note the significant amount of effort that *"is going on behind the scenes – by moderators, individuals, and organisationally defined subgroups – to create a coherent and productive meeting"*. In particular, the scheduling and organisation of meetings is important, with short and regular meetings proving most effective [8, c.f. 15]. It is also important to choose the right type of meeting for the right task, as studies show that distributed meetings are more effective in support of some types of tasks, such as information transmission and brainstorming, and not very productive in support of others, such as negotiation [14, 15].

2. Participant and team characteristics

It is important that participants in a distributed meeting are ready to work in a distributed manner and with the technology required [11]. Their ability to cope with technology-related challenges and their attitudes towards technologies and practices can have a big influence on the outcome of the meeting [8, 25]. Good team cohesion is also very important [8, 11, 26]. Teams with common ground [11] and pre-existing strong social bonds [27] often work more effectively. There are measures that can be taken to improve team cohesion, such as providing opportunities to socialise [25], using team-building exercises and meeting face-to-face at the start of a project [8].

3. Meeting facilitation

The meeting facilitator or Chairperson can do much to improve a distributed meeting [28]. Interaction Associates [29] give various recommendations for the Chairperson, including polling the group, using names and giving a commentary for remote listeners. Yankelovich *et al*. [9] note that facilitators should check for audio problems and that not doing so could cause issues. They also noted the importance of adequate advance planning.

4. Participant behaviour

The behaviour of individual participants also plays an important role. Yankelovich *et al*. [9] found that not following good meeting behaviours (such as identifying oneself when speaking) caused problems, although this was not as highly correlated with meeting effectiveness as audio or technical problems. Furthermore, when participants do not concentrate on a call (e.g. by checking e-mail at the same time), this impedes their memory and knowledge retention [30]. Interaction Associates [29] also advocate establishing ground rules (etiquette) for meetings.

CHAPTER 2

The Research

The literature presented in the previous chapter identified a large number of influencing factors. Further research was conducted to establish which of these factors were the most important and how they were relevant in the Asia-Pacific region today. The key question was:

What are the factors that most influence the effectiveness of distributed meetings?

In order to answer this, the research employed three complementary methods:

1. Semi-structured interviews with five multidisciplinary experts;
2. Semi-structured interviews with representatives of multi-sector companies with extensive experience of conferencing, ten in Australia and ten in China;
3. An online survey of professionals with some experience of distributed meetings, 100 in Australia and 100 in China.

These methods are described in further detail in the following sections.

2.1   Interviews with experts

Five interdisciplinary experts were interviewed in order to expand on and deepen the understanding developed through the literature review, which had identified issues relating to both *Technology* and *People* aspects of conferencing. Therefore, the experts were gathered from both technological and more people-oriented sectors, and included:

*   Steve Brewster, University of Glasgow, UK (multimodal human-computer interaction);
*   Paul Dourish, University of California, Irvine, US (computer-supported cooperative work);
*   David Good, University of Cambridge, UK (psychology of human communication);
*   Brian Moore, University of Cambridge, UK (auditory abilities and speech perception);
*   JoAnne Yates, Massachusetts Institute of Technology, US (management and communication and information technology).

These experts were selected to provide a broad range of perspectives on effective teleconferencing, each being able to share uniquely informed views and insights. The experts are renowned in their respective fields and their opinions are formed not only from their own research, but also from the research and contributions of others in their disciplines. Their views were elicited using a semi-structured interview method and mapped to the main points relating to the *Technology* and *People* aspects of conferencing using the general inductive analysis approach [31].

2.2   Interviews with companies

Interviews were also conducted with representatives of multi-sector companies with extensive experience of conferencing. The interviews investigated participants' experience and opinions of the effectiveness of distributed meetings, and were subsequently analysed for emerging patterns in data and coded using the general inductive analysis approach [31].

2.2.1 Interviews with Australian companies

Ten interviews were conducted with representatives of Australia-based companies. The respondents were from both large and small-to-medium sized companies from sectors that included: government, education, architecture, news and entertainment, design, food and healthcare.

The interviewees had between one and 13 years of experience in using conferencing in their work and most had experience of chairing meetings. The frequency of their participation in distributed meetings varied from twice a month to several times a day. The size of meetings also varied widely, depending on the type of meeting. However, meetings with between two and ten participants were common. Phone and Skype conferences were

particularly commonly used. However, respondents also utilised a range of other technologies, including web conferencing, Google Hangouts, GoToMeeting and (occasionally) video conferencing suites. Most interviewees stressed the high importance of distributed meetings to their work, across Australia and, in some cases, with other countries.

2.2.2 Interviews with Chinese companies

Ten interviews were conducted with representatives of China-based companies. The respondents were from both large and small-to-medium sized companies from sectors that included: management and technology consulting, finance, manufacturing, telecommunications, engineering and jewellery.

The interviewees had between two and five years of experience in using conferencing in their work and most had some experience of chairing meetings. The frequency of their participation in distributed meetings varied from about once a month to several times a day. Meetings tended to include between five and ten participants, although some were larger. Respondents also used a range of technologies, including telephone conferences, web conferencing, instant messaging and document sharing facilities. Most interviewees stressed that, in the modern world of business globalisation, internationally-run distributed meetings are of high importance in their work.

2.3 Online survey

An online survey was conducted to get a wider view of how professionals use distributed meetings in their daily work. Professionals with regular experience of teleconferencing were recruited in both Australia and China as described below. Data analysis of the responses was conducted using descriptive statistics.

2.3.1 Australia survey

One hundred respondents were recruited in Australia, through personal connections and the help of a locally-based recruitment agency. Survey respondents worked in different parts of their companies, including: Information Technology (22), Research (22), Administration (19), Marketing (13), Customer Service (12) and Other (30). Some respondents worked in more than one area. Most (97%) of respondents had at least one year of experience with distributed meetings, with 42% having over five years of experience, 29% between three and five years, and 26% between one and three years. There was similar variation in frequency, with 11% typically engaging in distributed meetings many times a day, and 13% about once a day. 28% of respondents participated in distributed meetings less than once a day but at least once a week, 28% less than once a week but at least once a month, and 20% less frequently than once a month. Most of the distributed meetings conducted by the respondents had up to 10 attendees (78% of responses) and lasted between 30 minutes and one hour (61%).

2.3.2 **China survey**

One hundred respondents were also recruited in China, through a China-based recruitment agency. Survey respondents worked in different parts of their companies, including: Sales (30), Marketing (25), Customer Service (18), Information Technology (17), Production (16), Finance (8), Distribution (7), Administration (6), Human Resources (5), Research (5) and Other (11). Some respondents worked in more than one area. All respondents had at least one year of experience with distributed meetings, with 39% having between one and three years of experience, 34% between three and five years, and 27% over five years. There was similar variation in frequency, with 2% typically engaging in distributed meetings many times a day, and 26% about once a day. 61% of respondents participated in distributed meetings less than once a day but at least once a week, and 11% less than once a week but at least once a month. Most of the distributed meetings conducted by the respondents had between 5 and 10 attendees (60% of responses) and lasted between 30 and 90 minutes (78%).

CHAPTER 3

Overview of Findings

This section presents an overview of the findings as they relate to the key research question:

> **What are the factors that most influence the effectiveness of distributed meetings?**

3.1   **Factors that influence the effectiveness of distributed meetings**

Fifteen overarching factors were elicited from a review of literature and interviews with experts and company professionals. A factor was defined as any tangible aspect of technology and people behaviour that improves, or reduces, the effectiveness of a conferencing meeting. These factors were presented to the survey participants, who rated them on a five-point scale according to the impact they have on distributed meetings (from no effect to high effect). The results for Australia and China are shown in Figures 1a and 1b respectively.

It should be noted that in both countries, all the factors were rated as having a medium-high or high impact by at least 40% of participants. This indicates that there is no one single panacea to running an effective distributed meeting. Rather a number of factors have to work together. These factors are discussed in more detail in the *Technology* (Chapter 4) and *People* (Chapter 5) sections of this report.

Figure 1a: Ratings of the impact of 15 factors on the effectiveness of distributed meetings (Australia).

How much do the following factors impact on the effectiveness of distributed meetings?

% of participants rating the factor
as having medium-high or high impact

How much do the following factors impact on the effectiveness of distributed meetings?

