Who Will You Ask? An Empirical Study of Interpersonal Task Information Seeking

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Information seeking behavior is an important form of human behavior. Past literature in information science and organizational studies has employed the cost-benefit framework to analyze seekers' information-source choice decision. Conflicting findings have been discovered with regard to the importance of source quality and source accessibility in seekers' choices. With a focus on interpersonal task information seeking, this study proposes a seeker-source-information need framework to understand the source choice decision. In this framework, task importance, as an attribute of information need, is introduced to moderate seekers' cost-benefit calculation. Our empirical study finds that in the context of interpersonal task information seeking, first, the least effort principle might not be adequate in explaining personal source choices; rather, a quality-driven perspective is more adequate, and cost factors are of much less importance. Second, the seeker-source relationship is not significant to source choices. Third, the nature of information need, especially task importance, can modify seekers' source choice decisions.

Introduction

Human information seeking behavior is an important part of human behavior. At the ecological level, human information seeking, like the food foraging of animals, is regarded as an indispensable skill for surviving the environment (Pirolli & Card, 1999). An important question in information seeking is which source a seeker should consult as source choice decisions directly impact the outcome of information seeking. In modern organizations, for example, employees' effective information seeking behavior is found to affect their job performance, their ability to cope with uncertainty in tasks, their knowledge acquisition, and their maintenance of comfortable social relationships with colleagues (Hart & Rice, 1991; Leckie, Pettigrew, & Sylvain, 1996; Morrison, 2002; Vakkari, 2003). Information seeking appears particularly important to newcomers who need new task skills as well as social information to adapt to a new environment (Miller & Jablin, 1991). Recent research in knowledge management finds knowledge seeking behavior exerting significant effects on employees' knowledge level (Gray & Meister, 2004). Those who seek knowledge not only learn from others to solve their current problems, but are also able to adapt the learned knowledge, and even innovatively create new knowledge.

Two disciplines—information science and organizational behavior—have studied the problem of information seeking, focusing on different contexts and using different research methodologies. However, most studies in both disciplines (Chakrabarti, Feineman, & Fuentevilla, 1983; Choo, 1994; Fidel & Green, 2004; Hardy, 1982; O'Reilly, 1982; Swanson, 1987; Vancouver & Morrison, 1995; Yitzhaki & Hammershlag, 2004) have adopted a cost-benefit framework and focused on the effect of source quality and accessibility on seekers' choices. Yet they have paid little attention to the impact of different task characteristics on the cost-benefit analysis. For example, the importance of cost and benefit could be affected by task importance. One exceptional study in this regard was by Morrison and Vancouver (2000), which considered seekers' need for achievement to be a contingent variable. Although the study investigated seekers' need for achievement, which was hypothesized to affect seekers' emphasis on source quality and access cost, need for achievement is better regarded as a personality rather than task characteristic. Moreover, the study did not investigate the seeker–source relationship in interpersonal information seeking, which has been found important in other studies (Ashford, 1986; Miller & Jablin, 1991; Pettigrew, Fidel, & Bruce, 2001).

The purpose of our study is to investigate seekers' choices of personal information sources in the context of task problem solving. The advantage of focusing on a specific context is the removal of the confounding effect of difference in the nature of information need (e.g., technical vs. social information). Our study also investigates task importance as a moderator affecting the importance of source quality and various costs. Contrary to the popularly held

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belief that seekers choose sources based on the least effort principle (Gerstberger & Allen, 1968), our empirical study finds that source quality may be the single dominant factor in source selection in the context of interpersonal task information seeking.

We have organized this article as follows. First, we review the information seeking literature and set the scope of this study. Then, focusing on the seekers' source choice problem, we propose a framework, which is called the *seeker–source–information need framework*. We introduce our hypotheses within the framework next, followed by our report of our empirical study. We then present our data analysis and discussion.

Conceptual Background

Information Seeking Behavior

Human information seeking can be regarded as purposive seeking of information to satisfy an information need. Although people also passively monitor information, it is arguably that active information seeking is of particular importance to problem solving (O'Reilly, 1982; Vancouver & Morrison, 1995). Our study focuses on active information seeking. Past research in organizational behavior and information science has focused on a few key research questions: (1) How does a seeker choose an information source (Chakrabarti et al., 1983; Fidel & Green, 2004; Morrison & Vancouver, 2000; O'Reilly, 1982; Swanson, 1987; Vancouver & Morrison, 1995)? (2) What affects the amount of information seeking (Ashford, 1986; Choo, 1994; Tan & Zhao, 2003; VandeWalle et al., 2000; Yitzhaki & Hammershlag, 2004)? (3) What is the nature of the information seeking process (Belkin, 1980; Kuhlthau, 1993)? The first two questions imply causal models addressing where to find information and how much information is sought. Factors such as the quality of information from a source (O'Reilly, 1982; Vancouver & Morrison, 1995), accessibility (Culnan, 1983; Fidel & Green, 2004; Gerstberger & Allen 1968; Yitzhaki & Hammershlag, 2004), social relationship with the source when the source is a person (Ashford, 1986), job nature (O'Reilly, 1982), and seeker's personality (Vancouver & Morrison, 1995) are shown to affect information seeking decisions. However, the first two questions are different in emphasis. In the source choice question, the focus is on source attributes, i.e., what are the attributes of the source that affect the seeker's choice? Both organizational researchers and information science researchers have investigated this problem. In the question about amount of search, source characteristics are of less interest. Instead, the issue is why someone engages in more information seeking than others. Therefore, the focus is on the seeker's personality or contextual demand (Tan & Zhao, 2003; VandeWalle et al., 2000). Furthermore, organizational research on this problem almost exclusively focuses on either employees' feedback seeking or newcomers' information seeking in an organization (VandeWalle et al., 2000). In contrast, studies in information science focus on the impact of task complexity and uncertainty on amount of information seeking (Byström, 2002). The third question focuses on seekers' cognitive states in the process of information seeking. For example, information seeking is regarded as a staged process starting with the awareness of a gap between the task demand and one's own deficient knowledge (Belkin, 1980), which leads to selection and exploration of a topic area, followed by focused search and collection of relevant information (Kuhlthau, 1993). Through these stages, the vagueness of the seeker's information need decreases, relevance judgment becomes stricter, and the seeker's search strategy changes (Case, 2002). The focus of our study is on seekers' choices of information sources.

