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Practicing What We Preach: Understanding Why Project Management Methodologies Are Often Ignored

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ABSTRACT
Effective project management of software development efforts is one of the most challenging aspects within IT management today. Literature has greatly extended our understanding of project management characteristics that enhance the likelihood of software development project success. Nevertheless, a disconnect seems to exist between an individual’s knowledge of pertinent project management characteristics and their subsequent use of those characteristics. The research model presented in this paper seeks to explain why software developers don’t consistently follow through with institutionalized project management principles. This model builds on previous research by addressing temporal aspects of the intention to use – usage relationship, examining institutional factors that impact eventual use of a project management practice, investigating phenomena at the level of an individual project, and considering the impacts of faithful or ceremonial use. The result is a model that is expected to explain a large degree of variance in the project management practice usage decision.

Keywords
Project management, management, project managers.

INTRODUCTION
“More people have ascended bodily into heaven than have shipped great software on time.” (McCarthy, 1995)

Effective project management (PM) of software development efforts is one of the most challenging aspects within IT management today. Researcher and practitioner literatures have greatly extended our understanding of project management characteristics that enhance the likelihood of software development project success. Nevertheless, a disconnect seems to exist between a project participant’s knowledge of pertinent project management practices and their subsequent use of those practices. Project participants often “know” how to successfully implement a project, so why don’t they consistently do so?

Previous researchers have attacked this question in several ways. One set of authors (Khalifa and Verner, 2000) used Triandis’ model of human behavior (Triandis, 1980) as a framework from which to understand an individual’s usage behavior for two specific software development methodologies, waterfall and prototyping. Using a cross-sectional, questionnaire-based data collection approach, Khalifa et al. (2000) found that use of either software development methodology was significantly influenced by organizational support, size of the development team, and developer beliefs regarding the methodology’s impact on the quality of the software development process.

A second set of authors addressing this question (Hardgrave, Davis and Riemenschneider, 2003) suggested a different theoretical lens from which to view the software development methodology – usage relationship, combining the technology acceptance model (TAM) (Davis, Bagozzi and Warshaw, 1989; Venkatesh and Davis, 2000) with diffusion of innovations theory (Rogers, 1995). Using a cross-sectional, questionnaire-based data collection approach, Hardgrave et al. (2003) found that perceived usefulness, social pressure, organizational mandate, and compatibility all demonstrated a significant relationship with the individual’s behavioral intention to use the software development methodology. Noting that complexity was showing a non-significant relationship with intention to use, the authors adjusted the model to improve goodness of fit. In doing so, they found that social pressure, complexity, and compatibility all demonstrated significant relationships with perceived usefulness (indirect effects on intention to use). Further, they found that organizational mandate, perceived usefulness, and compatibility exerted positive relationships with intention to use the methodology.

While both sets of research have furthered our understanding of why individuals use (or intend to use) a software development methodology, there are important gaps in our knowledge that must be addressed in order to further our collective understanding of an individual’s use of a software development methodology. First, the studies above both collect
data at one point in time and thus don’t address the temporal aspects of the intention to use – usage relationship. For example, each study either targets use or intention to use, but neither incorporates both constructs into their conceptual models. This can be problematic if, following the time when an individual decides to use a methodology, events occur that interfere with the individual’s actual use of the methodology. Second, neither study addresses the degree to which institutionalization of the methodology within the organization will impact methodology usage. Third, both studies abstract their analysis from the context of any specific project, and thus fail to capture individual perceptions of the methodology as they relate to a particular project. Finally, neither study addresses an individual’s faithfulness of methodology use within their use constructs.

The research model and propositions presented in this paper extends the work of previous authors by directly addressing these concerns. The ultimate goal of this research is to provide explanation of the following question: why don’t project participants consistently follow through with institutionalized project management practices? The paper will begin with the presentation of a theoretical framework from which this question can be addressed. Next, a conceptual model and associated research propositions will be presented followed by a brief conclusion.

CONCEPTUAL BACKGROUND

Two streams of theory provide essential explanatory power when discussing the usage decision made by project participants with respect to a particular PM practice. First, theories of technology adoption provide a theoretical lens from which the entire usage decision process can be examined. Second, Institutional Theory provides a perspective for understanding the role that institutional forces play in individual usage decisions. The following sections provide an overview of each literature stream.

