

A Cross-Regional Exploration of Barriers to the Adoption and Use of Electronic Meeting Systems

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Abstract

Electronic Meeting Systems (EMS) are intended to support group collaboration in completing tasks. While there have been many case studies and laboratory experiments on how EMS can support group tasks, large scale macro investigations exploring EMS adoption and use have been practically non-existent. Furthermore, while several barriers to EMS adoption and use have been suggested, their validation across organizations remains unexplored. We undertook a global initiative to explore information technology support for task-oriented collaboration in the US, Australia, Hong Kong, and Norway. In this paper, we focus specifically on assessing the adoption and use of EMS, and barriers to their adoption and use in organizations across the four regions. Our results suggest that EMS currently have limited adoption and are used infrequently across all the four regions. A further investigation into barriers to EMS adoption and use suggests that significant numbers of respondents do agree with a list of fourteen suggested barriers. However, while there is significant agreement between two countries (US & Australia) over how these barriers are ranked, there is no significant agreement between the remaining pairs of countries. Implications of our findings are discussed for practitioners and researchers.

Key words: group decision support systems, electronic meeting systems, collaboration technologies, IT adoption, barriers to technology adoption

1. Introduction

In recent years, task collaboration has received an increasing amount of attention from both practitioners and researchers. While information technologies (ITs) may

enhance collaborative efforts by providing electronic support for groups engaged in accomplishing tasks, adoption and use of such technologies remains largely unexplored globally. Several ITs can support collaborative efforts. Amongst these, Electronic Meeting Systems (EMS) have attracted the attention of many investigations exploring IT support for groups (Jessup and Valacich 1993; Nunamaker et al. 1997; Fjermestad and Hiltz 1999, 2001).

Broadly, EMS can be viewed as a special class of tools that provide electronic support for groups engaged in accomplishing tasks through meetings or other forms of collaboration that may involve negotiations, consensus seeking, and conflict resolution (Bui et al. 1992; Lewis and Spich 1996). From a group support standpoint, while much has been published on EMS over the last years, for the most part past research has focused on case and field studies (Fjermestad and Hiltz 2001), and laboratory experiments (Fjermestad and Hiltz 1999). Given that the capability of EMS to provide support for groups in task-oriented collaboration depends largely on the extent to which they have been successfully deployed, laboratory experiments lack that 'real world' perspective, and case and field studies do not provide enough evidence of their macro level patterns of adoption and use and barriers to their adoption and use in organizational environments, especially outside of the US.

A global research effort was initiated in 2001 to broadly investigate IT support for task-oriented collaboration in business organizations. We explored adoption and use patterns of several IT clusters that have the capability to support task collaboration. The study began in the US, and has since been expanded to include Australia, Hong Kong, and Norway. In this paper, we focus specifically on EMS adoption and use and on the barriers to adoption and use in organizational environments across four countries.

1.1. EMS and task-oriented collaboration

In general, collaborating to accomplish tasks requires communication, coordination, and information sharing to identify problems, discuss possible solutions, and reconcile or agree on possible courses of action. EMS were developed to support meetings that focus on problem solving and decision making. Most of the published literature on EMS elaborates on how they can support information exchange and discussion on problems, solutions, obstacles, values, goals, decision criteria etc. (Fjermestad and Hiltz 1999, 2001). By adopting and using EMS, collaborating entities can take more of a problem solving approach rather than focusing on personalities, political power, and so on. The anonymity feature of EMS may assist in separating participants from their contributed ideas. As a result, participants may be more likely to discuss ideas based upon their general merit instead of their authorships. In general, EMS can provide several benefits to adopting organizations, including: effectiveness and efficiency in meetings, the ability to work with large groups, user satisfaction with the meeting process, and equality of participation (Jessup and Valacich 1993).

Although the usefulness of EMS in group collaboration has been documented by many researchers, and there is a rich body of case and field studies on their adoption and use (Fjermestad and Hiltz 2001), large scale investigations documenting their adoption have been practically nonexistent. While an early investigation on EMS in US organizations suggested very low adoption (Straub and Beauclair 1988), we know little about their current macro-level diffusion patterns, in spite of the fact that this technology has now been around for over two decades. In the next section, we elaborate on a global study to address this void in the literature.

