Committed Use of Project Management Methodologies: Understanding the Role of Costs, Benefits, and Psychological Needs

Completed Research

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Abstract

Even when employees use project management methodologies (PMMs), the question regarding the nature of their use remains, i.e. are they using PMMs in a dedicated manner? While empirical research states that the usefulness of a methodology is the single most important determinant of its acceptance and use by actual users, studies have not examined which methodology use outcomes are more important for which type of people regarding determining their committed PMM use behavior. In our study, we develop a theoretically and practically complete, as well as relevant, typology of the costs and benefits of using a methodology and study the effect of personal traits such as psychological needs. We develop and test a conceptual model, using a sample of 2,651 participants, which shows that individual needs determine which costs and/or benefits have a greater effect on individuals' committed use of a PMM.

Keywords: Project management, committed use, behavioral science, costs, benefits
Introduction

Despite the advantages of using a project management methodology (PMM) (e.g. reduced project complexity, increased transparency and control, reduced risk, and tested guidelines (Fitzgerald 1998), only 50% of organizations get their staff to use such methodologies appropriately (Glass 1999). In the context of software development projects, a survey conducted by Russo et al. (1996) shows that only 6% of organizations claim that their methodologies are always used as specified. Since individuals do not use PMMs appropriately or to the correct extent, their practical usefulness remains a controversial issue (Winter et al. 2006). Even when employees use these methodologies, the question regarding the nature of their use remains, i.e. are they using PMMs in a dedicated manner? In our opinion, this question is critical because usage alone does not ensure sustained productivity gains. This implies that the use of a PMM is an essential condition, although not necessarily sufficient, for achieving task-related performance gains. Usage behavior has traditionally been studied in terms of time, duration, and frequency. However, this quantitative operationalization of usage behavior does not do sufficient justice to the complex construct, i.e. it does not capture the differences in end user usage behavior. 'Simply saying that more use will yield more benefits, without considering the nature of this use, is clearly insufficient' (DeLone and McLean 2003). Researchers also need to consider the nature and quality of PMM use. In IT research, the use of an IT artifact is viewed as a continuum that refers to the range from nonuse, compliant use, and committed use (Chuang et al. 2011). Based on the existing literature, we therefore seek to capture the motivational difference in PMM usage by studying the committed use nature of PMM use. As we discuss later, this specific usage behavior captures the intrinsic and dedicated character of PMM use, the mysteries of which organizations and researchers are constantly trying to unearth.

Furthermore, in the methodology adoption and usage domain, the study of usage antecedents has generally been conducted from singular theoretical perspectives focusing on abstract user attitude dimensions. Some of these studies have sought to examine individual usage behavior regarding methodologies from a technology adoption perspective. They view PMMs as innovations and make use of the technology acceptance model (TAM) (e.g. Hardgrave et al. 2003; Riemenschneider et al. 2002). Others apply sociological models, such as the theory of planned behavior (TPB) (Ajzen 1991) and Triandis’s (1980) theory of interpersonal behavior, to examine the development of individuals’ intention to use methodologies (e.g. Hardgrave and Johnson 2003; Khalifa and Verner 2000). Subsequent research has also focused on this singular approach. Concerning abstract user attitude dimensions, empirical research states that a methodology’s value or usefulness is the single most important determinant of its acceptance and use (Hardgrave and Johnson 2003; Hardgrave et al. 2003; Riemenschneider et al. 2002). However, studies have generally neglected to explicitly integrate the costs dimension, leading to an incomplete understanding of how behavioral outcomes influence the usage of methodologies. This is a critical issue, because perceived value has dual dimensions and is a function of what people are getting (i.e. the benefits) and what they are giving (i.e. costs) (Parasuraman and Grewal 2000). Consequently, while some studies use the relative advantage or similar constructs (e.g. Venkatesh et al. (2012) “price value” construct) to implicitly consider behavioral costs, this approach still leaves the costs vs. benefits understanding a black box.

Regarding the singular approach, critics have also suggested that TAM and TPB are too parsimonious and must be expanded by integrating variables specific to the methodology and the people who use it (Venkatesh and Davis 2000). As Warner (1974) observes, development of behavioral motivations is a complex social-psychological phenomenon that involves both technical and nontechnical factors. Sociologists and psychologists would undoubtedly agree with this view. Unfortunately, the various disciplines, which generally concentrate on their specific variables, have neglected to incorporate deep-rooted, long-term stable psychological needs into understanding the methodology usage problem (focusing generally on rather simple characteristics such as age and gender). It seems reasonable that variables from both sets are important in order to explain the problem at hand (Warner 1974). For example, researchers have not examined which aspects of usefulness (e.g. higher productivity, promotion, etc.) are more important to satisfy which type of human needs in which situations. Based on an individual’s intrinsic psychological characteristics, human needs might be able to show us that different types of benefits and costs influence individuals’ committed usage motivation in different ways. We thus heed Pfleeger’s call (1999) to the MIS field for a better understanding of people’s role in the adoption process by drawing on psychological and social models (Riemenschneider et al. 2002). We have identified
Murray’s (1938) theory of psychogenic needs to provide a comprehensive theoretical basis to help us understand how the satisfaction of specific psychological needs through benefits / costs contributes to the development of committed PMM use. Neglecting the impact of such complex relationships might lead to results that are not always valid (Henseler and Fassott 2010). Fundamental questions regarding the impact of a methodology’s benefits and costs on an individual’s committed usage behavior are: a) Which PMM usage benefits and costs affect an individual’s committed PMM use? b) How do individuals’ basic needs influence the predictive power of these different PMM usage benefits and costs?

Our study takes a step towards filling the gap in the PMM usage literature, which to date has neither developed a theoretically and practically complete and relevant typology of a methodology’s usefulness, nor studied the effect of psychological needs. The remainder of the paper is organized as follows: section 2 explains the basic theoretical concepts that provide the framework for our conceptual model. In Section 3, we present our research model and hypotheses. Section 4 outlines the research methodology. The implications of our research are discussed in Section 5.

Theoretical Background

Nature of Use

Understanding usage behavior is critical, because although an organization develops and implements a particular methodology, only the methodology’s users determine the way in which it is used. The reasons for PMM adoption and usage being challenging and for usage motivations differing between employees are partly derived from the tacit, organizational, and individual problems that the introduction of a new methodology causes. The stress associated with learning a new methodology, fear, the impact on self-esteem and identity associated with an organizational restructuring, the emotional costs of role conflict, ambiguity, and workplace transformation might be serious inhibitors of commitment motivations (Vickers 1999).