Information sources are carriers of information. Many researchers implicitly assume this definition (Chakrabarti et al., 1983; Kuhlthau, 1999; Morrison & Vancouver, 2000; O'Reilly, 1982). The information source should be differentiated from information content. The same information can be available from multiple sources and a specific source can provide different types of information. One source can also be better in providing one type of information but not another. Therefore, source quality and access costs are more reliably evaluated when the task problem is spelled out. Information sources can be categorized into personal (e.g., colleagues, supervisors, and internal and external experts) or impersonal (e.g., documents, manuals, technical specifications, journals, libraries, and electronic repositories), and internal (i.e., within the organization) or external (Byström & Järvelin, 1995; Choo, 1994). Similar to Choo (1994) and Kuhlthau (1999), we classify information sources into internal personal, internal impersonal, external personal, and external impersonal. Seekers evaluate personal and impersonal sources with different sets of criteria (Culnan, 1985). For example, with impersonal sources such as computerized systems, ease of use might be an important concern; this criterion, however, is not applicable to personal sources (Culnan, 1985). Similarly, social risk (e.g., embarrassment) in information seeking is meaningless with impersonal sources. Therefore, different cost-benefit calculations are engendered with different types of sources. Among the four types of information sources, the two types of personal information sources are constantly found to be the most heavily used sources in organizations (Byström, 2002; Chakrabarti et al., 1983; Choo, 1994; Gerstberger & Allen, 1968; Hardy, 1982; Hertzum & Pejtersen, 2000; Yitzhaki & Hammershlag, 2004). Therefore, this study focuses on only choices of personal sources to avoid the complication of addressing different decision models for different source types. Some past studies used the term *channel* to refer to information source (Byström & Järvelin; Gerstberger & Allen, 1968; Hardy, 1982; Swanson, 1987). We define channel as the way content is delivered from source to receiver, i.e., mode of communication, which can be face-to-face, phone calls, e-mails or the like, and we differentiate it from information source. Our study focuses on the source choice rather than the channel choice decision (e.g., Daft & Lengel, 1986).

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Seekers' source choices are highly context dependent. One key aspect of context is the seeker's information need. In organizational settings, based on the nature of the content, information needs may be classified into: (a) task mastery information needs, (b) role clarification information needs, (c) acculturation information needs (e.g., knowledge of the norms), and (d) social integration information needs (Morrison, 1993). Seekers' source choice behavior may vary with the information need. For instance, a seeker looking for task mastery information might consider quality more important whereas another seeker looking for social integration information might put more weight on the social risk entailed in information seeking. Therefore, the cost-benefit analysis of source choice can also be a function of type of information need. It is therefore necessary to treat each type of information need separately or control for type of information need when studying source choice decisions. Because task problem solving is the most common information need (e.g., Gerstberger & Allen, 1968; O'Reilly, 1982; Yitzhaki & Hammershlag, 2004), our empirical study focuses on this aspect, i.e., search for task mastery information.

Source Choice Decisions

What are the factors affecting seekers' source choice decisions? A cost-benefit paradigm is widely adopted by both organizational and information science researchers. However, there is disagreement on the relative importance of the two components. There are two categories of research in the literature, with one advocating the least effort principle (e.g., Anderson, Glassman, McAfee, & Penelli, 2001; Chakrabarti et al., 1983; Culnan, 1983; Gerstberger & Allen 1968; Yitzhaki & Hammershlag, 2003), and the other indicating source quality as more important (Ashford, 1986; Morrison & Vancouver, 2000; Swanson, 1987; Vancouver & Morrison, 1995).

The least effort principle advocates source accessibility as a dominant factor in source selection, whereas quality plays a minor role in the decision process (Kwasitsu, 2003; Gerstberger & Allen, 1968; Yitzhaki & Hammershlag, 2004). The principle emerged naturally from empirical studies rather than because of theoretical reasoning. Indeed, its emergence was a surprise even to its initial advocators (Gerstberger & Allen, 1968). Why do seekers consider accessibility before source quality? O'Reilly (1982) argued that the value of information is inherently ambiguous in the information-seeking process; therefore, seekers would discount source quality. He also argued that time pressure might drive seekers to the most convenient source. However, Orr (1970) and Swanson (1987) attributed the insignificance of source quality to lack of variance in source quality in past studies. Although this methodological argument might be true, later studies that involved a large set of sources of different quality still found support for the least effort principle. For example, Chakrabarti et al. (1983), who surveyed 500 scientists and engineers on the use of 22 sources, found availability to be correlated more with frequency of use than utility of sources. Andersen et al. (2001) in their study of 872 aerospace engineers' use of five sources found the least effort principle supported. Similar evidence could be found in studies by Hertzum & Pejtersen (2000) and Yitzhaki & Hammershlag (2004).

In contrast, the argument for source quality as a dominant factor is intuitive. It is generally agreed that an important objective of information seeking is to reduce uncertainty (Ashford, 1986; Miller & Jablin, 1991; Morrison, 2002; Vancouver & Morrison, 1995) and improve task competence (Tan & Zhao, 2003; VandeWalle et al., 2000); therefore, a source is preferred when it offers quality information. Moreover, the cost component would be meaningless if quality were not a concern in information seeking. This stream of thinking is rooted in communication (Orr, 1970) and economic research (Stigler, 1961). It puts forth that people continue searching when perceived marginal benefit exceeds marginal cost, until the two are equal (Stigler, 1961). This stream of thinking is consistent with findings in the recent information foraging theory, which posits that one explores an information source until marginal return is lower than average return in the environment (Pirolli & Card, 1999). The empirical support for this proposition is also strong. Ashford's (1986) empirical study of 331 employees in feedback seeking showed perceived value of feedback to be the most dominant determinant for frequency of feedback seeking behavior. Morrison and Vancouver (2000) surveyed 282 aerospace engineers and found that source expertise had more weight than accessibility in the choice of five information sources. In contrast, Andersen et al. (2001), as we reported earlier, found the opposite with a similar population of aerospace engineers—that the least effort principle was supported.