2. Study Methodology

A survey research design was deployed to investigate several ITs that have the capability to support task-oriented collaboration. This paper focuses exclusively on EMS. Our objective was to explore EMS adoption, use, benefits, and barriers to adoption and use. A three-step instrument development process was undertaken. The first step included an extensive review of the literature to identify item-measures related to EMS adoption and use, and barriers to EMS adoption and use. Meetings were held between four experienced EMS researchers to review initial measures. Finally, we conducted a pilot test of our survey by soliciting comments from two high-level IT professionals. Both participants were requested to comment on clarity and appropriateness of our item-measures. Slight modifications were made to the item measures based upon the feedback of the two pilot test participants.

2.1. Variable measures

EMS adoption was measured by a single item that required respondents to indicate whether EMS were accessible and available to end-users in their organization. Instead of providing a formal definition of EMS, we listed examples of popular products like GroupSystems, MeetingWorks, TeamFocus, VisionQuest, Facilitate.com, etc. so that the respondents could relate better to the technology under investigation. A five-point scale, semantically anchored at the extremes and mid-way (1 = no one in the organization, 3 = some persons in the organization, and 5 = everyone in the organization) was used to capture responses. Similar types of scales to measure organization innovation have been popular in the IT literature (Fichman 2001). In our study, organizations were classified as non-adopters if EMS were not accessible and available to any one in the organization. All others were classified as EMS adopters. Such an approach to measure adoption status has been deployed previously, see Rai and Bajwa (1997). While our item-measure does capture the level of EMS adoption, for this paper we have used a binary measure of adoption status.

EMS Use was measured by a single item that required the respondents to indicate the extent to which EMS were currently being used to support task-oriented group collaboration in their organization. A five-point scale, semantically anchored mid-way (1 = never, 3 = occasionally, and 5 = always) was deployed. As in the

previous case, organizations were classified as non-users if EMS were never used. All others were classified as EMS users. While single-item measures can be problematic in operationalizing many variables, they have been frequently adopted to operationalize information systems use (for a review of the literature, see DeLone and McLean 1992).

Barriers to EMS Adoption and Use were measured using fourteen items. These items were developed after reviewing key contributions of EMS researchers from the past literature (Straub and Beauclair 1988; Jessup and Valacich 1993; Lewis et al. 1996; Nunamaker et al. 1997; Briggs et al. 1998; Fjermestad and Hiltz 1999; 2001; Hayne 1999) and based upon the experience of the authors with EMS over the past two decades. Broadly, the fourteen adoption and use barriers can be categorized as technology-related, organization-related, meeting-related, and vendor-related. Six items were formulated to assess EMS adoption and use barriers that can be considered to be technology-related: costs (hardware and software, facilities, and training), technical design quality of EMS, complexity in installing and maintaining EMS, and use of substitute technologies for meeting support. Four items were formulated to assess organization-related EMS adoption and use: difficulty in gauging EMS benefits, alterations in organization power structures due to EMS use, resistance to change, and poor fit with organizational needs. Three items were formulated to assess meeting-related adoption and use barriers: incompatibility of EMS with cognitive styles of some managers, lack of any perceived value-added over manual meetings, and lack of incentives for efficient and effective meetings. Finally, one vendor-related item was formulated: product positioning of EMS (as a general purpose tool). A five point likert-type scale (strongly disagree to strongly agree) was used for the fourteen items measuring barriers to adoption and use of EMS in responding organizations. In each case respondents were requested to indicate the extent of their agreement (or disagreement) with statements describing these fourteen items as barriers to adoption and use of EMS. Finally, based upon summarized literature (Jessup and Valacich 1993), we included five commonly cited benefits of EMS (effectiveness of meetings, efficiency of meetings, ability to work with large groups, user satisfaction, and equality of participation) and requested the respondents to indicate if they agreed that these benefits had been realized in their organizations.

In our survey, respondents were instructed to stop and submit their data if no end-users in their company had ever had access to or used EMS. These instructions were given before the section on barriers, so the data on barriers were obtained from companies where there was at least a minimal amount of experience with EMS. This explains why the number of respondents is much lower for the barriers questions. We felt that most of the remaining companies had such little experience with EMS that they would lack a reasonable basis for responding to the remaining questions.

2.2. Data collection

Data was collected in four phases. First, data was collected in the US using an electronic mailing to the members of the Society for Information Management

(SIM). An email message along with an electronic link to an on-line questionnaire was sent to all the members of SIM. The message explained the purpose of the study and asked for their cooperation in responding to the survey. Each member was requested to forward the message to the appropriate person in their organization if they were not knowledgeable about technology support for task-oriented collaboration in their respective organization. A follow-up email message was sent after seven working days.

