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Understanding Information Behavior and the Relationship to Job Performance

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Abstract:

Information behavior is an important topic area for the future Internet, Information Systems developers, and the information research community. This article shows two main factors of information behavior—information motivation and information capability—and its relationship to job performance based on the literature review of psychology, management, IS, and IT training fields. This article reviews the wide range of literature on the information behavior, provides the summarized tables of literature, and proposes the future research framework based on the literature review.

Keywords: information behavior, job performance, motivation, capability

I. INTRODUCTION

Information behavior, the efficient and effective usage of information, is an important topic area for the future Internet, Information Systems (IS) developers, and the information research community. The future Internet will be shaped by people's information behavior and the Information Technologies (IT) developed to support those information behaviors. This article shows two main factors of information behavior—information motivation, the willingness to use information, and information capability, the perceived ability to manage information—and their relationship to job performance based on the literature review of psychology, management, IS, and IT training fields. We have searched the journals that focus on the individual level analysis of motivation and capabilities. We also narrowed the articles into the topics of information, knowledge, and technology to focus on the IT-related information behaviors. Finally, we only restricted to the articles with the empirical test and analysis to investigate the causal relationships among the constructs on the information- and technology-related behaviors.

There are numerous concepts of motivation including effort, need, or personality that are interrelated and thus inhibit the complete understanding of the phenomena of individual's motivational behavior. Capability is also often measured by cognitive ability [e.g., Locke, 1965], attentional capacity [e.g., Kanfer and Ackerman, 1989], or skill [e.g., Gran, 1967]. A clear understanding of individual's motivation and capability should be preceded before generating their relationship to performance. There is only a limited IS literature covering both motivation and capability aspects together. While there are a number of studies focusing separately on motivational aspects of IT adoption [e.g., Davis, 1989; Davis et al., 1989] or capability aspects such as user competence [e.g., Marcolin et al., 2000; Munro et al., 1997], the complete model covering both of these aspects should provide valuable insights of individual's behavior.

The organization of this article is as follows: Section II presents the literature review of this study on the information motivation, information capability, and the relationships to job performance. Section III presents the future research framework based on this literature review. Section IV then concludes the article.

II. LITERATURE REVIEW

Motivation and Capability and the Relationship to Performance

Psychology literature has suggested that motivation and capability represent two fundamental determinants of individual's work performance [Hunter, 1986; Kanfer and Ackerman, 1989; Dunnette, 1976]. The general proposition that performance is a multiplicative function of motivation and capability has a long-standing history [e.g. French, 1957; Fleishman, 1958; Vroom, 1960; Locke, 1965; Lawler, 1966; Galbrath and Cummings, 1967; Gran, 1967; Gavin, 1970; Arvey, 1972; Dachler and Mobley, 1973; Lawler and Suttle, 1973; Mitchell and Nebeker, 1973]. Terborg [1977] summarized prior psychology literature findings regarding the effects of motivation and capability on performance based on the expectancy theory [Vroom, 1964], which posits that people act to maximize their expected pleasure or satisfaction. The overall findings showed that motivation and capability were the direct and consistent determinants of performance.

Recent studies have continuously posited that motivation and capability are important determinants of performance as shown in Table 1. Various concepts of motivation (e.g., effort, desire, need, and personality) and capability (e.g., ability, capacity, tactics, mental model, experience, and skill) have been used in these studies. Performance measurement was also applied to multiple jobs, such as training, information seeking, leadership, unexpected task, and job search. For example, Kanfer and Ackerman [1989] showed the relationship among individual differences in cognitive abilities, self-regulatory processes of motivation, and information processing demands in three field-based lab experiments conducted with 1,010 U.S. Air Force trainees. They argued that, by mapping motivation and capability to the performance function, any subject's performance may be represented as a joint function of the proportion of the subject's total attentional resources allocated to the task (motivation) and the subject's relative attentional capacity (capability).

Sackett, Gruys, and Ellingson [1998] also found that motivation and capability are distinct and important determinants of work performance based on their empirical study. Witt and Burke [2002] investigated the applicability of motivational personality and general mental ability test scores in predicting high-performing IT professionals with data collected from ninety-four IT employees in a service industry firm. The results indicated that

conscientiousness contributed unique variance to the explanation of relationship management effectiveness of knowledge worker and that individuals with greater general mental ability are likely to write code with fewer errors, solve system problems more effectively, and generate solutions more quickly and innovatively. The results overall support that motivation and capability are two fundamental determinants of performance across various domains, such as Air Force trainee, managers, solders, students, executives, and IT professionals.

