MOTIVATIONAL NEEDS AND IT ACCEPTANCE: THE NEED FOR A RICHER CONCEPTUALIZATION OF THE PERCEIVED USEFULNESS CONSTRUCT

One of the most studied concepts in IT acceptance and use research is the usefulness of new systems as perceived by users; it has almost always been conceptualized from a performance-related perspective. In this paper, we suggest that a richer conceptualization is needed of the perceived usefulness concept, one that incorporates a wider spectrum of human needs that go beyond purely performance-related drivers.

Introduction

Information technology acceptance and use in organizations remain a major concern in information systems research and practice (Schwarz and Chin, 2007; Venkatesh and Davis, 2000). A number of theoretical perspectives have been adopted to shed light on determinants of use. One important line of research employs models that are based on the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980) and the Theory of Planned Behavior (TPB) (Ajzen, 1991). From that stream, the Technology Acceptance Model (TAM) (Davis et al., 1989) has emerged as a powerful and parsimonious model that represents the antecedents of system use (Taylor and Todd, 1995; Venkatesh and Davis, 2000). In addition to TAM, other models from that stream also use behavioral intention to predict use (e.g., Thompson et al., 1991; Karahanna et al., 1999). Other theoretical perspectives adopted in IT acceptance research include studies based on Social Cognitive Theory (e.g., Compeau et al. 1999), and diffusion of innovations (e.g., Moore and Benbasat, 1991). In most of the aforementioned research, perceived usefulness (PU) has been dealt with as a black box that “very few have tried to pry open” (Benbasat and Barki, 2007, p. 212). Usefulness is a key construct in influencing use, and thus more research to advance knowledge on usefulness would be an effort well spent (Benbasat and Barki, 2007), especially since usefulness can be a function of a complex set of beliefs and evaluations (Bagozzi, 2007). However, few studies have tried to explain PU (Bagozzi, 2007).

In addition to the limited conceptualization of PU, there is another significant caveat. Most of the research on acceptance in general and PU in particular addresses strictly performance- and/or economic-based influences. The human valuing process, however, is complex, and is governed to varying degrees by aspirations that cannot be fulfilled by economic resources alone (Griesinger, 1990). Indeed, Davis (1989) states that his definition of PU is based on the definition of the word ‘useful’: “capable of being used advantageously” (p. 320). It stands to reason that “advantages” may come from instrumental as well as non-instrumental sources. Recent literature appears to acknowledge the presence of that caveat. For example, Srite and Karahanna (2006) assert that acceptance research does not place enough focus on
‘feminine’ cultural values such as personal fulfillment, belonging, and empathy. Komiak and Benbasat (2006) argue that current acceptance models are dominated by cognition and do not pay enough attention to other factors, such as emotions.

In laying the groundwork for a reconceptualization of PU, we believe that theories on motivation could provide a rich foundation upon which to base our arguments. The study of motivational needs is crucial to understanding and predicting human behavior, since fundamental motivation generally guides cognition and emotion (Baumeister and Leary, 1995), and motivational needs, in particular, influence the cognitive processes that produce behavioral variability (Kanfer, 1991). Indeed, the study of psychological needs is ubiquitous in the research on human behavior in organizations. For example, needs have been studied in the research on work motivation (e.g., Latham and Pinder, 2005), person-environment fit (e.g., Cable and Edwards, 2004; Choi, 2004; Kristof, 1996), perceived organizational support (e.g., Rhoades and Eisenberger, 2002), and social exchange theory (e.g., Cropanzano and Mitchell, 2005).

Broadening the conceptualization of PU to include motivation not only leads to a better understanding of IT system acceptance and usage, but may also provide plausible explanations to what may seem as research dilemmas. For example, Bagozzi (2007) mentions that a person may accept that PU is a favorable criterion for deciding to act but does not wish to act and might even overtly decide not to act, notwithstanding the fact that he perceives the system as useful. This seems to contradict the notion that PU is a fundamental belief influencing intention to use. However, broadening the conceptualization of PU may help explain some seemingly paradoxical situations.

