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Extending technology usage to work settings: The role of perceived work compatibility in ERP implementation

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ABSTRACT

Spanning over three decades and hundreds of studies, researchers have generated models, that examined user perceptions of technological attributes presumed to influence intention to use IT and consequent usage behavior. While these theories have provided reasonable explanations of IT usage across a broad range of technological and task settings, they did not address the role of IT in organizations, though they have been tested in organizational contexts, the models have not been modified to fit the context of organizational work. Current models are good at explaining IT usage in personal-settings, but they have not adequately examined the role of IT in organizations and thus have limited explanatory power in such settings. Furthermore, organizations deploy IT both to maximize its usage and to derive performance benefits from it. However, current IT usage models generally only consider IT usage as the dependent variable, without examining its performance impact. We extended IT usage models to include the role of IT's perceived work compatibility in shaping users' IT usage intention, usage, and performance in work settings. The model was empirically validated using a field survey of 138 users of ERP systems in 62 firms in China.

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1. Introduction

Firms spend millions of dollars on IT implementation initiatives, such as ERP, workflow, and knowledge management (KM) systems, expecting significant operational or performance gains from them. The worldwide market for ERP software licensing, implementation, and maintenance was $28.8 billion in 2006, and the number was projected to grow at a compound annual growth rate of 11% until 2011 [4]. However, many large IT system projects fail due to poor response to the implementation by the organization's users and inability to realize expected benefits. It is therefore important to understand why many organizational IT systems are not enthusiastically accepted by users, and how IT usage could translate into tangible benefits.

We believed that it was important to contextualize IT usage within work settings in order to maximize its power in organizations. This should provide organizational managers with a broader set of options to increase IT usage within their organizations and assess the impact of such usage on outcomes (such as productivity or performance gains). Our objective was therefore to extend IT usage models to (1) incorporate the role and impact of organizational work, and (2) assess the impact of IT usage on organizational outcomes. Toward these ends, we synthesized prior IT usage research with task–technology fit (TTF) to postulate relationships linking the work context to IT usage, and then, to link IT usage back to individual performance in organizations. The hypothesized model was empirically tested using data collected from a survey of 138 ERP users in 62 firms across ten provinces in China and analyzed using PLS.

2. Theory and hypotheses

2.1. Prior research

Much prior IT usage research was based on Ajzen's theory of planned behavior (TPB), shaped by three perceptions: attitude, subjective norm (SN), and perceived behavioral control (PBC). Though it did not identify specific beliefs or other perceptions salient to IT usage, TAM added perceived usefulness (PU) and perceived ease of use (PEOU) as attitudinal beliefs salient to IT usage. The resulting relationships, synthesized in UTAUT and shown in Fig. 1, suggested that a person's intention to use IT was influenced by four user perceptions: PU, PEOU, SN, and PBC. Because these associations are well known and have been extensively validated, we did not include them as formal hypotheses. UTAUT also proposed additional moderating effects

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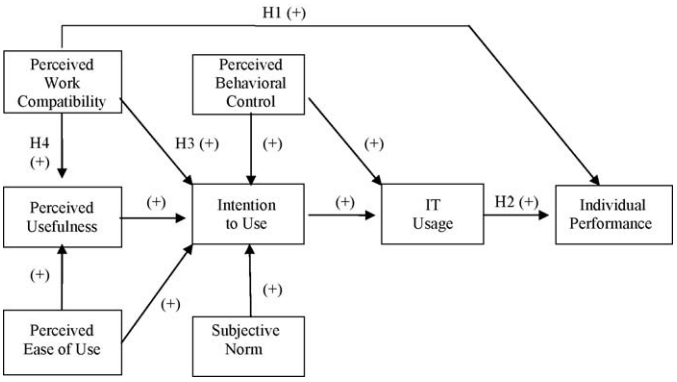

Fig. 1. A model of organizational IT usage.

of gender, age, experience, and voluntariness of use, but these associations were based on empirically observed correlations rather than on theory, we did not include them as formal hypotheses.

2.2. Work context and IT usage

TAM was originally conceptualized in the context of personal use. Though it has demonstrated reasonable explanation of IT usage within organizations, such studies have generally ignored the role of organizational work on IT usage or its predictors, and its performance impact. Clearly, organizational users use IT to perform specific tasks and speed organizational work; hence it is important to consider the role of organizational work in IT usage.