The study was then extended to Australian organizations. A mailing list of the largest 1000 organizations (measured by Gross Revenue in the 2000/2001 financial year) in Australia was used to collect data. This list, the "BRW Top 1000", is developed by Australia's leading business magazine, the Business Review Weekly (BRW), and was purchased from BRW (BRW, 2001). A target sample of 500 randomly selected organizations from the Top 1000 was used to collect data in Australia.

In the third phase of the data collection process, the survey was extended to organizations in Hong Kong. A mailing list of top IT executives in 1000 organizations was obtained and the survey was mailed to a random sample of 400 organizations. Finally, in the fourth phase, the study was extended to Norway. A random sample of 650 organizations was selected from the directory of the Norwegian Computer Society. Although many of the contacts in this listing have IT affiliations, there are also several non-IT professionals listed in this directory. Data from this target sample was collected using a web-based survey.

We used the same item-measures for EMS adoption, level of use, and barriers to their adoption and use in all the four regions. For data collection in Norway, the survey instrument was translated into Norwegian by a native researcher. The translated instrument was pilot tested in four organizations to ensure that the item measures were clearly interpreted by respondents.

2.3. Response profile

Overall 419 organizations responded to our survey. We received 119 usable responses from US organizations (response rate of 8.3%), 140 responses from Australian organizations (response rate of 28%), 85 responses from organizations in Hong Kong (response rate of 21.3%), and 75 responses from organizations in Norway (response rate of 11.5%).

The great majority of our respondents were from top management (CEOs, VPs, Presidents, CIOs etc.) or middle management (Directors, Senior Managers, General Managers, etc.) levels, with only a few lower level managers represented. The US sample had almost as many in the top tier as the middle, about half of the Norway sample were from the top tier, while the largest number of Australian respondents by far were from the middle tier. There were more respondents in the middle management tier than in the top tier for the Hong Kong sample as well.

Both the organization size and the IT function size appeared to follow a normal distribution for the US, Australian, and HK responses with the greatest number of

responses coming from mid-sized firms and IT functions. However, a majority of the responses from Norwegian firms came from organizations with less than 500 total employees and fewer than 50 employees in their IT functions. There were only two responses from large organizations (more than 5000 employees) with large IT functions (more than 500 employees) in Norway. This can actually be regarded as representative for the general distribution of company size in Norway, where more than 90% of the registered companies have less than 100 employees.

3. Analysis and Results

About 314 organizations in the four countries responded to the EMS adoption measure, while 318 responded to EMS utilization status and level. Table 1a summarizes EMS adoption across the four regions. It is clear that a large majority of respondents report that EMS has not been adopted in their organization. Overall, over two-thirds reported non-adoption. The pattern is generally consistent across countries, with the number of adoptions in Norway being especially small.

Table 1b compares EMS use level across all the four regions. The profile again appears to be similar across US, Australia, and Hong Kong. In Norway, EMS adoption and use was especially low, with over 80% reporting no use at all. While the distribution for Norway may appear quite different from some of the other countries, we have to remember that there are really very few adopters at all in Norway (less than 10), so that it only takes a few companies to impact the percent.

One possible reason for this is that Norway is a smaller economy, and there are no firms in Norway marketing EMS. Overall, there is little doubt that EMS adoption and use is limited across all the four regions and that EMS are used rather infrequently. These findings suggest that significant EMS adoption and use barriers do

Table 1a. EMS adoption status across regions.

	Australia [<i>n</i> = 114]	US [<i>n</i> = 108]	HK [<i>n</i> = 64]	Norway [<i>n</i> = 58]	Overall [<i>n</i> = 344]
Non-adopters	78 [68.4%]	66 [61.1%]	43 [67.2%]	50 [86.2%]	237 [68.9%]
Adopters	36 [31.6%]	42 [38.9%]	21 [32.8%]	08 [13.8%]	107 [31.1%]

Table 1b. Level of EMS use across regions.

Level of use	Australia		United States		Hong Kong		Norway		Overall	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
0	71	68.3	65	63.1	40	66.7	42	82.4	218	68.6
1	17	16.3	21	20.4	8	13.3	3	5.9	49	15.4
2	13	12.5	14	13.6	9	15.0	2	3.9	38	11.9
3	1	1.0	2	1.9	2	3.3	1	2.0	6	1.9
4	2	1.9	1	1.0	1	1.7	3	5.9	7	2.2

Table 1c. Benefits from use of EMS [% of overall responses agreeing].

Country	Effectiveness (%)	Efficiency (%)	Ability to work with large groups (%)	User satisfaction (%)	Equality of participation (%)
US	14.3	13.4	16.8	10.9	10.1
Australia	14.2	15.0	16.7	5.8	10.0
HK	13.5	18.9	18.9	21.6	21.6

exist and organizations across the four regions may be facing formidable challenges in overcoming these barriers for EMS deployment.