In this paper, we suggest that the motivational needs theorized by Maslow (1954) could play an important role in demonstrating the viability of using motivation as a building block toward broadening the conceptualization of PU. The objective of our study is thus not to validate or test Maslow’s hierarchy, nor to add more antecedents to PU. Rather, this is a first step toward developing an all-encompassing conceptualization of PU. The paper also suggests that the context of system use – voluntary versus mandatory – plays a contingency role, moderating the relationship between motivational needs and PU.

In the next section we present a literature review of perceived usefulness and Maslow’s theory of motivation. We then develop propositions and a theoretical model concerning the relationships between motivational needs and perceived usefulness. Finally, we conclude with a discussion of the study’s limitations and make suggestions for future research.

**Theoretical Background**

**Perceived Usefulness**

The usefulness of IT systems, as perceived by users, has been a major focus of study in the line of research concerned with IT acceptance and use. Various conceptualizations have been offered for PU, most of them taking a utilitarian view that links usefulness to performance- and/or economic-based rewards. Table I (please see Appendix A), a summary of which is presented below, presents various definitions and operationalizations of PU and closely related constructs that are found in the IT literature. To develop the table, the texts of all papers published since 1989 (the year that the Davis paper introducing Perceived Usefulness was published) in MIS Quarterly, Information Systems Research, Journal of Management Information Systems, Journal of the Association for Information Systems, and Information & Management were searched for the term “perceived usefulness.” The papers were then analyzed to find studies where PU – or a closely related construct – was operationalized and measured. The studies that used a performance-oriented conceptualization of PU, or related constructs, are bold-typed in the table.
The most widely used conceptualization is TAM’s PU, defined by Davis (1989) as “the degree to which a person believes that using a particular system would enhance his or her job performance” (p. 320). Numerous studies have built and tested models containing PU and using the same or very similar operationalizations to the one originally used by Davis (e.g. Adams, 1992; Szajna, 1994; Gefen and Straub, 1997; Igbaria et al., 1997; Lim and Benbasat, 2000; Grandon and Pearson, 2004). In addition to TAM’s PU, other related conceptualizations of PU have appeared that have also been focused on performance-based rewards. For example, Moore and Benbasat (1991) conceptualized relative advantage, defined as the degree to which an innovation is perceived as being better than its precursor and operationalized with a clear focus on job- and productivity-related “advantages.” Another example is the concept of perceived job fit (Thompson et al., 1991), defined as the extent to which an individual believes that using a PC can enhance their job performance.

Compeau et al. (1999) moved a step closer toward an all-encompassing conceptualization of PU through the construct of outcome expectations (OE). OE is defined as the perceived likely consequences of using computers, and it comprises two dimensions. First, performance-related outcomes are those associated with the improvements in job performance (efficiency and effectiveness) resulting from computer use. Second, personal outcome expectations relate to expectations of change in image or status or to expectations of rewards, such as promotions, raises, or praise. In another study, Barki and Hartwick (1994, p. 62) viewed user involvement as a belief, and defined it as “the extent to which a user believes that a new system is both important and personally relevant.” The authors pointed out, however, that although their “involvement” construct was likely related to TAM’s PU, the two constructs were distinct because “a system may be seen to be useful, but not necessarily important or personally relevant.”