Although this intriguing coexistence of competing arguments is noticed by some researchers (e.g., Hardy, 1982), few theoretical explanations have been advanced to reconcile them. One stream of theoretical work has introduced the seeker–source relational factor to enhance the pure cost-benefit framework. For example, Vancouver and Morrison (1995) introduced source reward power but found it insignificant to the amount of search, whereas Ashford (1986) considered social risk. Tan and Zhao (2003) found relationship quality to affect perceived value of feedback seeking. Overall, the effectiveness of the relational factor is still inconclusive. Another stream of theoretical work has introduced contingency variables. Morrison and Vancouver (2000) proposed seekers' need for achievement as a moderator variable. They argued that source quality might be perceived as more important if seekers' need for achievement was high.

We suspect that more contingent factors might be needed to reconcile the two arguments. To tap on task differences directly, we introduce task importance as a moderator variable affecting the cost-benefit calculation. We propose a seeker–source–information need framework to explain how seeker, source, seeker–source relationship, and information need might be related in influencing source choices.

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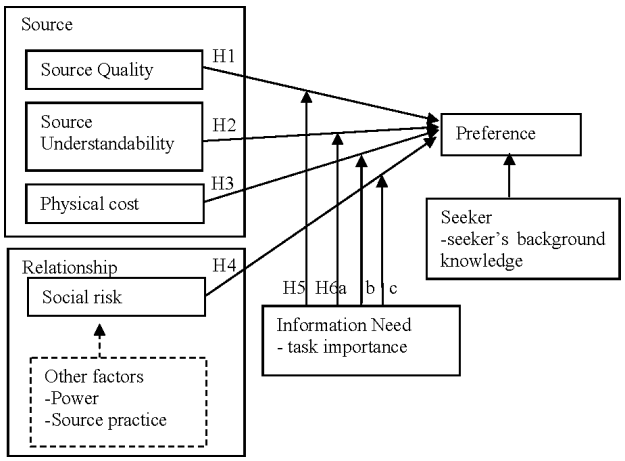

FIG. 1. The seeker-source-information need framework. (The constructs in the dotted boxes were not empirically tested in this study.)

A Seeker–Source–Information Need Framework

We regard source choice decision as a function of the interplay among seeker, source, seeker-source relationship, and information need. Figure 1 summarizes the relationship among these four factors.

Source

As discussed above, the basic characteristics of an information source are its perceived benefit and cost. The benefit of a source is ultimately determined by the information content it possesses. Accuracy, relevance, specificity, reliability, and timeliness are regarded as important aspects of the quality of personal as well as impersonal sources (O'Reilly, 1982). Vancouver and Morrison (1995) used the term "expertise" to describe personal source. An expert is expected to be more reliable and to provide more useful and diagnostic information. Swanson (1982) used reliability, precision, timeliness, comprehensiveness, and conciseness to describe report quality, whereas Xu and Chen (2006) used topicality, novelty, understandability, scope, and reliability to describe document quality. In this study, we define source quality as the reliability, relevance, scope, and novelty of the information content the source carries.

Although there is general agreement on the definition of source quality, the definition of access cost is vague. Not only do researchers hold different definitions of this construct, information seekers themselves are unclear of what access cost is (Fidel & Green, 2004). Fidel and Green (2004) interviewed 32 engineers and discovered 19 aspects mentioned under the general term of source accessibility. Moreover, unlike quality, which pertains to information content alone, cost may pertain to both information content and the source that carries the content. Therefore, cost needs to be further defined. Cost pertaining to content can be summarized as understandability of the source (Swanson, 1987; Xu & Chen, 2006). Cost pertaining to access to the source per se is reflected in physical distance (Chakrabarti et al., 1983; Fidel & Green, 2004; Gerstberger & Allen 1968; McCreadie & Rice, 1999) and ease of use if the source is impersonal (Chakrabarti et al., 1983; Culnan, 1985; Hardy, 1982). Because ease of use applies only to impersonal sources such as document and digital repositories, we do not include it in this study; instead, we focus only on source understandability and physical proximity. Past literature also considered availability of source as a dimension of source accessibility (Chakrabarti et al., 1983; Fidel & Green 2004). However, availability should be considered a prerequisite of source evaluation because source quality and access cost are meaningful only when availability is assumed. In the context of personal source choices, we hypothesize:

Hypothesis 1. Source quality is positively related to seekers' source preference.

Hypothesis 2. Source understandability is positively related to seekers' source preference.

Hypothosis 3. Source physical proximity is positively related to seekers' source preference.

Seeker-Source Relationship

For personal sources, an important factor that might affect information seeking is the social risk engendered in information seeking behavior (Ashford, 1986; Pettigrew et al., 2001; VandeWalle et al., 2000). Social risk refers to the embarrassment, loss of face, and revelation of incompetence (Ashford, 1986) associated with asking another person for information. For example, old-timers in an organization are supposed to know the rules of the organization, and they would incur social risk by asking about the rules. Similarly, a worker who has performed poorly on the job would incur social risk by seeking feedback on her performance.