The small differences in the numbers between Tables 1a and 1b occur because these are based on answers to two different questions. Table 1a is based on a question regarding how many persons in the organization had access to an EMS, and Table 1b is based on a question concerning extent or frequency of EMS use. Some respondents did not answer both questions, and apparently one respondent from Norway answered the second question, but not the first.

Table 1c shows how the respondents perceived benefits resulting from the use of EMS (*Note: Norway data is excluded due to the very small number of responses to this question*). The general pattern is that only a relatively small percentage of the respondents believed that a given benefit was likely to result from the use of EMS, with the highest agreement level just over 20%. Respondents from Hong Kong were generally more likely to agree that EMS would result in the potential benefits. The ability to work with larger groups was the most frequently cited benefit.

Table 2 shows the percentage of responses from those respondents that indicated "agreement" with fourteen barriers (i.e. scores of 4 and 5). The ranks of barriers within each region are also shown in parentheses in the same table. Barriers are highlighted (**bold and italic**) where more than 30% of the respondents agreed it was a barrier. The column on the right indicates the number of countries where more than 30% agreed it was a barrier.

We computed Kendall's coefficient of concordance (W) to statistically examine the average agreement in rankings of barriers to EMS adoption and use between the regions. Statistically significant agreement was detected only between the US and Australia. This is an indication that there are often significant differences in the perception of barriers in different countries. That there was more agreement on EMS adoption and use barriers between US and Australian respondents than between respondents in other regions is not very surprising given that there are more cultural similarities between US and Australia than there are between Hong Kong, Norway, and these two regions.

4. Discussion

Our results indicate that adoption and use of EMS in all the four regions is quite limited suggesting that there must be formidable barriers to their adoption and use.

Table 2. Percentage of respondents agreeing on adoption and use barriers [Ranks].

	US N = 39*	Aust. N = 29*	HK N = 34*	Nor. N = 25*	Mean	SD	Agree
1. There are no organizational incentives for effective & efficient meetings using EMS	46.2% [3]	62.1% [1]	27.3% [9]	40.0% [1]	44.3%	12.5%	3
2. It is too difficult to measure & demonstrate EMS benefits	48.7% [1]	55.2% [3]	29.4% [8]	25.0% [7]	42.7%	14.5%	2
3. EMS approach is not compatible with some cognitive styles	44.7% [4]	57.1% [2]	26.5% [10]	20.0% [10]	37.1%	17.0%	2
4. Suggestions to use EMS triggers resistance to change	47.5% [2]	44.8% [4]	32.4% [3]	8.0% [14]	35.6%	16.6%	3
5. EMS technology (hardware & software) is too costly	23.1% [11]	40.0% [5]	40.0% [1]	30.0% [3]	35.6%	8.8%	3
6. Dedicating a facility to EMS use is too difficult or costly	40.0% [6]	31.0% [7]	32.4% [4]	23.0% [9]	35.0%	9.8%	3
7. Requiring trained EMS staff is too costly	37.5% [8]	25.0% [8]	33.3% [2]	28.0% [4]	34.8%	9.8%	2
8. EMS use alters organizational power structures	38.5% [7]	24.1% [9]	32.4% [5]	24.0% [8]	29.9%	6.1%	2
9. EMS vendors are not positioning their product correctly	42.1% [5]	20.7% [11]	30.3% [7]	25.0% [6]	28.7%	8.2%	2
10. EMS is too complex to install and maintain	32.5% [9]	6.9% [14]	20.6% [11]	40.0% [2]	28.0%	14.2%	2
11. There is no perceived value-added from EMS use over manual meeting processes	20.5% [13]	34.5% [6]	14.7% [12]	20.0% [11]	24.1%	8.3%	1
12. Technical aspects of EMS software are poorly designed	27.0% [10]	10.7% [12]	32.4% [6]	16.0% [12]	22.8%	9.0%	1
13. EMS applications are a poor fit to organizational needs	10.3% [14]	10.3% [13]	14.7% [13]	28.0% [5]	19.2%	10.4%	0
14. Other technologies provide better meeting support than EMS	21.6% [12]	24.1% [10]	9.1% [14]	16.0% [13]	18.7%	6.2%	0

* Note: the number of respondents varied slightly by question.