In seeking to understand human behavior, the literature has largely used a cognitive perspective based on rational choice theory (RCT) and driven by conscious processes, according to which individuals make goal-oriented, rational decisions (e.g. the plethora of studies based on TAM, and UTAUT models). The affect perspective and particularly the unconscious affect perspective, which refers to the experience of feeling or emotion as a result of instinctual reaction to stimulation (Zajonc 1980), have generally been ignored. However, in psychology, in particular Freud’s (1896) theory of psychoanalysis, human behavior is primarily driven by the unconscious mind (also termed the subconscious mind by popular psychology authors). In our daily lives, researchers and practitioners might feel that a person’s motivations and consequent behavior is a conscious cognitive or conscious affective act (Lazarus 1982) (affective reactions, such as liking, disliking, evaluation, or the experience of pleasure or displeasure, based on a prior cognitive process (Brewin 1989)), because it is externally visible to us and our environment. However, this is only the tip of the iceberg; we are unaware of the huge, hidden, unconscious mind that secretly drives our decision-making by triggering certain unaware, uncontrollable stimuli.

Piaget (1973), Freud (2010), Jung (1981), Lucan et al. (1998), and other students of psychology before and after them consider most cognitions and affects to be unconscious. For example, unconscious cognition can be observed when we come up with a ‘eureka’ idea without being consciously aware of the process that led to it, or when an expert pianist’s fingers are almost automatically guided to the right keys without conscious thought, even when he or she is distracted, or when we use the right words in the right way. Studies also show that a significant amount of language and grammar learning takes place unconsciously (Scott and Dienes 2008). Research on perceptual-cognitive and motoric skills indicates that the mental processes in question are habituated through experience and are thus rendered automatic or unconscious. On the other hand, unconscious affect is at work when we don’t exactly know or know how to explain what we are feeling and why, i.e. we like or dislike a stimulus, but don’t know why. Berridge and Winkielman (2003) define unconscious affect as ‘an affective reaction of which one was simply not aware, even upon introspection.’ Most scientists (e.g. Zajonc 1980) also agree that while an affective reaction might itself be conscious, unconscious affective stimuli can trigger it (Winkielman et al. 2005). A plethora of experimental research, generally using subliminal impulses, has also shown that basic affective reactions can be unconscious and interact with conscious processes to influence behavior. Neuro-
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anatomical investigations show that, in the absence of conscious perception, the brain regions involving the amygdala (Morris et al. 1998; Whalen et al. 1998) and somatosensory association (Anders et al. 2004) areas mediate emotional responses. Based on the discussion above, the basic understanding underlying our conceptualization of usage motivation is that it is influenced by either conscious or unconscious and cognitive or affective mental or psychological processes, or by the interactions between them.

In a work environment, commitment often refers to a perceived psychological bond that individuals have with some social entity associated with their job (Klein et al. 2009). Definitions focused on behaviors consider commitment 'a force that binds an individual to a course of action of relevance to one or more aims' (Meyer and Herscovitch 2001). According to Meyer and Allen (1991), commitment is a psychological state of mind that a) characterizes the individual's relationship with a specific behavior, and b) has implications for the decision to continue or discontinue with the behavior, i.e. compels an individual to a course of action.

Commited use (CU) refers to behavior characterized by an individual's emotional attachment to, identification with, and involvement with PMM use (Meyer and Allen 1991). This concept of psychological attachment is based on Kelman’s (1958) theory of social influence. Individuals hereby experience a psychological bond with a behavior characterized by feeling strong emotions, warmth, belongingness, fondness, inner peace, and pleasure. The psychological state of mind is characterized by a strong personal desire to follow a course of action because they ‘want to’ do it (Meyer and Herscovitch 2001). Key affective tendencies is what make people like what they do and continue to do it even when it is evident that a financial payoff is less likely (Salancik 1977). The basis for this type of commitment behavior is formed by self-determined motivations, that are void of external controls and influences (e.g. financial gains) that are visible in autonomous tendencies to engage in goal-directed behaviors because they are perceived to be important in and of themselves (Deci et al. 2001). Behavior based on self-determination motivation results in higher performance and perseverence levels, because people generally invest greater effort when they are intrinsically motivated (Deci et al. 2001).

In such a context, committed use occurs when a user agrees internally to the usage behavior, is enthusiastic about it, and is likely to exercise initiative and demonstrate unusual effort and persistence in order to carry out the necessary actions successfully (Falbe and Yukl 1992). Based on the above discussion, and in line with the suggestion by Meyer and Herscovitchs (2001), we propose that any variable that contributes to the possibility that an individual will a) become involved in a usage behavior, b) recognize the behavior's personal value, and c) identify himself or herself with the behavior, will eventually contribute to the development of committed usage. Based on our conceptualization of CU, it makes sense that a number of favorable theoretical concepts that we encounter in psychology and sociology that are relevant to the MIS domain might be theoretically related to committed use (e.g. Jafri 2010) finds that commitment is positively related to innovative behavior). Furthermore, from a results perspective, many desirable outcomes, such as higher user efficiency, productivity, and satisfaction, might also have committed motivation as an important determinant.

When operationalizing committed use, we do not specifically differentiate between cognitive and affective commitment, since our goal in this specific research is the prediction of committed use and not uncovering its different dimensions and the underlying interdependent mechanisms. While highly relevant, this issue would surely require a separate dedicated research project. However, the discussion above should provide readers with a richer understanding of usage and commitment and enable them to recognize the future research possibilities that building on and extend our conceptualization.

Human Needs and Costs : Benefits

Over the past few decades, various categories of motivational theories have been developed to understand and predict human behavior. Among these, content theories (Alderfer 1972), such as needs theories – for example, Murray's (1938) theory of psychogenic needs – have become widely accepted in research studies, because they are considered the best way of understanding an individual's motivation to act in a particular way (Arnolds and Boshoff 2000). According to needs theories, individuals are motivated to use a particular methodology by their individual desire to satisfy certain needs. Ryan and Deci (2000) indicate that 'a basic need, whether it be a physiological need or a psychological need, is an energizing state that, if satisfied, conduces toward health and well-being but, if not satisfied, contributes to pathology.
and ill-being.’ This implies that if a PMM fails to satisfy an individual’s basic needs, this might result in serious dissatisfaction, which might be visible in the individual’s rejection of a specific methodology.

Similar to needs theories, expectancy theories also propose that individuals have different sets of goals that determine their actions. While needs theories emphasize deep-rooted basic human needs as motivators of behavior, expectancy theories suggest that a behavior’s outcome motivates individual behavior; that is, the belief that performing a specific behavior will result in a desirable reward or outcome that will fulfill individuals’ superficial goals or wants (Vroom 1964). Based on this view, individuals are expected to use a methodology if they can a) realize certain benefits and/or b) avoid costs. Regarding the former, a behavior’s expected favorable outcome or usefulness has emerged as a core construct in the MIS field. This development has been largely driven by the use of the TPB (Ajzen 1991), TAM (Davis 1989) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al. 2003), which examine an individual’s beliefs about a behavior. A plethora of empirical research in various fields has confirmed that a behavior’s favorable outcome or usefulness is the most important aspect in predicting it. Hardgrave et al. (2003) state that ‘usefulness generally has a beta (path coefficient) of around 0.60 in TAM studies.’ In the context of methodology adoption, Riemenschneider et al. (2002) apply five theoretical models and conclude that ‘if a methodology is not regarded as useful by developers, its prospects of successful deployment may be seriously undermined.’ Based on their research, Hardgrave and Johnson (2003) conclude that ‘software developers do not view their personal benefits separately from organizational benefits’ and that a methodology’s personal usefulness (PU) might therefore not affect their decision to use it. They arrive at this conclusion because they could not psychometrically separate their PU construct from their organizational usefulness (OU) construct. We suggest differentiating between OU and PU on other grounds, and seek to provide a solution with our conceptual model.