% of participants rating the factor
as having medium-high or high impact

Figure 1b: Ratings of the impact of 15 factors on the effectiveness of distributed meetings (China).
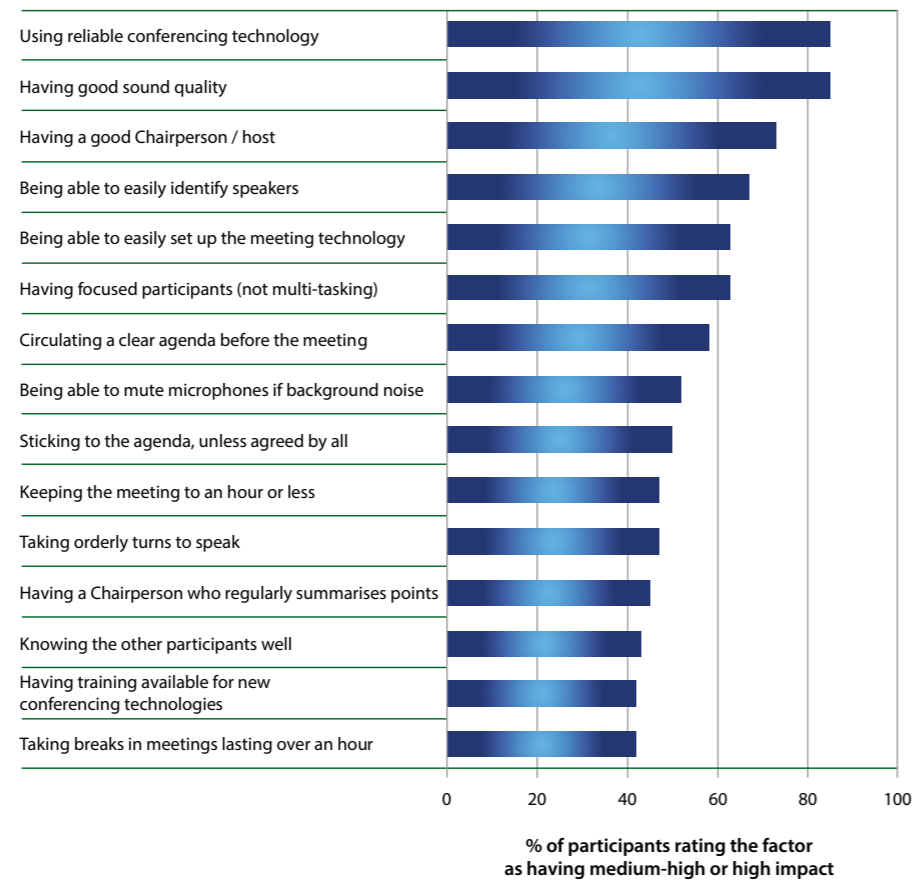
In Australia, nine out of the 15 factors were rated as having a medium-high or high impact by over 50% of participants, with the remaining six being rated so by between 40% and 50% of participants. 'Using reliable conferencing technology' and 'having good sound quality' were the top factors, both rated as having a medium-high or high impact by 85% of respondents. They were followed in third place by 'having a good Chairperson / host' at 73%.
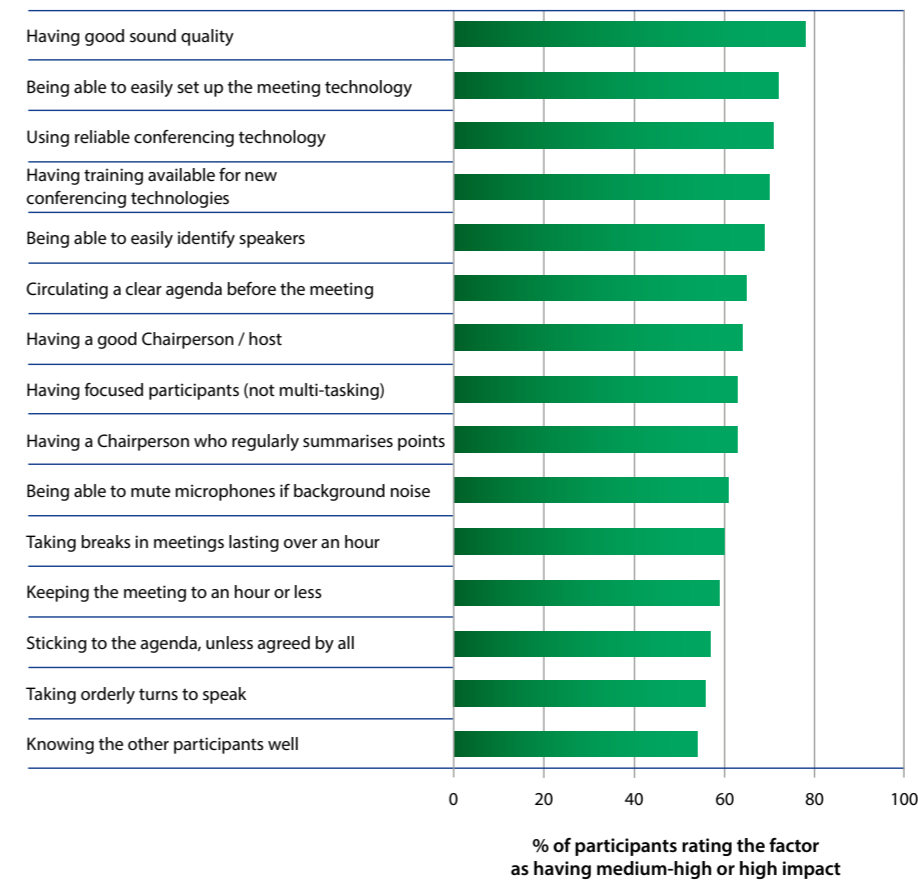
In China, all of the factors were rated as having a medium-high or high impact by over 50% of participants. 'Having good sound quality' was the top factor, rated as having a medium-high or high impact by 78% of respondents, followed by ease of set-up in second place (72%) and reliability of the conferencing technology in third position (71%).

3.2   Technologies used

The factors affecting the performance of a distributed meeting may vary depending on the technology used in that meeting. Therefore, it is useful to examine what technologies are actually used. The results from the Australian and Chinese surveys are shown in Figures 2a and 2b respectively.

Figure 2a: Technologies used in distributed meetings (Australia).

Which technologies do you use regularly in distributed business meetings?

% of participants using this technology
(Note: participants may use multiple technologies)
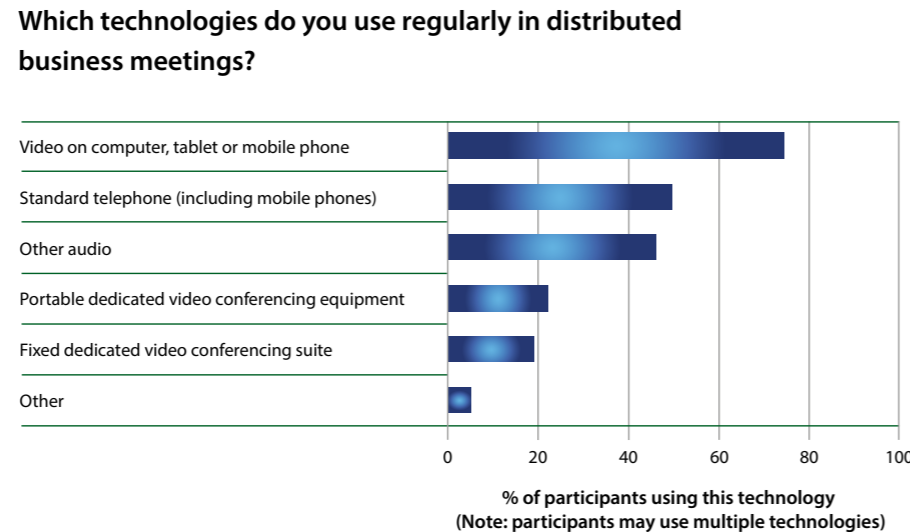
In Australia, the most common conferencing technology was video on a computer, tablet or mobile phone, used regularly by 74% of survey respondents. In fact, 85% of respondents used video conferencing solutions (including dedicated video conferencing equipment). Audio-based solutions were also commonly used, with 69% of respondents regularly using audio-only technologies. 49% of these regularly used standard telephones for distributed meetings, while 46% used other audio-only solutions.

Which technologies do you use regularly in distributed business meetings?

% of participants using this technology
(Note: participants may use multiple technologies)

Figure 2b: Technologies used in distributed meetings (China).
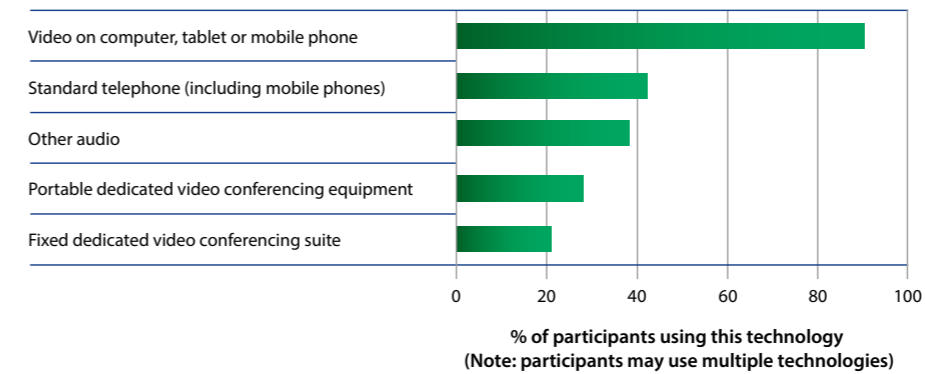
In China, video on a computer, tablet or mobile was also the most common, used by 90% of participants. Standard telephones were used by 42% of respondents, while other audio-only solutions were used by 38%. Overall, 95% of participants used any video solutions, as opposed to 60% using any audio-only technologies.

3.3   Influences on audio meetings

Audio-only meetings have particular characteristics and challenges, and are often the only technology that is feasible to use. The survey, therefore, examined further the factors that influence these types of meetings.

What would improve the efficiency of audio meetings?
Figures 3a and 3b show the results when participants from Australia and China were asked to choose three improvements that would contribute to the efficiency of their audio-based meetings.

What would improve the efficiency of your audio-based distributed meetings?

% of participants
(Note: participants were asked to choose their top three options)
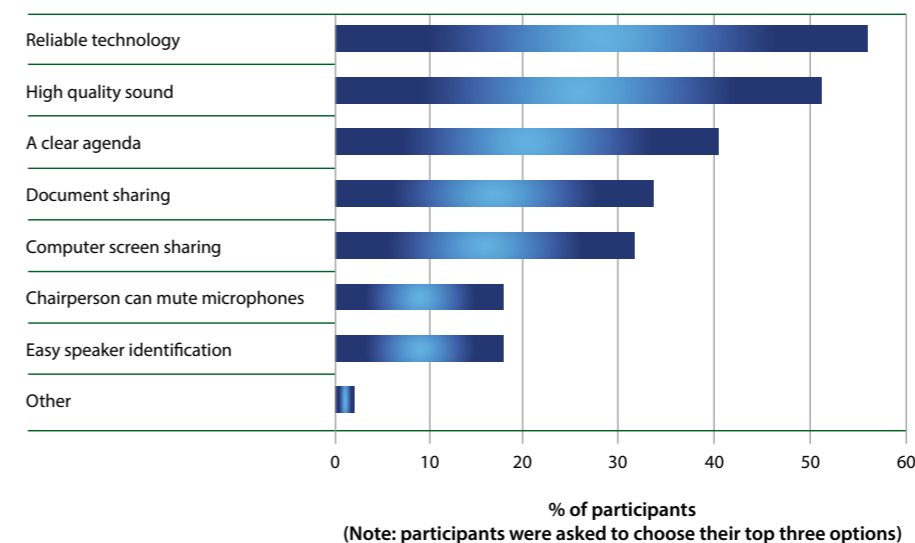
Figure 3a: Interventions that would improve the efficiency of audio-based conferencing (Australia).

In Australia, the highest ranking intervention for improving audio meetings was 'reliable technology' (chosen by 57% of participants), followed by 'high quality sound' in second place (52%) and 'a clear agenda' in third position (41%).

Figure 3b: Interventions that would improve the efficiency of audio-based conferencing (China).

What would improve the efficiency of your audio-based distributed meetings?

