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The Role of Information and Communication Technology in the Urgent Decision-making Process: a work in progress report

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The Role Of Information And Communication Technology In The Urgent Decision Making Process: a work in progress report

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Abstract

This paper reports part of a study that examines how members of a senior management team in a public sector organisation make decisions under urgency. Four regional managers, who are geographically dispersed around New Zealand were interviewed, either face-to-face or via telephone, regarding their experiences of decision making under urgency. Preliminary results indicate that only three out of a possible seven steps of a conventional decision making process are used during the urgent decision making process. The study also shows that participants do not fully utilise the information and communication technology available during the decision making process. The implications the findings have for practice and research are discussed.

Keywords

Information and communication technology, computer-mediated communication, decision making under urgency

INTRODUCTION

Like many organisations in today's business environment, the New Zealand public sector is under extreme pressure to meet their objectives. This may include developing agendas or plans, drafting legislative proposals or delivering public services to clients. As a result, it is often difficult to arrange synchronous meetings, either face-to-face, or via audio conferencing for decision making as members are busy with other work. In conjunction with this is the setting of unrealistic deadlines, which leads organisational members working overtime to meet their objectives. This then raises the question, how do organisational members cope with these issues?

A number of research studies have focused on decision-making, information and communication technologies (ICT) and associated theories, such as the Information Richness Theory (Bigelow 1999; Campbell 1999; Daft and Lengel 1986; Markus 1994; Lee 1994; Ngwenyama and Lee 1997; Ross 2001). According to Duarte and Snyder (2001), ICT can be used in the decision making process as it allows for the easy transmission of information to all group members. However, few studies have looked at the role that different information and communication technologies may play in urgent decision-making situations.

This work-in-progress paper reports part of a study that examines the urgent decision making process and the role of ICT employed in this process by a New Zealand public sector organisation.

This paper is organised as follows. The following section provides a literature review to provide a background of group decision-making under urgency. The second section describes the research methodology used; the third section describes the research findings. The final section discusses the implications of the study and possible future research directions.

REVIEW OF CURRENT LITERATURE

Group Decision-Making

Group decision-making is defined as the process of making a choice from two or more alternatives via the interaction of two or more people (Robbins *et al*., 1998). Groups offer an excellent medium for the decision making process (Robbins *et al*., 1998; Fox 1987), as they are a source of both breadth and depth of input for information gathering, particularly when the group is composed of individuals with diverse backgrounds. Group decision making increases understanding and commitment, which in turn increases the likelihood of good solutions and of their effective implementation (Fox, 1987). On average, several people will produce more and better solutions to a non-routine problem than will a single person (Shaw, 1976; Eisenhardt, 1999).

There are many different processes in decision-making (Robbins *et al*., 1998). According to some authors (Watson, 1987; Robbins *et al*., 1998) decision-making is a structured process, and by following certain steps, a decision can be easily reached. In the psychology literature, decision-making models are used to identify a small number of explicit or implicit decision making rules that groups can adopt (Davis, 1973; Stasser *et al*., 1989). In these models, knowledge of the initial distribution of individual opinions in the group, and what rule the group is operating under, allows prediction, with a high degree of certainty, of the final group decision (Davis, 1973). Other authors claim that the decision making process is much more complex than following certain defined steps (Baish *et al*., 2002; Al-Hogail, and Previts, 2001; Callingham and Baker, 2001; Davis, 1973; Penrod and Hastie, 1980). In order to obtain an answer to the research question, the decision-making method to be used for the current study is a structured process developed by Watson (cited in Dufner *et al*., 2002).

1.	Define Problem
2.	Define Selection Criteria
3.	Define Alternatives
4.	General Discussion
5.	Rate Alternatives
6.	Vote or Straw Poll
7.	Group Decision

Figure 1: Suggested Decision Making Agenda (Watson cited in Dufner *et al*., 2002:6)

According to Watson's (1987) model, the first step in the seven-step process is used to define the problem, that is, what it is that needs to be solved. This allows the group to get a clear idea of the context for the rest of the decision making process. Once the group has determined and understood the problem, the criteria that will be important in making the decision must be identified. Step three requires the group to list all the viable alternatives that could possibly succeed in resolving the problem. A discussion is then held regarding the alternatives, in particular, the advantages and disadvantages of each alternative. Step five involves the evaluation of each alternative. The evaluation of each alternative is based on reviewing each alternative against the selection criteria established in Step two. A vote is then held on the alternatives in order to reach the seventh and final step, a group decision, which is the most preferred alternative.