Dishaw and Strong [3] noted that a major weakness of TAM was its absence of task focus and recommended consideration of (TTF), which refers to the degree of correspondence between task requirements, individual abilities, and the functionality of the technology. In their technology-to-performance chain (TPC) model, Goodhue and Thompson argued that IT was more likely to be used in organizational settings and would have a positive impact on individual performance if the capabilities of the IT matched the tasks that the user had to perform. They observed that TTF, in conjunction with IT usage, was a significant predictor of improved job performance and conceptualized TTF as a multi-dimensional construct tapping into different facets of fit between IT and organizational work. With a sample of 662 people using 25 different IT systems and working in 26 departments at two firms, they empirically validated eight of their original 16 TTF dimensions: quality (of data), locatability (of data), authorization (for access to data), compatibility (between data and work), ease of use/training, production timeliness, systems reliability, and user relationship. Most of these are attributes of data, rather than those related to organizational work, with compatibility the only exception. Staples and Seddon shortened the original TTF scale to four dimensions: work compatibility, ease of use, ease of learning, and information quality. Because *work compatibility* is the only TTF dimension directly related to organizational work, we selected it as the core construct of interest in our study.

It should be noted that we view work compatibility strictly as the fit of IT to organizational work, and not to personal preferences or work habits. Organizations deploy IT to facilitate organizational work rather than to match users' personal preferences or habits. Nevertheless, like PU and PEOU, work compatibility is very much a perceptual construct as it is the *perception* of fit between IT and work that motivates employees to use the system, irrespective of the actual extent of fit. To capture the perceptual nature of this construct and to maintain consistency with PU and PEOU, we refer to this construct hereafter as *perceived work compatibility* (PWC).

How does PWC influence TAM constructs? Goodhue and Thompson's TPC model suggested that TTF influenced work performance, both directly and indirectly, via effects on IT utilization and/or the precursors of IT utilization. These precursors may include users' cognitive beliefs (PU and PEOU) of IT usage. The stronger the fit between IT and the portfolio of organizational tasks that it is intended to simplify, the greater the likelihood that users will realize performance gains from its use. The direct effect of TTF on performance is even more pertinent when IT usage is less voluntary, as in many organizational settings. In such circumstances, performance impacts will depend on TTF rather than on IT usage. Since our study focused specifically on TTF's work compatibility dimension, we hypothesized:

Hypothesis 1. Users' perceived work compatibility between their organizational tasks and a given IT is positively related to their individual work performance.

In circumstances where IT usage is within one's volitional control, it is normally the extent of IT usage that determines performance. This expectation has been supported by DeLone and McLean's IS success model, empirically validated by Petter and McLean [7]. Organizational users cannot realize significant productivity or performance gains if they do not use IT adequately and appropriately. On the other hand, IT usage may not always translate into improved performance, suggesting that IT usage is necessary though not sufficient condition for performance improvement. However, in view of the dominant assumption in the literature that IT usage is a necessary condition for workplace performance, we hypothesized:

Hypothesis 2. Users' organizational IT usage is positively related to their individual work performance.

In addition to its direct effect on performance, TTF impacts performance indirectly through IT usage. Though Goodhue and Thompson found this effect to be very small indirect effect, explaining 2% of the IT usage variance, it is possible that the lack of a strong direct effect may be related to the aggregation of multiple TTF dimensions, rather than focusing on PWC along. Further, the lack of a direct effect of TTF on IT usage may be indicative of a mediated effect, where this effect is mediated by users' intention to use IT.

Theoretical support for a mediated association comes from models of IT usage such as TRA and UTAUT, which suggested that users' cognitive beliefs of IT usage was manifested on their actual use via their intention to use IT. Hence, PU and PEOU were modeled as influencing intention to use IT, rather than directly linked to usage behavior. Likewise, we should expect intention to use to mediate the effects of other perceptual beliefs, such as PWC, on actual IT usage. Therefore, we proposed:

Hypothesis 3. Users' perceived work compatibility between their organizational tasks and a given IT is positively related to their intention to use that IT.

Finally, the TPC model indicated that TTF was related to the precursors of IT utilization, such as PU. IT usage studies have long contended that cognitive beliefs related to IT usage are interrelated and may influence each other in intricate ways (e.g., [13]). Empirical evidence for the association between TTF and PU is however quite tenuous. This association was tested but not supported in Dishaw and Strong's study, but this lack of support may have been due to the small sample size and consequently low statistical power. Given our focus on TTF's work compatibility dimension, to empirically test for a potential relationship between PWC and PU, we proposed:

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