% of participants
(Note: participants were asked to choose their top three options)
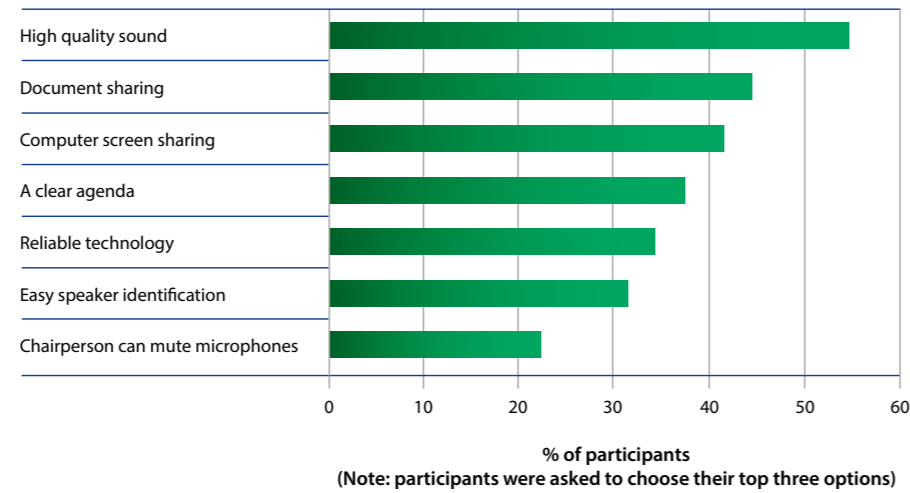
In China, the highest ranking improvement to audio meetings was 'high quality sound' (54% of participants). 'Document sharing' came second with 44% and 'computer screen sharing' in third place (41%).

What one improvement to audio conferencing would encourage greater usage?

Respondents were also asked what single improvement would encourage them to use audio conferencing more. This question was open-ended, with participants being able to answer in their own words. The responses were categorised and the results are shown in Figures 4a and 4b.

What is the one improvement to current audio conferencing technology that would encourage you to use it more often?
(Respondents replied in their own words and responses were categorised).

% of participants identifying this improvement
(Note: 9 people identified 2 improvements)
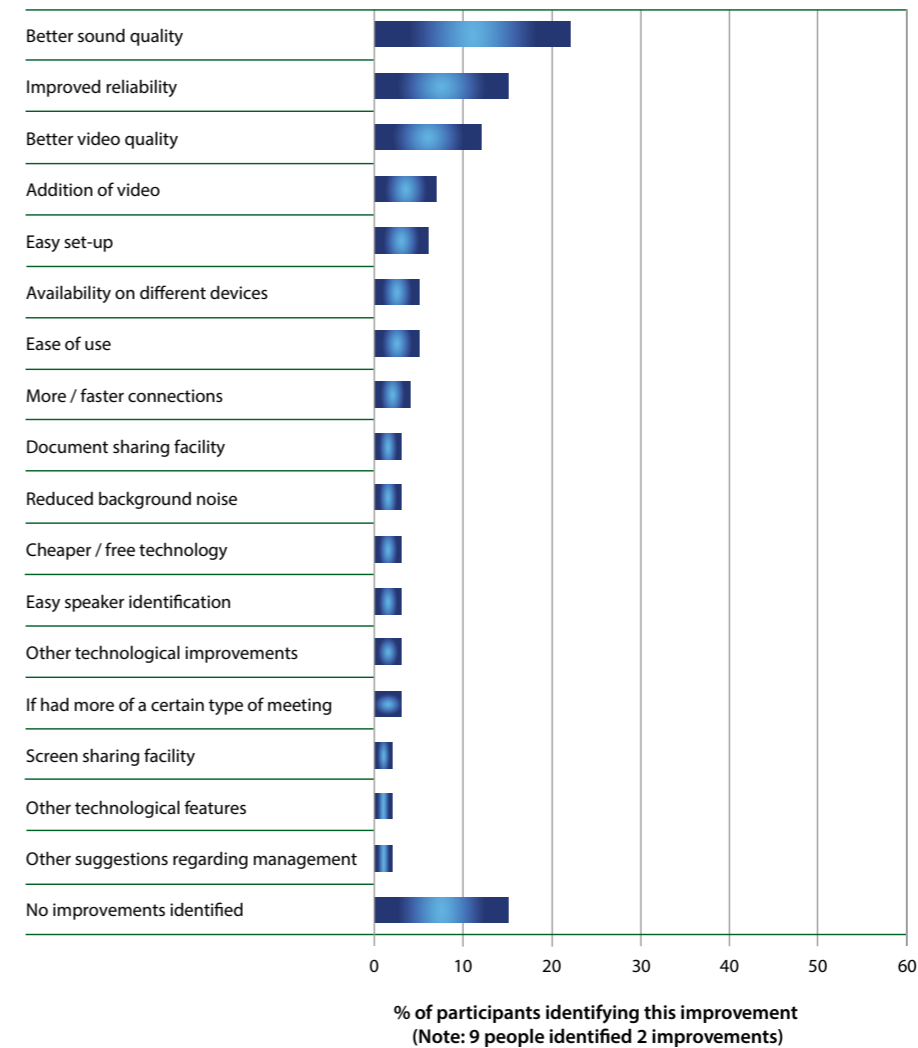
Figure 4a: Categories of responses when asked what one improvement to audio conferencing technology would encourage respondents to use it more often (Australia).

In the open-ended question, the most prevalent category of response was 'better sound quality', identified by 22% of Australian respondents. This was followed by 'improved reliability' mentioned by 15%. Although the question was about audio conferencing, 12% of participants said that improved video quality would help, and an additional 7% wanted video to be added to audio conferences.

Interestingly, participants rated the same two factors highest when discussing overall conferencing technology (Figure 1a), interventions for audio conferencing in particular (Figure 3a), and in their responses to the open-ended question (Figure 4a). In all these cases, 'reliable technology' and 'better sound quality' came top, although not always in the same order.

Figure 4b: Categories of responses when asked what one improvement to audio conferencing technology would encourage respondents to use it more often (China).

What is the one improvement to current audio conferencing technology that would encourage you to use it more often?
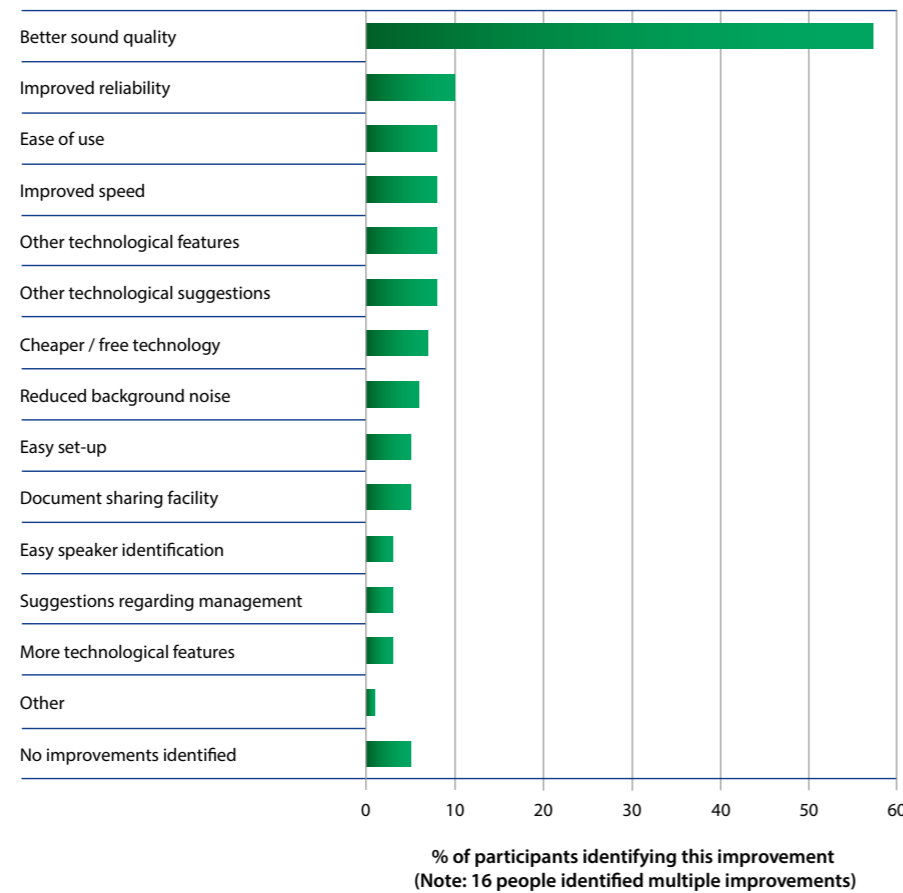(Respondents replied in their own words and responses were categorised).

% of participants identifying this improvement
(Note: 16 people identified multiple improvements)

In the open-ended question, Chinese respondents were also in favour of 'better sound quality', with an overwhelming 57% mentioning this in their responses. The next category, 'improved reliability' was only mentioned by 10% of respondents. 'Ease of use' was the third preferred improvement to audio conferencing at 8%.

In the Chinese survey, participants rated 'high quality sound' highest when discussing both overall conferencing technology (Figure 1b) and interventions for audio conferencing in particular (Figure 3b). It was also the improvement identified most often in the open-ended question (Figure 4b). 'Improved reliability' and 'ease of use' were also rated highly both in general and in the open-ended question.

3.4 Barriers to adoption of new conferencing technologies

Survey respondents were also asked for their opinions on the overall barriers to adoption of new teleconferencing interventions. Responses varied in Australia and China surveys as shown in Figures 5a and 5b.

What is the main thing stopping you from adopting new teleconferencing technologies?