While the extant literature demonstrates the important influence of PU on users’ intention to use, we still need a more comprehensive understanding of PU itself. More specifically, we need a broader conceptualization of PU to help us understand the mechanisms underlying this important construct. Examining the relationships between human motivational needs and PU, and demonstrating how various needs may shape users’ beliefs toward an IT system, would constitute a step in this direction.
Table I (Summarized)

PU and Closely Related Constructs in IT Research

<table>
<thead>
<tr>
<th>Construct</th>
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<th>Definition</th>
<th>Number of Studies</th>
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<tr>
<td>PU</td>
<td>For example: Adams et al., 1992; Agarwal and Karahanna, 2000; Ahn et al, 2007; Amoako-Gyampah and Salam, 2004; Bajaj and Nidumolu, 1998; Bhattacherjee and Premkumar, 2004.</td>
<td>Definition provided by/modified from Davis (1989) “the degree to which a person believes that using a particular system would enhance his or her job performance” (p. 320).</td>
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<td>Perceived Job Fit (near-term consequences)</td>
<td>For example: Thompson et al., 1991; Chang and Cheung, 2001.</td>
<td>The extent to which an individual believes that using a PC can enhance their job performance (Thompson et al., 1991, p.129)</td>
<td>3</td>
</tr>
<tr>
<td>Performance Expectancy</td>
<td>For example: Al-Gahtani et al, 2007; Chiu and Wang, 2008.</td>
<td>The degree to which an individual believes that using the system will help him or her to attain gains in job performance (Venkatesh et al., 2003, p. 447)</td>
<td>3</td>
</tr>
<tr>
<td>Relative Advantage</td>
<td>For example: Agarwal and Prasad, 1998; Compeau et al., 2007.</td>
<td>The degree to which adopting/using the IT innovation is perceived as being better than using the practice it supersedes (Moore and Benbasat, 1991, p. 195).</td>
<td>7</td>
</tr>
<tr>
<td>Utilitarian Outcomes</td>
<td>For example: Venkatesh and Brown, 2001.</td>
<td>The extent to which using a PC enhances the effectiveness of household activities (Venkatesh and Brown, p. 74).</td>
<td>1</td>
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<tr>
<td>Perceived Net Value</td>
<td>For example: Briggs et al., 1998.</td>
<td>An attitude, a valenced subjective assessment in response to all the perceived likely consequences of changing from existing technology to the proposed technology (Briggs et al., 1998, p. 157).</td>
<td>1</td>
</tr>
<tr>
<td>Outcome expectations</td>
<td>For example: Compeau and Higgins, 1995; Compeau et al., 1999.</td>
<td>The perceived likely consequences of using computers (Compeau et al., 1999, p. 147).</td>
<td>6</td>
</tr>
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</table>

Maslow’s Hierarchical Needs Theory

Maslow’s (1954) hierarchical needs theory is a well-known theory on motivational needs. In fact, few models of work motivation have had the revolutionary impact that Maslow’s (1954) need theory had when it initially came to light (Latham and Pinder, 2005). Maslow was the first to advance a general theory of human motivation that emphasized a concept of needs (Oleson, 2004). In his theory, Maslow (1954) states that an individual has a hierarchy of motivational needs (see Figure 1, below). The most basic needs are physiological, including the need for food and sleep. The next level, which we may call level two, is safety needs that include, for example, security and stability needs. In level three we find belonging and love needs, which include the need to be a part of a clan, or a herd: the need to join and

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1 The references for Table 1 are provided in the References for Table 1 section at the end of the paper.
belong. We could term such needs “social needs,” following researchers such as Porter (1961) and Ronen and Kraut (1980). In level four we find the need for self-esteem. Maslow divides this level into self-respect needs, like the need for achievement, and “prestige” needs, like the need for appreciation. Finally, Maslow believes that the highest level of needs is self-actualization needs, which refers to people’s aspirations to attain self-fulfillment and realize their potential.

**Figure 1**

*Maslow’s Hierarchy of Needs*

![Maslow's Hierarchy of Needs](image)

Maslow argues that the individual has to, at least minimally, satisfy his or her “lower” needs, such as physiological and safety needs, before they can address the “higher” needs, such as the need for belonging and self-esteem. If the individual has reasonably satisfied basic and higher-order needs, they then try to satisfy the highest need, self-actualization. According to Maslow (1954), the hierarchy of needs is not a rigid order that is the same for every individual. Rather, the order may vary from one person to the next, especially in the middle-order needs such as social needs and the need for self-esteem.

