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# Intention to Champion Continuous Monitoring: A Study of Intrapreneurial Innovation in Organizations

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**ABSTRACT:** Innovations in organizations often arise through the efforts of intrapreneurs—entrepreneurial-oriented employees who typically work outside of their day-to-day job responsibilities. Currently, little research has addressed this important source of innovation. Using Innovation Value Chain theory, we theorize that individual, organizational, and innovation-specific factors influence intrapreneurial innovation, operationalized as managerial accountants' intentions to champion the adoption of an IT innovation within their organizations. Additionally, we consider how information system complexity may influence these factors. We test our model using a structural equation model (SEM) with 320 management accountants. Perceptions of organizational orientation toward innovation and of the technology are significant determinants of individuals' intention to champion the adoption of continuous monitoring. Individual inclination to innovate is not significant in the presence of the other two factors. We also find that system complexity lowers perceptions of the technology's benefits, thus inhibiting intention to champion.

**Keywords:** continuous monitoring; innovation; system complexity; intrapreneur; second-order structural equation model (SEM); innovation value chain theory.

## I. INTRODUCTION

Innovation is considered a means of increasing organizational performance (Keong and Hirst 2010; Ordanini and Rubera 2010).[1] Indeed, economists consider innovation one of the fundamental factors necessary for organizations to achieve and maintain competitive advantage (Yamin, Mavondo, Gunasekaran, and Sarros 1997). In regard to information technology (IT) innovation, in particular, Nambisan, Agarwal, and Tanniru (1999, 365) assert, "It is increasingly evident that organizations can no longer afford to wait for suitable problems to occur for information technology deployment; instead, they need to be proactive and scout for opportunities to exploit new information technologies." Indeed, even public accounting firms are recognizing that their futures depend on IT innovation (KPMG 2016).

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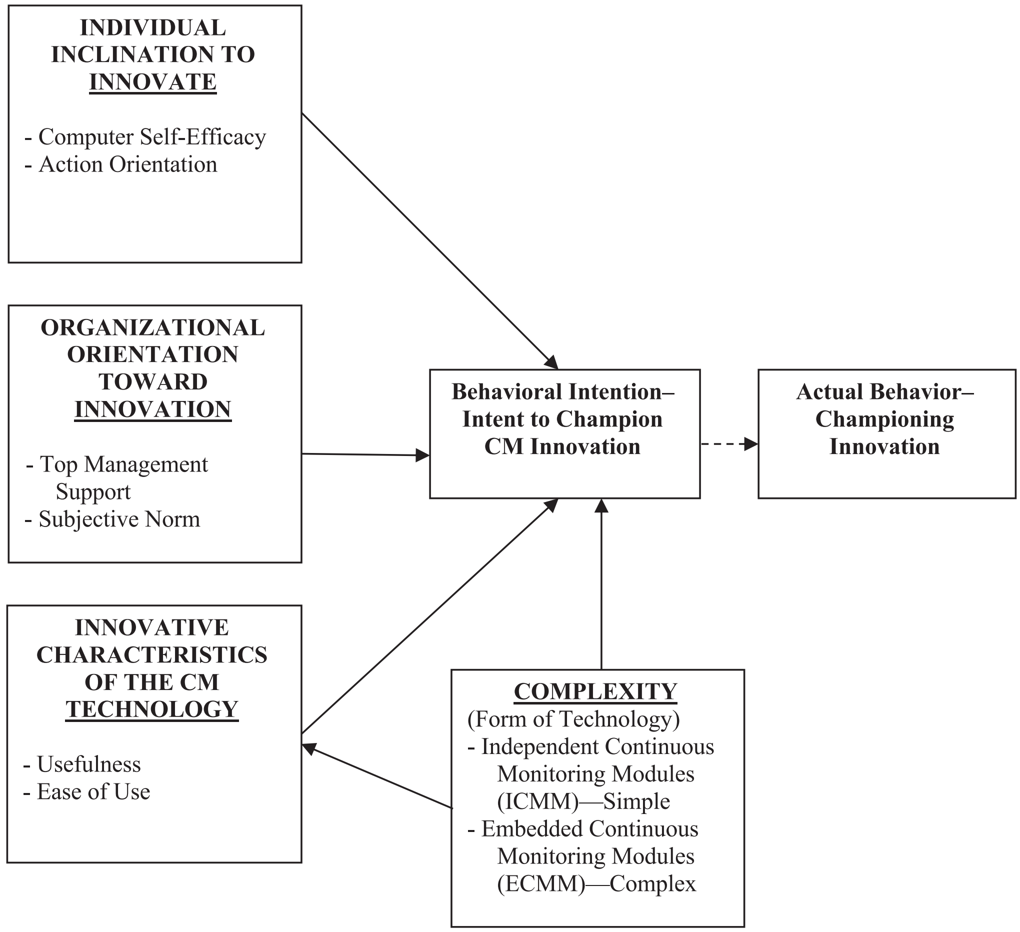
[1] We define innovation as "applying innovative ideas concerning structures, systems, and methods to new organizational settings" (Brimm 1988). Business advisory firm Plante Moran's 2013 Innovation Survey reports that 74 percent of business leaders said they are now using innovation as part of their organizational strategy, up from 66 percent in 2012 (https://www.plantemoran.com/perspectives/innovation-survey/Documents/2013-innovation-survey.pdf; last accessed February 3, 2019).