% of participants
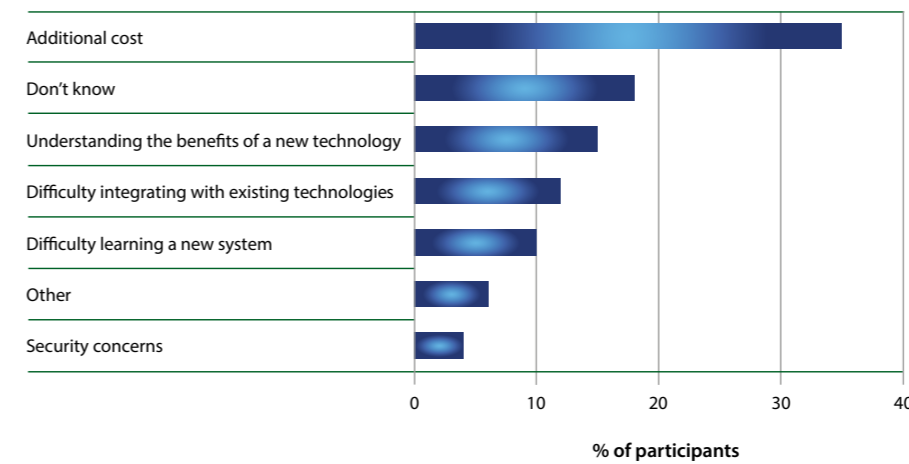
Figure 5a: Main factors stopping adoption of new conferencing technologies (Australia).

In Australia, the main deterrent was 'additional cost', identified by 35% of respondents. 18% said that they did not know what the main barrier was, while 15% reported issues with 'understanding the benefits of a new technology'.

What is the main thing stopping you from adopting new teleconferencing technologies?
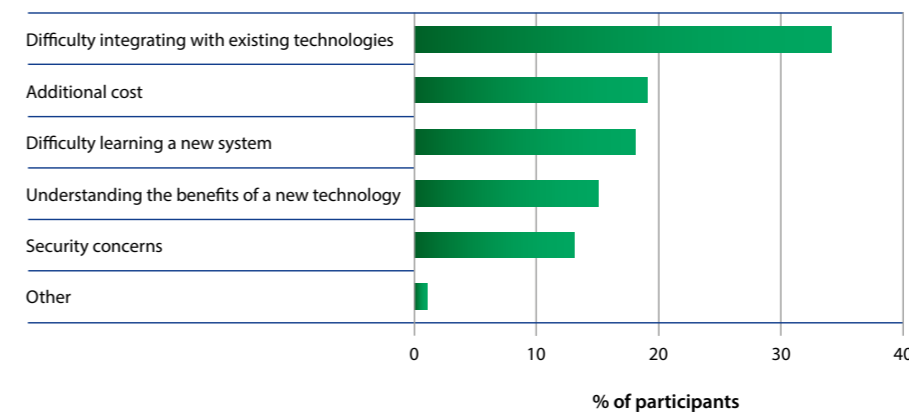

% of participants

Figure 5b: Main factors stopping adoption of new conferencing technologies (China).

In China, 'difficulty integrating with existing technologies' came top, with 34% of responses. 'Additional cost' was chosen by 19% of participants, closely followed by 'difficulty learning a new system' at 18%.

CHAPTER 4

Technology Issues

The previous chapter gave an overview of the factors influencing the performance of distributed meetings. This, and the following, chapter expand on the individual factors in more detail, starting with those related to *Technology*.

The study previously found that various *Technology* factors impact on the effectiveness of distributed meetings (see Chapter 1), namely:

- Usability and ease of set-up;
- Sound quality;
- System quality;
- Technology features.

The following sections discuss these factors in more detail, drawing on the results of the interviews with experts and company representatives, and the online survey.

4.1   Usability and ease of set-up

The literature identified the ease with which a distributed meeting can be set up as a key factor in its effectiveness.

Two of the interviewed experts also touched on this issue, highlighting the importance of the convenience and availability of teleconferencing technology. As said by one expert: *"There's no value in my having a high-end conference set-up if my colleague is on a Wi-Fi network in China with a laptop and is happy to Skype in"*. It is vital that the teleconferencing systems allow participation through the multitude of communication devices used in different countries and by employees working remotely. As explained by one of these experts: *"monolithic*

solutions that tend to presume particular kinds of configurations don't operate very effectively".

The availability of the technology is also related to its cost. *"Probably at the back of the university somewhere there's a video conferencing suite that they set up at great expense a few years ago, but no-one uses that stuff any more, even though it was probably better, because Skype is cheap and free. So in the end it's a default to Skype"*, said one of the experts.

The Australian part of the study agreed with the importance of usability and ease of set-up, with 62% of the Australian survey respondents rating ease of set-up as having a medium-high or high impact on a distributed meeting. It was also mentioned in the open-ended question on improvements to audio conferencing technology, with 6% of respondents mentioning ease of set-up and 5% ease of use.

Usability and ease of set-up were, moreover, discussed in the company interviews, with one Australian interviewee saying: *"In the past, we have had issues using 'complicated' web conferencing technology – too many numbers, too many different sources / locations of documents and information. Questions abound as to whether we are using the phone or are we using the computer? Clarity and ease of use with the technology is very important"*.

Usability was only mentioned by one of the Chinese interviewees. However, the China survey highlighted the importance of this factor, with 72% of the Chinese respondents rating ease of set-up as having a medium-high or high impact on the effectiveness of a distributed meeting. In addition, 8% of respondents mentioned ease of use in their responses to the open-ended question on improvements to audio conferencing technology.

4.2   Sound quality

The expert interviewees agreed that sound quality was key for an effective distributed meeting. In particular, four of them said that poor audio quality of teleconferencing systems was a barrier to running an effective meeting. This was because poor audio quality made it harder to understand who was speaking and what was being said, and in what emotional tone, leading to increased stress levels of the participants. One expert explained that poor sound quality affected speech intelligibility, making sound unnatural and harder to understand. This put a load on the listener's hearing and thinking capabilities, resulting in tiredness and impaired recall of items and decisions discussed in the meeting, as well as having a negative effect on secondary tasks such as note-taking. Two other experts agreed, explaining that good audio quality resulted in easier identification of voices and specific tones, and placed less load on the cognitive capabilities of participants. One of them additionally described the difficulties of getting audio "right" and said that poor audio had more of a negative impact than poor video.

Accessible and clear sound was argued by one expert to be particularly important for older people with some hearing loss. One simple way of improving accessibility for this group is to add a slight amplification to the higher sound frequencies.

The importance of sound quality was echoed in the interviews and surveys. In Australia, the online survey found that sound quality was the joint top factor impacting on distributed meetings. 85% of respondents rated it as having a medium-high or high impact on the effectiveness of these meetings. It was also the second most requested improvement to audio-only meetings, identified by 52% of respondents.

The high significance of sound quality in distributed meetings was also echoed in the interviews, with 70% of the Australian interviewees complaining about problems with current sound quality and the difficulties this can cause. Problems were also caused by 'background noise', identified as an issue by 50% of the Australian interviewees. As one Australian respondent lamented: *"This problem [with sound] is worst due to background noise levels in some of the meeting rooms... A few of us dialled in for a 1.5 hour information session in our conference room at work, I was on the phone and could not hear a thing (of value) for almost the whole meeting. I could hear that 'someone' was speaking, but I didn't know who, and I couldn't hear what they said"*. Another respondent commented: *"There were situations where the phone would start to act up or there would be feedback on the line or digital echo, when somebody would say something and it would repeat and repeat and repeat"*.

In the Chinese survey, participants rated 'high quality sound' highest when discussing both overall conferencing technology (78% of respondents) and interventions for audio conferencing in particular (54%).

The interviewees in China agreed, with 70% of them highlighting the importance of sound quality and 90% complaining about problems with existing sound quality. When asked to identify the biggest problems in conferencing, one respondent from China said: *"Speaker problems... sometimes there [is] still some noise there. We found that we [cannot] hear clearly"*. Another real issue was 'background noise', identified by 30% of those in China. One Chinese interviewee explained: *"The background sound is a big problem"*.

4.3 System quality

Although the issue of reliability was not directly discussed by the interviewed experts, it was a big concern presented in the company interviews and the online survey.

In the Australian survey, the reliability of the conferencing technology was the other joint top factor impacting on distributed meetings. 85% of respondents rated it as having a medium-high or high impact on the effectiveness of these meetings. It was also the most requested improvement to audio-only meetings, identified by 57% of respondents.

Reliability was also reported in the interviews to be an important issue, with 50% of Australian interviewees emphasising its significance, and 40% complaining about problems with the reliability of internet connections. This was a particular problem when having meetings with people in remote areas, as one interviewee explained: *"Having done a lot of distributed meetings from and with people in regional areas, the internet speed can not maintain a reliable link and so results in cut outs, distortions, delays with the overall result being confusion and frustration"*. Poor connectivity can result in people avoiding internet-based conferencing technologies when communicating with such areas: *"So unfortunately if doing distributed meetings in regional areas that don't have the NBN [National Broadband Network] it can mean avoiding using internet based technologies and instead relying on the good old fashioned telephone"*, argued one Australian respondent.

Another important aspect of teleconferencing related to security. One expert suggested that many organisations prefer not to use mainstream teleconferencing software, such as Skype, because it is not perceived as being secure in the business environment. 20% of the Australian interviewees also described work restrictions, such as firewalls, that limit what software they can instal and use for conferencing.

The China survey also highlighted the importance of the reliability of the conferencing technology. This was the third factor impacting on distributed meetings, with 71% of respondents rating it as having a medium-high or high impact on the effectiveness of these meetings. The interviews also identified the importance of reliability, with 30% of them being concerned about the audio or the video on a call 'freezing', and 20% being worried about the reliability and speed of the internet connection.

Security issues were also mentioned as a concern, with one Chinese interviewee mentioning that there may be limits on internet access, which could cause problems for some web-based systems.

4.4   Technology features

The different features of conferencing technologies and their impact on the effectiveness of distributed meetings were widely discussed in both the expert and company interviews.

Interestingly, one expert indicated that different conferencing technologies were suitable for different types of meetings with varying levels of formality. For example, specialised conferencing set-ups were said to be more suitable for scheduled corporate meetings than for everyday casual meetings. One expert also stressed the importance of having technology that would recreate the natural echos of a conferencing room in order to create a more immersive feeling.

4.4.1   Speaker identification

The significance of speaker identification was presented in the literature. Therefore, it was deemed important to further investigate how easy it was to recognise speakers in distributed meetings. The ability to identify who is speaking at a given time during a discussion can impact other participants' understanding of whether the speaker has the authority or expertise to back up their statements and whether all attendees shared their opinions. Therefore, both qualitative (expert and company interviews) and quantitative data (the survey) were collected relating to the degree to which speaker identification was a problem in conferencing meetings.

The experts agreed that speaker identification can be a problem. While the received wisdom in distributed meetings is to say one's name when starting to speak, participants rarely follow this rule and often say their name quickly and not very clearly, leading to difficulties in speaker identification. As put by one expert: *"The problem is people often forget about identifying themselves, they think that everyone knows who they are and the more important they are the more they think that everyone ought to know who they are. So they do not identify themselves"*.