The present study reviews the previous research on various concepts of motivation covering psychology, IS, and IT training literature to provide the relevant construct of information motivation. While there are many theories regarding various concepts of motivation, motivational constructs have been summarized and investigated extensively in the psychology literature. Based on this conceptualization of motivation, intention to use IT, intrinsic or extrinsic motivation of IT adoption, and computer self-efficacy have been the popular research topics regarding motivational behavior in IS literature. The present study reviews these various concepts of motivation to support the specific construct of information motivation and tries to compare to the other motivational constructs in IS literature.

Table 1: Literature of Motivation and Capability to Predict Performance						
					Significant effects on performance	
Study	**Subjects**	**Motivation**	**Capability**	**Performance**	**Motivation**	**Capability**
Terborg [1977]	Air Force trainee	Percentage of time for the material	Cognitive ability	Time to complete task	Yes	Yes
Kanfer and Ackerman [1989]	Air Force trainee	Self-reported attentional effort for goal	Attentional capacity	Task performance of training	Yes	Yes
Ashford and Black [1996]	Managers	Desire for control and proactive socialization	Information and feedback seeking tactics	Job performance and satisfaction	Yes	No
Sarkett, Gruys, and Ellingson [1998]	Soldiers/ managers	Need-for-achievement and effort	Quantitative, technical, verbal, and speed	Job performance, technical proficiency, and leadership	Yes	Yes
LePine, Colquitt, and Erez [2000]	Students	Conscientiousness and openness to experience	Cognitive ability	Decision-making performance prior and after unforeseen change	No Yes	Yes Yes
Boudreau, Boswell, Judge, and Bretz [2001]	Executives	Agreeableness, Neuroticism, and openness to experience	Cognitive ability	Job search performance	Yes	Yes
Witt and Burke [2002]	IT profession	Agreeableness, extraversion, and emotional stability	Cognitive ability	Supervisor ratings	Yes	Yes

Information Motivation

Locke [1991; 2001] summarized and classified various work motivations that were used in the past twenty-five years of psychology literature. He discussed cognitive self-regulation theories in relation to other work motivation theories and to key concepts in the realm of motivation. Needs, values, goals, intentions, and self-efficacy were included and integrated in his study as different aspects of motivational sequence. His classification and integration of various motivation concepts would be beneficial to this study to understand these complex phenomena of individual behavior. The motivation sequence [Locke, 1991] begins with needs defined as the standard by which to judge why living organisms act in the specific way. Needs can habitually be partially satisfied, whether by choice or involuntarily, and exist even if the individual is not aware of them. Maslow's need hierarchy model [1968] found that some needs take precedence over others and noted five layers of needs, such as physiological, safety, belonging,

esteem, and self-actualization. Based on the need hierarchy model [Maslow, 1968], people try to satisfy the various needs according to a specific hierarchical pattern. Needs are the fundamental reason why a person acts and thus are essential to a full understanding of motivation [Locke, 1991].

The next motivation concept in the motivation sequence is values. Values are what people want or consider beneficial to their welfare, although the ultimate evidence for what a person values lies in their actions [Locke, 1991]. In contrast to needs, which people may or may not have knowledge of, values are in consciousness. Value theory posits that different individuals may attach a different value to an object based on how it can satisfy their needs [Harper, 1974; Moser, 1997]. Value theory posits that needs and value are the separate constructs in the motivation factors. The implication of this theory is that the same object may be judged as relatively more important by one individual than another, depending on the extent to which the object is perceived to be able to fulfill what the individual needs. Thus, the needs for a specific person decide his/her value.

One of the generalized value models is expectancy theory [Vroom, 1964], which argues that people act to maximize their expected pleasure or satisfaction and use foresight to choose among courses of action, based on the values [expectation] they believe each course of action will lead to. Vroom [1964] posited that performance is a function of the multiplicative combination of motivation that is the choice of individual and ability that is considered to be a relatively stable individual characteristic. Similar propositions have been stated by others [e.g., Atkinson, 1964; Gagne and Feishman, 1959; Heider, 1958; Maier, 1955; Viteles, 1953]. The expectancy theory is not limited to any particular domain or set of values and proposes that it is important to measure all the values that people believe in the situation in question to predict actions.