While potential benefits related to the usage of a methodology generally motivate individuals to use it, costs can have the reverse effect. According to Zeithaml (1988), costs can be defined as what is given up or sacrificed to adopt a methodology. Research in economics, home economics, and marketing supports the proposition that costs – time, effort, search, mental, etc. – are salient to consumers and have a negative effect on their adoption decision (for an overview, see Zeithaml (1988)). Transaction cost theory’s (TCT) (Coase 1937; Williamson 1981) behavioral approach, based on the work of Herbert Simon (1955, 1957, 1959) in the 1950s, has specifically attracted considerable attention from researchers when analyzing decision-making in situations of uncertainty. This behavioral approach holds that people possess limited cognitive ability and therefore can only exercise ‘bounded rationality’ when making decisions in complex, uncertain situations (Cyert and March 1992). Perceived costs have also been discussed as possible general antecedents of behavioral intents (e.g. Menon and Varadarajan 1992), and have received some empirical support. For example, Feng-Cheng Tung et al. (2009) found that perceived financial costs had a negative effect on behavioral intention to use a specific customer relationship management system. In their study, Burnham et al. (2003) found that switching costs significantly influence consumers’ intentions to remain with their current service provider, which better explains variance than satisfaction does. Considering the significant impact that a methodology’s outcome expectations have on individuals’ motivations, it is crucial to understand a) which type of outcomes, b) under which circumstances, and c) with which effects contribute to predicting employees’ committed methodology usage.

**Conceptual Framework**

Based on our discussion above, we hypothesize that regarding a) benefits and costs influence an employee’s committed PMM usage motivations, and b) individual employee needs affect the explanatory power of the benefits’ effect; costs therefore act as moderators (see Figure 1). In our research, we specifically focus on moderating effects because, besides the examination of direct effects, scholars in MIS increasingly seek to understand complex relationships (Henseler and Fassott 2010). While the literature emphasizes the need to consider moderation effects (Chin et al. 2003), its neglect of this has led to a lack of relevance, because ‘relationships that hold true independently of context factors are often trivial’ (Henseler and Fassott 2010). Furthermore, as McClelland and Judd (1993) point out, what makes moderation effects so interesting is that while experimentalists often detect such interaction effects, nonexperimentalists (e.g. quantitative-survey-oriented researchers) find it extremely difficult to find such effects (e.g. Jaccard et al. 1990; Morris et al. 1986; Zedeck 1971). For example, disappointed after a number of unsuccessful attempts to find moderator variables, Zedeck (1971) concluded that ‘moderators are as elusive as suppressor variables.’ Evans (1985) goes further, concluding that because moderator
effects are so difficult to detect, one should seriously consider even those that explain as little as 1% of the total variance. Given the importance of moderator variables, it is unsurprising that Frazier et al. (2004) state that the identification of such variables reflects the maturity and sophistication of a field of inquiry and is at the heart of social science theory.

**Benefits:** A behavior’s expected favorable outcome or usefulness has emerged as a core construct in the MIS field. Past research has primarily focused on the task-related *utilitarian outcome* (Andersen and Vaagaasar 2009), which seeks to provide the user with instrumental value, such as increasing task performance, encouraging efficiency, and increasing productivity (van der Heijden 2004). However, research in the consumer behavior field suggests that there are other sources of usefulness. These sources are not only related to one’s individual goals (*hedonic outcome*) (Babin et al. 1994), which are more subjective and personal than utilitarian outcomes (van der Heijden 2004), but also to materialistic outcomes (Belk 1985), which focus on the acquisition of worldly, tangible, and intangible possessions.

Plausible experiences produced by sensations generated in multiple sensory channels when an individual uses a specific methodology generate a hedonic outcome (van der Heijden 2004). A hedonic outcome may therefore be defined as the extent to which the activity of using a methodology is perceived as enjoyable in its own right, besides any performance consequences that may be anticipated (Davis et al. 1992). On the other hand, a materialistic outcome is based on an orientation that views material goods and money as important for personal happiness and social progress. According to Belk (1985), ‘at the highest levels of materialism, such possessions assume a central place in a person’s life and are believed to provide the greatest sources of satisfaction and dissatisfaction.’ In the context of our study, materialism not only refers to monetary advantages (*extrinsic materialistic outcomes*), but also involves intrinsic rewards (*intrinsic materialistic outcomes*) such as respect and appreciation from and acceptance by peers and seniors (Arnolds and Boshoff 2000). This differentiation of the materialistic outcome dimension is necessary, because although it is generally well accepted in psychological journals that monetary rewards suppress intrinsic motivation, studies show that praise or respect act as enforcers (Cameron and Pierce 1994; Eisenberger and Cameron 1996). We will now elaborate on this.

Utilitarian, hedonic, and intrinsic materialistic outcomes as a result of PMM usage provide employees with an internal stimulation or motivation to use a PMM. Such benefits help an individual to achieve higher levels of self-actualization and self-worth (Maslow 1954) by giving them a sense of personal achievement, autonomy, exploration, enjoyment, competency, an opportunity to develop and grow in the workplace and build meaningful and satisfying relationships with colleagues (i.e. affiliation) (Vansteenkiste et al. 2007). Motivations and behaviors driven by such outcomes are initiated freely, self-generated (Reeve 2002), and represent thoroughly endorsed preferences and values (Wichmann 2011). On the other hand, extrinsic materialistic outcomes represent motivations and behaviors that are controlled and driven externally, often due to a strong sense of anticipated rewards or punishments (Vansteenkiste et al. 2005). Extrinsic rewards seriously diminish autonomy and intrinsic motivation (Deci
et al. 1999). Ryan and Deci (2006) also argue that rewards have the power to control behavior that reduces internal motivation and – more generally – reduces the motivation to not act authentically in line with one’s values and interests. This form of motivation is based on a cost-based dimension according to which people resort to a course of action or behavior because they perceive that the costs of not doing so would be too high for them. Consequently, external rewards lead to PMM usage motivations and behaviors that are apathetical, undertaken with minimum or average effort (rather than enthusiastically) (Ryan and Deci 2006), and without initiative (Falbe and Yukl 1992). People’s primary interest is to obtain rewards or avoid punishment, they therefore become a pawn to such regulations (Ryan and Deci 2000), and their usage motivation reflects actions that enable them to achieve these goals without any intrinsic involvement.