When we examine the responses to the list of potential barriers, it does appear that the items we included on the list are indeed viewed by many respondents as significant barriers. For the sake of this discussion, we assume that a barrier is important if over 30% of potential users agree that it is a barrier, since this could significantly reduce potential adoption of a technology by a large group. Using this standard of 30% agreement, there are four barriers where respondents in three of the four countries agreed that they were significant barrier to EMS adoption and use (items 1, 4, 5, & 6 in Table 2), six barriers where respondents in two countries agreed they were barriers (items 2, 3, 7, 8, 9, & 10), and two more barriers where respondents in a single country agreed it was a barrier (items 11 & 12). Only two items fell below the standard of 30% agreement mark in all four countries. It is also interesting to note that nine barriers met the 30% standard in the US, seven in Australia and Hong Kong, and only three in Norway. This may help explain why a greater percentage of EMS adopters in Norway reported high levels of use. We can use the level of agreement to further discuss the barriers.

4.1. Barriers common to 3 countries

There are four of these barriers as follows:

- There are no organizational incentives for effective & efficient meetings using EMS
- Suggestions to use EMS triggers resistance to change
- EMS technology (hardware & software) is too costly
- Dedicating a facility to EMS use is too difficult or costly

These could be considered the set of key barriers across several countries. Overcoming these barriers could provide the greatest impact on EMS adoption and use overall.

4.1.1. Lack of incentives

Large numbers of respondents in the US, Norway, and Australia indicated that their organizations do not provide any incentives for efficient and effective meetings. This was especially true in Australia where it was the top-ranked barrier (62% agreement). Far fewer respondents in Hong Kong agreed that this was a significant barrier (only 27.3%).

Indeed, many organizations do not track the costs of meetings, even though if one were to calculate the costs of having several highly paid professionals sit in a room together for several hours, the number would be quite high, and the cost of poor decision-making can also be high. However, if an organization does not provide any incentives for improving the effectiveness and efficiency of meetings, managers might not be motivated to adopt and use EMS. It is interesting that this is not seen as a significant barrier by nearly as many respondents in Hong Kong (27.3% agreement). Organizations based in this region are known to emphasize the general importance

of efficiency and effectiveness (Lai et al. 2005), which may extend to meetings. This tendency could also be related to the stronger emphasis on collective behavior in Hong Kong (Rutkowski et al. 2002), as indicated by their low score in the national cultural measure of Individualism (Hofstede 2005).

4.1.2. Resistance to change

A large number of respondents in the US, Hong Kong, and Australia agreed that this could be a barrier to EMS adoption and use. It was the second, third, and fourth highest ranked barrier in the respective regions. Interestingly, very few respondents in Norway agreed that this would be a barrier (only 8%). Resistance to change was actually the lowest-ranked item in Norway.

It is well known that introducing change into an organization is difficult. Employees may resist adoption of a new technology for a variety of reasons such as change in job content, loss of status, change in interpersonal relationships, loss of power, change in decision-making approach, uncertainty or unfamiliarity or misinformation, and job security (Jiang et al. 2000).

The potential introduction of EMS may trigger anxiety and resistance in some managers and employees based on several of these issues, especially loss of status, loss of power, and change in decision-making approach.

Of the four countries, Norway does have the lowest score for the national cultural dimension of Long Term Orientation (Hofstede 2005), which would be interpreted as a general openness to change in the society, and a reduced importance of tradition. This may mean that, in Norway, they have less general resistance to the changes that could be introduced by the adoption and use of EMS.

4.1.3. High EMS cost

The cost of the EMS technology was seen as a barrier in all the countries except the US. While as many as 40% of the respondents in both Australia and Hong Kong agreed that this was a barrier, less than a quarter of the US respondents agreed.

In most cases, adopting EMS requires the acquisition of a significant number of computers, as well as the purchase of a software license. Current prices for the EMS hardware and software are apparently a problem in many countries. Certainly, in Hong Kong IT budgets were very tight at the time the survey was conducted, due to a broad economic slowdown across Asia (Garg et al. 1997). Perhaps this is less of an issue in the US because more US firms have already acquired the necessary computers (perhaps utilizing computers initially purchased for other reasons), and are only faced with a software purchase, or because the price of computers in the US is lower. The US organizations in our sample did have larger IT departments as compared to other regions, suggesting greater availability of resources to acquire hardware and software for EMS deployment. However, further research is needed to explore if lack of availability of IT resources could explain this as a barrier in other regions.

4.1.4. EMS facility cost

The cost of a dedicated facility was also identified as a significant barrier in several countries. Interestingly, it was a more important issue than the cost of EMS technology in the US, and of less importance in Norway. Apparently, it is often difficult and costly to find a facility that can be dedicated to the use of EMS. This could be even more difficult if the facility is not fully utilized, and most respondents did indicate that EMS was used only infrequently in their organization. Over time, this issue may decline as a barrier if EMS practitioners use more portable laptop-based EMS approaches, or if more different time/different place EMS meetings occur where a dedicated facility is not needed.