Social risk is a function of the seeker–source relationship. In an organizational setting, such seeker–source dyadic relationships may be found between coworkers, manager and subordinate, and informal leader (e.g., an expert colleague) and follower. An important implication of such dyadic relationships is that the source's power, social status, and practice affect the seeker's social risk in information seeking. While seeker-source relationship and social risk perception are related, the relation may not be simple. For example, intuitively, a worker whose performance is unsatisfactory would avoid seeking feedback from a high power source (Vancouver & Morrison, 1995). However, if the high power source actively encourages information seeking (Tan & Zhao, 2003) and shows consideration to seekers' requests (VandeWalle et al., 2000), the worker whose performance is unsatisfactory may perceive lower social risk in asking for feedback or other information from the source. Similarly, past interaction between the seeker and the source and the structure distance in terms ranks between the two might affect the social risk in information seeking (Rice, Collins-Jarvis, & Zydney-Walker, 1999). Overall, many relational variables

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are likely to affect source choices indirectly through social risk perceptions. Therefore, we hypothesize:

> Hypothesis 4. The social risk entailed in approaching a source is negatively related to seekers' source preference.

Information Need

Information need refers to the demand of a specific task or problem situation that motivates information-seeking behavior. The versatility of information-seeking behavior is a reflection of the multiplicity of different information needs arising from different problem situations. Therefore, an important yet unresolved issue in information seeking research is to categorize different information needs. Information need may be described in terms of the nature of the information content, such as the technical or relational orientation of the information (Morrison, 1993), or the task situation where the information need is rooted.

Related to task situation, complexity and uncertainty of the underlying task have received particular attention in research (Byström, 2002; Byström & Järvelin, 1995; Culnan, 1983; O'Reilly, 1982). Task complexity has been referred to as the number of sources needed (O'Reilly, 1982), coordination and joint problem solving needed (Anderson et al., 2001), or amount of relevant external information needed (Culnan, 1983). It has also been defined as multiplicity of paths to problem solving, multiplicity of outcomes, conflicting interdependencies, and uncertain linkage between path and outcome (Campbell, 1988). Task uncertainty refers to routines or standardization of the task (O'Reilly, 1982), amount of information the seeker has (Ashford, 1986), anxiety and feeling of being overwhelmed (Kuhlthau, 1999), lack of predictability, lack of information, and uncertain sources (Anderson et al., 2001). Although different definitions have been used for these two attributes of information need, there is the consistent finding that complexity and uncertainty increase the number of sources searched or the total amount of information searched (Anderson et al., 2001; Ashford, 1986; Byström, 2002; Culnan, 1983). Some studies (Byström, 2002; Kuhlthau, 1999) also found these factors might affect the source choice throughout a task lifecycle. For example, Kuhlthau (1999) found an expert security analyst made more site visits than did a novice security analyst. We suspect that is because the expert security analyst has a different benefit perception of the source—he perceives the site visit as of higher quality in reducing uncertainty. Therefore, these factors might be mediated by a cost-benefit calculation in source choice.

We propose task importance as another important attribute of information need. Task importance refers to the importance of the outcome of the task to the seeker's well-being. Based on the elaboration likelihood model in psychology (Petty & Cacioppo, 1986), task importance can potentially modify the cost-benefit calculation in source choices. In the elaboration likelihood model (Petty & Cacioppo, 1986), task importance is termed *personal relevance*. The elaboration likelihood model posits that effort spent on information processing is affected by personal relevance of the information-processing task. It asserts that when people are motivated to engage in the evaluation of information, they are more likely to scrutinize the information and base their judgment on the merit of the content of the information. This type of processing is called the *central route of processing*. In contrast, if people are unwilling or unable to process an information item, less cognitive capacity will be devoted to it, resulting in a judgment based more on peripheral cues. The elaboration likelihood model is widely used to explain people's cognitive processing of persuasive messages; however, it may also be applicable to information seeking (Cho & Boster, 2005; Posavac & Herzenstein, 2003). Therefore, if the problem situation is important to the seeker and the seeker is motivated, she will be more willing to devote physical and cognitive effort and to incur social risk to solve the problem. Task problem solving is very likely to activate such outcome involvement. We hypothesize:

> Hypothesis 5. When seekers perceive higher task importance, they place more weight on source quality than when they perceive lower task importance.
>
> Hypothesis 6. When seekers perceive higher task importance, they place less weight on: (a) source understandability, (b) physical proximity, and (c) social risk than when they perceive lower task importance.

Seeker

Seekers enter into information-seeking behavior with various personal backgrounds. Most important, seekers come with insufficient background knowledge in the problem domain (Kwasitsu, 2003; Miller & Jablin, 1991; VandeWalle et al., 2000). The level of background knowledge might affect amount of information seeking because an expert might consider it less profitable to ask other people than novices do. However, it is unclear how background knowledge alters source-choice decision criteria. We therefore treat background knowledge as a control variable in addition to general demographic variables such as the seeker's age, gender, education, and job tenure.

Seekers enter into information seeking with not only different domain knowledge, but also different personalities. The extant literature has identified seekers' need for achievement, uncertainty tolerance, and learning orientation as factors affecting source choices to various degrees, and has found these dispositional factors to be related to the amount of information seeking done (Morrison & Vancouver, 2000; Vancouver & Morrison, 1995; VandeWalle et al., 2000). Dispositional factors affect information seeking because they affect level of motivation to seek, i.e., the willingness to bear cost in the seeking process. In other words, these factors affect how much a seeker considers a task as personally important. Therefore, they are likely mediated by task importance. Moreover, task importance perception incorporates not only the intrinsic motivations related to dispositional factors, but also the extrinsic and situational demands arising from the task environment. Task importance

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perception—which we consider in detail in our study—is hence more comprehensive. Therefore, we exclude personality factors in our model.

Methodology

To test the proposed model and hypotheses empirically, we adopted the survey methodology. For all constructs in the model (i.e., the factors in the hypotheses), wherever available, we generated multiple measurement items (survey questions) either through reusing tested items in the literature or creating new ones based on the conceptual discussion in the literature. We adapted and modified the items to form the initial version of our questionnaire. Then we performed a pilot test of the questionnaire with working students and professionals as a quality check. Finally, we administered the survey to a wide variety of professionals working in a major university in Southeast Asia, and analyzed the results following a psychometric procedure.