Theories of Technology Adoption

Theories of technology adoption strive to understand antecedent conditions involved in an individual’s decision to use or not use a technology. This research stream has primarily grown from social psychology, where the theory of reasoned action (TRA), the theory of planned behavior (TPB), diffusion of innovation (DOI) theory, and social cognitive theory (SCT) all were utilized to explain individual adoption behaviors specific to technology (Agarwal, 2000). In general, the theories tend to suggest that an individual’s perceptions regarding complexity, compatibility with the existing work domain, ease of use, and perceived relative advantage of a technology all play a significant role in determining whether the individual will use or not use the technology being investigated (Moore and Benbasat, 1991; Rogers, 1995).

An example of the adaptation of social psychology theories is the technology acceptance model (TAM), which drew heavily on TRA in order to derive a model specific to explaining individual technology acceptance (Davis, 1989; Davis et al., 1989; Hardgrave et al., 2003). The original TAM was composed of perceived usefulness and perceived ease of use constructs that were suggested to explain intention to use the technology. While this model was empirically shown to provide explanatory power regarding individual technology usage (Davis, 1989; Davis et al., 1989; Mathieson, 1991), there were suggestions that the model only supplied general information on user opinions regarding a system and was thus limited in its ability to provide finer-grained answers to the technology usage decision (Mathieson, 1991). This and other limitations led researchers to extend the model to incorporate subjective norm and voluntariness components (Venkatesh et al., 2000; Venkatesh, Morris, Davis and Davis, 2003). It is this revised model that lends itself well to our investigation of an individual’s decision regarding PM practice use, an idea that is consistent with earlier attempts to investigate software developer intentions to follow methodologies (Hardgrave et al., 2003).

Institutional Theory

Software development efforts of interest in this study exist within the context of an organization, so it is essential that a theoretical lens be available for explaining the impacts of institutional forces on an individual’s usage of a PM practice. Institutional Theory provides such a lens and possesses sufficient legitimacy in organizational research. As stated by previous authors, “institutional theory suggests that the behaviors of individuals within organizations are significantly influenced by the prevailing organizational norms, values, culture, and history” (Purvis, Sambamurthy and Zmud, 2001, p. 120). Within this stream are the following three conceptions of institutions that are all suggested to interact to promote and sustain orderly behavior: 1) regulative where institutions are viewed as providing systems of rules or governance systems, 2) normative where institutions are viewed as providing a moral framework for the conduct of social life, and 3) cultural-cognitive where institutions are viewed as providing a means by which social reality is constructed (Scott, 2003).

This distinction has been further extended with regards to technology use in organizations (Orlikowski, Yates, Okamura and Fujimoto, 1995), recognizing the importance of both individual structuring actions and metastructuring actions. In this view...
individuals are suggested to “engage in explicit structuring actions for exploring if and how the technology ‘fits with’ or ‘enhances’ their work activity” (Purvis et al., 2001, p. 120). Further, metastructuring actions (direct and indirect actions that attempt to make use of the technology more desirable) undertaken by referent, and often powerful, individuals within the institutional environment are suggested to significantly influence individual structuring actions (Purvis et al., 2001). It is this theoretical background that will be used to explain the impact of institutional forces on individual use of the PM practice.

CONCEPTUAL MODEL AND RESEARCH PROPOSITIONS

Figure 1 provides a graphical depiction of the conceptual research model proposed in this paper. Understanding why individuals choose to use or not use a particular PM practice is an extremely complicated task, and the paragraphs below will outline the rationale and justification for relationships proposed in the conceptual research model.

PM Practice Usage & Usage Intention

So why do project participants use or not use a PM practice within the context of a specific project? Previous authors studying this phenomenon have focused either on intention to use (Hardgrave et al., 2003) or use itself (Khalifa et al., 2000) as the dependent variable of interest. While intention to use “has repeatedly proven to be a strong predictor of actual future use” (Hardgrave et al., 2003, p. 130), it has become widely accepted in literature investigating user acceptance of IT that both intention to use and actual use are key components of understanding individual use behaviors (Taylor and Todd, 1995; Venkatesh et al., 2003).

Projects are dynamic, and sometimes chaotic, environments where resource availability can change in a very short period of time (PMI, 2000). Assuming that there is any distance of time between when one decides to use a PM practice and the actual completion date of the project, it becomes possible that incidents may occur between the two events that might cause an individual to modify their initial usage intentions. For example, a well-structured software development project that begins with all developers closely following a prescribed PM practice might experience changes in usage if the project timeline is compacted by 20%.
The model proposed in this work suggests that after one’s intention to use is determined, external forces exist that might impact actual use behavior. Thus, it is believed that PM practice usage intention and PM practice use are both necessary in order to understand the overarching usage behavior of individuals. In this context, PM practice usage refers to a project participant’s actual use of the PM principle for a given project. Similarly, PM practice usage intention is defined as the degree to which a project participant intends to use the PM practice for a given project.