The ability to identify other speakers' voices, potentially via a simple graphical user interface (e.g. by highlighting a photo of the speaking person or their name), were considered by two experts to be greatly beneficial to the effectiveness of a distributed meeting. The importance of delivering these features efficiently appeared to be further amplified in larger meetings. According to another expert, speaker identification was particularly challenging in low quality audio conferencing. The ability to easily identify speakers was also said by one expert to be of a more prominent issue in larger meetings with unfamiliar people.

90% of company interviewees in Australia viewed speaker identification as an important aspect of an effectively run distributed meeting. In addition, 80% of interviewees said that it can be a problem, particularly in bigger meetings, audio-only meetings or when there are new people on a team. One interviewee explained: *"I do think it is important to understand who is in attendance at a distributed meeting and who is speaking at any one time. This allows one to gain a more in depth understanding of team dynamics and to engage in the other attendees in a respectful and sensitive manner"*. Interviewees believed that saying one's name before speaking can be helpful, but this can disrupt the flow of conversation, and people often forget to do it. As one interviewee said: *"In more formalised settings such as interviews or meeting with new people it is useful to always identify yourself before you say what you wanted to say. This keeps things clear. However, it can be challenging as it can stop the flow of discussions and also some people find it hard to remember to do it so"*.

The survey results also show that 57% of the Australian respondents felt that speaker identification was a problem in audio meetings at least 'sometimes' (as opposed to 'rarely' or 'never').

In China, 40% of the interviewees said that speaker identification was important and 70% argued that it was sometimes an issue, particularly in audio-only meetings or when sound quality was poor. As put by one interviewee: *"I think [speaker identification] is important because... sometimes we will be confused and we have to keep asking the contacts – 'oh, sorry who speaks these words?' We have to ask during the meeting, it's a little bit annoying... Actually for some contacts there we are not familiar with their voice"*. However, 80% of respondents felt that speaker identification is not usually an issue, partly because they usually used video conferencing or because the other people's voices were familiar. One interviewee explained: *"I think that the [video] can help people to recognise the one... he or she is speaking to"*.

The results from the survey also show that speaker identification is a particular problem in audio meetings. 81% of the Chinese respondents felt that speaker identification was a problem in audio meetings at least 'sometimes' (as opposed to 'rarely' or 'never'). Furthermore, 34% of participants said that it was a problem at least 'about half the time'.

4.4.2   Spatial audio

Three experts believed that spatial audio would be a useful technological intervention in distributed meetings to assist speaker identification. Spatial audio is a type of audio where sounds appear to originate from different locations around the user. For example, the speech from one speaker would appear to come from the left of the listener, while another person's speech would appear to come from his or her right. Spatial audio is one way of achieving voice separation, allowing listeners to hear speech from different speakers more distinctly.

Separating the audio from different people was perceived to improve audio quality and intelligibility, and make it easier to identify and distinguish the different speakers and determine what each of them had said. *"An issue with audio not being spatialised is that the [human] audio system can't take advantage of being able to separate out those streams and then process them independently, because everybody's mashed together into one single audio source... That's why spatial audio makes sense for conferencing and many other audio applications"*, stated one expert. This opinion resonated with that of another expert, who commented that spatial audio is useful for helping teleconference attendees orient to the right person (i.e. the person who is speaking): *"It's important to provide appropriate spatial information so when a new person starts talking, the person in the remote location will know which direction to orient to, to latch on to that talker"*. Similarly, a third expert argued that the aspect of spatial audio that would make the biggest difference in conferencing is higher quality of audio and a clear separation of voices, rather than the spatialisation per se.

One of the experts also added that spatial audio is better at separating audio sources than the commonly used mono streams and the stereo available in fixed conferencing suites, because the latter solutions are *"still not using all the capabilities of your [cognitive] audio system"*. Moreover, this expert was of the opinion that exocentric spatial audio (i.e. where the audio is fixed in space rather than relative to the listener) could positively impact the effectiveness of distributed meetings. However, this proposed intervention would require some equipment for head tracking (e.g. accelerometer or camera).

Spatial audio was also commented to have its caveats. Two experts suggested that spatialisation could be more useful in some kinds of meetings than others. For example, it was believed to work better in smaller meetings with up to six participants.

4.4.3   Other features

One expert proposed that it would be useful to have a function to allow note-taking to be visible to all attendees. Following the theme of nice-to-have technology, another expert also argued the need for being able to share documents that attendees are working on.

Regarding the audio versus video debate, one expert posited that while video does not offer immediate benefits, it does allow everyone to have a more positive emotional experience, giving a sense of participation and mutuality particularly in long meetings. This opinion resonated with two other experts. One of them appeared to be unconvinced with the idea that: *"video adds very much, but there may be circumstances"*. The second expert explained that video is, in fact, secondary to the audio and its usefulness depends on: *"what kind of meeting you're having and [how important it is to] see the other person's responses"*. Another expert argued that it is more difficult to get the mechanics of audio *"right"* and that poor audio has more of a negative impact than poor video: *"miking, ambient audio feedback... just the mechanics of making audio work is a killer"*.

Despite a profound belief that good audio quality had the biggest impact on the running of teleconferencing meetings, two experts chose multi-way video technology as the most effective piece of technology. One of them explained: *"Sometimes it [multiple video stream] is helpful, sometimes not, but I think there's something to be said for seeing the other person, even if it's massive blocky pixels"*.

Company respondents from Australia also talked about a range of technology features that they frequently used, including document sharing, screen sharing and participant identification. One respondent, who believed in the benefit of screen sharing, said: *"As somebody that often has to make decisions on UX [user experience] and interface development, I find it frustrating to try and ascertain which part of a design or wireframe is being talked about. Screen sharing mitigates this"*. Another Australian respondent argued the importance of the ability to

share documents: *"We would often forward something by email for discussion: a document, photograph, drawing etc... And so making sure that the person or people we are meeting with have access to this material is important".*

Similarly, in China, company respondents talked about a range of technology features. Document sharing (mentioned by 40% of Chinese interviewees) and instant messaging (30%) were particularly popular. These technology features were considered to enhance distributed meetings. As one interviewee in China said: *"We take some photos to send to each other so we can see the product more [clearly]. So I think this is my way to improve the [meeting], to make it better".*

People Issues

As well as *Technology* factors, various *People* factors impact on the effectiveness of distributed meetings (see Chapter 1), namely:

1. Project management and the wider organisation;
2. Participant and team characteristics;
3. Meeting facilitation;
4. Participant behaviour.

The following sections discuss these factors in more detail, drawing on the results of the interviews with experts and company representatives, and the online survey.

5.1   Project management and the wider organisation

Project management can have a large influence on a distributed meeting. In particular, the literature indicates that it is important to choose the right type of meeting and conferencing technology for the task at hand. The expert interviewees agreed, with one expert arguing that: *"audio conferencing does just fine"* for task oriented conversations, while face-to-face is more suited for *"developing the socio-emotional aspects"*. Another expert added that different meeting technologies send different signals about the formality of the meeting. For example, conferencing suites that need to be booked weeks in advance indicate that a meeting is very formal.

The choice of meeting size also plays an important role. One of the experts argued that bigger meeting groups (with over six participants) were noticeably more challenging to manage: *"[In bigger meetings] it starts to get a bit difficult. People just tune out, because it's difficult to listen to what's going on, so they stop*

participating... Trying to get people to have their say and know who wants to say what... becomes more difficult when there's more people talking all at the same time".

Three experts also stated that the way in which different attendees were distributed could impact on the effectiveness of a conferencing meeting. An especially problematic situation occurs when just one person is remote and the others are placed in the same room. In particular, one of these experts said: *"When most of the people are in the same room they end up interacting with each other the way they do in person... it is hard to break in when you are the only one who is remote".*

20% of the Australian interviewees agreed that smaller meetings were better, with larger meetings particularly causing problems with turn-taking. One respondent noted: *"Fewer people across fewer locations make for a better meeting".*

Some (30%) of the Australian interviewees also commented on the situation where most of the meeting participants are in the same room. They described the difficulties that remote participants can have with trying to contribute in this situation: *"I don't think it works so well when people are having a face-to-face meeting and then others are plugged into this meeting... They are always saying 'Excuse us, but we are here too' or they find it hard to jump into the situation... But when everyone is on the hook up, they don't worry about that because everyone is on a level playing field"*, said one respondent.

Another Australian interviewee also suggested that a good structure can help keep the meeting to time: *"Time limits on things, understanding when you have talked through an issue enough and that you need to move on... I'm also conscious of it not going over time, so structure to the meeting is important".* Moreover, 47% of Australian survey respondents believed that 'keeping the meeting to an hour or less' had medium-high or high impact on the productivity of the meeting.

The Chinese participants also felt that smaller meetings are more effective, as one of the interviewees said: *"We have to control the number [in the meeting]...*

I think that more than five people joined to the meetings maybe you have some confusion... four or five people [is enough]".

In addition, 20% of Chinese interviewees said that meetings of longer duration were more fatiguing and 60% agreed that audio-only meetings were particularly tiring. One Chinese interviewee said: *"I think [the] use of the voice phone it's also okay. But we should control the time, not too long... [When] It's too long, my hand is tired and my brain is tired, so I don't like the voice telephone too long".*

Including breaks can help, as one Chinese interviewee said: *"We may stop for a while and then take a rest and then we will drink some coffee or go to the toilet or discuss something unrelated to the job".* Limiting meeting length is also helpful, as shown in the survey, where 59% of Chinese respondents rated 'keeping the meeting to an hour or less' as having a medium-high or high impact on the productivity of the meeting. Similarly, the Chinese interviewees suggested that meetings should be limited to under an hour, or under half an hour when audio-only solutions are used.

5.2   Participant and team characteristics

One expert suggested that an effectively managed meeting was not just defined by what happens during that one meeting, but that it was also about a wider team-working context: *"It's never about what just happens within the frame of the meeting... there's a sequence of moments before and after that contextualise what happens in that particular frame".* Similarly, another expert explained that the effectiveness of a meeting is influenced by how well participants know each other beforehand.