Studies have also repeatedly shown that focusing on extrinsic outcomes, such as money, leads to lower intrinsic motivation (for an overview, see Deci et al. 1999). However, recent debate – in particular by Deci and associates (2001, 2001; 2000) – on the effects of materialistic rewards proposes that quality-dependent rewards that increase a sense of competence or self-determination generate intrinsic motivation, whereas rewards for merely taking part in or completing an activity would have the opposite effect, i.e. reduce intrinsic interest by lessening self-determination. Findings from a behaviorist meta-analysis of a large number of studies by Cameron and Pierce (1994), as well as Eisenberger and Cameron (1996) also support this view. From their classification of many investigations, these authors find that tangible rewards had a small positive effect on attitude if the reward was quality dependent. For example, verbal rewards (e.g. praise, respect) tended to have a positively reinforcing effect on intrinsic motivation. However, it must be noted that, to have positive effects on intrinsic motivation praise, respect, and acknowledgement should be conveyed sincerely (Henderlong and Lepper 2002). On the other hand, if praise is used as and perceived to be a medium of control, then it exhibits characteristics of extrinsic materialism and would therefore have a negative effective on intrinsic PMM usage motivation.

Our conceptualization of intrinsic materialistic outcomes is subject to the former view, in line with predictions from cognitive evaluation theory (Ryan and Deci 2000), according to which, as forms of feedback, praise and acknowledgement encourage employees’ personal perception of competence and autonomy. In summary, our proposed study of a methodology’s usefulness according to four distinct dimensions captures outcome expectations better. Furthermore, this might be a suitable approach to resolve the psychometric problem that Hardgrave and Johnson (2003) faced. As a result, we propose the following:

**H1:** Utilitarian outcome (UO) is positively associated with committed usage (CU).

**H2:** Extrinsic materialistic outcome (EMO) will be negatively associated with CU.

**H3:** Intrinsic materialistic outcome (IMO) will be positively associated with CU.

**H4:** Hedonic outcome (HO) will be positively associated with CU.

**Costs:** In microeconomics, strategic management, and the marketing literature, changing past behavior to adopt new innovations such as ideas and practices (Rogers 2003) leads to switching costs. Switching costs are considered one-off costs that users associate with the process of switching to a methodology and might even be incurred long after the change or switch has been made (Burnham et al. 2003). When making complex behavioral change decisions, individuals experience financial, social, and psychological impediments (Fornell 1992). These factors are seldom expressed, but become evident when users are faced with a reason to consider switching methodologies (Burnham et al. 2003). When switching costs are high, individuals might show a heightened sense of resistance. Given the assumption of bounded rationality, human beings are very sensitive to the relative advantages and disadvantages of any change from the status quo. Therefore, a new, improved methodology, no matter how great its merits, should be significantly better than that which the user uses before he or she switches. The underlying psychological, emotional, and social costs of switching are often overlooked or underestimated by organizations (who want to ‘sell’ their developed and implemented methodologies to the users) and users (employees who are looking for methodologies that fulfill their requirements).

In the context of methodology usage, the switching costs might specifically affect a person’s committed methodology usage motivation (Burnham et al. 2003): Learning costs are the time and effort required to acquire new skills or know-how in order to use a methodology effectively. Bandura (1986) suggests that individuals evaluate their experiences and thoughts, and determine what they will do with their knowledge and skills, i.e. their competence. Judgment of one’s personal competence, reflected in one’s
self-belief, therefore not only determines what a person decides to do but also ‘how much effort people will expend on an activity, how long they will persevere when confronting obstacles, and how resilient they will prove in the face of adverse situations’ (Pajares 1997). Based on Bandura’s (1986) research, self-efficacy – a core construct in his social cognitive theory – refers to the belief that one has the capability to perform the necessary actions in order to be able to use a methodology. Individuals with low self-efficacy believe that using a methodology would a) require considerable physical and mental effort and b) be difficult to learn (Davis 1989). Consequently, individuals who believe that they would need to invest substantial time and effort in learning a methodology might not be intrinsically motivated to use it. Therefore, we propose that:

**H5: Learning costs (LC) will be negatively associated with CU.**

In order to fully understand the effect of costs, in addition to switching costs, we also examine sunk costs (i.e. past costs that have already been incurred and cannot be recovered). In traditional microeconomic theory and normative economic decision theory, only future costs are relevant to one’s decision. Sunk costs should be ignored (Arkes and Ayton 1999; Brealey and Myers 1996), because they cannot be affected by the decision to accept or reject the proposition at hand (Brealey and Myers 1996). However, evidence from behavioral economics suggests that this theory fails to predict real-world behavior (Arkes and Blumer 1985). Sunk costs greatly affect actors’ motivations. Numerous empirical studies (for an overview, see (Brockner et al. 1986; Singer and Singer 1986; Singer 1990; Weber and Zuchel 2005) have shown that sunk costs cause a decision-making bias known as ‘sunk-cost fallacy,’ because humans are inherently loss-averse (i.e. have strong misgivings about ‘wasting’ resources) and thus generally act irrationally when making economic decisions. The latter reflects individuals’ tendency to invest more future resources in a situation in which a prior investment has been made rather than in one in which no prior investment has been made (Strough et al. 2008).

In the psychology literature, this bias to commit resources to justify previous actions, whether or not the rationale for the initial commitments is still valid, is also known as the ‘escalation of commitment’ effect (Garland 1990; Heath 1995). Research (e.g. Bazerman et al. 1982; Brockner and Rubin 1985; Staw and Ross 1987; Staw 1976, 1981) has shown that individuals who made a decision in the past are more likely to make biased decisions in future to justify their earlier decision. Based on this research stream, sunk costs might motivate individuals to commit to PMM usage, because they are convinced of the action as a result of certain biases. The bias makes people feel internally motivated to do things the way they are used to doing them because, over time, through repeated, intentional or unintentional exposure to certain activities, they have developed an intrinsic bond with these activities. In 1968, in what is perhaps the classic sunk cost experiment, Knox and Inkster (1968) revealed a specific feature characterizing the sunk cost heuristic – ‘overly optimistic probability bias’ – whereby individuals develop strong intrinsic beliefs that investing further resources in their current methodology or way of doing things (e.g. extra training, certifications, etc.) will eventually lead to higher utilitarian or hedonic value. Related work in social psychology also found that people often experience cognitive dissonance (Festinger 1957) when they receive information that is inconsistent with something they believe to be true. Consequently, we propose that:

**H6: Sunk costs (SC) will be positively associated with CU.**

**Personal Needs:** In the following, we focus on examining the interactions between perceived costs and selected high-level human needs, because: i) while there has been considerable progress regarding understanding the benefits dimension, there is little research on the costs perspective, ii) other secondary needs can be derived from these high-level primary needs (Sun 2009) (e.g. the need for contrariness and the need for acquisition may be derived from the need for achievement (nAch) (Reiss 2004), iii) in order to maintain parsimonicity and interpretability, since the introduction of a large number of highly complex moderations effects increases multicollinearity, type I errors, and, consequently, distorts results. Furthermore, as the list of needs studied increases, the utility of the approach diminishes. A long, unwieldy list of needs is precisely the reason why earlier needs-related theories fell out of favor (Ryan and Deci 2000).

