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# **Managerial Information Acquisition and the World Wide Web: An Exploratory Study**

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## **Abstract**

This paper is concerned with why managers use the World Wide Web as a channel for information acquisition. The research adopted a case study method involving eight senior managers in a large organisation. The study found that Web-based information acquisition by managers is a complex socio-technical activity that requires a broad theory base for understanding. The Web may not be as important to managers as it is for other classes of knowledge workers and the reasons for this lies in the equivocal, ambiguous, and uncertain nature of managerial tasks. However, managers do use the Web as an institutionalised information channel.

**Keywords:** Managers, World Wide Web, information acquisition, information channel selection.

## **1. Introduction**

Managers are the most important knowledge workers in an organisation (Simpson & Prusak, 1995). One of the most important processes in knowledge management is the acquisition of information and knowledge. Managers have more discretion in their selection of information sources than any other class of knowledge worker. They obtain information from a variety of sources, or information channels, which include face-to-face meetings, the telephone, paper documents, and newer, information technology-based media like email, executive information systems (EIS), and the World Wide Web (WWW or the Web). The Web is an information space consisting of hyperlinked documents published on the Internet. This paper is concerned with the use of the Web as a channel for information acquisition by managers. Andersen Consulting (1999) reports that 92 percent of the world's senior executives and managers have access to the Web, and that 83 percent use the Internet at least once a week, much of this is Web usage. This paper is focussed on one function of the Web, that which covers the one-way transfer of information from the Web document to the user. Intuitively, this information acquisition is the bulk of current Web usage.

The paper is organised as follows: first, the theoretical background of the study is summarised; the research questions are then identified and the research design is described; the research findings are presented in a series of tables and the results are discussed in terms of the research questions; finally, some concluding comments are made.

## **2. Theoretical Background**

The project was guided by theories that match information requirements to the type of task, theories of information retrieval, theories of the properties of information, and information channel selection theories. The nature of managerial work affects managerial information behaviours (Vandenbosch & Huff, 1997). Mintzberg (1989) argued that managers gather information in two ways: first, to assist in the making of decisions, and second, to maintain an awareness of the environment. When posed with a problem, managers collect information relevant to the specific decision to be made. This includes information about the problem domain, alternative actions, and the possible consequences of each action. On the other hand, managers also gather information that has no apparent immediate decision relevance (Feldman & March, 1981). Managers who are responsible for more convergent and structured aspects of organisational management such as auditing and financial planning are less likely to scan their environment. Those who have responsibilities that are more divergent and less structured are more predisposed to scanning behaviour (March, 1991). This is also related to the perceived uncertainty or ambiguity of one's environment. The higher a manager is in the organisational hierarchy, the more likely it is that they will face equivocality and environmental uncertainty (Daft & Lengel, 1984; 1986; Daft, Lengel & Trevino, 1987). Uncertainty pertains to situations where the problem may be well understood, but a lack of relevant information impedes its solution. These problems can often be solved by accumulating more information, a straight-forward decision support application. In contrast, equivocality refers to those situations where the managers find it hard to even conceptualise the problem. In these situations a problem is characterised by ambiguity, conflicting interpretations of the environment, and general confusion. Simply gathering more information may not be helpful. In low equivocality and low uncertainty situations, issues are well defined and only routine objective information is needed. When equivocality is low and uncertainty is high, managers have an understanding of the issues involved but lack the necessary information to solve them. Here, managers tend to collect more explicit and quantitative data. Situations with high equivocality and uncertainty are typically characterised by rapid change, and unpredictability. To cope with these situations, managers need both objective and subjective information. They seek out coworker opinions in discussions to clarify and understand ambiguous situations, and they also search for possible solutions through systematic data collection.

Choudhury & Sampler (1997) classified information acquisition as either reactive or proactive. In reactive mode, managers collect information in response to a specific question or problem. On the other hand, proactive information acquisition occurs when managers scan or survey the environment for any information that may be relevant or important. El Sawy (1985) also used a similar continuum of retrieval modes to describe information retrieval.