McClelland's need for achievement theory [1961] is another motivation theory focusing on values and identifies a complex of values that are associated with successful entrepreneurship. Achievement-motivated people show the desire to achieve excellence as measured by some standard; the preference for moderate risk-taking; the desire for immediate and concrete feedback; the desire to be responsible for one's own task achievement; and the desire to improve and innovate [McClelland, 1961]. People with high achievement motivation want feedback to know how well they are doing on their job, whereas people with low achievement motivation are more concerned about how other people feel about them rather than how well they are doing. McClelland was convinced that the achievement motivation can be taught by the training programs for business people.

Goals, intention, and self-efficacy are the other motivation concepts in the motivation sequence. Goals can be viewed as applications of values to specific situations and well investigated in the goal setting theory [Locke and Latham, 1990]. Focusing on why some individuals perform better on work tasks than others even when they are similar in capability and knowledge, the theory seeks the answer from their differing levels of goals. Research indicates that individuals who set specific and difficult goals and who are committed to those goals are more likely to exert effort and perform at a high level [Locke et al., 1984; Mento et al., 1987; Tubbs, 1986]. Although goal setting theory offers a practical surrogate for a motivation concept, this theory leaves largely unaddressed question of why individuals choose one goal over another, an issue that remains a central focus of need-achievement theory.

Individual's action and performance are also controlled by intention as posited in the theory of reasoned action [Ajzen and Fishbein, 1980; Fishbein and Azjen, 1975]. The theory of reasoned action is based on the assumption that human beings usually behave in a sensible manner; that they take account of available information and implicitly or explicitly consider the implications of their actions. According to this theory, the attitude, the individual's positive or negative evaluation of performing the behavior, is determined by salient beliefs about the behavior. Each salient belief links the behavior with some valued outcome or other attitudes. The attitude toward the behavior is determined by the person's evaluation of the outcomes associated with the behavior and by the strength of these associations. Technology acceptance model [Davis, 1989; Davis et al., 1989], one of the most popular theories in IS area, can be interpreted as a specific application of the theory of reasoned action to IT adoption behavior.

The other component in the motivation sequence is self-efficacy (i.e., self-perceptions of capability). In the motivation sequence, self-efficacy influences work performance directly or through the mediating effects of goals or intentions. Motivation sequence model [Locke, 1991] posits that needs and values influence work performance with direct and indirect effects of a motivation hub. A motivation hub contains various other motivation sequences, such as goals, intentions, and self-efficacy (Figure 1). Kraiger et al. [1993] also categorized affective outcomes of training into self-efficacy, goal, and attitude, toward a targeted object. These motivational dimensions are interrelated but not identical as they are explored in the motivation sequence model.

Other individual characteristics, such as personalities, are also important concepts to understand human motivation and behavior. The Big Five model is considered to be one of the most comprehensive, empirical, data-driven research findings in the history of personality psychology. Identifying the traits and structure of human personality