4.2. Barriers common to 2 countries

There are six of these barriers as follows:

- It is too difficult to measure & demonstrate EMS benefits
- EMS approach is not compatible with some cognitive styles
- Requiring trained EMS staff is too costly
- EMS use alters organizational power structure
- EMS vendors are not positioning their product correctly
- EMS is too complex to install and maintain

4.2.1. Difficulty of EMS benefit measurement

Over half of Australian respondents and nearly half of US respondents agreed that this was a barrier to EMS adoption and use. It was the top-ranked barrier for US respondents and the third-highest barrier for Australian respondents. It should be noted that, in earlier studies, the same target group of Australian organizations regarded measuring the benefits of IT generally as a critical issue for their managers (Pervan 1998), and that such measurement was difficult (Lin and Pervan 2003).

Much of this difficulty is likely centered on proving that the decisions reached are in some way better than those that would have been reached by other means. Laboratory studies have resulted in somewhat mixed results on this issue (Fjermestad & Hiltz 1999). In addition, laboratory studies have frequently shown lower participant satisfaction, even when decision outcome was better. Efficient meetings may have the benefit of cost-avoidance, but many organizations do not give much credit for cost avoidance, focusing on revenue generation instead, and making it harder for EMS advocates to make the business case (Post 1992). Examination of Table 1c would indicate that respondents in the US and Australia did not generally expect that the listed benefits would result from EMS use, which is consistent with their response to this barrier.

It is interesting to note that far fewer respondents from Hong Kong (29.4%) and Norway (25%) agreed that this was a barrier to EMS adoption and use. Are

EMS benefits more accepted or known in these regions, or is it less important to prove that there are benefits for some reason? When looking at Table 1c, it does appear that Hong Kong respondents were more likely to perceive benefits from EMS use. One important consideration might be that Hong Kong managers must frequently travel overseas. As travel becomes more expensive, being able to use EMS as a substitute for travel will become more important as a benefit. However, further research can shed more light on this result for Norway and Hong Kong.

4.2.2. EMS incompatible with cognitive styles

The response pattern for this item is very similar to the previous item. Many US and Australian respondents agreed that this was a barrier (ranked second-highest in Australia and fourth-highest in the US). However, far fewer respondents in Hong Kong and Norway agreed that it was a significant barrier (only 26.5% and 20%, respectively). The standard deviation for this item was the greatest of all barriers.

EMS generally would be characterized as a rational approach to group decision making with the emphasis on structured problem solving. Some managers might be more comfortable with a political or social approach to group decision making, where there is a greater emphasis on maintaining existing authority and power relationships, or on maintaining positive social interactions and interpersonal relationships. Managers who do not feel comfortable with an emphasis on rational problem solving may not want to adopt and use EMS for group decision making.

Perhaps this is seen as less of a barrier in Hong Kong and Norway because the rational style is more commonly accepted there, or perhaps the entire issue of managers' cognitive styles is not familiar to respondents in these regions. Our Norwegian co-author certainly felt it was difficult to translate this concept into the Norwegian language so that it "made sense" to the respondents. Further research could clarify this issue.

4.2.3. High cost of EMS staff

More US and Hong Kong respondents were concerned with this barrier than the respondents in Australia or Norway. Indeed, for Hong Kong respondents, it was the second-highest ranking barrier.

Most EMSs assume the availability of at least one trained facilitator (Clawson et al. 1993), and sometimes a team including a technical support person. In many organizations, it is harder to obtain funding for on-going staff positions than for equipment or even facilities. If using EMS requires hiring new personnel, or even requires using existing staff for additional purposes, this could be a significant cost barrier that reduces EMS adoption and use. Additional research could help us understand why this is not identified by as many respondents in Australia and Norway. Perhaps it is more common to have appropriate staff already available in these regions, or perhaps it is not as costly

to hire additional staff there. It is also a possibility that EMS users in Australia and Norway do not use trained staff as often in EMS sessions, so the cost is not seen as a significant barrier.

4.2.4. EMS alters power structures

Nearly 40% of the respondents in the US, and just under a third of the respondents in Hong Kong agreed that this is a barrier. Only about a quarter of the respondents in Australia and Norway agreed.