Instrument Development

Source preference. For the dependent variable, seekers' source preference, we used self-developed items. In past quantitative studies (e.g., O'Reilly, 1982; Vancouver & Morrison, 2000), frequency of information seeking from a specific source was used almost exclusively as the dependent variable. We consider frequency of seeking a measure of amount rather than of choice. The rationale is that one may infrequently use a source because the problem situation occurs infrequently. Therefore, amount of seeking as source preference is confounded by other factors. Source preference is measured as a source's relative quality among all sources and one's preference to use and one's dependence on it. We used four items to tap on these aspects (Table 1). To mitigate loss of statistical power in the presence of moderators (Carte & Russell, 2003), we measured the dependent variable using a 100-point scale. The items for other constructs all used 7-point Likert scales.

Antecedents. Source quality refers to the expected quality of information content from a specific source when the source is approached for information in a certain problem situation. Items for this factor are derived from Xu and Chen (2006) and O'Reilly (1982). Although Morrison and Vancouver (2000) also proposed items for source quality, they measured source quality in terms of whether the source is good for certain types of task and social information. However, we note that a source of quality may not necessarily be

TABLE 1. Items for major constructs.

Construct	Items	Item wording	References
Source quality	QUA1	He/She has knowledge that is potentially applicable to the task.	Xu & Chen, 2006
	QUA2	He/She has knowledge that is relevant to the task.	O'Reilly, 1982
	QUA3	He/She has broad knowledge related to the task.	Xu & Chen, 2006
	QUA4	He/She knows the task well.	Self-developed
	QUA5	He/She is an expert in the task.	Self-developed
	QUA6	He/She has unique knowledge which can be used to perform the task.	Xu & Chen, 2006
Physical cost	PHY1	His/her office is located close to mine.	Fidel & Green, 2004
	PHY2	I do not have to travel a long distance to his/her place.	Self-developed
	PHY3	It is not difficult to approach him/her in person. (Dropped)	Self-developed
Understandability	UND1	He/She is able to explain the issue clearly to me.	Self-developed
	UND2	The knowledge from him/her is easy to understand.	Xu & Chen, 2006
	UND3	I can easily follow what he/she suggests.	Xu & Chen, 2006
	UND4	The knowledge from him/her is clear in meaning.	Self-developed
Social risk	SOC1	I would be nervous to ask him/her for task knowledge.	Ashford, 1986
	SOC2	It is embarrassing to ask him/her for knowledge.	Ashford, 1986
	SOC3	He/she might think I am incompetent if I ask him/her.	Ashford, 1986
	SOC4	I think he/she would think worse of me if I ask him/her.	Ashford, 1986
Task importance	TASK1	The task is an important part of my duty.	Self-developed
	TASK2	The task is important to my performance.	Self-developed
	TASK3	The task means a lot to me.	Self-developed
Source preference	PRE1	If I come across a problem in the task, I think he/she is the best person to approach for problem solving knowledge.	Self-developed
	PRE2	Among all the people available to me, I prefer to ask him/her for task knowledge.	Self-developed
	PRE3	Without him/her, it would be more difficult for me to obtain the needed knowledge if a problem arises.	Self-developed
	PRE4	Overall, he/she is a very useful source of task knowledge.	Self-developed
Background knowledge	KNO1	I consider myself an expert in doing this task.	Xu & Chen, 2006
	KNO2	I can tell people a lot of how to do this task.	Xu & Chen, 2006
	KNO3	I know this task very well.	Xu & Chen, 2006
	KNO4	I can logically analyze this task.	Self-developed

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good at providing all types of information. Therefore, we turned to the concept in Xu and Chen (2006), which measures content relevance in five dimensions: having on-topic content, scope, reliability, novelty, and understandability. Among these five dimensions, understandability of information is more a cost factor that measures information seekers' cognitive cost. We therefore excluded it from source quality, and treated it as a cost measure instead. As for the other four dimensions, although Xu and Chen (2006) considered them distinct constructs, we took them as manifestations of source quality instead in our study. This is because in the context where a personal source is evaluated, the perception of source quality determines what the seeker expects from the source. Six items (e.g., "He/she has knowledge that is potentially applicable to the task.") were used to measure source quality to tap on these four dimensions (Table 1). The second construct understandability of information from a source was measured with four items based on two items from Xu and Chen (2006), and two self-developed ones (e.g., "The knowledge from him/her is easy to understand."). Physical cost was measured in terms of physical proximity. Three items were developed for this construct (e.g., "His/her office is located close to mine."). Social risk was measured based on four items used in Ashford (1986). The items covered embarrassment, nervousness, and being regarded as incompetent.

Control variables. Past literature found job tenure and seekers' education to be potential factors affecting information seeking (Ashford, 1986; O'Reilly, 1982); therefore, in addition to general demographics (e.g., age, gender), we included these variables as control variables. Another control variable, seekers' background knowledge, was measured with three items from Xu and Chen (2006) and one newly developed item (e.g., "I consider myself an expert in doing the task."). Table 1 summarizes the items for the major constructs and the seekers' background knowledge.

Pilot Test

Because many constructs in our model were defined or measured differently from those in the past literature, we carried out a pilot test to verify the instrument. We collected a convenience sample from a class of 44 part-time master's level students and 21 technical staff working in the same university. Following the recommended procedure of psychometric analysis (Anderson & Gerbing, 1988), we conducted exploratory factor analysis to test the convergent and discriminant validity of the instrument. Convergent validity means that all items intended to measure a construct do reflect that construct. Discriminant validity means a question should not reflect an unintended construct and that constructs are statistically different from each other. Exploratory factor analysis measures convergent and discriminant validity by letting the underlying factors emerge naturally from the data without imposing any constraint. If the items for a construct are well designed, factor analysis should show that these questions are highly correlated with each other and with the same latent factor. If an item is problematic, it can be detected and removed from later study. Exploratory factor analysis with principal component analysis was used to extract factors in our study (Hair, Anderson, Tatham, & Black, 1995). Major principal components with an eigenvalue greater than 1 were extracted as constructs; minor principal components with an eigenvalue of less than 1 were ignored. The major components were then rotated (with the Varimax rotation method) to form interpretable factors. An item and the intended construct correlation (also known as factor loading) should be greater than 0.5 to satisfy convergent validity; an item and the unintended construct correlation should be less than 0.4 for discriminant validity (Hair et al., 1995). Seven major latent factors were extracted with an eigenvalue of greater than 1. The seven latent factors together explained 82.5% of the total variance. Table 2 reports the principal component analysis results with Varimax rotation using SPSS13 software. All items satisfied the convergent and discriminant validity requirements.