**PM Practice Complexity**

Complexity has been described as “the degree to which an innovation is perceived as relatively difficult to understand and use” (Rogers, 1995, p. 242). Using this definition as a guide, PM practice complexity is defined as a project participant’s perception concerning the degree of difficulty associated with the understanding and use of the PM practice for a particular project. This definition is similar to the perceived ease of use construct in IT literature (Davis et al., 1989; Venkatesh et al., 2003), and very consistent with an earlier definition of Perceived Complexity (Hardgrave et al., 2003). Perceived complexity of an innovation has been suggested to be negatively related to the innovation’s rate of adoption within a social system (Rogers, 1995). One explanation for this relationship is that “innovation adoption is a process of uncertainty reduction” (Agarwal, 2000, p. 89), and the role of attitude towards the innovation is tightly intertwined in the process. Thus a relationship is posited between PM practice complexity and PM practice attitude, which refers to a project participant’s overall attitude pertaining to the PM practice.

**Proposition 1:** PM Practice Complexity will be negatively related to an individual’s PM Method Attitude.

**Perceived Usefulness for Project & Perceived Usefulness for Individual**

In addition to PM practice complexity, it is expected that an individual’s attitude towards the PM practice will be shaped by their perceptions regarding personal utility of the practice. Consistent with definitions of perceived usefulness offered in IT adoption literature (Hardgrave et al., 2003; Venkatesh et al., 2003), perceived usefulness for project refers to the degree to which a project participant believes that using the PM practice will help them attain gains in **project performance**. Similarly, perceived usefulness for individual refers to the degree to which an individual believes that using the PM practice will help him or her to attain gains in **job performance**.

In contrast to previous literature, however, this research will picture both perceived usefulness constructs as consisting of two components: 1) a general perception with regards to the PM practice (outside the context of any particular project) and 2) perceptions of usefulness with respect to a particular project. This is an important theoretical distinction for two primary reasons. First, the study at hand is concerned with a project-level analysis of why individuals use a particular PM practice and thus it becomes highly relevant to study perceived usefulness with regards to a specific project. Second, the project context (e.g., resource constraints, socio-emotional issues within the project team) has the potential to alter an individual’s perceptions regarding usefulness that are divergent from their general perceptions regarding the PM practice. For example, a constrained time schedule might force one to consider a PM practice less valuable within the context of that particular project given a need to complete the project within a shortened time span.

A positive relationship between perceived usefulness and an individual’s attitude has been consistently demonstrated in IT adoption literature (Davis, 1989; Davis et al., 1989; Mathieson, 1991; Moore et al., 1991; Taylor et al., 1995), and that relationship is expected to hold for the relationship between both perceived usefulness constructs and an individual’s attitude towards the PM practice.

**Proposition 2:** Perceived Usefulness for Project will be positively related to an individual’s PM Practice Attitude.

**Proposition 3:** Perceived Usefulness for Individual will be positively related to an individual’s PM Practice Attitude.

**Adopted by Project Manager**

In the context of this study, adopted by project manager refers to the degree to which the PM practices have been adopted by the project manager for a particular project. This construct implies the voluntariness associated with the PM practice for a
particular project (if it is adopted by the project manager, then the PM practice is mandatory). Researchers have long realized the importance of including a voluntariness construct in the pursuit of understanding user adoption of IT (Hardgrave et al., 2003; Moore et al., 1991). Adopted by project manager is expected to impact several constructs within the proposed usage model.

First, project manager adoption of the PM practice is expected to have a direct impact on the individual’s intention to use the PM practice. This assertion is consistent with earlier findings concerning the impact of organizational mandate on a developer’s intention to follow a methodology (Hardgrave et al., 2003). However, a question remains as to the type of use that the individual intends to enact. For example, do individuals intend to use the PM practice in a way consistent with its purpose and design, or do they only intend to “go through the motions” in order to pacify those in power? In examining the implementation of control mechanisms within software development projects, a colleague recently made a useful distinction between faithful and ceremonial adoption methods (Ayres, 2003) that is meaningful to the discussion at hand. Ceremonial intention will be discussed as an individual’s intention to use “a practice for legitimacy reasons without belief in its value for the organization and without forming positive attitudes toward the practice” and faithful intention as an individual’s intention to use “a practice consistent with the general intent with regards to values and goals underlying the specific types of rules or capabilities offered by the practice” (Ayres, 2003, p. 96). This distinction is further conceptualized as two ends on a single continuum, so usage intentions will be discussed as either more ceremonial or more faithful in nature.