has been one of the most fundamental goals in all of psychology. Over three or four decades of research, these five broad factors were gradually discovered and defined by several independent sets of researchers [Digman, 1990]. These researchers began by studying all known personality traits and then factor-analyzing hundreds of measures of these traits (in self-report and questionnaire data, peer ratings, and objective measures from experimental settings) in order to find the basic, underlying factors of personality. The Big five factors are openness, conscientiousness, extroversion, agreeableness, and neuroticism [Digman, 1990]. Each factor consists of a cluster of more specific traits that correlate together. For example, extroversion includes such related qualities as sociability, excitement seeking, impulsiveness, and positive emotions. These five factor individual personalities are also important to understand human motivation.
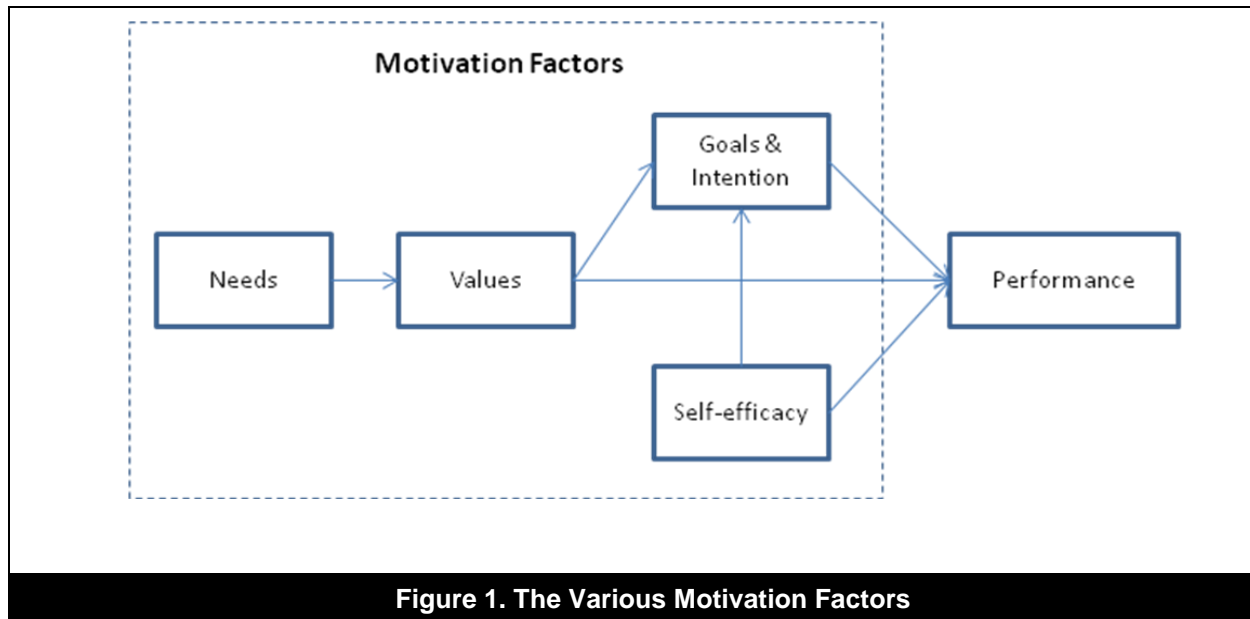

Figure 1. The Various Motivation Factors

In the IS literature, two kinds of motivation, namely intrinsic and extrinsic motivation, have been emphasized in the context of the technology adoption beliefs. Intrinsic motivation refers to "an activity for no apparent reinforcement rather than the process of performing the activity per se" [Davis et al., 1992; Ghani et al., 1991; Ghani and Deshpande, 1994]. Flow, the holistic sensations that people feel when they act with total involvement [Csikszentmihalyi, 1975; 1977; Csikszentmihalyi and Csikszentmihalyi; 1988], has been applied to intrinsic motivational aspect in online consumer behavior [Koufaris, 2002]. Conceptually, intrinsic motivation can be posited as an antecedent of values in the motivation sequence model [Locke, 1991]. In contrast, extrinsic motivation refers to an activity that is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself. Perceived usefulness, the degree to which a person believes that using a particular system would enhance his or her job performance, is the example of extrinsic motivation [Davis, 1989; Davis et al., 1989; Venkatesh, 2000; Venkatesh and Davis, 1996]. Davis et al. [1992] explained the role of these beliefs, suggesting that user intention to adopt a new IT is affected by both extrinsic and intrinsic motivation.

Self-determination theory [Deci and Ryan, 1985] also showed that all individuals have natural, innate, and constructive tendencies to develop an ever more elaborate and unified sense of self. It focuses on how individuals develop a coherent sense of self through regulation of their behavioral actions that may be self-determined, controlled, or motivated. Malhotra and Galleta [2005] argued that the tacit perspective of human behavior should be managed and controlled mainly by intrinsic motivation (perceived enjoyment), rather than by formal controls based on self-determination theory. Perceived enjoyment refers to the extent to which the activity of using a computer system is perceived to be personally enjoyable in its own right aside from the instrumental value of the technology [Davis et al., 1992; Yi and Hwang, 2003]. Davis et al. [1992] and recently Venkatesh and Speier [2000] emphasized perceived enjoyment as a type of intrinsic motivation, which is a type of needs in Figure 1 and an important factor to values based on the self-determination theory. There can be the potential crowding-in and crowding-out effects between the intrinsic and extrinsic types of motivations [Deci and Ryan 1985]. Crowding-out effects refer to instances whereby the introduction of extrinsic motivations shifts the locus of causality from internal to external of an individual, and consequently displaces his or her intrinsic motivations for performing a behavior. In contrast, crowding-in refers to instances whereby the introduction of extrinsic motivations enhances an individual's intrinsic motivations.