Besides its continuing and widely accepted practical significance (Ajila, 1997; Kamalanabhan et al., 1999), Maslow’s hierarchical needs theory has been studied in such areas as marketing (e.g., Yalch and Brunel, 1996) and socio-economics (e.g., Seeley, 1992), in addition to research on organizational behavior, where not only is there a resurgence of emphasis on needs, but there has been a resurgence of interest in Maslow’s theory (Lantham and Pinder, 2005). Moreover, while the theory has faced some strong criticism, there have been relatively recent efforts to validate it and calls to operationalize it. For example, Ronen (2001), using multidimensional scaling of employee data collected in 15 countries, found support for the taxonomic aspect of Maslow’s theory. Further, Kluger and Tikochinsky (2001) advocated ongoing efforts to find ways to validly operationalize the theory.

Maslow’s theory in particular and motivational needs in general have also been used in IT research. For example, in the context of project group effectiveness, McLeod (1992) cites Maslow and others in stating that the needs for affiliation, acceptance, and inclusion are important motivators for some people. Further, Smits et al. (1993, p. 103) found that “in spite of using a common system of hiring practices, job design, equipment purchases, performance standards, and rewards, there may still be situations where some workers out produce their peers.” The authors contend that more productive workers have a high psychological need for achievement and state that “from a psychological perspective, needs energize behavior; that is, an unmet need has the potential to initiate behavior” (p. 104). Finally, Harris et al. (1995) present two case studies to illustrate the value of taking Maslow’s needs into consideration for successful IT implementations. The authors argue that many of the problems encountered during the implementation of the systems discussed in the two cases could have been avoided if careful attention had been paid to the human needs of end users.
**Toward a Broader Conceptualization of PU: Integration with Motivational Needs**

As a first step towards a richer conceptualization of the perceived usefulness concept – a conceptualization that incorporates a wider spectrum of human needs that reach beyond purely instrumental and economic drivers – we propose an integration of Maslow’s (1954) hierarchy of needs with PU. This is shown in Figure 2. In the figure, we suggest that the salient motivational need - whether safety, social, self-esteem, or self-actualization needs - for a specific user would create what could be likened to a filter. We expect the user to view the usefulness of the system largely in the light (or through the filter) of the system’s potential in satisfying that salient need. Theorizing a relationship between motivational needs and PU provides a conceptual basis for the dynamic nature of PU. That is, as we will discuss below, different systems would satisfy different needs for different users, depending in part on what the “salient” need is for the user. While a number of IT studies (e.g., Davis et al., 1992; Venkatesh, 1999) examined intrinsic motivation – where the use of the system is enjoyable in itself – our intent is to show that the use of a system will be perceived as useful if such use is perceived to be instrumental in satisfying users’ salient motivational needs.

We can infer from Maslow’s theory that, as a human being, an IT user comes into contact with a system while already carrying a package of needs that are satisfied to varying degrees. On the other hand, the IT artifact has become more ubiquitous, more interactive, and more malleable than ever before. With such a state of affairs, one might expect that, from the user’s perspective, and according to Maslow’s theory, a user at any given point in time is striving to satisfy one salient need. At the same time, from the system perspective, a system may have the potential not only to help attain productivity goals, but also to satisfy other needs, such as social needs. In the paragraphs below we will explain our use of Maslow’s motivational needs and offer propositions regarding the relationships between different needs and PU.

In developing our propositions, we will not address physiological needs (e.g., food and sleep). This is because it would be difficult to argue that the use of an IT system would help satisfy such needs. Hence, we will move directly to the second level, safety needs.