**FIGURE 1**
**Intent to Champion Innovation**
**Theoretical Model**




Although innovation may arise from anywhere within the organization, the predominant frame of innovation research has a top-down orientation. In the vast majority of academic research, innovation is perceived to be either an organizational characteristic or a mandate from top executives (Abernethy and Bouwens 2005). This is evidenced by the fact that most innovation research is conducted from an organization-level of analysis (Ravichandran 1999; Jarrar and Smith 2014). However, many innovation opportunities arise not through the push down from above but through the creative and innovative activities of employees, and Nambisan et al. (1999) assert that organizations are increasingly dependent upon such user-led IT innovation.[2] This is a much more difficult path to innovation because these employees must possess the individual characteristics necessary to pursue nontraditional job activities. They must find themselves within an organization that at the least does not suppress individual initiative. And the potential innovation itself must be of a nature to warrant the attention and resources of the employee as well as management. Indeed, even the most innovation-focused organizations, like Google, have difficulty sustaining their innovative edge as they grow and develop a more bureaucratic corporate culture (Foege 2013). We consider these three factors in testing a model of bottom-up IT innovation (see Figure 1).

[2] PwC's "Unleashing the Power of Innovation" advises that success in the market today requires employees to see creating, promoting, and executing new ideas as a crucial part of their job description. A recent study of partners at Big 4 firms stated that, "Entrepreneurialism is a prime quality" of successful partnership candidates (Carter, Spence, and Dambrin 2014).

One technology for which these concerns may be particularly applicable is continuous monitoring (CM). Although CM is useful for management accountants to achieve their roles within the organization, that of monitoring whether an organization is operating effectively and complying with standards (ISACA 2010; Kogan, Alles, Vasarhelyi, and Wu 2014), the predicted growth of this technology has not materialized (Deloitte 2010; Gonzalez, Sharma, and Galletta 2012b; Grant Thornton 2011; KPMG 2010).[3] While the concept of continuous monitoring is not new (Groomer and Murthy 1989), the actual adoption of continuous monitoring technology has fallen short in comparison to expectations (DBS Partners 2018). The identification and elimination of the barriers to adoption is an essential question (Chiu, Liu, and Vasarhelyi 2014).

It is our contention that the reason for this limited adoption is that CM is a fairly radical, highly technological innovation, relatively unknown and little understood by those whose job it is to champion the adoption of new technology (PwC 2011; Hardy 2014; Malaescu and Sutton 2015). Additionally, because knowledge of CM's capabilities and possibilities resides with those at technical (rather than executive) levels and with administrative or staff (rather than line or IT) personnel within the organization, it is less likely that CM adoption will follow the traditional top-down path of innovation or the IT-driven path to technology innovation. Further, with the relaxation of Sarbanes-Oxley (SOX) demands following the passage of the audit standard AS5, it is doubtful that CM adoption could be driven by purely audit arguments, without justification via other contributions. CM has many capabilities outside of the audit realm, however, and it is the management accountant who is in the best position to recognize the technology's potential. Therefore, we assert the adoption of CM must begin at the grassroots—for example, through the support of a management accountant in the field who recognizes an opportunity for CM to positively impact their organization and champions its use upward through the corporate hierarchy—employee intrapreneurs who are in the position to understand the innovation's potential benefits and to sell that potential up the corporate ladder. The barriers to this process explain the limited adoption of CM.