Individual's work motivation determines the direction of attentional effort, the proportion of total attentional effort directed to the task, and the extent to which attentional effort toward the task is maintained over time [Campbell and Pritchard, 1976; Kanfer, 1987]. Motivation directs the action referring to the expenditure of energy [Vroom, 1964] and should be maintained for the target task in the human information processing [Campbell and Pritchard, 1976]. Kanfer and Ackerman [1989] have presented a resource allocation model of motivation that builds on earlier theories of information processing [Kahneman, 1973; Navon and Gopher, 1979; Norman and Borow, 1975]. In this model, cognitive effort (motivation) is defined as the level of attentional resources allocated to self-regulatory activities and task activities. Naylor, Pritchard, and Ilgen [1980] viewed motivation as the proportion of personal resources devoted to a task and suggested that individual differences create differences in total resource availability.

IT Training literature explores the motivational aspects of learning, which is an information processing activity [e.g., Bostrom et al., 1990; Marcolin et al., 1997; Martocchio and Judge, 1997]. Studies cover both cognitive aspects of information processing activity in the learning process [Cheney et al., 1986; McLean et al., 1993; Nelson and Cheney, 1987] and the methodology to increase the effectiveness of training [Gist et al., 1988; Gist et al., 1989; Simon et al., 1996; Simon and Werner, 1996; Yi and Davis, 2001]. Several studies in IT training support that computer self-efficacy [Compuea and Higgins, 1995; Hill, 1987; Taylor and Todd, 1995; Venkatesh, 2000; Yi and Davis, 2003] and individual motivation [Trevino and Webster, 1992; Webster and Martocchio, 1993] are important determinants of training effectiveness and task performance. Yi and Davis [2003] used motivational aspect (self-efficacy) and ability of IT (declarative knowledge) as determinants of learning performance. This research stream provides useful knowledge domain regarding how an individual adopts specific knowledge with the complex cognitive structure in the information processing behavior and how the belief of IT ability can influence the learning or information processing behavior.

Several studies in IS field focused on the motivational aspects of information use. For example, Staples and Jarvenpaa [2000] found that perceived information usefulness (motivation) of an individual was strongly associated with the person's use of electronic media and information sharing activities. They suggested that it is important to motivate sharing via individual-held attitudes and beliefs and needing to use IT that fits the task. Organization can also hire people that hold attitudes and beliefs that influence whether or not an individual will share information. Individuals might be reluctant to share information for fear of losing ownership and power or they may be unwilling to engage in sharing activities that consume time and resources [Staples and Jarvenpaa, 2000]. Lack of motivation can result in information passivity, secrecy, blockage, withholding, or distortion. Based on the motivation factors in Figure 1, information usefulness is values with the specific information needs, which is an extrinsic motivation. The information usefulness beliefs would influence intention to use information for knowledge sharing in the organization with the goal and attitude (or intrinsic motivation) of good image as a colleague. Computer self-efficacy would influence this attitude and intention to use information and/or IT, as the various technology acceptance model [e.g., Davis, 1989] suggests. Finally, intention to use information and computer self-efficacy would influence job performance, as the social cognitive theory [Compeau and Higgins, 1995] suggests in the IT domain.

Information Capability

Individual's capability, covering almost anything that might directly or indirectly affect job performance [Woodruffe, 1993], has been continuously investigated in the cognitive psychology literature [Dunnette, 1976; Ghiselli, 1966; Kanfer and Ackerman, 1989] and training literature [Norman and Bobrow, 1975; Colquitt et al., 2000]. Being different from the motivation and supporting conditions, capability has been posited to influence individual job performance [Hunter, 1986; Ackerman, 1989; Kanfer and Ackerman, 1989; Fleishman, 1972]. The present study categorizes an individual's capability into three types: cognitive ability, mental model, and experience, based on the prior literature. We investigated the individual's capability focused on the information behavior in the psychology, management, IS, and training literature and categorized into these three types of capabilities, as shown in Table 2. As the table shows, the focus of the capability has been moved from cognitive ability into the mental models and experiences as the information behavior has become the general knowledge worker's activities rather than specific information extensive jobs in the past.