According to Maslow, safety needs include needs for security and stability. A user’s feeling of vulnerability would arguably stem from the presence of two conditions. First, a feeling of job security should be important to the user. For example, a user who is well-to-do and/or planning to quit their job anyway is not expected to have a feeling of job vulnerability. Second, to be vulnerable, the user should have strong reasons to believe that their job is at risk. For example, in a case study carried out by Beaudry and Pinsonneault (2005), a bank account manager being introduced to a new system was initially reluctant to use the system. “They tried to impose it on us but I’ve been here for many years……I knew they wouldn’t kick me out because I didn’t use it.” We argue that had he felt that not using the system would compromise his job security, he might have chosen to use it. In other words, he would perceive such use as useful because it would satisfy his safety needs.

**Proposition 1:** If the user’s safety needs are salient, and the user perceives that using the system will satisfy these needs, then the user will perceive the system as useful.
The next level of needs in Maslow’s hierarchy is belonging/social needs. As social beings, most of us are inevitably influenced by social forces/clues, and the use of an IT system can satisfy social needs in different ways. For example, the use of an IT system can directly satisfy the need for belonging by facilitating communication and collaboration among group/team members. The user would perceive use of the IT system as useful if it is perceived to help satisfy their need for belonging. The literature provides evidence that a user may use a system to be in accord with their group even though they do not perceive such a use to be otherwise useful. For example, in Lapointe and Rivard’s study (2007), a physician was using a new clinical IS even though they reported not perceiving the system as useful: “If they took the system out, I don’t think that our lives would be made any more difficult. As far as I’m concerned, it gets in the way.” However, she chose to use it because she had just joined this hospital and wanted to be well-accepted by her peers. She knew that her fellow physicians were using the system and wanted to blend in the group. We would like to note that this user did not perceive the system as useful under the traditional conceptualization of PU, but an expanded conceptualization of PU – one that incorporates social needs – explains how this user may have perceived the system as useful. More specifically, the user’s social needs may have been salient, and through a belief that using the system would help satisfy those needs, the user came to perceive the system as useful. This is supported by the authors’ contention that what prompted this specific physician to use the system was the need to fit in with fellow physicians.

2 It is worth noting that Figure 2 shows arrows leading from each class of needs to PU to demonstrate the theorized relationships between needs and PU. The dotted lines and their different patterns are intended to indicate that not all needs are at work at the same time, nor are they equally salient for different individuals. The lines are also meant to illustrate a conceptual argument rather than depict causal relationships.
Proposition 2: If the user’s social needs are salient, and the user perceives that using the system will satisfy these needs, then the user will perceive the system as useful.

The subsequent level of needs in the hierarchy is self-esteem needs. As mentioned above, Maslow argues that self-esteem needs may express themselves through the need for achievement and the need for appreciation. The need for achievement may be satisfied through the user’s ability to successfully use a sophisticated system, thus granting the user a sense of competency and self-respect. The need for appreciation, on the other hand, is related to prestige. In an IT use context, such prestige might be sustained through growth and power. For example, in Markus’s (1983) study, people in one department (corporate accounting) found that using a new financial accounting system was useful because previously they had only modest formal organizational power and no independent information on which to base their attempts to develop and administer policy guidelines. The new system allowed the necessary information to flow directly to corporate accounting without the intermediate step of being manipulated by the divisions, hence it significantly empowered the people in corporate accounting by reducing their dependency on those divisions.

Proposition 3: If the user’s self-esteem needs are salient, and the user perceives that using the system will satisfy these needs, then the user will perceive the system as useful.

At the top of Maslow’s hierarchy we find the need for self-actualization or self-fulfillment. One way that the use of an IT system may help satisfy self-actualization needs is through reputation-building. In knowledge networks, reputation is gradually built through a history of contributions of expertise and ideas that other users consistently identify as helpful and valuable (Bush and Tiwana, 2005). For example, Orlikowski (1996) quoted a technical support specialist as saying that “[the electronic process documentation] is a working database of what I am doing….It’s my brag record….[it] sort of validated the fact that I am very busy, I am taking a lot of calls, I am really contributing to the group effort.” In such networks, the process of reputation-building allows those users to realize what is more than self-esteem or a sense of achievement; it allows them to realize their potential as experts.