Decision-making and Urgent Time Constraints

Many decisions in everyday life are restricted by time (Cosgrave, 1996). Consequently, there must be a careful distinction between decisions that are constrained by time, and those that are critically bound by time, that is, decisions that need to be made urgently.

In urgent situations, decisions often need to be made as soon as a problem presents itself (Cosgrave, 1996; Heath, 1995). This is because, at the worst, delaying a decision could put lives at risk. As a result, the time it takes to perform an organisational activity, function or process has become an important measure of an organisation's effectiveness or

performance (Stepanovich and Uhrig, 1999; Eisenhardt, 1989). According to Eisenhardt (1989), five key characteristics of fast decision making were related to high performance:

1. Fast decision-makers used more information.
2. They developed more alternatives than slower decision makers.
3. They used a layered advice process emphasising input from experienced counsellors.
4. They actively resolved conflict using consensus with qualification.
5. They integrated strategic decisions with one another and with tactical plans.

In the public sector, the time it takes group members to develop an agenda or plan, the time it takes to draft legislation and the time it takes to deliver a public service to a client have become the chief determinants of an agency's effectiveness (Cullin and Cushman, 1999). Time has become an important measure of an organisation's effectiveness because of its ease of use, its relative lack of bias and its predictability of other desirable organisational outcomes (Fraker, 1984; Cushman, 2000).

When a decision is deferred, the decision making load on the manager is increased, particularly in the situation where there is a constant stream of decisions that need to be made (Cosgrave, 1996). The number of decisions to be made may be such a constraint that it may lead to non-urgent decisions to be treated as urgent, simply to get them out of the way.

Eisenhardt (1989) found that fast decision makers preferred real-time communication such as email or face-to-face conversations to slower modes of communication such as paper-based memorandums. However, other studies have found that decision-making and task completion are not faster when electronically mediated (DeSanctis and Monge, 1998).

Improving a firm's organisational communication processes is the central ingredient necessary for reducing organisational cycle time for launching new products or services. Removing communication bottlenecks; standardising information transfer; developing rapid response systems; improving communication quality; and adaptations to customers, clients, voters, contributors and aid recipients are the central outputs that come from decreasing organisational cycle time (Cushman, 2000).

In summary, an extensive selection of literature exists on decision-making (Watson, 1987) and associated ICT theories (Daft and Lengel, 1986; Ross, 2001; Bigelow, 1999; Campbell, 1999; Markus, 1994; Lee, 1994; Ngwenyama and Lee, 1997). Few studies have looked at the urgent decision making process and in particular, the role of ICT in this process. This study aims to see if a difference occurs between decision-making and decision making under urgency. It should also help the New Zealand public sector organisation gain an increased understanding of their urgent decision-making process via ICT.

METHODOLOGY

Data collection procedures

The public sector organisation being studied is geographically dispersed around New Zealand with key branches in Auckland, Hamilton, Wellington, Christchurch and Dunedin and its Head Office is situated in Wellington. Each centre has a Regional Manager and the entire group of managers meet once a month in Wellington with the General Manager to discuss progress reports and planning. These face-to-face monthly meetings have proven to be costly in both time and money.

Often, in between these monthly meetings problems arise that require the urgent attention of the Regional Managers and General Manager. This has led team members to use different communication technologies to communicate with one another either synchronously (via audio conferencing) or asynchronously (via email) to come to an effective solution. Urgent decisions are made approximately once a fortnight. The members of this senior management team are interested in understanding more fully the nature of their decision making under urgency process and in exploring the role of ICT in enhancing this process. They have agreed for the first author to interview some team members regarding this issue.

In order to document a specific situation in which the participant was involved in an urgent decision making process where some form of ICT (such as email, audio-conferencing or video-conferencing, etc.) was used, the Critical Incident Technique (CIT) was selected as the data-gathering tool. Symon and Cassell (1998) discuss this interview technique:

> *The critical incident technique is a qualitative interview procedure, which facilitates the investigation of significant occurrences (events, incidents, processes or issues) identified by the respondent, the way they are managed, and the outcomes in terms of perceived effects. The objective is to gain an understanding of the incident from the perspective of the individual, taking into account cognitive, affective and behavioural elements (1998:56).*

Therefore, the CIT allows the researcher to "get closer to the participants" (Symon and Cassell, 1998:55) and is a "set of procedures for collecting direct observations of human behaviour" (1998:53).

The CIT is context rich, that is, it enables incidents to be viewed in context, which helps put them in perspective (Symon and Cassell, 1998). Relating the context of the events and the fact that the incidents are 'critical' means that the interviewees often have very vivid recall. The CIT also enables linkage as it is focused on an actual event, which is explicated in relation to what happened, how it was handled and what the consequences were.