Managers' information behaviours are also influenced by properties of the information they acquire. The extent to which information-gathering activities are conducted by managers themselves or delegated to others can be explained by the concept of information specificity. Information specificity is defined as "the extent to which the value of information is restricted to its use and/or acquisition by specific individuals or during specific time periods" (Choudhury & Sampler, 1997, p 28). There are two forms of information specificity - time specificity and knowledge specificity. Within each category, a distinction is made between specificity in acquisition and

specificity in use. Information with high knowledge specificity in acquisition refers to information that can only be acquired by someone with the required specific knowledge or expertise. Knowledge specificity in use relates to information that can only be effectively used by someone with the relevant knowledge. Time specificity in acquisition refers to information that must be acquired immediately, or very shortly after, it originates or becomes available. Information with high time specificity in use means that the information has to be used immediately, or soon after it becomes available, or it loses value.

A number of theories have been developed to help understand how a manager chooses between different information channels for a given task. They can be divided into those based on rational choice and those based on social interaction. Rational choice theories assume that each information channel has fixed inherent properties. Under rational choice models, media characteristics are considered invariant regardless of context. The user makes an independent selection through cognitive evaluations of the media and its appropriateness to the task at hand. This choice is objectively rational and efficiency-motivated. The rational choice theories used in this project are media richness (Daft & Lengel, 1984; 1986; Daft et. al., 1987; Lea, 1991, Schmitz & Fulk, 1991; Lee, 1994), contextual demands (Trevino, Daft & Lengel, 1990), and channel disposition (Swanson, 1987; Schmitz & Fulk, 1991; Trevino, Lengel, Bodensteiner, Gerloff & Muir, 1990; Alexander, Penley & Jernigan, 1991). Social interaction theories were developed as an alternative to the rational media choice models and look beyond physical attributes of media and consider the social dynamics of the media selection process. These theories suggest that media perceptions are subjective, partly influenced by social factors, and vary across individuals and contexts (Fulk, Steinfield, Schmitz & Power, 1987; Fulk, Schmitz & Steinfield, 1990). Choice is therefore influenced by other users, past behaviour, and existing social norms. The social interaction theories used in this research are social influence (Fulk et. al., 1987; Fulk et. al., 1990; Steinfield, 1992; Schmitz & Fulk, 1991), symbolic meaning (Feldman & March, 1981; Sitkin et. al., 1992; Zmud, 1990), and critical mass (Markus, 1990; Rudy, 1996; Steinfield, 1992).

### **3. Research Design**

This project addressed the primary research question – what is the nature of managerial information acquisition using the Web? General Web usage has been studied by a number of researchers (for example: Atkinson & Kydd, 1997; Novak & Hoffman, 1998; Arnold, 1998; Korganonkar & Wolin, 1999; Kraut et al 1999; Bucy, 2000) but to date little research has focussed on managerial information acquisition although there has been a plethora of trade articles on the topic (for example, McCormack, 1999; “Even the boss is surfing for a new job”, 1999). A number of subsidiary research questions arise from the primary question, namely: What is the nature of information accessed on the Web by managers? How do managers perceive the value of Web information? What factors affect a manager’s Web usage? What are the characteristics of the Web that make it a useful information channel? When is the Web preferred to other media as an information channel? How does the social context in which managers operate influence their Web usage?

The research project was mainly exploratory in nature, with some descriptive elements (Neuman, 1997). The aim of the project was to develop propositions for more systematic inquiry. The project used a single case study approach which is useful for exploratory studies, especially for theory building and refining concepts for further study (Benbasat et. al., 1987; Cavaye, 1996; Eisenhardt, 1989). The study of a single case enables the researcher to investigate the phenomenon in depth, resulting in rich description and revealing deep structure (Cavaye, 1996). Within the case there were multiple units of analysis, the manager subjects. The existence of sub-units of analysis within a single case allows for the comparative logic of replication, similar to the cross-case analysis of a multiple-case study (Eisenhardt, 1989; 1991).

The organisation for the case study was chosen because it is reasonably large and is considered a high performing organisation. It is a semi-government authority with over 5,000 staff and an annual budget of around \$600 million. The Authority can be considered a heavy user of information technology and Email and the Web are institutionalised as information channels. The Authority has a large intranet and most policies and procedures are Web published. Every manager has a personal computer in their office and many also have a laptop computer. All Authority staff have unlimited Internet access. The sampling strategy used to select subjects was purposeful sampling of typical cases (Patton, 1990). Eight managers were chosen as the sample based on informational considerations (Lincoln & Guba, 1985) and the make-up of the managerial population (Seidman, 1991). Some managers were from quasi-autonomous business units, while others were selected because their responsibilities covered a range of divisional activities. Two managers were selected because they reported to more senior managers already included in the sample. This enabled the investigation of whether the work environment and relationships with coworkers and superiors, has an effect on Web usage. The characteristics of the manager subjects are shown in Table 1. A condition of the university ethics committee approval of the project was anonymity for the organisation and the manager subjects.