Proposition 4: If the user’s self-actualization needs are salient, and the user perceives that using the system will satisfy these needs, then the user will perceive the system as useful.

Mandatoriness as a Contingency Factor

A user is bound by the policies and rules set out by their organization. “Breaking” the rules is normally expected to lead to punishment that may include the user losing their job. Hence, in mandatory settings, a user would naturally fear job loss if they fail to use the system. Thus, in mandatory settings we would expect the need for safety to be more salient than in voluntary settings.

Proposition 5: Mandatoriness will moderate the relationship between safety needs and PU, such that the higher the level of mandatoriness, the larger the role safety needs will play in shaping PU.

Social influence, when defined as the “degree to which an individual perceives that important others believe he or she should use the new system” (Venkatesh et al., 2003; p. 451), has been represented as a direct determinant of behavioral intention under different rubrics in a variety of studies: for example, image (Moore and Benbasat, 1991), social factors (Thompson et al., 1994), and subjective norm (Venkatesh and Davis, 2000). The rationale behind a direct effect of subjective norm (SN) on intention is that “people may choose to perform a behavior, even if they are not themselves favorable toward the behavior or its consequences, if they believe one or more important referents think they should, and they are sufficiently motivated to comply with the referents” (Venkatesh and Davis, 2000; p. 187). 
A number of studies suggest that social influence is salient only in settings where IT system use is mandatory (e.g., Hartwick and Barki, 1994; Venkatesh and Davis, 2000; Venkatesh et al., 2003). Venkatesh and Davis (2000) assert that such a finding was the result of “compliance” in mandatory situations. Such compliance leads to a direct effect of social influences on intention. In a similar vein, Bagozzi (2007), citing Kelman (1974), states that social normative influence is a sort of compliance “based on the need for approval, acceptance, or fear of reprisal” (p. 247). Such influence may operate on individuals as members of organizations through policies, rewards, or sanctions, and may also function between peers or between an informal group and its members. Hartwick and Barki (1994) contend that users in mandatory settings seem to give more weight to the opinions of others, and hence use the system frequently when others think that such frequent use is the appropriate thing to do. In contrast, voluntary users pay less attention to the opinions of others, and rather focus on their own “attitudes” (p. 455). Based on the above evidence, we argue that in mandatory settings, a user’s social needs will be more salient than in voluntary settings and will take the shape of a need for approval and compliance.

Proposition 6: Mandatoriness will moderate the relationship between social needs and PU, such that the higher the level of mandatoriness, the larger the role social needs will play in shaping PU.

The model in Figure 3 summarizes the arguments presented in this paper and positions them within the larger context of acceptance research. The model illustrates the relationship between four levels of needs and PU (propositions 1-4), in addition to presenting the moderating effect suggested for mandatoriness (propositions 5 and 6). It is worth noting that mandatoriness is viewed here as a continuous variable that covers an array of values ranging from complete voluntariness on the one hand and complete mandatoriness on the other.
Conclusion

In this paper we have called for a richer conceptualization of PU so that the construct can represent a wider spectrum of human needs, one that encompasses and goes beyond performance and productivity goals. Performance goals may be related, for example, to safety needs, in the sense that a user will want to be productive in order keep their job. Performance goals may also be related to self-esteem needs from the perspective of the need for achievement. However, both safety and self-esteem needs, while comprising performance needs, are not limited to such needs. For example, as mentioned earlier in the paper, self-esteem needs may be related to the need for power, something that goes beyond mere performance. Moreover, other types of needs, such as social needs, may to a large extent be distinct from performance and productivity concerns. While we have taken only one step toward such a broader conceptualization, we believe that we have helped lay the groundwork for this important endeavor by using Maslow’s theory to highlight a more comprehensive set of needs that arguably shape a user’s beliefs about using an information system.