Ceremonial intention to use can be seen as a way for individuals to resist managerial initiatives without incurring managerial wrath. This idea is consistent with previous research that suggests “by ceremonially adopting a prescribed control mechanism, a software project team can gain legitimacy from the organization but still maintain the way it is currently operating” (Ayres, 2003, p. 95). Efforts by the project manager to force the PM practice without addressing an individual’s attitudes regarding the practice are expected to result in a positive relationship between project manager adoption and a more ceremonial PM practice usage intention from the individual. On the other hand, a situation where the project manager doesn’t require the PM practice but a project participant has a favorable attitude towards the practice is expected to result in a faithful intention to use the practice.

**Proposition 4:** Adopted by Project Manager will have a more significant impact on more faithful PM Practice Usage Intention when PM Practice Attitude is higher than when it is lower.

Second, adoption of the PM practice by the project manager means that they expect the PM practice to be used for the project at hand (e.g., less than voluntary). Researchers have suggested that metastructuring actions are often used by management champions to influence individual structuring actions of a specific technology (Orlikowski et al., 1995; Purvis et al., 2001). Metastructuring actions are said to “include both direct actions to make the technology more valuable to users and indirect actions to manipulate prevailing institutional structures and influence individual structuring actions” (Purvis et al., 2001, p. 121). In this scenario, it is possible for the project manager to undertake metastructuring actions that attempt to increase the value of PM practices for project participants. It is this avenue that leads to the next two propositions regarding project manager adoption of the PM practice and both perceived usefulness constructs.

**Proposition 5:** Adopted by Project Manager will be positively related to an individual’s Perceived Usefulness for Project.

**Proposition 6:** Adopted by Project Manager will be positively related to an individual’s Perceived Usefulness for Individual.

**Project Team Social Norms**

The social setting in which one operates is essential when considering how an individual makes adoption decisions (Agarwal, 2000). This is supported by previous research that found an individual uses co-worker opinions as an important component when forming their opinions about a new development process (Johnson, Hardgrave and Doke, 1999). The current model recognizes impacts of social norms via a project team social norm construct. Similar to the subjective norm construct found in the Theory of Reasoned Action (Fishbein and Ajzen, 1975), project team social norms refer to the degree to which a project participant perceives that important others believe he or she should use the PM practice for a given project. This concept goes beyond the influence exerted by a project manager to include all individuals perceived to be influential in the social circle of the project participant (e.g., technical experts, project team members).
Project manager adoption of the PM practice can be understood as an organizational mandate in the eyes of project participants. Supervisor mandates regarding the PM practice is expected to influence the degree to which an individual perceives that those important them (via their formal position) believe they should use the PM practice. Thus, adoption of the PM practice by the project manager is expected to experience a positive relationship with project team social norms. This is supported by research suggesting a relationship between the attitudes of top management and the attitudes and perceptions of organizational workers (Lewis, Agarwal and Sambamurthy, 2003; Massey, Montoya-Weiss and Brown, 2001).

**Proposition 7:** Adopted by Project Manager will be positively related to Project Team Social Norms.

Further, project team social norms are expected to have a direct impact on an individual’s intention to use a PM practice. Researchers have suggested that individuals may choose to perform a behavior that goes against their perceptions of its value if they believe people important to them think they should (Venkatesh et al., 2000). Indeed, previous studies have found that a direct, positive relationship exists between perceived social pressure and a developer’s intention to follow a particular methodology (Hardgrave et al., 2003). But a question remains as to whether the individual perceives those influential others as having faithful or ceremonial intentions. Where project team social norms are seen as faithful, then it follows that an individual will be influenced towards faithful usage intentions (and vice-versa). Thus, it is expected that project team social norms seen as faithful will have a positive relationship with an individual’s faithful intention to use a PM practice.

**Proposition 8:** Project Team Social Norms that are perceived as being faithful will be positively related to an individual’s faithful PM Practice Usage Intention.