*Table 1. Managers in the study*

Manager	Gender	Job type	Tiers from CEO	Tenure (years)	Highest Education	Age	Web Use (years)	Office Web Sessions (/day)	Session Length (mins)	Home Web use
M1	male	divergent	1	1.5	Bachelor	50s	3	1-4	5-10	yes
M2	female	convergent	2	0.75	Graduate	30s	> 3	1-4	5-10	no
M3	female	convergent	2	2.0	Graduate	50s	1-2	1	15-30	no
M4	female	convergent	2	1.5	PhD	40s	> 3	5-9	varies	yes
M5	male	convergent	2	1.75	Bachelor	20s	1-2	1-4	15-30	yes
M6	male	convergent	2	15.0	Graduate	50s	1-2	> 10	< 5	no
M7	male	convergent	2	8.5	Graduate	40s	> 3	1-4	15-30	no
M8	female	convergent	3	1.0	Bachelor	30s	> 3	1-4	5-10	yes

Formal Authority documentation and examination of the Authority's Web site were used to compile background data for the case. Research data was collected through semi-structured interviews. The questionnaire that guided the interviews was developed with reference to the research questions and the theoretical background. The interview protocol was pilot tested with three senior managers who did not form part of the final

sample. The protocol was substantially amended following the pilot. Interviews with the manager-subjects were conducted in their offices and lasted around one hour. Follow-up questions were addressed by telephone. All interviews were audio taped. Data was entered into conceptually ordered tables (Miles & Huberman, 1994). The methods used to analyse the data are shown in Table 2. Whenever possible multiple methods were used.

Table 2. Data Analysis Methods

Method	Abbreviation	Page number in Miles & Huberman (1994)
Noting patterns or themes	PAT	246
Seeing plausibility	PL	246
Making metaphors	META	250
Clustering	CL	248
Factoring	FA	256
Counting	SUM	252
Making contrasts or comparisons	CON	254
Noting relations between variables	REL	257
Partitioning variables	PVAR	254
Subsuming particulars into the general	SUB	255
Direct question and answer	QU	-

#### 4. Findings

The study findings are presented in tables for clarity and space reasons. The tables were formed by the major themes of the research – demographic factors, information behaviours and information characteristics, rational choice theories of information channel selection, and social interaction theories of information channel selection. The data analysis methods are reported for each finding.

Table 3. Findings related to demographics

Finding	Method
Computer literacy is a pre-requisite to Web use.	PAT
Managers' Web skills are largely self-taught.	QU
Managers do not have to be highly skilled Web users to derive benefits.	PAT, REL
Gender, tenure, and education level do not affect levels of managerial Web use.	REL
Younger managers are more likely to use the Web and perceive it as more important than the older managers do.	SUM, REL, PAT
Managers' Web use is frequent, brief, and fragmented,	PAT
Most managers were introduced to the Web at work, and rarely use it for any purpose other than work.	SUM, PAT
Managers do not use the Web because they enjoy using it, rather because it is a means to an end.	QU, META

Table 4. Findings related to information behaviours and information characteristics

<b>Finding</b>	<b>Method</b>
Managers use the Web for intelligence gathering.	PAT, SUB
Information acquisition activity on the Web is categorised as active rather than passive, usually involving problematic search for information, and routine monitoring of familiar sites.	CL, FA, SUM, PAT, SUB
Information gathering on the Web is more often carried out in a reactive mode rather than a proactive mode.	CL, FA, SUM, PAT, SUB
Information obtained from the Web is used in decision-making, in maintaining an awareness of the environment both internal and external to the organisation.	QU, CL, PAT
Managers do not scan or surf the Web in general, but use it to scan their own environment.	QU, PAT, SUB
Managers use the Web to look for very specific information.	QU, PAT
Managers do not experience information overload with Web usage.	PL, QU
The Web is more important to managers whose Web activities are closely aligned with the core responsibilities of their position and type of work.	PAT, CON, SUM
Managers use the Web for tasks that are unequivocal and involve varying levels of uncertainty.	PAT, SUM
Higher level managers, who encounter equivocal situations more often, are less likely to use the Web, or use it less often.	PL
Managers seldom delegate Web activities, but when they do, they delegate tasks that are fairly structured, and do not delegate tasks that are unstructured.	SUM, CON, PAT
Managers delegate Web tasks that do not require the Web user to have special knowledge to collect the information, and do not delegate when special knowledge is required to use the information.	CON, PAT
Managers usually print information off the Web to read off-line, distribute to others, and use in discussions and meetings.	QU, SUM
Managers judge the quality and reliability of information on the Web based on the perceived reliability of the source, currency, and completeness.	PVAR, CL, QU
Managers perceive internal Web information to be more reliable than external Web information.	QU, PAT, PL
Managers perceive Web information to be more current than their paper-based equivalents.	QU, SUM
Managers use search engines only occasionally.	QU, SUM
Lack of formal searching skills affects search engine usage.	QU, SUB, PL
The level of searching skills is low because of lack of training, and when “trained” a lack of an understanding of how search engines work.	QU
Managers face problems with using search engines in terms of determining keywords to use in a search, and relevance of results.	QU, CL
As their information needs are very specific and their field of search is narrow, they do not need to perform broad searches on the Web.	PL