Most EMSs are designed to increase participation and assume the basic equality of the participants, at least for the purposes of the meeting. Generally, everyone has an equal chance to contribute items to discussions, and everyone's votes or ratings are given equal weight when evaluations are conducted. Anonymity reduces the opportunities that powerful members have to influence other participants. Reducing oral discussion and increasing written communication may shift power in favor of those more skilled with the latter form of communication. So, there are a number of ways that use of an EMS may change the power structure. Some of these changes may be desired by the meeting manager and the participants, but this may not always be the case. When managers want to maintain or reinforce existing power structures, they may avoid use of EMS to prevent any shift of power.

As to why this is not as widely seen as a barrier in Australia and Norway, it could be debated that these countries have a stronger tradition of egalitarian social structures, and so do not worry as much about upsetting existing power hierarchies. If we look at the national cultural dimension of Power–Distance (Hofstede 2005), we would see Australia and Norway do have low scores for Power–Distance, while Hong Kong has a much higher score than any of the other three countries. In a high Power–Distance culture such as Hong Kong, the society places greater emphasis on differences in power and wealth. While this seems logically related to the tendency of the Hong Kong respondents to agree that the threat EMS poses to existing power structures is a barrier to adoption and use, it does not explain why so many respondents from the US also agreed. The US has a much lower Power–Distance score than Hong Kong (just a bit higher than Australia), so one would generally expect less concern over threats to organizational power structures. Further research is needed to explore this issue.

4.2.5. Poor product positioning

A substantial number of US respondents and somewhat fewer Hong Kong respondents agreed that this could be a barrier. It was seen as the fifth highest-rated barrier for US respondents. Only about a quarter of Norway respondents and about twenty percent of Australia respondents agreed this was a barrier.

EMSs are often described as general purpose tools for supporting meetings. This may be accurate, but there is seldom a formal position in an organization that deals with general meeting support. Individual managers have specific problems to solve and decisions to make, and are likely looking for tools that match their own

problems and decisions. Sometimes a tool that is described as doing everything in general is in danger of being perceived as doing nothing in particular. It is not immediately obvious why there are rather large differences between the four countries. It could be that there are different marketing approaches (or none at all) being used by EMS vendors in the various regions, but further research is needed to investigate that possibility.

4.2.6. EMS complexity

A large number of respondents from Norway, and somewhat fewer in the US agreed that this was a barrier. Respondents from Australia and Hong Kong were quite unlikely to agree (it was the lowest-ranked barrier for Australia).

When EMSs were initially deployed, there were often problems with what was at that time new technology (microcomputers and networks) and new software (the EMS software packages themselves). While designers and vendors hope this has improved over time, it is surprising that 40% of the respondents in Norway and almost a third of US respondents still find EMSs too complex to install and maintain. The very low percent agreeing that this is a problem in Australia may indicate that different EMS software is in use in that country, or that vendors are providing better support. In interviews with EMS users conducted as part of a different study, we did find that there were significant differences in the perceived ease of installation and maintenance of different EMS products (Bajwa 2005). This would be an interesting topic for further research.

4.3. Barriers reported in 1 country

There are two of these barriers as follows:

- There is no perceived value-added from EMS use over manual meeting processes
- Technical aspects of EMS software are poorly designed

4.3.1. No value-added from EMS

In general, it is good news for EMS that this was only seen as a barrier in one country, where a little more than a third of the Australian respondents were concerned with this issue. Respondents in other countries were not very likely to see this as a barrier.

If EMS is not seen to provide any real advantage over normal meetings, then it would not be surprising if managers did not rush to adopt and use the technology. This barrier may be related to the difficulty in measuring and demonstrating benefits (and the relatively few benefits that Australian respondents expect from EMS use as shown in Table 1c), and the lack of organizational incentives for effective and efficient meetings as discussed above.

4.3.2. Poorly designed EMS software

Again, it is relatively good news for EMS that only one country met the 30% standard for agreement that poor software design was a barrier to EMS use. This seems to be an important issue in Hong Kong, but not in the other countries. Agreement in Australia was especially low, with only about 10% agreeing.

If software products are poorly designed with errors in coding, or hard to use interfaces, it would likely greatly reduce the level of adoption and use. Since these products have now been in the marketplace for almost two decades, most of these problems have hopefully been solved or minimized. However, the significant number of respondents agreeing in Hong Kong and the large difference in response between Australia and Hong Kong calls for further investigation. Hong Kong residents are known to be knowledgeable technology users (Burn et al. 1993), who are often demanding about the inclusion of sophisticated features in high-tech products. They may expect more from the design of EMS products, where respondents in the other regions may be more interested in the practical aspects of EMS software. In addition, there may be language or cultural issues that are involved in this issue in some way.