An important aspect of this is the building of trust in collaborating teams. This issue was reported by all the experts. Most of them believed that it was hard to get to know people well when only interacting in distributed meetings, because of an absence of important non-verbal cues, such as eye contact and body language (unless teleconferencing for an extensive period of time). Many experts suggested that teams should always aim to meet face-to-face at least once, or have an offline chat. One expert said that mutual intelligibility and the ability to determine when someone was confused due to problems with understanding (rather than problems with the technology), were especially impaired in audio-only conferencing: *"It's the speed of responsiveness and the degree of queuing of what I do with what you do that gives a major insight into whether or not we're on the same wavelength".*

According to another expert, trust in teams could be built by sharing people's credentials ahead of time, or at the start of the meeting, and by getting everyone to participate in the meeting.

This issue was further investigated in the online survey, where respondents were asked about the best ways to build trust in distributed teams. The results for Australia and China are shown in Figures 6a and 6b respectively.
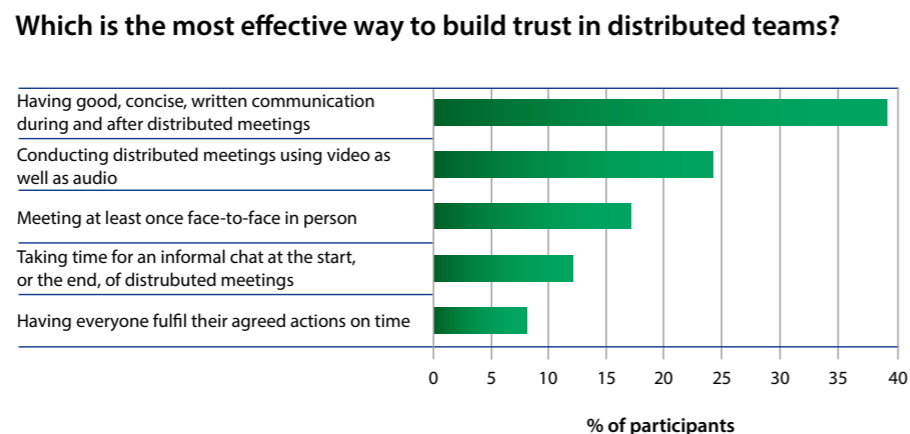
Figure 6a: Ways to build trust in distributed teams (Australia).

Which is the most effective way to build trust in distributed teams?

	% of participants
Meeting at least once face-to-face in person	
Having good, concise, written communication during and after distributed meetings	
Conducting distributed meetings using video as well as audio	
Having everyone fulfil their agreed actions on time	
Taking time for an informal chat at the start, or the end, of distrubuted meetings	

In Australia, the survey found that 'meeting at least once face-to-face in person' and 'having good, concise, written communication during and after distributed meetings' were considered to be the most effective methods of building trust (with 32% and 25% of responses).

These social aspects of team relationships were explored further in the company interviews. In the Australian interviews, 70% of professionals felt that trust can be built in distributed meetings provided that they are well-managed. As one interviewee said: *"It [online interaction] is the quickest and easiest way to start building a relationship and you begin to identify someone from their voice or from their thoughts, ideas and what they actually do for the company"*. Nevertheless, this can be more difficult than in face-to-face meetings. 40% of interviewees described difficulties with building trust in these situations, and some explained that poorly-managed distributed meetings can actually erode trust and make the situation worse. One Australian interviewee explained: *"[Can distributed meetings generate a good level of trust?] Not as much as with a physical meeting. Trust in a workplace requires a lot of personal development and it is the same in collaboration. I think that means the ability to have coffee with somebody, the ability to sit down and have lunch with somebody, and the ability to meet someone face-to-face"*.

Figure 6b: Ways to build trust in distributed teams (China).

Which is the most effective way to build trust in distributed teams?

	% of participants
Having good, concise, written communication during and after distributed meetings	
Conducting distributed meetings using video as well as audio	
Meeting at least once face-to-face in person	
Taking time for an informal chat at the start, or the end, of distrubuted meetings	
Having everyone fulfil their agreed actions on time	

The survey results in China did not emphasise the importance of face-to-face meetings. The most effective methods of building trust were considered to be 'good, concise written communication' (39% of respondents) and 'conducting distributed meetings using video as well as audio' (24%). Only 17% of respondents chose 'meeting at least once face-to-face'.

This is echoed in the interview results, where only 20% of Chinese professionals thought it difficult to build trust in distributed meetings alone, and 20% said that face-to-face meetings are better. 50% said that they had no problems with trust in distributed meetings, with 30% explaining that video meetings are better at building trust than audio-only ones. Some interviewees explained that trust is generated based on someone's background or credentials, with one person saying: *"[I] cannot trust the person, I must know the background first"*.
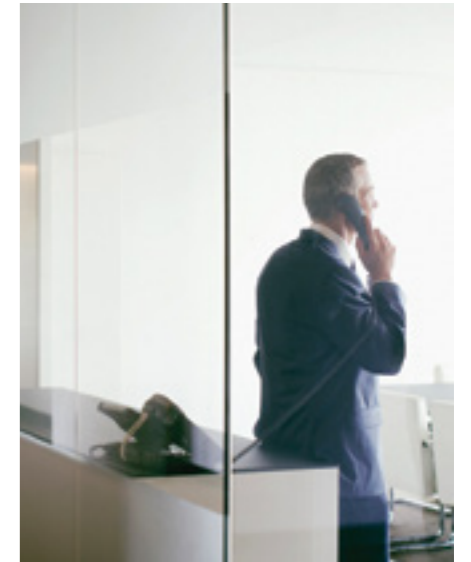
5.3 Meeting facilitation

Meeting facilitation is a very important factor in achieving an effective distributed meeting. The expert interviewees described many tasks and roles that a good Chairperson should fulfil. For example, one expert stated that a Chairperson should ideally be *"polite but firm"*, ensure that no-one dominates the meeting, identify those who have not said anything and try to *"get something out of them"*, and should also be *"someone the other people respect"*.

Turn-taking was a particularly important point, as explained by one expert: *"It's very easy for people to talk over each other, because they're missing all the social cues, somebody to support the turn-taking is quite important"*. Turn-taking was, moreover, viewed by two other experts to be more challenging in audio-based conferencing, because non-vocal cues, which are absent in audio conferencing, are key to knowing who would like to speak. In addition, one of these experts argued that there was typically a lot of non-verbal communication between a group in one room, which was rarely communicated to remote parties.

It is clear that there are many aspects to being a good Chairperson. However, one expert commented that Chairpeople hardly ever enhance the management of meetings, because they are typically focused on the content of the meeting, rather than the manner in which it is delivered. Another expert suggested that currently there is a significant absence of a good guide to chairing, and that it would be useful if such a resource was produced. This is clearly an area where the effectiveness of distributed meetings could be improved.

73% of survey respondents in Australia rated 'having a good Chairperson / host' as having a medium-high or high impact, making it the third highest factor. Similarly, 60% of company interviewees in Australia agreed that the Chairperson plays an important role.

The Australian interviewees highlighted some particular tasks that the Chairperson should do. In particular, 70% of them explained that the Chairperson should brief the meeting participants in advance, for example by sending out an agenda. As one respondent said: *"Having communicated the meeting objectives prior [to the meeting] is important to the success of a distributed meeting".*

Another key part of the Chairperson's role is to encourage all participants to contribute to the meeting (mentioned by 60% of interviewees). This may involve asking for comments at regular intervals, or asking individual people for responses directly. One Australian interviewee suggested that the Chairperson should: *"provide a framework in which people can contribute by... stating a general topic and then going around allowing everyone to contribute. And if this gets dominated by anyone or some people don't contribute, the best practice manager will ask specific questions to the quieter people who haven't been heard from".*

50% of Australian interviewees also believed that a key role of the Chairperson was to manage turn-taking and intervene if participants spoke over one another or one of them tried to dominate the conversation. One interviewee believed that a Chairperson needs to: *"make sure everyone gets a chance to speak and prevent people from using it as an opportunity to use it as their own soap box".*

A good Chairperson was also considered important in China. In the China survey, 64% of respondents rated 'having a good Chairperson / host' as having a medium-high or high impact. In the company interviews, 40% of interviewees highlighted the significance of good quality chairing.

In the survey, 65% of Chinese respondents rated 'circulating a clear agenda before the meeting' as having a medium-high or high impact. However, this was not echoed in the interviews, with only one interviewee (10% of the sample) mentioning the importance of any kind of briefing.

80% of the Chinese interviewees believed that a key role of the Chairperson was to manage turn-taking and intervene if participants spoke over one another

or one of them tried to dominate the conversation. One company professional explained that the situation where multiple people speak at once *"should be handled by the meeting facilitator... the facilitator must do a better job to control this otherwise, I guess, no way to control".* Another respondent stated that: *"we have the power to control what, who can speak, who cannot speak".*

60% of Chinese interviewees mentioned the importance of managing the meeting, ensuring that it starts on time and everyone can hear one another, as well as following through the agenda items and making sure that they are adequately discussed.

5.4   Participant behaviour

The study found that the behaviour of individual participants, as well as the Chairperson, was an important factor of conferencing. Guidance produced by an organisation or the Chairperson on how the attendees are to behave in a meeting (sometimes called 'meeting etiquette') was said by one expert to be a vital part of every meeting, not just a distributed one. An example of such etiquette is the recommendation that participants say their names before speaking, in situations where technology is not available to help identify speakers.

However, while having clear guidance on how to behave in a meeting is helpful, it is not sufficient, because, in the excitement to express one's point, participants often 'break in' and say something out of sequence. Therefore, it is vital that a good set of etiquette rules is coupled with an effective Chairperson in distributed meetings.

In particular, distractions and disengagement were perceived to be very problematic to meeting efficiency, according to three interviewed experts. This is often a by-product of a loosely-focused agenda with low relevance to some attendees.