An individual difference in cognitive capacity was captured by the single factor underlying scores on tests that measure a broad array of cognitive abilities [Hunter, 1986; Jensen, 1986; Ree and Earles, 1991; Welsch et al., 1990]. This single factor has occasionally been defined as the ability to learn in the training literature [Hunter, 1986]. The determinants of this ability encompass the individual's repertoire of knowledge and facility with "acquiring, storing in memory, retrieving, combining, comparing, and using in new contexts information and conceptual skills" [Humphrey, 1979]. IQ or specific test scores have been used as the proxy of the cognitive ability in the prior studies [Hunter, 1986; Ackerman, 1989]. The relationships between cognitive ability and work performance have been supported in the prior studies as summarized in Table 1.

Table 2: Sample Studies That Measured Various Capabilities			
Study	**Capability**	**Performance**	**Findings**
Fleishman [1958]	Cognitive ability: Test scores	Air Force training performance	Individual with high cognitive ability test scores showed high training performance.
Locke [1965]	Cognitive ability: Pre-experimental trial	Students' training performance	College students with high pre-experimental cognitive ability and high goal setting showed high training performance.
Lawler [1966]	Cognitive ability: Supervisor ratings	Supervisor ratings and self - ratings	Cognitive ability scores based on supervisor's ratings were related only to the supervisor's performance ratings but not to the self-ratings.
Gran [1967]	Cognitive ability: Pre-experimental trial	Work performance	Female worker with high cognitive ability showed high work performance.
Arvey [1972]	Cognitive ability: Test scores	Student's training performance	College students with high cognitive ability test scores showed high training performance.
Dachler & Mobley [1973]	Cognitive ability: Test scores	Job performance in factory	Factory workers with high cognitive ability showed high job performance.
Mitchell & Nebeker [1973]	Cognitive ability: Understanding regression equation	GPA	Students with high ability to understand regression equation showed high GPA.
Foss et al. [1982]	Mental model: Metaphor	Learning time	Individuals who were provided with the metaphor learned in less time in training.
Johnson-Laird [1983]	Mental model: Inferences	Decision task	Mental model allowed to draw inferences, make predictions, understand phenomena, and decide which actions to take.
Kieras & Bovair [1984]	Mental model: Inferences	Learning performance	Individuals with the mental model learned the procedures faster, retained them more accurately, and executed them faster.
Kanfer and Ackerman [1989]	Cognitive ability: Test scores of attentional capacity	Air Force training performance	High test score of attentional capacity was related to high training performance in the sophisticated Air Force training experiment.
Staggers and Norcio [1993]	Mental model: Inferences	Job performance	Individual's capability to run the model to understand the relationship between causes and effects influenced job performance.
Santhanam and Sein [1994]	Mental model: Conceptual training and interaction	Learning performance	Individuals who formed conceptual mental models performed better than those who formed procedural mental models.
Lim et al. [1997]	Mental model: Co-discovery	Learning performance	Mental model with co-discovery had a significant effect on inference potential, which had a significant effect on task performance.
Guimaraes and Igbaria [1997]	Experience: Years of computer usage	System usage	End-user computer experience has the strong direct effects on the variety of tasks on general system usage.
Venkatesh [2000]	Experience: Past behavior	Future system acceptance	Past behavior or experience was found to correlate significantly with future behavior.

Attentional capacity has been suggested as the comprehensive mechanism for cognitive ability in the human information processing behavior [Kanfer and Ackerman, 1989; Ackerman, 1986; 1987; Zeaman, 1978; Anderson, 1982; Baddeley, 1986; Kyllonen and Christal, 1990]. Attentional capacity is the capability aspect of individual's cognitive resources, whereas attentional effort is the motivation aspect [Kanfer and Ackerman, 1989]. Individuals differ in terms of basic information processing capacities or their level of cognitive resources, and this difference is measurable by the specific test scores in the job situation [Ackerman, 1999; Kanfer and Ackerman, 1989; Norman and Bobrow, 1975]. Traditionally, scholars have posited that cognitive work takes place in a physical space called *working memory* [Lord and Maher, 1991] and that processing of additional information becomes problematic, because some pieces of information are lost once the limits of working memory are reached. The literature on skill acquisition is consistent in showing that information processing or attentional capacity is important during early stages of task performance, when a great deal of information from the environment and recalled knowledge must be represented in working memory [Ackerman, 1986; 1987; Anderson, 1982; Jensen, 1998].