4.4. Barriers not reported in any country

There are two of these barriers as follows:

- EMS applications are a poor fit to organizational needs
- Other technologies provide better meeting support than EMS

Of the set of 14 barriers presented in the survey, only these two did not have at least 30% of respondents agreeing in at least one country. Apparently, EMS is indeed viewed as generally meeting some important organizational needs, presumably for improving meeting processes and outcomes. In addition, the respondents did not agree that other technologies are better than EMS for providing meeting support, which some researchers have proposed.

5. Summary

We have attempted to fill an empirical gap in the literature by assessing patterns of adoption and use of EMS in four regions across the globe. Our study also examined barriers to the adoption and use of EMS across the regions investigated. There are some important implications of our study findings. Given the fact that EMS have been around for nearly two decades, their limited deployment in organizations and the presence of barriers to their adoption and use is of great concern from both research and practice standpoints.

5.1. Study limitations

While this paper provides insights into overall EMS adoption and utilization patterns, and barriers to their adoption and use across four regions of the globe, we must also recognize some of the limitations of our research. First, the relatively low response rates in the US and Norway surveys may pose some limitations to our study in those regions. Since web-based surveys were used in both these regions, respondents may have encountered technical problems in responding (Boyer et al. 2001; Goldsby et al. 2001). It would be useful for future studies to attempt to obtain responses from an even larger sample.

Second, a single respondent was used to collect data from each organization. Although this can be problematic, the majority of our respondents were senior and middle level executives in their respective organizations. We would argue that these respondents are likely to be knowledgeable about EMS in their organizations. In any case, we did request that the survey be forwarded to the person most knowledgeable about IT support for collaboration in case the respondent receiving the survey could not provide the information related to our study.

While the authors have attempted to provide potential reasons for the adoption patterns we found, this study did not collect detailed rationales from the respondents. However, following this study, we have conducted in-depth interviews with EMS adopters and consultants in the US, and some of our insights concerning adoption patterns came from these interviews (Bajwa 2005). Nevertheless, additional case studies and in-depth interviews should be conducted in the sampled countries to confirm some of our suppositions in this paper.

Finally, while this study has begun to extend EMS research to a more global perspective, we have still only included a relatively small number of countries. Adding more countries to our future research efforts will help overcome this limitation.

5.2. Implications for future research

From a research perspective, there certainly has been no lack of effort in exploring EMS. In fact, given their limited scope compared to other information technology applications in organizations, EMS have probably been one of the more widely researched technologies over the past 15 years. Much of the early EMS research focused on assessing outcomes comparing EMS supported and non-EMS supported groups, in experimental settings. Our survey approach has extended past research and provided information on some of the barriers to the adoption and use across four regions.

One useful avenue for further research might be to conduct in depth case studies of organizations in different regions where EMS have been successfully adopted and are used frequently, and compare this with case studies where adoption and use has failed. A study by Anson and Munkvold (2004) is an initial step in this direction.

This may yield further insights into the regional factors that have resulted in successful EMS adoption and use and may, in turn, lead to improved deployment in other organizations in the same region.

Each of the barriers identified by this study should be studied in greater depth, with a view towards finding strategies for overcoming them. For example, if product positioning is a major barrier, then we need to understand how the potential users across regions perceive the current products and look for positioning alternatives that could be more effective. If current EMS provide support for only some cognitive styles, then future research could help provide advice on ways to support other styles. If resistance to change is a major problem, then future research can focus on ways to minimize the resistance, which may involve providing support for other important group goals such as “group well being” and “member support” (Dennis & Reinicke 2004).

Our research findings also have important implications for practice. First from the development standpoint, EMS developers and vendors should focus their marketing efforts on appropriately positioning their products based upon regional attributes. To further enhance the capabilities of EMS, developers and vendors may benefit from emerging technologies that could be incorporated in the next generation of EMS.

Second, from the business practice standpoint, groups in organizations that have experienced positive outcomes from EMS may be able to increase awareness of these systems throughout their organization, and help make EMS attractive and available to other groups. Perceptions of critical mass can certainly affect participant choices to use this IT.

Third, from a global IT deployment standpoint, our findings suggest that organizations may face different barriers to deployment of technology solutions (in this case, EMS to support task-oriented collaboration) across different global regions. As such, executives and managers contemplating extending their business operations overseas or those embarking upon virtual collaboration with participants in organizations in different global regions must be sensitive to barriers that may stifle adoption and use of their preferred technology solutions or collaborative tools in other regions (Munkvold 2005).

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