A further behavioural problem in distributed meetings is fatigue. As one expert explained, any type of meeting, including face-to-face, can be tiring. However, three experts agreed that audio-only meetings are particularly fatiguing, because participants have to concentrate harder to understand what is being said without any visual cues. One expert said: *"It is quite fatiguing trying to separate out the different people, understand what they're saying".*

Two of the expert interviewees explained that the fatiguing nature of audio conferencing is exacerbated by poor audio quality, as a higher demand is put on participants to decipher lower quality speech: *"Some of the cues in speech aren't there and you have to do more work to understand the speech. It takes more brain power to use the remaining cues".* While intelligibility may remain high, people feel more tired, remember less and, as a result, other secondary tasks, such as note-taking, suffer.
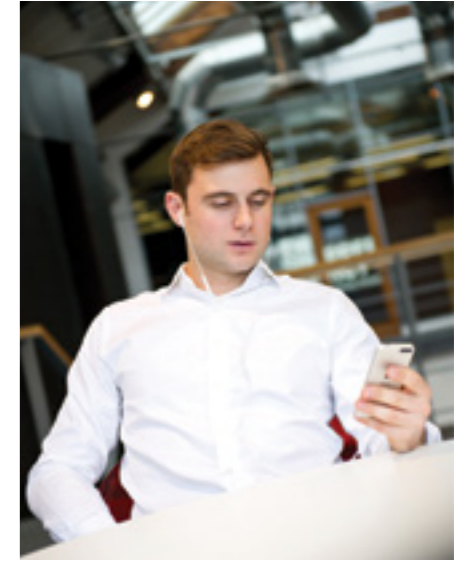
Consequently, high quality audio is one of the key interventions for lowering tiredness levels in participants, according to two experts. Spatial audio would also help to reduce fatigue, and video can also be a helpful addition, as suggested by another expert: *"Video helps me hear better"*. Moreover, one expert stated that fatigue could be mitigated by taking regular five-minute breaks, provided that the Chairperson is good at time keeping, as well as limiting the length of a distributed meeting to one hour or less.

Although the latter suggestion was likely to make it more difficult to discuss certain agenda items in depth, one expert believed that a potential solution was to: *"have regular meetings and in-between discussion"*.

60% of Australian interviewees commented that audio-only meetings can be tiring. As one interviewee said: *"I think fatigue is higher if you are not physically in a room with others. Concentration and fatigue are associated and I think you concentrate more on the phone. You concentrate more to make sure you have heard correctly and that makes you tired"*.

However, 30% of Australian interviewees believed that distraction and boredom are bigger issues than fatigue. In fact, 62% of Australian survey respondents rated 'having focused participants (not multi-tasking)' as having a medium-high or high impact on the effectiveness of a distributed meeting. Furthermore, 60% of interviewees mentioned that people do get distracted, stop paying attention or multi-task, with this being particularly common in audio-only meetings. One interviewee explained: *"Sometimes the distributed meeting can become challenging if we just have audio to use as we can't see what the others are doing and this can make people distracted, such as if they are sitting in front of their computer they might start emailing and that sort of thing. You don't want to get all school teacher on your colleagues but it can be hard sometimes when you can hear people are distracted"*.

Fatigue was also a concern for Chinese interviewees, with 80% of them commenting that fatigue can be a problem, especially in audio-only meetings. As one interviewee argued: *"If it's too long, maybe I feel like using the video meeting, it would be easier for me. If it's too long, my hand is tired and my brain is tired, so I don't like the voice telephone too long"*.

63% of respondents in the China survey rated 'having focused participants (not multi-tasking)' as having a medium-high or high impact on a distributed meeting. Nevertheless, this was not mentioned at all in the interviews. It is possible that this is not seen as much of a problem in China.

CHAPTER 6

Recommendations

This section proposes recommendations for improvement, based on the results of the study. These recommendations address the main factors that influence the effectiveness of a distributed meeting: both those relating to the *Technology* and those associated with the *People* issues (see Chapters 4 and 5). These recommendations can be grouped into three main principles:

- **Te***chnology: Us***e high quality communication technology**
  The technology used in a distributed meeting has a large impact on its effectiveness. Poor technology can make meetings ineffective and waste the valuable time of the participants and company money. Technology should provide high quality sound, be reliable and be easy-to-use.

- **Ma***nagement: E***mploy effective management approaches**
  The way in which a project and an individual meeting are managed has a big impact on meeting effectiveness. Good management can help teams to work well together, cover the important points and make efficient decisions.

- **Te***am behaviour: E***ncourage good team behaviour**
  The behaviour of people participating in a distributed meeting can improve, or detract from, that meeting. This has implications for team work and individual behaviour, both within a particular meeting and across a project more generally.

It should be noted that, while these three principles are valid for both Australia and China, the application of their underlying recommendations may vary subtly depending on the culturally accepted norms in each country. For example, a conferencing meeting in Australia may not necessarily require as tightly-focused agenda as a cultural protocol in China would dictate. Thus, when reading the recommendations proposed below, it is important to consider them in line with the detail about each country provided in Chapters 4 and 5.

The three principles have different implications for different people within an organisation. In particular, there are three groups with a large part to play in a distributed meeting: the *Organisation* as a whole, *Chairpeople* and the *Participants*. While all three groups are important in delivering effective distributed meetings, some groups have more impact on some aspects of the meeting than others. For example, *Organisations* as a whole make the decision to invest in a given conferencing suite for employees to use and dictate that certain meeting practices are to be followed. Conversely, *Participants* typically have little say in what technology is adopted and are compelled to use it, but can choose how they behave in an individual meeting.

We examine below how each of the main three principles can be put into practice by each of these three groups. The specific recommendations, illustrated in Figure 7, can help individuals to determine the part they can play in successful distributed meetings.

Figure 7: The recommendations for improving the effectiveness of distributed meetings fall into three main areas. Each of these can be influenced by different levels in an organisation.
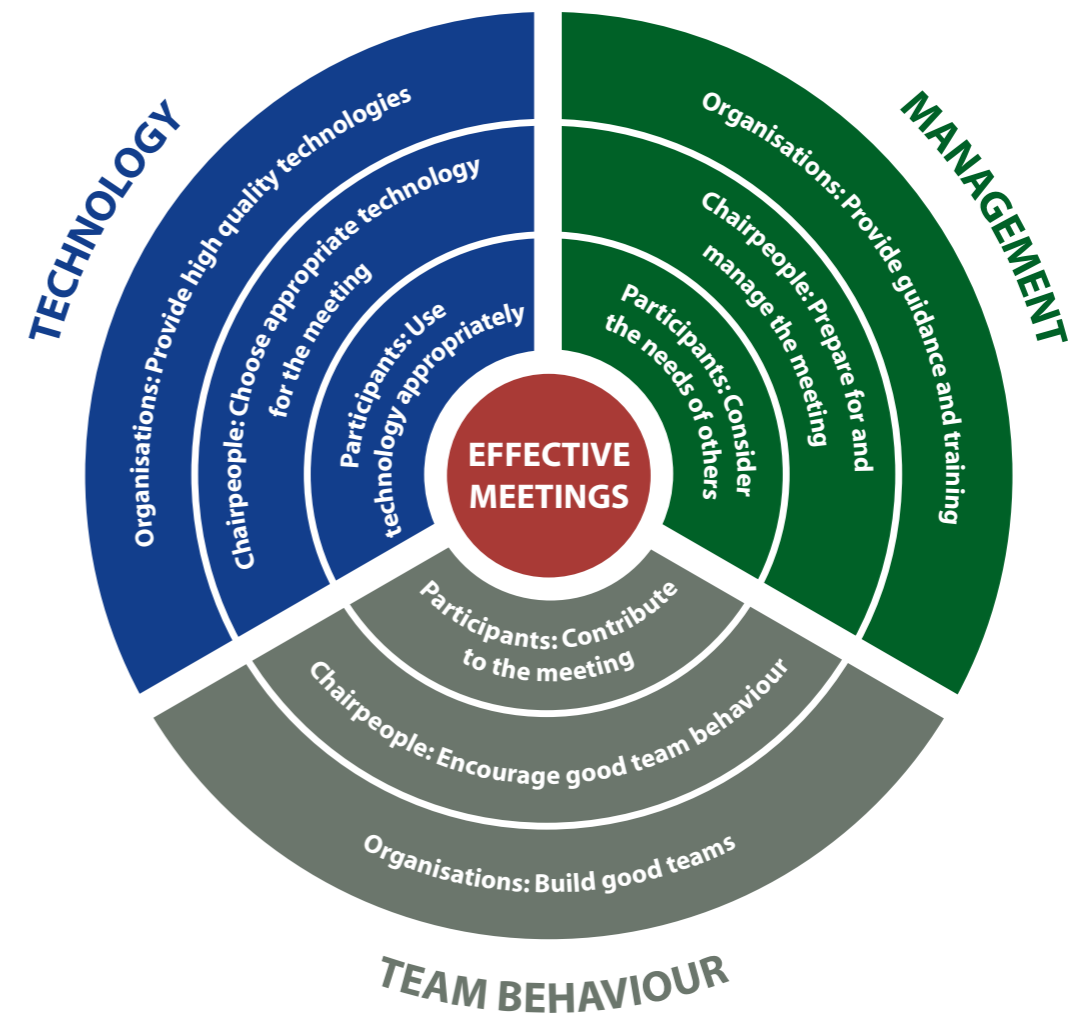
The specific recommendations for each of the three high-level principles – *Technology, Management* and *Team behaviour* – and what *Organisations, Chairpeople* and *Participants* can do about them are explained in more detail in the following sections.

6.1   Technology: Use high quality technologies

The study found that the technology used in a distributed meeting is critical to its success. In particular, survey respondents rated high quality sound and the reliability of the technology as the two highest factors that impact on meeting effectiveness. It is also important for technology to be easy-to-use and simple to set up. Specifically, conferencing technologies should:

- *Provide good sound quality*
  Perhaps the most important factor in the effectiveness of distributed meetings, sound should ideally be clear, consistent and free from noise. Quality audio solutions will provide high-definition voice and suppression of noise from remote and on-the-move participants.

- *Ensure reliable cross-platform connection*
  It is vital to use technology that copes well and recovers gracefully from any connection problems, and allows people to easily join from disparate technological platforms (including consistency in the feature set on different platforms).

- *Enable ease of use*
  It should be easy to set up a meeting and to operate the technology within the meeting. Employees often will not use technology if it entails dealing with a large number of set-up steps to join the meeting, constant need for system updates (communicated in a cumbersome technical language) and integration issues.

- *Facilitate identification of callers and speakers*
  A large proportion of study participants (67% in Australia and 69% in China) felt that efficient speaker identification was a crucial aspect of an effectively run meeting. A high quality audio solution will facilitate better recognition of specific voices and tones.

The different parts of the organisation have different parts to play in relation to technology:

1   *Organisations:* **Provide high quality technologies**
    The organisation as a whole often chooses the technology that will be used in distributed meetings. It has a responsibility to select technologies with the characteristics described above: with good sound quality, high reliability, ease of use, and help towards speaker identification.