Table 5. Findings related to rational choice theories of information channel selection.

<b>Finding</b>	<b>Method</b>
Managers do not consider the Web a suitable information channel for equivocal tasks because it is not a rich medium.	CL, SUM, PAT, PL
Managers use the Web because it is an effective medium for unequivocal tasks.	CL, SUM, PAT, PL
When faced with an urgent need for information, managers select the Web because it is the most efficient channel, the most readily accessible, and the most convenient to use.	QU, SUM, CL, FA, PAT
Managers use the Web when channel substitutability is low.	SUM, CL, PAT
The Web acts as a complement to other information channels, and in certain cases, as a replacement.	CL, CL, FA, SUM
Managers use the Web because of the high accessibility of information, rather than information quality; managers are willing to tolerate occasions of poor information quality in exchange for high accessibility.	SUM, CL, FA, CON, PAT
Managerial Web use is self-reinforcing.	SUB, PL

Table 6. Findings related to social interaction theories of information channel selection.

<b>Finding</b>	<b>Method</b>
Managerial Web use is socially influenced by relationships between co-workers and superiors.	CL, PAT
Managers use the Web when it is part of organisational media behaviour norms.	CL, PAT
Managers use the Web because they want to “keep up with the times”.	CL, PAT, SUM, META
Managers use the Web to influence Web use in others.	CL, SUM
Managers use the Web when usage is acceptable and legitimate within the organisation.	PL
Managers are more likely to use the Web when the provision of relevant information has achieved critical mass.	CL, CON, PAT

## 5. Discussion

The discussion is structured around the subsidiary research questions identified in Section 3.

*What is the nature of information accessed on the Web by managers?*

Most of the information acquired from the Web is internal to the organisation. Managers access this information to maintain an awareness of the organisation. They do not use search engines to any great extent and they tend to have a specific information need in mind when they access the Web. Contrary to March (1991) this also applies to managers with divergent responsibilities. When they access external Web sites they tend to monitor the activities of similar or rival organisations and organisations in their supply chain. A significant amount of Web-based information is used for decision making with a stress on the intelligence stage of Simon’s model (Simon, 1960). Both of these acquisition behaviours are consistent with Mintzberg (1989). This information acquisition is best characterised as reactive (Choudhury & Sampler, 1997) in unequivocal task



environments (Daft, Lengel & Trevino, 1987). That is, they use it for predetermined structured information tasks.

*How do managers perceive the value of Web information?*

Managers judge the value or quality of Web information on its source, perceived currency, and perceived completeness. They judge the reliability of the information largely on their perception of the reliability of the source. One aspect of this judgement is that they feel that internal Web information is more reliable than external Web information. In general, managers do not perceive any serious reliability problems with Web information. The currency of information is the most important factor in assessing the value of Web information and managers feel that it is easier to judge currency on the Web than for other information channels. The Web is important for information acquisition with high time specificity (Choudhury & Sampler, 1997). Some managers judge the value of a Web site by whether or not they perceive the information on the site to be complete or not rather than by currency.

*What factors affect a manager's Web usage?*

Managerial Web usage patterns are not strongly influenced by demographic factors. Gender, job tenure, and education level have little effect on the nature of managerial Web usage although older managers are less comfortable with Web use and tend to place less importance on it. Managers seldom delegate Web information acquisition tasks but when they do it is for structured tasks. The Web information acquisition tasks that managers do not delegate are characterised by small scale ("easier to do it myself") or tasks with high knowledge specificity (Choudhury & Sampler, 1997). The use of the Web could be self-reinforcing although most managers do not use the Web because they enjoy it. Other Web use factors are identified in the discussion of the other research questions.