Main Study

In the main study, a convenience sample was collected from employees in a university. Invitation letters were sent to nonresearch staff at the library, university hospital and health center, estate management office, entrepreneurship office, computing center, and administrative and professional staff at the engineering school. Managers at each office were first contacted for permission. Staff members in each office who were considered knowledge workers were then invited by the managers or researchers to take part in the study. In total, 190 survey forms were distributed. A sample of 161 responses was obtained (with a response rate of 85%). Seven subjects did not answer all the questions and were excluded, leaving only 154 usable observations. Sampling bias was not evaluated given the nature of convenience sampling. However, most of our subjects were professionals whose job required frequent information seeking. Table 3 summarizes their demographics.

In the survey form, the subjects were asked to list four tasks that they performed in their job. They were then asked to list at least four people whom they could consult if they needed information on performing the tasks. On average, the subjects listed 4.4 personal sources. Next, they were asked to focus on one given task. The four tasks were balanced in number among all subjects, i.e., we had four versions of the survey form differing only in the task that the subject should evaluate. Subjects were then asked to pick a personal source based on a number produced by a random number table, which took the subject's birth month and the total number of personal sources listed as row and column for lookup. The rest of the survey questions were then answered based on the chosen task and the chosen personal source. Table 4 reports the descriptive statistics of the major constructs and their correlations.

After data collection, following Anderson and Gerbing's (1988) suggestion the measurement model was first tested to further validate the instrument before hypothesis testing.

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TABLE 2. Exploratory factor analysis for pilot data.

	1	2	3	4	5	6	7
QUA1	**0.75**	0.36	−0.01	0.06	0.12	0.24	0.08
QUA2	**0.85**	0.31	−0.03	0.04	0.20	0.17	0.08
QUA3	**0.84**	0.23	−0.14	0.06	0.14	0.19	−0.01
QUA4	**0.88**	0.24	−0.01	−0.04	0.06	0.14	0.09
QUA5	**0.90**	0.05	−0.01	0.08	0.00	0.14	−0.04
QUA6	**0.72**	0.07	−0.19	−0.01	0.17	0.19	0.06
PHY1	−0.03	0.24	−0.01	−0.21	0.06	0.10	**0.85**
PHY2	0.17	0.09	−0.16	0.10	0.07	−0.03	**0.87**
PHY3	0.00	0.45	−0.18	−0.11	0.08	0.01	**0.73**
UND1	0.31	**0.71**	−0.01	0.04	0.03	0.24	0.16
UND2	0.25	**0.82**	−0.11	0.03	0.19	0.12	0.30
UND3	0.27	**0.85**	−0.11	0.07	0.16	0.12	0.14
UND4	0.31	**0.84**	−0.20	0.07	0.09	0.08	0.20
SOC1	−0.09	0.00	**0.88**	0.06	0.04	0.03	−0.14
SOC2	−0.06	−0.07	**0.93**	0.08	0.00	0.05	0.00
SOC3	−0.10	−0.09	**0.91**	0.04	0.02	0.01	−0.05
SOC4	−0.06	−0.18	**0.86**	−0.02	−0.13	−0.06	−0.13
TASK1	0.19	0.09	−0.06	0.18	**0.86**	0.08	0.15
TASK1	0.16	0.07	−0.07	0.17	**0.92**	−0.06	0.13
TASK3	0.12	0.18	0.06	0.10	**0.90**	−0.04	−0.07
PRE1	0.42	0.26	−0.13	0.01	−0.05	**0.75**	−0.11
PRE2	0.30	0.40	−0.18	−0.05	−0.01	**0.74**	0.05
PRE3	0.14	−0.09	0.36	0.08	−0.13	**0.72**	0.07
PRE4	0.42	0.16	0.01	−0.11	0.17	**0.78**	0.06
KNO1	−0.09	−0.21	0.00	**0.88**	0.08	0.03	−0.07
KNO2	0.00	0.02	0.01	**0.89**	0.14	−0.01	0.05
KNO3	0.12	0.10	0.09	**0.90**	0.10	0.02	−0.06
KNO4	0.12	0.32	0.08	**0.76**	0.12	−0.07	−0.10
Eigenvalue	8.90	3.96	3.37	2.49	1.90	1.28	1.20
% of variance	31.78	14.13	12.05	8.91	6.78	4.56	4.30
Cumulative %	31.78	45.91	57.95	66.86	73.64	78.20	82.50

TABLE 3. Demographics.