This paper contributes to research by providing a more comprehensive view of PU, one that differs from the rather narrow view typically used in IT research. By taking into account the hierarchy of motivational needs underlying human behavior, we acknowledge that various needs may play an important role in shaping PU. In addition, the role played by various motivational needs may differ from one user to another, and even for the same individual in different settings. Also, the role that such needs play in shaping PU goes beyond that of “strictly” performance-related rewards such as raises or bonuses.

This paper’s contributions to practice include providing IT managers with better insight into the underlying motivations that shape user beliefs about their use of IT systems, and will give them a better ability to predict such use and “sell” their systems to future users. This insight stems from a broader conceptualization of what motivates users to use an IT system, one that takes into account a hierarchy of human needs that is, again, not limited to economic needs.

One limitation of our study is that while we made it clear that we used Maslow’s theory to open the door toward a broader conceptualization of PU, few valid measures exist for testing the theory. It might therefore be a challenging task to derive and test hypotheses from the propositions developed here.

It would be interesting, and arguably worthwhile, for future studies to examine more theories on motivational needs. Such theories may be used, possibly in conjunction with Maslow, to actually develop a revised conceptualization of PU while addressing the aforementioned limitation regarding testing and measurability. Once the updated conceptualization has been developed, it would be interesting to test it empirically in the context of more recent classes of information technology. These technologies, such as blogs, with their rich characteristics and the increasingly vague boundary between their productivity- and non productivity-related attributes, would trigger and invoke the motivational needs captured by the more comprehensive conceptualization, thereby demonstrating the richness of the expanded conceptualization and underscoring its importance as a more accurate representation of user beliefs about information system use.
## Appendix A

### Table 1: PU and Closely Related Constructs in IT Research

<table>
<thead>
<tr>
<th>Construct</th>
<th>Study(s)</th>
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<tbody>
<tr>
<td>PU</td>
<td>Adams et al., 1992; Agarwal and Karahanna, 2000; Ahn et al., 2007; Amoako-Gyampah and Salam, 2004; Bajaj and Nidumolu, 1998; Bhattacharjee and Premkumar, 2004; Bhattacharjee and Sanford, 2006; Bhattacharjee, 2001; Briggs et al., 1998; Burton-Jones and Hubona, 2006; Castaneda et al, 2007; Cenfetelli et al., 2008; Chau and Hu, 2002; Chau, 1996a; Chin and Todd, 1995; Chin et al, 2003; Cho and Kim, 2001; Cho, 2006; Chung and Tan, 2004; Cyr et al, 2006; Davis, 1989; Deng et al, 2005; Dennis and Reinicke, 2004; Devaraj et al, 2002; Devaraj et al., 2008; Dinev &amp; Hu, 2007; Dishaw and Strong, 1999; Fang et al., 2005; Fedorowicz and Villeneuve, 1999; Fu et al, 2006; Gefen and Straub, 1997; Gefen et al., 2003; Gefen, 2004; Gopal et al., 1992; Grandon and Pearson, 2004; Ha et al, 2007; van der Heijden, 2004; Hasan, 2006; Hendrickson et al., 1993; Hong and Tam, 2006; Hong et al., 2001; Hsu and Lu, 2004; Hsu and Lin, 2008; Hu et al, 2003; Hu et al., 1999; Huang et al, 2008; Hung, 2003; Igbaria and Zviran, 1996; Igbaria et al., 1995; Igbaria et al., 1995; Igbaria et al., 1997; Igbaria, 1996; Im et al, 2008; Jiang and Benbasat, 2007; Kamis and Stohr, 2006; Kamis et al., 2008; Karahanna and Straub, 1999; Kim, 2008; Kotulic and Clark, 2004; Koufaris, 2002; Koufaris and Hampton-Sosa, 2004; Kraemer et al., 1993; Kulkami et al., 2006; Kumar and Benbasat, 2006; Kwaak and Lee, 2008; Lai and Li, 2005; Lee et al, 2005; Lee et al, 2006; Lewis et al, 2003; Liao and Cheung, 2002; Lilien et al, 2004; Lim and Benbasat, 2000; Limayem and Cheung, 2008; Limayem &amp; Hirt, 2003; Lin et al, 2005; Liu and Ma, 2005; Lopez-Nicolas et al, 2008; Lu et al, 2008; Lucas and Spitter, 2000; Mao and Palvia, 2008; Mellarkod et al, 2007; Montazemi et al., 1996; Moon and Kim, 2001; Nah &amp; Benbasat, 2004; Ong et al, 2004; Parthasarathy and Bhattacharjee, 1998; Pavlou and Fygenson, 2006; Plough et al, 2001; Rai et al, 2002; Saade and Bahli, 2005; Saeed and Abdinnour-Helm, 2008; Satzinger and Lorne, 1995; Segars and Grover, 1993; Shang et al, 2005; Shih, 2004; Shih, 2004a; Son et al., 2006; Srite and Karahanna, 2006; Staples et al, 2002; Straub et al, 1997; Straub, 1994; Sussman and Siegal, 2003; Szajna, 1994; Taylor and Todd, 1995; Taylor and Todd, 1995a; van der Heijden, 2003; Vandenbosch and Ginzberg, 1996; Venkatesh and Morris, 2000; Venkatesh, 1999;</td>
<td>Definition provided by/modified from Davis (1989) “the degree to which a person believes that using a particular system would enhance his or her job performance” (p. 320).</td>
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</tbody>
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3 The references for Table 1 are provided in the References for Table 1 section at the end of the paper.
4 The construct studied was Perceived Consequences (PQ), originally by Triandis (1980). However, it was conceptualized, as mentioned by the authors, similar to PU.
5 The authors measured Perceived Efficiency and Perceived Effectiveness, based on measures of PU.
### Appendix A