2   *Chairpeople:* **Choose appropriate technology for the meeting**
    While organisations choose the technologies that are available within a company, individual Chairpeople often still have a choice as to the particular technologies used in an individual meeting. To maximise meeting productivity, they should:

participants have to join the meeting on their mobile phones.

- *Identify the appropriate technology for the meeting*
  Some tasks are more suited to face-to-face interaction, while others work well with video or with audio-only technologies. The Chairperson should select the most appropriate way of interaction for the particular tasks that need to be accomplished in the meeting.

3   *Participants:* **Use technology appropriately**
    Participants often have little choice in the technology used in a distributed meeting. However, they still have a part to play, ensuring that they use the technology and its features appropriately. A particular example that arose in the study was:

- *Mute microphones appropriately*
  If participants are in a noisy place, they should mute their microphone in order not to disrupt the meeting. But it is important that they turn microphones back on when they do want to contribute, and that they do not use this feature in order to disengage from the meeting. New technologies with online user interfaces can also help identify participants with background noise and offer noise cancellation that reduces the unnatural behaviour of 'muting and unmuting'.

6.2 Management: Employ effective management strategies

Management also has a large impact on the effectiveness of a distributed meeting. This encompasses both the management of a project as a whole and the management of individual meetings. Good management can help teams to work well together, cover the important points and make efficient decisions. Different parts of an organisation all have a part to play in achieving this:

1 *Organisations:* Provide guidance and training
Organisations can influence how projects and meetings are managed, in particular through the provision of guidance and training. The recommendations in this report can provide a good start for this. Recommendations and best practice guidance should be presented accessibly and widely shared within an organisation. Training sessions can further equip project managers, Chairpeople and employees to manage and run distributed meetings effectively, including accustoming them to the use of new, useful technologies.

2 *Chairpeople:* Prepare for and manage the meeting
How a Chairperson runs an individual distributed meeting can change that meeting entirely. Chairpeople can take several steps towards making a meeting more effective and productive:

- *Set clear objectives and an agenda*
  Having clear objectives focuses a meeting and helps it to be more productive. In addition, participants in any meeting contribute best if they know what is expected of them. The objectives, agenda, speaker plan and any other documents should, ideally, be circulated in advance, so that participants can prepare and know how best to contribute.

- *Introduce the topics and goals and check for their proper understanding*
  For clarity and overall understanding of those in the meeting, the Chairperson should outline the meeting structure at the outset of a meeting and summarise key points throughout.

- *Maintain the momentum of the meeting*
  Chairpeople should ensure that topics are discussed, the agenda is covered and important decisions are made. They need to move the discussion on and prevent it from getting stuck on certain points in order to ensure that the meeting goals are achieved within the time available. The degree to which this is formalised will vary depending on the country, with a more informal structure being appropriate in some instances (see Section 5.3). However, some level of management is useful in most cases. A good plan for the meeting, coupled with quality sound, document sharing and time keeping features, can help in achieving this.

3 *Participants:* Consider the needs of others
Individual participants can help towards the good management of a meeting, supporting the Chairperson rather than working at odds with him or her. In particular, participants can help by following these recommendations:

- *Do not speak over other participants*
  It is very disruptive when participants speak over each other, particularly in distributed meetings. Higher quality sound can help towards more natural interactions, but it is still important for participants to be considerate when they want to break into a discussion. In general, it is better for participants to wait for a natural break in the conversation, or to signal to the Chairperson that they would like to speak. Technologies, such as instant messaging, can help attendees do the latter.

- *Include remote participants*
  The study found that a particularly problematic situation is where several participants are gathered in the same room and a few are calling in from remote locations. Remote participants can find it very hard to engage in and contribute to the meeting effectively. Meeting attendees need to be aware of the presence of remote participants and give them opportunities to engage in the conversation.

6.3   Team behaviour: Encourage good team behaviour

A distributed meeting is also heavily affected by how the team works together and how its members behave. Different parts of an organisation can all contribute towards good team behaviour:

1   *Organisations:* **Build good teams**
Team-building starts at the organisation and project manager levels. Organisations can encourage team-building and provide space and time for it in schedules, while project managers can take care over the selection of people on a team and over team-building. In particular, they should:

- *Choose team members carefully and provide training*
Team members in distributed teams need to be ready for distributed working and be able to cope with the challenges and opportunities it brings. Chairpeople may need to take care when choosing people to work on distributed teams. It is also important to ensure that team members are trained appropriately in distributed working and in using the technologies involved, including latest interventions. Selection of an easily accessible and usable system will likely expedite the learning process of participants and make it less daunting.

- *Invest in team-building*
In order to build a strong team, it is important that team members are properly introduced to each other, and have the time and space to meet each other more informally. If possible, distributed teams should meet face-to-face at least once. If this is not possible, project managers should still ensure that teams are properly introduced and have time to get to know each other. Technologies that allow for a more immersive feeling and a more natural flow of the conversation can help with this, as well as being instrumental in driving good team behaviour over time.

2   *Chairpeople:* **Encourage good team behaviour**
Chairpeople can encourage good team behaviour within individual meetings. The particular actions taken may vary between countries, as certain issues may arise more often in some countries (see Section 5.3). However, the following recommendations are generally important:

- *Include time for introductions*
Participants work better when they have a level of trust and team cohesion, which can be fostered by taking the time to properly introduce attendees and providing time for social interaction in a meeting.

- *Manage turn-taking*
It is important to stop individuals from dominating discussions; making sure everyone gets a chance to contribute on each point should they wish to. This can be helped through the use of appropriate technology. For example, technology can help participants signal when they have something to say.

- *Encourage contributions from all participants*
There is a reason why different people are in the meeting and, therefore, each of them should be encouraged and allowed to voice their opinion; this may require, where appropriate, prompting quieter individuals. Additionally, there are technologies available that do not 'clip' participants' words when trying to 'break into' a conversation. This can help to overcome the issue with dominating speakers in a more natural way.

- *Encourage people to be attentive*
De-focused participants generally contribute very little to the items being discussed in a meeting. A tightly-focused agenda, coupled with quality sound and continual checking of understanding, can help to keep people focused and contributing.

3   *Participants:* **Contribute to the meeting**
Finally, good team behaviour comes down to the performance of the individual participants. It is important that they are considerate of the needs of others (as mentioned above) and also focus on and contribute to the meeting. In particular, they should:

- *Concentrate on the meeting*
Although multi-tasking is occasionally appropriate, in general it defocuses participants and reduces meeting effectiveness, with people missing important information or not making useful contributions. Participants should try to resist the lure of their e-mail and web browser and concentrate on the meeting. Both reliable technology with high quality sound and good management can help to keep people focused on the task in hand.

CHAPTER 7

Conclusions

As communications technology continues to evolve, business meetings in internationally dispersed teams are expected to run effectively at any time and anywhere, saving both time and money. This project investigated the *Technology*- and *People*-orientated factors that impact on the effectiveness of such distributed meetings in the Asia-Pacific business population.

After a review of the existing research in this area and conversations with interdisciplinary experts, experienced representatives of multi-sector organisations in Australia and China were interviewed about their use of and opinions about the perceived efficiency of their conferencing meetings. A survey addressing similar issues was also conducted with 100 participants in Australia and 100 in China.

The patterns of use of conferencing technology varied across distributed teams, with the majority of professionals using it for between 30 and 90 minutes in teams of up to ten individuals on average. The preferences stated for key improvements also varied, but good sound quality, reliability of conferencing technology, easy set-up of facilities and an effective Chairperson were voiced as the most prevalent among the study participants in both countries.

The study also found various challenges to successful conferencing. These include: (1) difficulties in making oneself heard; (2) difficulties identifying who is speaking; (3) problems with people getting tired or distracted; and (4) the challenge of building good working relationships through distributed meetings. Furthermore, when asked about the barriers to adopting new technologies, many of the survey participants expressed concerns about issues such as cost (35% in Australia, 19% in China) and difficulty integrating new technology with existing systems (12% in Australia, 34% in China).

Taking all of these issues into consideration, this study identified two main areas that impact meeting effectiveness: *Technology* and *People*. These can be further divided into three main factors: *Technology*, *Management* and *Team behaviour*. The *Technology* used in a distributed meeting was reported to have a significant impact on its effectiveness. Poor technology can make meetings ineffective and waste both the valuable time of the participants and company resources. The *Management* of a project and an individual meeting was, moreover, said to have a large impact on meeting productivity. Effective management can help teams to work well together, cover the important points and make good decisions. The *behaviour of the team* can also improve, or detract from, a distributed meeting. This has implications for team work and individual behaviour, both within a particular meeting and across a project more generally.

The three factors – *Technology, Management* and *Team behaviour* – can be influenced by people at all levels of an organisation. In particular, this study has identified three groups that have a part to play in ensuring that distributed meetings are run productively: the *Organisation* as a whole, the *Chairpeople* and the *Participants*. *Organisations* can provide high quality technologies, produce and widely disseminate guidance and training on how the meetings should be run, and can help to build well-gelled teams. *Chairpeople* can choose appropriate technology for their particular meetings, prepare for and manage those meetings well, and encourage good team behaviour. Lastly, the *Participants* in a distributed meeting can improve the meeting by making appropriate use of the technology, considering the needs of others and remaining attentive throughout.

Ultimately, a combination of *Technology* and *People* factors – **using high quality communication technology, employing effective management approaches** and **encouraging good team behaviour** – can achieve greater productivity in distributed meetings for *Organisations, Chairpeople* and *Participants*.

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Conversations, Conferencing and Collaboration:

An Asia-Pacific investigation of factors influencing the effectiveness of distributed meetings

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Modern communication technology makes it possible to easily and cost-effectively run meetings across internationally dispersed teams all the time, anywhere. These distributed meetings can reduce travel costs and time. However, it is matter of some debate whether and in what circumstances such meetings can be as effective as meetings held face-to-face.

The Engineering Design Centre (EDC) at the University of Cambridge, in partnership with BT and Dolby, produced a report investigating this important question among Asia-Pacific-based organisations. Notably, this work was aimed at identifying the key factors impacting on the effectiveness of conferencing meetings and distilling good practice recommendations.

More information about this research project can be found at:
http://www-edc.eng.cam.ac.uk/teleconferencing

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