Demographic	Category	Frequency (n = 154)	%
Age	<20	1	<1
	20–30	62	40
	30–40	59	38
	40–50	26	17
	>=50	6	4
Gender	Male	39	25
	Female	115	75
Job title	Manager	20	13
	Administrative officer	48	31
	Engineer	17	11
	Instructor	4	3
	Nurse	36	23
	Part-time student	1	<1
	Librarian	18	12
	Other	10	6
Education	High school	34	22
	Diploma	18	12
	Undergraduate	40	26
	Postgraduate	61	40
	Ph.D.	1	<1
Job tenure	<=1 year	41	27
	2–5 years	72	47
	6–10 years	31	20
	10–20 years	10	6

Measurement model. The purpose of the measurement model was to ensure instrument quality. Confirmatory factor analysis (CFA) is recommended as a statistical method (Anderson & Gerbing, 1988) for this purpose. With this method, the corresponding relationship between items and construct is first specified. Items of a construct are expected to be highly correlated with the intended construct only. If an item is not substantially related to the intended construct, or significantly related to an unintended construct, the prespecified relationship is invalidated and adjustment of the instrument is required. In other words, the same convergent validity and discriminant validity requirements used in exploratory factor analysis apply here, although a different statistical procedure is employed. For convergent validity, there are three criteria. First, construct-item correlation should be statistically significant (Anderson & Gerbing, 1988). Second, an item should be explained more by its intended construct than the information captured in the residual. The average variance extracted (AVE) is such a measure, and it is required to be greater than 0.5 (Fornell & Larcker, 1981). Third, items of the same construct should be highly correlated. To measure such correlations, two measures: composite factor reliability (CFR) and Cronbach's alphas (α) are required to be greater than 0.7 (Hair et al., 1995). If all these criteria (significant correlation, high AVE, CFR, and α) are satisfied, the

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TABLE 4. Descriptive statistics.

	M	*SD*	1	2	3	4	5	6	7
1. Source quality	4.63	1.57	0.88						
2. Physical proximity	5.14	1.83	0.39**	0.92					
3. Understandability	5.22	1.36	0.68**	0.44**	0.93				
4. Social risk	2.50	1.40	−0.09	−0.04	−0.27**	0.87			
5. Task importance	4.73	1.61	0.35**	0.20*	0.28**	−0.07	0.90		
6. Background knowledge	4.74	1.19	0.04	0.01	0.12	−0.2*	0.41**	0.87	
7. Source preference	63.20	25.65	0.56**	0.27**	0.37**	−0.04	0.24**	−0.04	0.88

Note. Values in the diagonal cells are square roots of average variance extracted (AVE).
*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed).

TABLE 5. Confirmatory factor analysis.

Constructs	Smallest standard loading	Item count	*T*-value	AVE	CFR	α
Source quality	0.73	6	15.02	0.77	0.95	0.95
Physical proximity	0.82	2	10.53	0.84	0.91	0.90
Understandability	0.92	4	14.93	0.86	0.96	0.96
Social risk	0.78	4	11.33	0.75	0.92	0.92
Task importance	0.89	3	13.73	0.81	0.93	0.93
Source preference	0.72	4	15.82	0.77	0.93	0.93
Background knowledge	0.68	4	13.63	0.75	0.92	0.92

Note. AVE = average variance extracted; CFR = composite factor reliability.

convergent validity of the items are said to be satisfactory. Our test using statistical package LISREL v8.5 showed that all items loaded properly on the intended construct except PHY3, whose loading was low (0.52). It was therefore removed. For the remaining items, the convergent reliability of measurement model testing is reported in Table 5. All criteria were satisfied.

To check discriminant validity, we adopted the criterion proposed in Fornell and Larcker (1981), which requires interconstruct correlation to be less than the square root of AVE. The underlying rationale is that an item should be better explained by its intended construct than by some other constructs. The correlation among constructs is reported in Table 2. Discriminant validity was confirmed for the main study data. In summary, the measurement model was supported by the data.

Hypothesis testing. We used moderated multiple regression to test our hypotheses. Simply put, moderated multiple regression extends ordinary least squares regression with products of independent variables. The products of independent variables are used to capture the enhancing or suppressing effect between independent variables, i.e., moderator effects. For our data, we first averaged the item scores for each construct. We then standardized the constructs involved in the moderator relationship. We created pair-wise construct products to capture the moderator effect for Understandability × Task Importance, Physical Effort × Task Importance, Social Risk × Task Importance, and Source Quality × Task Importance. We then regressed source preference on the main antecedents, which represented main effects and the products, which represented moderator effects. In doing the regression, to present the different contribution of main effects and moderator effects, we adopted a hierarchical process. We first regressed source preference on the control variables (education, gender, age, job tenure, and seeker's background knowledge); they were all insignificant. We then added the main effects of source quality, physical proximity, understandability, and social risk to the model. Only source quality was found significant at the $p < .05$ level. Finally, the moderator effects were then added to the model. After adding the moderator effects, the main effect of source quality, physical proximity, understandability, and social risk remained unchanged. Therefore, hypothesis 1 was supported, but hypotheses 2, 3, and 4 were not. No moderator effect was found significant at the $p < .05$ level. The moderator effects for source quality and physical cost were found weakly significant at the $p < .10$ level. However, the direction of the sign was opposite to what was expected. For example, for source quality, we expected the product with task importance to be positive, so that when task was more important, the overall importance of quality, which was the sum of the main effect and the moderator effect could be larger. However, the coefficient for the moderator turned out

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TABLE 6. Hypothesis testing.

	Control variables β	Main effect β	Moderator effect β
Education	−0.01	−0.08	−0.10
Gender	0.11	0.02	0.03
Age	−0.03	−0.02	−0.06
Job tenure	0.02	−0.09	−0.09
Seekers' background knowledge	−0.04	−0.06	−0.08
Source quality		0.58*	0.57*
Physical proximity		0.08	0.08
Understandability		−0.05	0.02
Social risk		−0.04	−0.07
Quality × task importance			−0.19**
Physical proximity × task importance			0.17**
Understandability × task importance			0.10
Social risk × task importance			−0.08
R^2	0.014	0.342	0.38

*$p < 0.05$. **$p < 0.10$.

to be negative. Therefore, hypotheses 5 and 6 were not supported. When task importance was included as main effect to the model, it was insignificant, and the significance of the other hypotheses remained the same. Table 6 reports the analysis result.

Discussion and Study Implications

We set out to test the impact of source quality, source understandability, physical proximity, and social risk on personal source preference in the context of task information seeking. We expected task importance to play a role in making seekers more sensitive to source quality and less sensitive to seeking cost. Our empirical study shows that the overall model fit was satisfactory and 38% of variance in source choices was explained, suggesting that the model was effective in explaining a significant portion of the seekers' source choice decisions. However, our data showed that in the context of our study, quality was the single dominant factor in personal source choices. No cost factor played a significant role; neither was social risk entailed in the seeker-source relationship. We shall further explain the findings and summarize the implications of these findings on research and practice in this section.