*Need for achievement (nAch)* refers to an individual’s desire to do things better, accomplish difficult tasks, overcome obstacles, become an expert, achieve high performance, or his or her need for significant task-related accomplishment (Murray 1938). Such individuals are focused on internal motivation and
personal achievement. People high in nAch aspire to accomplish difficult tasks in which success depends primarily on their efforts. High learning costs reflect a complex, hard task, and the more difficult to learn a methodology is perceived to be, the more gratification or satisfaction people high in nAch are expected to feel, because being successful at using methodologies that others find difficult to master symbolizes and communicates personal competence. Studies have also shown that individuals high in the need to achieve are more committed to difficult goals (Hollenback et al. 1989). Individuals high in nAch are expected to expend more effort and persevere longer when confronted with obstacles, and show resilience in the face of complex methodology usage (Pajares 1997). On the other hand, individuals with a low need to achieve avoid difficult tasks characterized by a high level of learning requirements, because their fear of failure greatly outweighs their expectation of success. We therefore propose that:

**H7**: The negative influence of learning costs (LC) on committed usage will be moderated by the need to achieve (nAch), such that the effect will be weaker for individuals with high nAch.

Need for cognition (nCog) is the desire for knowledge and reasoning (Murray 1938; Reiss 2004), as well as the need to explore and discover. It describes the extent to which people engage in and enjoy cognitive activities high in effort (Cacioppo and Petty 1982). Individuals high in nCog tend to naturally seek, acquire, and reflect on information by experimenting and exploring in order to make sense of the problem at hand (Cacioppo et al. 1996). Empirical studies have shown that people with a high need for cognition are generally more intelligent, conscientious, open-minded (e.g. Cacioppo and Petty 1982; Sadowiski and Cogburn 1997), and therefore actively seek challenging tasks. In their study, Cacioppo and Petty (1982) asked subjects to perform either a complex or a simple task. They also found that individuals high in the need for cognition scale preferred the complex task over the simple one. Park et al. (2008) came to similar conclusions and found that individuals high in the need for cognition were more satisfied with their jobs when they perceived their tasks to be complex. People high in nCog are therefore more likely to be intrinsically motivated to use methodologies that involve high learning costs, since they find this task (i.e. learning) intellectually stimulating. As a result, we propose that:

**H8**: The negative influence of learning costs (LC) on committed usage will be moderated by the need for cognition (nCog), such that the effect will be weaker for individuals with high nCog.

In his study, Cohen (1957) shows that individuals high in nCog have a relative proclivity to organize, abstract, and evaluate information, in contrast to those low in nCog. They have a tendency to avoid ambiguity and systemically and analytically seek to achieve an integrated and meaningful world. Besides generating more thoughts, individuals high in nCog are more likely to engage in metacognition (Petty et al. 2007) (i.e. thinking about thoughts) in order to evaluate their thoughts for validity (in a process termed self-validation (Petty et al. 2002) and consequently forming judgments based on highly valid thoughts. People high in nCog are found to form their attitudes by playing close attention to relevant arguments instead of peripheral cues based on their personal biases (Perlini and Hansen 2001); i.e. because they think carefully and are concerned about validity, they often anticipate potential judgmental biases and then adjust accordingly (for a review, see Wegener and Petty (1997). For example, in their study, DeSteno et al. (2004) found that when an irrelevant source of emotion was made salient, people high in nCog adjusted their judgments in a direction opposite to the emotion’s perceived biasing impact. On the other hand, people low in nCog rely on heuristics (i.e. mental shortcuts) to reduce information overload and to yield quick decisions, an approach that leads to systematic biases (Kahneman et al. 1982). The obsession of people high in nCog with careful, objective information evaluation makes them highly rational in their evaluations (Epstein et al. 1996) and therefore the decision-making biases which people experience in the sunk costs framework are severely weakened. Consequently, we propose that:

**H9**: The positive influence of sunk costs (SC) on committed usage will be moderated by need for cognition (nCog), such that the effect will be weaker for individuals with high nCog.

**Research Methodology**

**Data collection**: The entire development process leading to the final survey instrument was conducted according to Straub’s (1989) recommendations. An initial pool of reflective measures was selected, based on their empirical validation in prior research. Instrument refinement was conducted on the basis of interviews with two subject matter experts, Q-sorting exercise in two rounds (Moore and
Benbasat 1991) with seven and eight participants respectively, and a web-based pre-test with 65 participants. Finally, all items were embedded in survey questions using a seven-point Likert scale anchored at strongly disagree (1) and strongly agree (7). Throughout the entire instrument development process, three researchers from different disciplines, nationalities, and institutions were always involved; they discussed every issue and formulated improvements. This triangulation of researchers and methods provides stronger substantiation of a valid and reliable instrument. Data was collected via an online survey for a period of four months. Participants for the study were collected through two approaches (personalized and anonymous): 1) They were randomly chosen utilizing databases of professionals (e.g. XING, Viadeo, CompetenceSite) and a keyword search (e.g. ‘project manager’), and 2) international project management organizations (e.g. PMI, IPMA) sent out open invitations to all their members. In the former case, personalized URLs of the online survey were sent to the potential participants. In the latter, anonymous case, the organizations sent a single URL to all their members via a newsletter. This approach allowed us to elicit a wide representation by country, industry, and company size. We then sent a personalized URL of the online survey to every individual identified.

Since all the research questions were mandatory, we did not have to exclude cases due to missing or incomplete responses. However, 30 cases were excluded, because during data cleaning we noticed that the participants had responded similarly to all the questions (e.g. all the questions were answered with the same Likert scale value). This can happen participants do not take a survey seriously and are only interested in acquiring the material incentive (i.e. the iPod). It is therefore important to remove such cases to avoid contaminating the results. Personalized survey URLs were administered to a total of 7,982 individuals, of which 1,249 completed the survey, representing a 16% response rate. The response rate is comparable to that of prior studies on sensitive IS issues and is also consistent with a typical response rate (10 to 20%) for project-management-oriented surveys (Iacovou et al. 2009). 1,408 individuals responded anonymously, bringing the total number of participants to 2,651. The respondents were asked to keep in mind their most recently completed project in which they used PMM when responding to the questions. We addressed the issue of nonresponse bias before the study by following the recommendations by Rogelberg and Stanton (2007): a) the survey’s physical design is pleasing to the eye and easy to read; b) the potential participants were provided with general information on the motivation for the study; and c) we provided a personal incentive i.e. an iPod. After the survey, we contacted all those who had been invited but had not participated in the personalized survey via email to inquire about their reason for nonparticipation. Overall, we received feedback from 613 nonparticipants. The most cited reasons for nonparticipation were: 1) the individual was the wrong contact person for the survey (45.68%); 2) a lack of time (39.8%); 3) no interest in topic (3.42%); 4) no interest in participation (2.28%); 5) the questionnaire was too long (2.21%); and 6) data confidentiality concerns (1.14%). Furthermore, we compared the early personalized survey respondents with the late respondents. We defined early respondents (51.6%) as those who completed the survey within the first 30 days of receiving the initial invitation email. All those who completed the survey after the first 30 days were categorized as late respondents (48.4%). T-tests on the early and late responders showed no significant differences concerning any of the research variables.