Experience has been investigated as individual's capability in psychology and IS literature (see Table 2). It has been suggested that knowledge gained from past behavior (or with education and age) will help to shape behavior [Eagley and Chaiken, 1993; Fisherbein and Ajzen, 1975], and past experience makes knowledge more accessible in memory [Fazio and Zanna, 1978; Reagan and Fazio, 1977]. Azjen and Fishbein [1980] argued that past experience makes low probability events more salient and enhances an individual's capability as knowledge. Venkatesh [2000] also found that past behavior or experience with system correlate significantly with future behavior of system acceptance that can result in subsequent performance. Thus, capability to perform the task can be obtained from the prior experience of the similar behavior.

In psychology and management literature, mental model has been suggested as individual's capability influencing task performance [e.g., Foss et al., 1982; Johnson-Laird, 1983; Kieras and Bovair, 1984]. Mental model is defined as a representation formed by an individual for a task, which provides most of their subsequent understanding and dictates the level of task performance [Wilson and Rutherford, 1989; Rouse and Morris, 1986]. Mental model makes inferences and predictions about the task [Johnson-Laird, 1983; Williams et al., 1983; Kieras and Bovair, 1984; Rouse and Morris, 1986] to predict and explain the behavior of the environment, to recognize and remember relationships among components of the environment, and to construct expectations for what is likely to occur next [Rouse and Morris, 1986; Brandt and Uden, 2003].

IT training researcher has investigated mental model as an important explanatory mechanism of individual's IT skill acquisition and subsequent performance [Vandenbosch and Higgins, 1995; Lim et al., 1997; Santhanam and Sein, 1994]. For example, Vandenbosch and Higgins [1995] proposed a model of the relationships among IS, learning with mental model, and performance, describing the impact of executive support systems on perceptions of competitive performance when viewed from a learning perspective with mental model. The model proposes two types of learning: mental-model maintenance, in which new information fits into existing mental model and confirms them; and mental-model building, in which mental models are changed to accommodate new information. They found that perceptions of competitive performance resulting from executive support systems use were strongly related to mental-model building, but found no link between competitive performance and mental-model maintenance. The presence of analysis capability of executive support system was the best differentiator between mental-model maintenance and mental-model building leading to performance.

Individual's capability of IT use has been investigated with the concept of user competence [Marcolin et al., 2000; Munro et al., 1997]. User competence is defined as the user's potential to apply IT to its fullest possible extent so as to maximize performance of specific job task [Marcolin et al., 2000]. Competence with IT and subsequent use of information are especially important because of its effect on workplace productivity [Brown, 1986; Little, 1997; Magnet, 1994]. Marcolin et al. [2000] concluded that specific dimensions of the competence should be measured with the appropriate methodologies, and this practice would be beneficial to completely understand the determinants of performance. Bassellier et al. [2001] also explores the concept of the IT competence of business managers, which is defined as the set of IT-related explicit and tacit knowledge of a business manager that enables him or her to exhibit IT leadership in the business. Explicit knowledge capability includes mapping knowledgeable people within or outside the organization and secondary sources of information through Internet, journals, or conferences. Tacit IT knowledge is conceptualized as a combination of mental model and experience.

III. IMPLICATIONS FOR FUTURE RESEARCH

Figure 2 presents the conceptual framework that has guided for the future research based on this study. The framework considers information behavior as a central determinant of a worker's job performance and as a key variable in linking individual characteristics, such as five factors of personalities, self-efficacy, and cognitive styles, on job performance. Our conceptual framework is based on the assumption that information management effectiveness is a critical precondition of workers' job performance differences, as a worker's job is highly