A convenience sample was employed, as there were only nine team members to select from. Another consideration that had to be taken into account was the time-period of the research, mid-December, which is typically a busy time of the year. Therefore, any volunteers were interviewed. As a result, one face-to-face interview was carried out as the participant was based locally. The remaining three participants were located outside Wellington, and scattered regionally throughout New Zealand. For these participants, the interviews were carried out via the telephone (speakerphone, enabling the researcher to record the interview).

Semi-structured interviews of approximately thirty minutes duration were conducted to understand the critical incident. This structure was enabled through the use of a Situation Incident Interviewing Form. The Situation Incident Interviewing Form requires the participant to recall a situation during the past few months in which they were involved in a decision making process whereby they had to use some form of communication technology (such as email, audio-conference or video-conference) to communicate as a member of the decision making team. Participants then had to think about a situation that really demonstrated the effective or ineffective use of communication technology, thinking of it *as if* they were there again. Once they had that one situation in mind, they were then asked to describe it using a semi-structured interview form.

Data analysis procedures

Open coding was employed as the data analysis method as it is "the process of breaking down, examining, comparing, conceptualising and categorising data" (Strauss and Corbin, 1990:60). The interviews were transcribed and printed. The printed transcripts were read as a whole and then the authors went back and highlighted one or more sentences that captured the essence of the incident (particularly in reference to the communication technologies employed by the organisation), a label was then given as to where they would fit in the overall plan of the research (that is, Does it relate to a technology? Was it an efficient or effective use of that technology? Does it relate to background processes that participants felt necessary to conduct a better decision?). The authors then grouped each outtake under the appropriate heading and proceeded to find common threads or differences in which they could comment on (with examples from the interview).

RESULTS

The Urgent Group Decision-Making Process

The notion of 'urgency' in the New Zealand public sector organisation requires further clarification. According to the literature, in urgent situations, decisions often need to be made as soon as a problem presents itself (Cosgrave, 1996; Heath, 1995). Participant Four confirmed this by stated that urgency in the organisation meant, "I need to know now" or "we need to decide now". That is, an almost instantaneous solution is needed in answer to a problem that has arisen. The key word to note in those two examples is *now*. These urgent decisions typically arise once a fortnight for each of the participants interviewed.

Drawing on the transcriptions of each interview, we determined what steps were used in the urgent decision making process and compared it to Watson's (1987) model (see Figure 1).

Participants Two, Three and Four all had relevant examples of the process they took to reach their decisions. Participant Two discussed a situation in which a meeting was established for two o'clock on a Friday to hold a phone conference. Before the meeting started, an agenda was emailed to each group member, that is, a problem was defined and the group was informed as to what was required of the meeting. Unfortunately, a new phone system was recently installed, which created some difficulties for the team. Participant Two:

> *We'd just had a new phone system put in place, which had its own conference calling capability in it, so I tried to use that to establish the phone conference, and it was a disaster to be honest. So the first conference we just canned in the end. It just wouldn't work.*

However, in a subsequent attempt, the meeting was able to take place and the audio-conference was used as a general discussion of the problem allowing each participant to convey his point of view. After the audio-conference, an email was sent to all participants (and senior management) announcing the decision made at the conclusion of the meeting. As Participant Two stated:

> *I think you have to have the phone conversation, sort of like the discussion, to get an agreed outcome, and a confirmation of the outcome, in many cases, spreading that outcome to other people, email is the most effective way to do that.*

Summing up what Participant Two said in the interview, two types of communication technologies were used to conduct an urgent decision making process. Email was used to inform the group about the nature of the problem ahead of the meeting. An audio-conference was then used to perform a group discussion. This allowed participants to share their views and offer alternative options to the solution before a final decision was reached. The final decision was then distributed to all participants and senior management. It should be noted that steps two (defining the selection criteria); five (rating the alternatives); and six (voting on the alternatives for the preferred option) of the decision-making process model (Watson, 1987) were all abandoned during this urgent decision making process. Step three (defining alternatives) was implicitly conducted as a sub-step of Step four (conducting a general discussion) and therefore is not included as a separate step.

Participant Four told a similar story, this time with the use of mobile phones instead of email and audio-conference. Whilst travelling back to the city (after having a meeting with the regional managers and the General Manager in Wellington) an urgent situation arose which required an "agreement on a process for interviews to fill a senior management position." Approximately five calls were required between participants to reach the final decision. The first was to establish and introduce the problem and subsequent calls were used to conduct a general discussion including alternatives. The final call related to the agreed upon interview process.

Again, a similar pattern seen in Participant Four's recollection is that steps two, five and six of Watson's (1987) decision making process model were abandoned in favour of steps one

(defining the problem); four (conducting a general discussion, including step three of the original process, defining alternatives); and seven (arriving at a group decision).