Data analysis and results: The research model was tested and the scales’ psychometric properties were assessed with the software SmartPLS (version 2.0 M3), which is based on partial least squares (PLS). We used PLS because, compared to covariance-based approaches, it is advantageous when the research model is relatively complex with a large numbers of indicators and multiple moderation effects, and the data is not normally distributed (Chin et al. 1996, 2003; Fornell and Bookstein 1982). It has also been argued that, compared to PLS path modeling, our chosen approach to analyze moderation effects is very difficult to implement in a covariance-based SEM context (Henseler and Chin 2010). The statistical significance of the parameter estimates was assessed using a bootstrapping procedure with 1,000 resamples. We followed Chin et al.’s (2003) guidelines and recommendations, as well as those of Carte and Russell’s (2003) to test and analyze the interaction effects with PLS. The process includes three steps (Chin et al. 2003): 1) standardizing the indicators for the main constructs (X) and moderating (Z) the constructs, 2) creating all pair-wise product indicators (i.e. each indicator from the main construct is multiplied with each indicator from the moderating construct), and 3) using the new product indicators to reflect the interaction construct (XZ). In a recent review of moderating effects in PLS models, Henseler and Fassott (2010) also recommended the product indicator approach for large sample sizes. The statistical significance of the parameter estimates was assessed using a bootstrapping procedure with
Validation of the measurement model: We used reflective indicators for all the constructs. The measurement model’s adequacy was assessed by the reliability of individual items, internal consistency between items, and the model’s convergent and discriminant validity (Straub et al. 2004) (see additional information document). Cronbach’s alpha (CAP) (1951) and Dillon-Goldstein’s rho (D.G.) were used to measure the internal consistency reliability. However, according to Chin (1998) Dillon-Goldstein’s rho is a much better indicator than Cronbach’s alpha, because D.G. is derived directly from the model (i.e. loading) instead of the correlations observed between the manifest variables in the dataset. In this study, each construct’s CAP and D.G. is greater than the recommended values of 0.50 (Nunnally and Bernstein 1994), and 0.70 (Werts et al. 1974), which indicates that all the model constructs are very reliable. We also followed Chin’s (1998) suggestion and calculated composite reliability (CR) as an alternative to CAP. The CR values of all the constructs are higher than 0.80, thus above the recommended minimum of 0.70 (Nunnally and Bernstein 1994). Convergent validity is demonstrated as a) the AVE (average variance extracted) values of all the constructs were higher than the suggested threshold value of 0.50 (Fornell and Larcker 1981) and b) all the item loadings were higher than the 0.70 guideline and statistically significant at the 0.001 level (Hair et al. 2009). Evidence of discriminant validity could be found, because a) the square root of all the AVEs were larger than the interconstruct correlations and b) all the construct indicators loaded more strongly on their corresponding construct than on other constructs (Chin 1998), and the cross-loading differences were much higher than the suggested threshold of 0.1 (Gefen and Straub 2005). For a variable to be a moderator, it should have a low correlation with the predictor (independent) variable, because multicollinearity can lead researchers to falsely conclude that a moderation effect exists, when there is a nonlinear effect (Baron and Kenny 1986). In our study, the intercorrelations between SC and nCog, LC and nCog. and LC and nAch are only 0.21, -0.12, and -0.19 (average = 0.17). This suggests that this error and result contamination is unlikely.

We evaluated common method bias (CMB), using the exploratory method of Harman’s one-factor test. Results from this test showed that five factors are present, which explained a total of 78.19% variance. The most variance that one factor explained is only 31.48%, indicating that common method biases probably did not contaminate the results. Furthermore, we applied a confirmatory method to analyze CMB in SmartPLS, as explained by Liang et al. (2007). We added a common method factor to the PLS model. The indicators of all the constructs were associated reflectively with the method factor. Thereafter, each indicator variance that the principle construct and the method factor explained, was computed. The results (see additional information file) show that while the indicators’ average substantively explained variance is 0.89, the common method-based variance is only 0.003. The ratio of substantive variance to method variance is approximately 324:1. Owing to the above evidence and the method variance’s small magnitude, we maintain that common method bias is unlikely to be a significant concern for this study.

Structural model results: After the validation of the measurement model, the structural model was independently analyzed and the proposed relationships between the constructs were tested. Using a blindfolding approach, we measured the cross-validated communality and redundancy via a Stone and Geisser test. The $Q^2$ results of cross-validated communality and redundancy were greater than 0, suggesting that the model has good predictive validity. A post hoc power analysis with the software G*Power 2 (Faul et al. 2007) resulted in a value greater than 0.80, which implies that our model can detect small effect sizes (Chin 1998). Finally, we calculated our model’s goodness of fit (GoF), as proposed by Tenenhaus et al. (2004) and emphasized by Wetzels et al. (2009), who define GoF as the square root of the product of AVE and $R^2$. The application of this formula leads to a GoF of 0.62, which exceeds the cut-off value of 0.36 for large effect size of squared multiple correlations ($R^2$), as proposed by Cohen (1988), and allows us to conclude that our model performs well.

In assessing the PLS model, we examined the squared multiple correlations ($R^2$) for the endogenous latent variable. The structural paths were evaluated for their significance. Proposed relationships were considered supported if the corresponding path coefficients ($β$) had the proposed sign and were significant. Besides analyzing the statistical significance, we also examined the paths coefficients of the main effects for practical significance in order to include them in a path diagram, as suggested by Kerlinger and Pedhazur (1973) and repeatedly emphasized by other researchers (e.g. Chin 1998; Meehl
We did so because statistical significance becomes less meaningful in a large sample size (like ours). Therefore, as per Meehl’s (1990) recommendation, only path coefficients of the main effects with values of 0.10 or higher, and which are significant at the 0.05 level or higher, are considered relevant. To provide a deeper analysis, we calculated the effect size using the F-test, since this is the most common and widely accepted measure of effect size in tests of moderation (Aiken and West 1991). We used the difference between the squared multiple correlations to assess the overall effect size for the variables. Cohen (1988) classifies effect sizes of 0.02, 0.05, and 0.35 as small, medium, and large. However, in light of the past 30 years of research on moderation effects, researchers are increasingly questioning this classification and are calling for more realistic standards, because the detected effect sizes are usually very small (Baron and Kenny 1986; Chaplin 1991; Frazier et al. 2004). For example, Aguinis et al. (2005) have shown that the average effect size in tests of moderation is only 0.009. Consequently, Kenny (2011) proposes that a more realistic standard for moderation effect sizes might be 0.005, 0.01, and 0.025 for small, medium, and large. As a result, in our study we find that it is appropriate to consider Cohen’s (1988) effect size classification for main effects and Kenny’s (2011) suggestion for interpreting the effect size of moderation effects.