information-intensive and information-dependent. The framework argues that the effects of individual differences on job performance will be mediated by individuals' information behavior [e.g., Davenport, 1998; 2009]. This conceptualization is consistent with recent studies on individual differences, which were found to influence information behavior [Brown and Lnouye, 1978; Wood and Bandura, 1989; Petty and Cacioppo, 1986; Salomon, 1984; Junglas et al., 2009]. In addition, including individual characteristics in the model allows us to understand how much the information motivation and capabilities can be influenced, linking prior research on personalities, such as self-efficacy, and cognitive styles, to the current research framework. These individual characteristics variables provide important insights into how information motivation and capabilities are shaped and cultivated by managerial actions.
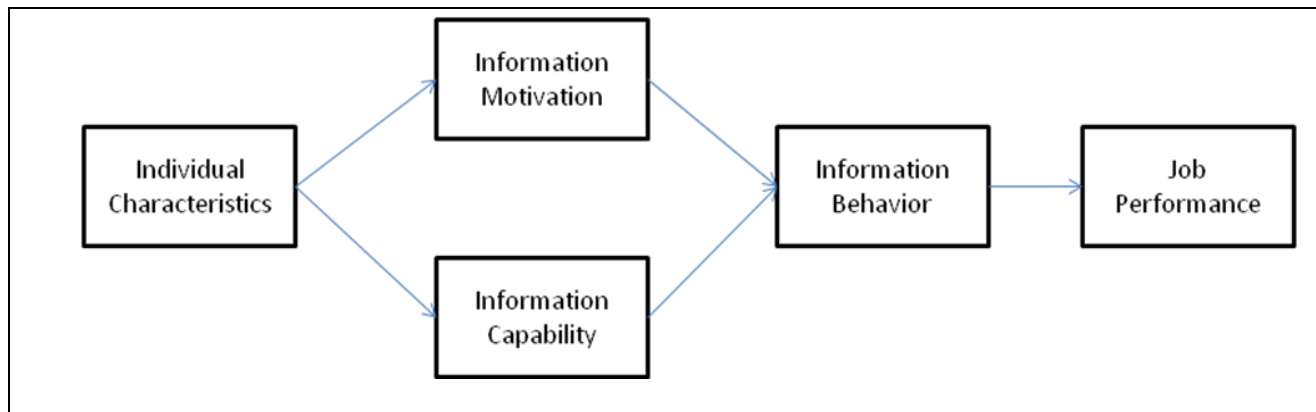
Figure 2. The Proposed Future Research Framework

In this proposed future research framework, we don't expect the interaction effects between information motivation and capabilities. The Kanfer and Ackerman's [1989] unified framework includes both the main effects of motivation and capability and the interaction effects between motivation and capability determinants of human performance. However, other researchers have found the interaction effects to be equivocal [Locke et al., 1984; Terborg 1977]. For example, Terborg [1977] found a clear interaction effect between motivation and capability in only two out of fourteen studies he reviewed. Thus, based on these findings, the proposed research framework theorizes motivation and capability variables as determinants of an information behavior, but does not include the interaction effects between the motivation and capability determinants.

There are several future research points on this proposed future research framework. First, future research can investigate how individual characteristics influence information motivation and capabilities, as well as job performance. We expect that the influence of individual characteristics on job performance would be fully mediated by information motivation and capabilities, since the current job is based mostly on the knowledge extensive procedures that require information behavior. Specifically, how the five factors of personalities (openness, conscientiousness, extroversion, agreeableness, and neuroticism), self-efficacy, and cognitive styles influence the job performance would be interesting future research topics, as these are not completed in the current literature.

Second, although we expect no interaction effects between information motivation and capabilities, these effects can be empirically tested and validated in future research. Although there has been a great amount of research on the interaction effects between motivation and capabilities of the general behavior and the mixed findings in the psychology literature, there has been no study in IS domain to investigate the interaction effects between information motivation and information capability. The complete understanding of these relationships would be useful guidance to the IS designer and IT training managers, since we should know how a person can increase job performance through information behavior. For example, we can implement it through the separate managerial intervention for information motivation and capabilities or through the selection of specific groups (such as high motivated and educated group) and the specialized training intervention to emphasize these relationships. This would also be practically useful in selecting the IT related knowledge workers in the human resource planning.

Third, future research would investigate whether the information behavior directly, or indirectly, influences job performance. Although we expected the direct influence of information behavior on job performance, based on the knowledge that extensive activities are general in the information age, future research can empirically test these relationships with the considerations of other variables such as experience, cognitive ability, IQ, educational background, culture, and IT skills. This study provides the valuable framework to study further these important issues for the IS community.

IV. CONCLUSION

In this study, we showed two main factors of information behavior—information motivation and capability—and their potential effects to job performance. We integrated the various literature in psychology, management, IS, and IT training. Given that information behavior, determined by information motivation and capability, is a critical factor for an individual's job performance and future Internet success, we should investigate these phenomena further. Future study can empirically test the potential linkage suggested in the previous literature and integrated in this article. This article can be a stepping-stone and guidance for the future research in this area on information behavior.

REFERENCES

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