Participant Three described a relevant example of the process taken to reach their decision. Participant Three was involved in an extensive appointment process, appointing new staff. The use of a telephone, and specifically a mobile phone in this situation was significant

> *…I was in Wellington and another person was in our regional office. We had quite a long discussion at times… we'd make a time to ring, or I'd be on standby, especially with cell-phones, you can carry them around no matter where you are.*

Analysing this excerpt, it can be determined that the problem was defined in a previous communication, possibly telephone as Participant Three was off-site for the day and was only contactable by telephone. Through a series of "long discussions" the participants involved were able to reach an agreed upon decision. This situation only called for steps one (defining the problem); four (conducting a discussion on the problem implicitly including step three, defining the alternatives); and seven (arriving at a decision) of the decision making process model introduced by Watson (1987), eliminating steps two, five and six.

The main result and recurring theme from the examples given by Participants Two, Three and Four is that not all steps of Watson's (1987) decision making process model are used in the urgent decision making process. That is, only steps one, four and seven are fully utilised and step three is included as a sub-step of step four. Figure 2 displays the revised model for the urgent decision-making process as derived through the conducted interviews.

1.	Define Problem
2.	General Discussion
	↳Define Alternatives
3.	Group Decision

Figure 2: Suggested Urgent Decision Making Process

Only three steps of the original decision making process (Figure 1) are used to derive a decision in urgent situations (that is, "we need to decide *now*" situations) as opposed to the seven steps described by Watson (1987). The actual substance of each step is essentially the same as those described by Robbins *et al.* (1998) and Watson (1987) in the original decision making process model. The first step of the amended model is used to define the problem, that is, what it is that needs to be solved. A discussion is then held regarding the alternatives (defining and discussing). This discussion then leads to a group decision.

THE EFFECTIVENESS OF THE USE OF COMMUNICATION TECHNOLOGIES

This section will evaluate the current use of communication technologies in the urgent decision making process in terms of effectiveness.

The use of Email

According to Duarte and Snyder (1999), email is "the most common and well-understood computer-mediated technology for distance collaboration" (1999:41). There is also the added advantage of allowing people to reflect and consider their responses, reach people in a short time, and the ability to deliver the same message to a number of people as well as provide a permanent, written record of the discussion.

Email use in the urgent decision-making process varied between different participants. The use of email has been abandoned in the urgent decision making process, according to Participant One. The contributing factor to this abandonment is the fact that no one is desk-bound and there is the possibility of sending an email whilst someone is on-site with clients therefore holding up the possibility of getting a quick response.

However, other incidents show that email is effective in that it allows the user to announce the outcome of the decision making process to all those that participated in the audio-conference and senior management. Participant Two was also able to use email to contact their local team and inform them to not to deal with a particular customer. No other communication technology that could reach so many people in a short space of time, especially when Participant Two was already tied up on the phone with the customer.

For interviewees, the use of email varies significantly in the urgent decision making process. It appears that the use of email alone is not sufficient to develop an urgent group decision and needs to be paired with other communication technologies to produce urgent decisions.

An evaluation provided by Duarte and Snyder (1999) claims that email is good for "discussion of ideas and plans, exchanging comments, revising plans and documents" (1999:43), all of which are relevant in generating ideas and plans and collecting data. In terms of problems with answers, email is good for "defining problems, discussing problems, transmitting data" (1999:43), which are the three steps in the refined Urgent Decision Making Process Model (Figure 2). The downfalls of email for problems with answers are that it is difficult to reach consensus on problems and to perform analysis (Duarte and Snyder, 1999).

The use of Audio-Conferencing

Duarte and Snyder (1999) do not elaborate on the use of audio-conferencing for different tasks such as generating ideas, plans, collecting data and dealing with problems with answers. They do claim however, that audio-conferences provide a 'good fit' for problems with answers and a 'marginal fit' for generating ideas and plans and collecting data. To put the fitting criteria into perspective, the example given is that of a 'poor fit', which may indicate too much or too little information richness.

There are mixed feelings for the use of audio-conferencing as an urgent decision making tool. The major problem for such a communication technology is the fact that everyone has to meet at the same time. That is, it is a synchronous series of communications that involves all participants at the same time (something that may not be possible due to other organisational commitments).

In fact, it was claimed that audio-conferences were dropped because "they actually became inefficient" (Participant Three). Participants in the audio-conference felt that they were wasting their time, as they could not do anything productive whilst sitting in front of the phone listening to another team member's talk, biding their time till it was their opportunity to speak. Another example showed the introduction of a new audio technology that had conference calling capabilities. However, this too caused problems for the decision-making team and led to the meeting being cancelled.