<table>
<thead>
<tr>
<th>LV</th>
<th>PLS (Stage I) Main effects</th>
<th>PLS (Stage II) Individual analysis of moderation effects</th>
<th>PLS (Stage III) Total variance explained</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1: SC*nCog</td>
<td>Model 2: SC*nCog</td>
<td>Model 3: SC*nCog</td>
</tr>
<tr>
<td>EMO</td>
<td>-.40*(.01)</td>
<td>-.05**</td>
<td>-.05**</td>
</tr>
<tr>
<td>HO</td>
<td>.11*(.01)</td>
<td>.08*</td>
<td>.11*</td>
</tr>
<tr>
<td>IMO</td>
<td>.77*(.03)</td>
<td>.15*</td>
<td>.15*</td>
</tr>
<tr>
<td>LC</td>
<td>-.11*(.02)</td>
<td>-.09*</td>
<td>-.05*</td>
</tr>
<tr>
<td>SC</td>
<td>.21*(.06)</td>
<td>.18*</td>
<td>.18*</td>
</tr>
<tr>
<td>UO</td>
<td>.32*(.10)</td>
<td>.27*</td>
<td>.27*</td>
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<td></td>
<td></td>
<td>.29*(.13)</td>
<td>-.05**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.08*(.02)</td>
<td>- .06*</td>
</tr>
<tr>
<td>SC*nCog</td>
<td></td>
<td>-.18*(.04)</td>
<td>.46</td>
</tr>
<tr>
<td>R² of CU</td>
<td>0.378</td>
<td>0.45</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Path coefficients with effect size (F) in parentheses; ***p < 0.05; **p < 0.01, *p < 0.001; Effect size (F) using the F-test (Cohen 1988) Results in the grey cells are used for evaluation and interpretation.

We applied a three-stage approach (Frazier et al. 2004) based on Chin et al.’s (2003), as well as Carte and Russell’s (2003) guidelines and recommendations, when estimating the model (see additional information document for a summary of the objective and each stage’s procedure). In the first stage, we entered the main effects. The results indicate that for the Stage I model, hypotheses H1 (β = .32, p < .001), H2 (β = -.10, p < .001), H3 (β = 0.17, p < .001), H4 (β = 0.11, p < .001), H5 (β = -0.11, p < .001), and H6 (β = 0.21, p < .001) meet the statistical and practical significance criteria, explaining 38% of the variance in the dependent variable CU. Of the six exogenous variables, utilitarian outcome benefits is found to have the strongest effect size with F² = .10, followed by sunk costs (F² = .06). In the second stage, we estimated the stand-alone models in the presence of the main effects for each moderation effect. The results show that, as hypothesized, need for achievement moderates (β = 0.13, p < .001, F² = .13) the relationship between learning costs and committed usage (H4), need for cognition moderates (β = 0.08, p < .001, F² = .02) the relationship between learning costs and committed usage (H5), and need for cognition also moderates (β = 0.18, p < .001, F² = .04) the relationship between sunk costs and committed usage (H6). In the third stage, we included all the moderation effects in addition to the main effects. Compared to Stage I, the overall R² increased by 8.2% from 37.8% to 46% and is attributed to the moderation effects. Figure 1 graphically illustrates the stage III PLS structural model results. This three-stage approach is more appropriate when the goal is to understand the impact of each moderation effect. This is because when estimating all effects in a single model, one that contains highly complex multiple two/three-way moderation effects, the path coefficients and the effect sizes are contaminated and uninterpretable, even with the slightest degree of multicollinearity caused, which is specifically due to the underlying product.
indicator approach (Carte and Russell 2003). However, when the goal is the evaluation of the overall performance of the model via R², the inclusion of all the main and moderating effects, as in the stage III, does not distort interpretation. To facilitate a better understanding of the moderation effects through appropriate visualization of the results, we followed Cohen et al.’s (2002) recommendation and calculated simple regression equations for CU, LC, and SC at low (-1 SD) and high (1 SD) levels of the moderator variables nAch and nCog. The obtained regression lines for high and low values of the moderator variable are then plotted to determine whether there is an effect. Figures 3a, 3b, and 3c depict the moderation effects.

To examine heterogeneity in data, we conducted an ex post permutation-based multigroup comparison in the PLS Path Modeling framework as suggested by Chin and Dibbern (2008). This approach is better suited to the PLS technique since, contrary to bootstrapping (t-test), permutation is nonparametric, i.e. does not require the two samples to be normally distributed. The test was conducted in respect of the variable Gender, which comprised the categories male and female. The results of the permutation test (see additional information file) show that, regarding Hypothesis 5 (LC → CU), there is a significant difference between the path coefficients for males and females (difference = -0.10, t-value = 2.39, p < 0.01). This implies that PMM learning costs have a stronger negative effect on committed use in women (β = -0.19, p < .001) than in men (β = -0.09, p < .001).

**Conclusion**

**Discussion:** Our work seeks to further the research on individual acceptance and use of PMMs by unifying the theoretical perspectives on individual needs and outcome expectations within a single model. Based on validated theories, we develop a conceptual model that holds that individuals’ personal needs determine which methodology usage outcomes have a greater effect on their committed use of PMMs. In terms of our contribution and the implication of our findings, our use of the newly developed committed
usage construct is, in the first place, a departure from the traditional operationalization of the usage construct. It reveals more complex and as yet unknown interaction effects on human behavior. Since researchers have generally relied on fairly simple and straightforward ways to operationalize IS artifact use and linked it to a number of desirable outcomes, such as user satisfaction and productivity, the construct and the relationships remain a black box. We still know very little about how people use IS artifacts and whether their usage style differences might be a better predictor of the numerous proposed positive/negative effects of IS use. In this sense, understanding committed employee behavior becomes critical, because if people do not use methodologies in a dedicated, committed manner, related benefits might not be realized. A lack of understanding of the nature of use might unjustifiably lead to IT becoming the “scapegoat” for organizational failures (e.g. lack of IT system effectiveness is attributed to the bad system rather than the uncommitted system usage behavior of one or more employees), calling the MIS domain’s contribution into question.