**Institutionalized PM Practices**

An essential component of this model that has been ignored thus far is the degree to which the PM practice has been institutionalized within the organization and its subsequent impact on PM practice usage. This issue can be theoretically addressed by employing institutional theory, which “suggests that the behaviors of individuals within organizations are significantly influenced by the prevailing organizational norms, values, culture, and history” (Purvis et al., 2001, p. 120). In this context, institutionalized PM practices refer to the degree to which a particular PM practice has been embedded into the organization’s PM methodology. Embeddedness into the organization’s PM methodology may be evidenced through formal (e.g., documented as an organizationally sanctioned practice) or informal (e.g., a strong preference by upper management) mechanisms.

As PM practices become more institutionalized within the organizational environment (e.g., the institutional system becomes more developed), regulative, normative, and cultural-cognitive forces will “interact to promote and sustain orderly behavior” (Scott, 2003, p. 135). Thus, organizational actors (e.g., project manager and project participants) will have a greater understanding of “right” behavior with regards to project work (e.g., the PM practice) and are more likely to adopt the “right” practices as those practices become more institutionalized within the organization. From this perspective, it is expected that the degree a PM practice is institutionalized will be positively related to a project manager’s adoption of that PM practice.

**Proposition 9:** Institutionalized PM Practices will be positively related to Adopted by Project Manager.

Further, the project participant, as a member of the organization’s project team, is expected to be impacted by institutionalization of the PM practice. Institutionalization, defined as “the process by which actions are repeated and given similar meaning by self and others” (Scott, 2003, p. 136), provides a measure of identity for the organization from which the project participant draws inferences about acceptable behavior. In a sense, the institutional environment serves as a referent other that influences the project participant’s decision regarding intention to use, and eventual use, of the PM practice. Where a PM practice has been institutionalized, it is expected that project team social norms will be perceived as more faithful.
Proposition 10: Institutionalized PM Practices will be positively related to Project Team Social Norms perceived as being faithful.

Finally, institutionalization of the PM practice is expected to exert a direct impact on the project participant’s use of the PM practice. From this perspective, higher levels of institutionalization are expected to impact usage directly since it reduces the need for a complex usage decision process and rather promotes usage through the existence of shared meaning. Routinization of the PM practice is expected to reduce friction in the usage decision process since the PM practice is already perceived as being “right”. Further, viewing institutionalization as “a process by which social reality is constructed” (Scott, 2003, p. 136) implies that the project participant will be actively involved in developing shared meaning concerning the value of the PM practice, an indication that the individual is likely to believe in the ‘spirit’ of the PM practice. In this case, institutionalization of the PM practice is expected to exhibit a positive relationship with the project participant’s faithful usage of the PM practice.

Proposition 11: Institutionalized PM Practices will be positively related to more faithful PM Practice Usage.

Project Exigency

A project is temporary by definition (PMI, 2000), and many unanticipated events can occur during the life of the project (from inception to completion). Assuming issues are managed within carefully controlled project processes, a project manager can ensure that the unexpected changes are handled in such a way that the project can be completed within specification. However, there are often events that circumvent carefully planned project procedures and result in an adverse affect on delivery of the project. It is this reality that led Tom Gilb to state that “projects which fail to specify their goals clearly, and fail to exercise control over even one single critical attribute, can expect project failure to be caused by that one attribute” (Gilb and Finzi, 1988). These same “events” can also cause an individual to act in ways that are contrary to their original intentions.

Project exigency refers to the degree of urgency exerted within the project by external forces. These external forces can be applied in many ways, such as directly by stakeholders or indirectly by a lack of available resources. The ultimate impact of project exigency is often a reduction in the amount of time and attention paid to those practices considered “unnecessary” to the completion of the project. Since there is always a period of time between when one makes a decision to use a PM practice and when one actually uses the practice, project exigency is expected to dampen the positive relationship between an individual’s intention to use a PM practice and their actual use of the PM practice. Thus, it is expected that the impact of faithful intentions to use on faithful use of the PM practice will be lessened as project exigencies intensify.

Proposition 12: Faithful PM Practice Usage Intention will have a less significant impact on faithful PM Practice Usage when Project Exigency is higher than when it is lower.

CONCLUSION

So why don’t project participants consistently follow through with institutionalized project management principles? The model proposed in this paper has attempted to address this question, and has built on previous researcher efforts that sought to understand this seemingly elusive set of relationships. It is hoped that this work will provide guidance to researchers and practitioners alike in their search to improve project success.

REFERENCES