The use of the Mobile Phone

The use of mobile phones in the decision making process has not been well discussed in the literature. The results of a Kepner-Tregoe survey of 339 workers and 479 managers found that "when asked about the impact of wireless technologies, about half of the respondents say it has improved decision-making speed and quality. The other half either don't use it or don't believe it has had much of an impact" (cited in Sandahl and Hewes, 2001).

However, using mobile phones in the urgent decision making process needs to be considered, due to the fact that team members could be anywhere that has cell-phone coverage and still participate in the group decision making process.

Only two participants have really utilised the mobile phone in the urgent decision making process. However, one thing to note is that no disadvantages were mentioned, and the advantages of using the mobile phone include the ability to multi-task and be anywhere and still be contactable.

DISCUSSION AND CONCLUSION

Limitations of the Current Study

Although the urgent decision making team in the public sector organisation is a small team (nine direct report-regional managers, and one general manager), only four of these members were interviewed. To get a better understanding of the organisation and for further incidents of the urgent decision making process, more participants should be interviewed, ideally the whole team.

Another limitation is the number of different technologies employed by the organisation. As mentioned, email and audio-conferencing are the main tools and lately, mobile phones have been used. It would be interesting to see how other technologies (such as chat rooms or video-conferencing) fare in the urgent decision making process when team members are dispersed around New Zealand.

As only one public sector decision making group was used and in that group only four members were interviewed, the results may only be generalised to a small population. However, Creswell (1994) and Yin (1994) both claim that the result of case research is not to generalise to populations, but to generate a theory, which can be tested in future studies, or provide confirmatory evidence of existing theory.

Implications for Practice

Having analysed the data collected from the interviews and comparing it to the decision making model established in Figure 1, recommendations to the decision making group of the organisation being studied can be made. These recommendations may help them improve their efficiency and effectiveness in future urgent decisions. The first recommendation is to become more efficient with the technologies used in the urgent decision making process. For example, due to lack of knowledge on the use of the new conference calling system, a meeting was cancelled.

In a study by Staples *et al.* (1998), it was found that "using IT is potentially an important task for effective remote work…An individual's experience and training with the IT which is available for use in the [organisation] is likely to influence his or her self-efficacy assessments… the more training individuals have regarding available information technology, the more effectively they should be able to use it" (1998:6).

Spending time and money training employees on the different technologies used in the organisation can help improve the efficiency and effectiveness of the technologies, therefore eliminating possible abandonment of meetings.

Another recommendation is the introduction of a data-conferencing system such as ICQ (http://www.icq.com) or Net-meeting (http://www.microsoft.com). These systems are asynchronous in communication. That is, one user could log on and leave a text message (and an attachment of any kind) for other team members who could then log on at a different time and access that message and attachment. A record is kept of the communications for later reference. The advantage of these technologies is that they can become synchronous if need be. That is, if the meeting is urgent, all members could log on at the same time and conduct a general discussion (online chat) whilst sending and receiving attachments (containing documents or presentations).

Training facilitators to mediate and structure meetings is another recommendation that could be made to the organisation. Bryant (1989) describes a good facilitator as being an 'open' rather than a 'closed' type of person who should be friendly and flexible. Facilitators must know what is going on, have a good sense of orientation, that is, 'see the trees and the forest in every problem' and have a keen sense of awareness of the relative importance of situations. They must have the tact and sensitivity to deal with people and the capacity to straighten out complexities and entanglements. Previous studies have found that facilitation skills are a key success factor in electronic meetings (cited in Yoong and Gallupe, 2001).

Implications for Research

As mentioned throughout this work in progress paper, the study of the urgent decision making process in public sector organisations is relatively new and little literature exists. This study provides an initial base and model that can be further established in future research.

The model developed in this study (Figure 2) needs to be taken into other public sector organisations and tested in their urgent decision making processes to see if the same steps apply. This can confirm or disconfirm the model as well as give the opportunity to further refine it.

Further research could also investigate to see if this model is applicable to the urgent decision making process of private sector organisations, again allowing the model to be further developed.

The addition of other communication technologies (such as video-conferencing and data-conferencing systems) should also be evaluated in the current model to see how applicable (in terms of efficiency and effectiveness) they are in the urgent decision making process.

Few studies have looked at the urgent decision making process and in particular, the role of ICT in this process. This study aims to see if a difference occurs between decision making and decision making under urgency as well as help the New Zealand public sector organisation gain an increased understanding of their urgent decision making process via ICT. We intend to build on the work of this pilot study.

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