Adopting a user-centric perspective, our findings suggest that while the benefits (costs) of using a methodology generally have a positive motivational (negative discouraging) effect on an employee’s committed usage behavior, there are exceptions. Specifically, while intrinsic benefits, such as personal achievement, respect, acknowledgement, and enjoyment, generate usage commitment, purely extrinsic benefits, such as money and perks, have the opposite effect. This finding has fundamental implications for management, because organizations seeking to influence employee behavior usually resort to simple forms of external motivators (Eisenhardt 1989) such as those based on the homo economicus (or economic human) concept (Pareto 1906) found in economic theories. According to this concept, people display economic rationalism and are solely driven by the desire to maximize materialist objectives. However, usage behavior driven purely by a calculative cost-benefit analysis is a fairly superficial form of attachment to worldly things and not true commitment (Ko et al. 1997). It makes people do what they do because they must do it and not because they desire to do so. A person’s primary interest is to obtain rewards or avoid punishment, and his or her usage behavior reflects actions that enable him or her to achieve these goals without any intrinsic involvement. Furthermore, purely providing monetary benefits and incentives in the hope that employees will use a methodology in a committed way might be perceived as bribery, i.e. the management purposefully deceives the users about the methodology’s usefulness and blinds their judgment by offering a financial incentive. Specifically individuals with a sense of moral or social responsibility might react against this notion of management buying their employees’ trust, loyalty, and dedication and show their disapproval by resisting the methodology’s usage. Employees driven by external rewards might therefore simply use the methodology to gain rewards, but might be apathetic rather than enthusiastic about usage, making only a minimal or average effort, and might not show any initiative (Falbe and Yukl 1992). Management should therefore restrain from using extrinsic rewards as the sole motivator, focusing instead on building an organizational culture and structures that could provide the employees with intrinsic satisfaction.

In respect of costs, we find that sunk costs have a commitment-increasing impact brought about by the inherently irrational decision-making character of realistic human beings characterized by personal biases and emotional investments. This implies that management should consider investing heavily in educating and training employees in a PMM’s use, especially prior to its implementation. Once employees have reflected on the time and effort required to learn and master a methodology, they might feel more committed to using it. While the importance of employee training and education is well known, the sunk cost mechanism provides a novel perspective and opens up new avenues for research. Furthermore, the motivational effect of sunk costs is a double-edged sword and should not be misused, because the bias and distortion of reality caused by the underlying psychological processes might severely hinder change in the future, i.e. employees might become ‘overcommitted’ to the methodology and refuse to switch to another in future.

The second contribution of our study is the development of a deeper and relevant understanding of the role played by employees’ deep-rooted psychological needs in order to determine the effect of methodology usage benefits and costs on their committed usage behavior. Past research has repeatedly discovered and discussed the harmful nature of learning costs as reflected in the object’s, behavior’s or in the action’s complexity in various contexts and domains (e.g. information complexity) (Plumlee 2003), in system complexity (Kim et al. 2009; Thompson et al. 1991), website complexity (Liqiong Deng and Poole 2010; Nadkarni and Gupta 2007), innovation complexity (Tornatzky and Klein 1982), in job or task complexity (Johnson and Bruce 1998; Oldham and Gordon 1999; Timmermans 1993), etc. Our study
provides a different perspective. Our findings suggest that while employees generally do not commit to using complex methodologies that are hard to learn, this is not true of everyone. Employees driven by a strong need to achieve and need for cognition are found to be positively motivated by methodology’s inherent complex nature. Complexity and increased learning effort fulfill the preference for success under conditions of competition of individuals high in nAch. Methodologies that are hard to learn allow high achievers to satisfy a need for self-actualization through accomplishments that others in their social environment might find difficult to achieve, because easily attained success is not a genuine achievement. Based on a similar line of thought, individuals with a high need for cognition find complex methodologies intellectually challenging. Difficult methodologies provide such employees with a platform to engage in demanding cognitive activities, to evaluate ideas, and analyze problems and their solutions. They force individuals to ‘think out of the box,’ to be open to experiences associated with unconventional thoughts, problem-solving, and reflection as an end in themselves (Patrick 2010) – activities on which people high in nCog thrive and for which they search in their work. These results might prove instrumental for management when trying to ensure that employees use PMMs in the intended way, particularly in the context of human resource issues. It is possible that employees high in nAch and nCog will be more committed to use PMMs when assigned to large projects, since such projects involve a multitude of stakeholders, goals, deadlines, and deliverables and are generally governed by comprehensive, complex methodologies. On the other hand, it would be advisable to allocate employees low in nAch and nCog to smaller projects that are usually managed with simple, less complex methodologies. Furthermore, the revelation that compared to people low in nCog, employees high in nCog are less sensitive to the sunk cost effect implies that organizational support in the form of training, coaching, etc. might not be very effective in generating usage commitment in such employees.

**Limitations and Future Research:** Generally speaking, our findings might not only have major implications for the MIS research community, but also for related fields. Human needs have always played a key role in organizational development, and the proposed study is an attempt to 'humanize' organizational methodologies (Alderfer 1977); that is, to enable organizations to be more responsive to human concerns when developing and implementing new methodologies. Each of the proposed constructs reveals a different aspect of human behavior and personality, and each can serve as a point of influence when organizations attempts to steer their employees in the desired direction (Ajzen 1991). Our findings could help organizations manage the selection, development, introduction, adoption, and use of new methodologies. The holistic and novel approach we apply to understand how employees use a methodology is important, because people are not always conscious, rational, and passive recipients of innovations. They might be unconsciously or automatically driven to seek new and effective methodologies, ‘experiment with them, evaluate them, find (or fail to find) meaning in them, develop feelings (positive or negative) about them, challenge them, worry about them, complain about them, “work around” them, gain experience with them, modify them to fit particular tasks, and try to improve or redesign them – often through dialogue with other users (Greenhalgh et al. 2004). Only when we understand and acknowledge that such a diverse list of actions and feelings are typical of human behavior, do we view methodology acceptance and usage as a complex process and realize that research needs a fresh perspective if the qualitative nature of usage and its antecedents are to be understood.

As closing thought: theoretically, it might seem clear that organizations will benefit most from employees’ committed usage behavior. However, from a practical perspective, committed behavior is not easy to achieve. The resources that one might need to invest to get employees to commit might be one of the biggest hindrances; even when this is achieved, commitment is not a guaranteed outcome, because people cannot always be motivated at an emotional level with artificial and superficial value propositions such as money, status, etc. One needs to genuinely inspire, excite, stimulate, energize, invigorate, and connect with employees’ deepest desires. Given that the possibility of all or most employees displaying committed usage behavior is low, we have to take another look at extrinsic compliant behavior. Is it sufficient? We hold that committed usage is not always required, but that, in certain contexts, compliant usage will suffice and can be considered a **practically** good outcome. For example, one such situation is the nature of the task at hand (Falbe and Yukl 1992). Committed usage will be a more successful outcome than behavioral compliance regarding a **complex task** that requires extra effort, initiative, and persistence to be performed effectively (e.g. using a highly complex PMM low in user-friendliness). Under these conditions, compliance is less successful than commitment, but is still preferable to resistance. For simple and
routine tasks, compliance may be all that is needed to accomplish a goal. In this situation, compliance may be regarded as a practically successful outcome.

Despite the encouraging results of our study, we point out a particular limitation concerning the use of perception-based measures rather than objective ones. Personal biases can influence participants' perceptions and can, therefore, sometimes contaminate the results. For example, in case of the variable “need for achievement,” individuals might be inclined to answer positively due to social desirability issues. While objective measures for such sociological/psychological constructs are hard to come by, subjective responses to questions should be examined with caution. However, our large sample size should control this limitation to some degree.

References