Understandability, Physical Cost, and Social Risk

Why was understandability insignificant to source preference? The correlation table shows that source understandability was significantly related to both source quality ($r = .68$) and source preference ($r = .56$). The high correlation with source quality suggests the possibility of multicollinearity in regression. We did multicollinearity checking with both condition index and variance inflation factor, and found no sign of the multicollinearity problem. Therefore, the insignificance of understandability was not likely a statistical artifact. A plausible explanation is that understandability is easy to achieve in interpersonal communication: The high average score in the study (5.22 out of 7) indicates that understandability was generally not a concern. Therefore, when source quality is considered, source understandability plays an insignificant role in source choices.

Physical cost was found conditionally significant. The main effect was insignificant whereas the moderator effect was weakly significant. One plausible reason for the insignificant main effect is that the personal sources evaluated by the seekers were mostly close to the seeker, as indicated by the high score of physical proximity (5.14 out of 7). When sources were generally easily available, at least in this sample, it was likely not to be a concern in source choices.

Social risk had very low and insignificant correlation with source preference ($r = -.04$). Given the technical nature of the information need, it seems that social risk was not a concern for our information seekers. However, the conclusion could be different if social information were sought. Future research is needed to investigate social information seeking and contrast it with technical information seeking.

Effect of Task Importance

Our result also indicates that task importance does not affect seekers' choice decisions in significant ways. Although past literature has suggested (Lee, Herr, Kardes, & Kim, 1999) task importance affects how much a seeker searches, our data indicates task importance weakly moderates source quality ($\beta = -.19$, $p = .062$) and physical proximity ($\beta = .17$, $p = .059$). Contrary to our hypotheses, the data indicates that as the task becomes more important, seekers pay less attention to source quality, and they look for closer rather than more remote sources. This finding suggests that seekers are not necessarily more rational in source selection for more important tasks. Rather, they resort to the local network for problem solving. This is likely because they want to gather as much information as possible; and most relevant information comes from local sources. Another plausible reason is that when task is more important, it might suggest time pressure. In such circumstances, seekers might look for conveniently available information to meet the deadlines (O'Reilly, 1982). The reason for task importance not moderating understandability might be that understandability was generally considered satisfactory, regardless of whether it was an important or unimportant task. For social risk, the insignificance of the moderator effect might be because of the low relational involvement in task information seeking.

Limitations and Future Research

Before we proceed to the implications of this study, we will note its limitations. First, our study is limited to only personal sources. To understand seekers' source choice decisions fully, it is necessary to incorporate multiple sources and compare seekers' decisions within and across sources. Second, this study considers only task information. As we

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have pointed out, in this narrow context, factors such as social risk are insignificant. However, if the information to seek is more relational, seekers' decision models can be different and social risk might be a significant factor. However, most information needs lie between these two extremes. Therefore, a future direction is to investigate the moderator effect of the relationship orientation of the information need. Third, even with personal sources, different seeker-source relationships can be differentiated. For example, source choice decisions among managers and colleagues might be different. Our study does not cover such aspects. Finally, convenience sampling might have constrained the generalizability of our findings.

Implications

The theoretical implication of this study is multifold. First, our study suggests the least effort principle might not apply to the context of single source type. Our result runs head-on against the least effort principle. However, it is consistent with some other studies (Morrison & Vancouver, 2000; Swanson, 1987), which also found quality to be more important than accessibility. One observation from our literature review is that studies in information science tend to find accessibility more important whereas organizational studies tend to find the opposite. This alludes to the influence that number of information source types may have on the results: Organizational studies tend to focus on personal sources while information science studies tend to cover various personal and impersonal sources. In fact, when narrowing down to written documents, Anderson et al. (2001) found that the least effort principle no longer holds. Other studies that observed quality dominance had also focused on single source type. For example, Swanson (1987) used different management reports as sources; Morrison and Vancouver (2000) included five sources—four were personal sources and only one was a document source; Vancouver and Morrison (1995) considered personal sources alone. Therefore, it seems probable that seekers choose source types based on the least effort principle; however, once the source type is decided, the choice among sources within the type is more quality driven. Clearly, future studies are needed to compare source type decisions and individual source decisions among seekers.

Second, this study suggests cost and benefit factors are separated by only a fine line. The least effort principle suggests that as long as effort is minimized, quality is less a concern. Our data suggests strong correlation between quality and low effort when the sources are human beings: The correlation among source Quality, Physical Proximity, and Understandability was significant. This is consistent with Fidel and Green's (2004) finding that seekers cannot clearly identify what benefit is and what cost is. Therefore, lower cost, to some degree, suggests higher quality, and the least effort principle to some degree suggests best quality. Why are low cost and high quality correlated? The plausible explanation is that human activities in organizing the information environment improve source quality and reduce source access cost at the same time. As suggested by the information foraging theory (Pirolli & Card, 1999), people actively engage in enriching their information environment. Job design for professionals in organizations is no exception to this rule.

Finally, although Pettigrew et al. (2001) suggested that information-seeking behavior is shaped by the social environment and the social perspective on information seeking is an important paradigm, our study suggests that the cognitive paradigm is more appropriate to task information seeking. As we have suggested, the selection of the appropriate paradigm in research might be dependent on the relational or technical nature of the information need.

For practitioners, and especially managers who want to encourage information and knowledge seeking in an organization, this study suggests that enriching the information environment is an important guideline for job design. Given the assumption that personal information seeking dominates, job design should try to place people of related skills together, so that good quality sources can be accessed with the least effort. Moreover, it is important to make seekers aware of who the expert is. As suggested by Hertzum and Pejtersen (2000), people often search electronic systems just to find out who the expert is. Our study provides a theoretical underpinning for the practice of establishing a "knowledge yellow page."

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