Table 1: PU and Closely Related Constructs in IT Research (Continued)

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<td>Performance Expectancy</td>
<td>Al-Gahtani et al, 2007; Chiu and Wang, 2008; Venkatesh et al., 2003.</td>
<td>The degree to which an individual believes that using the system will help him or her to attain gains in job performance (Venkatesh et al., 2003, p. 447)</td>
<td>3</td>
</tr>
<tr>
<td>Relative Advantage</td>
<td>Agarwal and Prasad, 1998; Compeau et al., 2007; Karahanna et al., 1999; Lai, 1997; Lee and Kozar, 2008; Moore and Benbasat, 1991; Tan &amp; Teo, 2000.</td>
<td>The degree to which adopting/using the IT innovation is perceived as being better than using the practice it supersedes (Moore and Benbasat, 1991, p. 195).</td>
<td>7</td>
</tr>
<tr>
<td>Utilitarian Outcomes</td>
<td>Venkatesh and Brown, 2001.</td>
<td>The extent to which using a PC enhances the effectiveness of household activities (Venkatesh and Brown, p. 74).</td>
<td>1</td>
</tr>
<tr>
<td>Perceived Net Value</td>
<td>Briggs et al., 1998.</td>
<td>An attitude, a valenced subjective assessment in response to all the perceived likely consequences of changing from existing technology to the proposed technology (Briggs et al., 1998, p. 157).</td>
<td>1</td>
</tr>
<tr>
<td>Outcome expectations</td>
<td>Compeau and Higgins, 1995; Compeau et al., 1999; Johnson and Marakas, 2000 (did not measure personal outcome expectations); Lin and Huang, 2008; Marakas et al., 2007 (did not measure personal outcome expectations); Yang et al, 2007.</td>
<td>The perceived likely consequences of using computers (Compeau et al., 1999, p. 147).</td>
<td>6</td>
</tr>
</tbody>
</table>
References


**References for Table 1**