*What are the characteristics of the Web that make it a useful information channel?*

Managers find Web browsers easy to use and are largely self-taught in their operations. They have little use for search engines partly because of a lack of training in formal text searching and partly because they find that domain names are intuitive and that they can easily find most external sites without the need for a search engine. Media expertise (Schlitz & Fluke, 1991) is therefore not a major barrier to entry for managerial Web use. Managers like the relative high speed of information retrieval using the Web. They also like the graphic aspects of the Web, especially photographs. They do not perceive a major information overload problem with Web usage, particularly when they do not use search engines. As described above, this may be because of the highly specific nature of their Web-based information search. The asynchronous nature of Web information acquisition is useful to managers. In a work environment characterised by brevity, variety, and fragmentation (Mintzberg, 1989) Web usage can easily fit between other tasks.

*When is the Web preferred to other media as an information channel?*

Information richness is defined as the ability of a medium to promote shared meaning or to convey information. The Web is a relatively lean medium, richer than paper reports but leaner than the telephone. Media richness theory predicts that managers are likely to choose a richer information channel for equivocal situations and a lean medium for situations that are unambiguous (Daft & Lengel, 1984; 1986). Accordingly, managerial Web use is largely replacing information acquisition from paper-based reports. However, most managers print out Web-based information for both distribution to others and for their own work purposes. The Web is also replacing some email tasks for managers.

Contextual demands like time constraints, geographic distances, time zones, and channel accessibility serve to constrain a manager's media choice even before other factors are considered (Trevino, Daft & Lengel, 1990). Managers often act under time pressure and when faced with an urgent need for information, the most readily accessible channel and the one that is most convenient to use, will be selected (Carlson & Davis, 1998). These contextual demands explain a large part of managerial information channel selection with respect to the Web. A further aspect of this selection is monopoly. Many documents are now only available on the Web, particularly internal policy oriented information. The theory of channel disposition argues that managers make trade-offs between information quality and accessibility when deciding between different media (Swanson, 1987). This is true for the Web and many managers are willing to tolerate some reduction in information quality in exchange for virtually instant accessibility.

*How does the social context in which managers operate influence their Web usage?*

A pattern of co-worker influence in media use has been observed with email, where it was found that an individual's media perceptions and usage reflect that of his or her peers and colleagues (Schmitz & Fulk, 1990). This is also true of managers and the Web and is especially true when a manager's manager uses the Web. Some managers use the Web mainly to promote its use by subordinates. Besides being a carrier of information, an information channel has symbolic meaning which has little to do with its objective characteristics or capabilities (Trevino, Daft et. al., 1990). The level of managerial use of Web is in part determined by a desire to be seen as "keeping up with the times". For some managers Web use symbolises power or competence. Further, Web use is considered normal practice within some organisational units, and the managers working in these units are expected to incorporate Web use in their work whether they wish to or not. A major reason behind the regular managerial use of the Web is that a critical mass of users and services has been achieved.

## **6. Conclusion**

This paper has presented exploratory empirical research that provides a strong foundation for further work. Because the findings reported here are based on a single case study they difficult to generalise. Nevertheless, they may form the basis for an understanding of managerial information acquisition using the Web. The Web may not be as important to managers as it is for other classes of knowledge workers and the reasons for this lie in the equivocal, ambiguous, and uncertain nature of managerial tasks. However, managers do use the Web as an institutionalised information channel. This study has found that Web-based information acquisition by managers is a complex socio-technical activity that requires a rich theoretical base for explanation. Both rational choice and social interaction theories of channel selection provide insights into managerial usage patterns. Even combined these theories are inadequate to explain managerial Web-based information acquisition. Theories of information retrieval, the properties of information, and managerial work are also required to understand this information acquisition. It is interesting to note that most of these theories were developed before the Web was invented, but as this study has found, they are highly relevant to the new medium.

While managers have been early adopters and persistent users of the Web, and appear comfortable with the technology, the likely impact of the Web on genuine managerial work is unclear. The lack of manager-oriented training is a major constraint in

moving beyond the Web simply replacing the provision of internal paper-based reports, which is currently the majority of usage. Moving beyond this stage will require the involvement of systems analysts experienced in business intelligence applications development and an appreciation of the chaotic nature of managerial work.

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