Borrowing from several bodies of literature, including those related to creativity, innovation, entrepreneurship, and technology acceptance and diffusion, we theorize that the factors influencing individual CM innovation decisions include those related to individual, organizational, and innovation-specific characteristics. We then identify specific constructs (facets)[4] reflecting those factors to execute our quasi-experimental survey with a sample of practicing management accountants. This approach allows us to test a second-order structural equation model (SEM), which is fairly unique within the accounting literature.[5] Results confirm the importance of two primary (second-order) factors in influencing the intention to champion CM (organizational and technological), as well as the specific first-order facets that reflect these three factors, including computer self-efficacy, action orientation, subjective norms toward IT innovation, top management support for innovation, ease of use, and usefulness. Additionally, our manipulation indicates that greater system complexity reduces perceptions of the technology's benefits, resulting in lower intentions to champion.

This study extends existing literature in several fields to investigate willingness to promote the implementation of untried software and combines several theories to develop a descriptive model organized around these three factors that are influencing individual CM innovation decisions. A contribution of our study is the consideration of innovation through technology. Much research has aimed to identify factors affecting the acceptance of technology once implemented (i.e., technology acceptance model and the unified theory of acceptance and use of technology), but little is known regarding the influences over the initial decision to select and implement technology. Accountants and information systems professionals must understand the nature of CM resistance if they are to promote its adoption. Our second-order structural equation model demonstrates a unique method for more precisely defining the influence of various factors influencing intrapreneurship and our theory provides a comprehensive model of factors that influence the decision to champion innovation. We also contribute to the research literature on continuous auditing and monitoring (Chiu et al. 2014). Finally, our study joins the small but growing body of work seeking to bridge the managerial and Accounting Information Systems (AIS) research literature.

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[3] A 2006 PricewaterhouseCoopers (PwC) survey indicated that half of the responding firms have implemented some kind of continuous auditing or monitoring techniques, and most of the other firms have an implementation plan for the future (PwC 2006). However, the adoption of these tools for audit purposes has far eclipsed the adoption for management control.

[4] Most research employing second-order models label the first-level factors, which make up second-order factor, as "facets" (cf. Gerbing, Hamilton, and Freeman 1994). We follow this nomenclature.

[5] Koufteros, Babbar and Kaighobadi (2009, 635) found that researchers employing a theory that lends itself to higher-order modeling tend to merely sum the various first-level indicators to form aggregate measures of the second-order factor. Thus, the lower level dimensional measures are lost from individual analysis. The disadvantage of this bundling approach is that the contribution of each lower-level dimension to the higher-level factor cannot be assessed or delineated. Second-order models recognize the contribution and retain the idiosyncratic nature of each first-order factor and treat those as facets of the higher-order factors. Thus, our approach allows us to form and test the influence of second-order dimensions (*factors*), as well as the individual contribution of each of our first-order dimensions (*facets*) to the model.



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## II. LITERATURE REVIEW AND MODEL DEVELOPMENT

### Continuous Monitoring and Managerial Accountants

Continuous monitoring is a methodology that provides for the electronic observation of organizational activities online/real-time (Vasarhelyi, Alles, and Kogan 2004).[6] CM offers many potential benefits to management accountants (Grant Thornton 2011; PwC 2011). For example, CM can support and enhance the key activities of management accountants, which include decision support, and planning and control. Furthermore, the COSO[7] commission's guidance on the monitoring phase of its internal control framework underscores the lack of and need for monitoring of internal control. The commission defines monitoring as steps taken to ensure "that internal control continues to operate effectively" (COSO 2009). The guidance specifically calls for continuous monitoring programs built into information systems as one of a wide variety of monitoring procedures.

Management accountants have traditionally shouldered the responsibility to supply management with useful information for operational and strategic needs. Yet with the development of managerial programs, such as just-in-time, activity-based costing, and six sigma, that are designed to improve organization performance, the role of management accountants has gradually changed over the years from merely measuring and reporting business activities to participating in the design and implementation of continuous improvement initiatives (Albright and Lam 2006). Additionally, top executives are now required to attest to the appropriateness and sufficiency of their firms' internal controls after the passage of SOX. The burden of supporting such attestation often falls on the management accountants. Thus, continuous monitoring serves as an important tool for management accountants to ensure that the information they provide meets the data integrity requirements for managerial decision-making as well as for management's attestation purposes (Chui and Curtis 2010).

In a position paper published by the Institute of Internal Auditors (IIA), management control is considered as the first line of defense in helping firms maintain an effective risk management system (IIA 2013). CM can benefit management accountants by providing them with more accurate and up-to-date firm performance measurements through enhanced management control systems (Vasarhelyi, Alles, Kuenkaikaew, and Littley 2012). In addition, these enhanced monitoring systems allow management accountants to more quickly identify control deficiencies and support their firm's operational managers in implementing corrective actions (Chui and Curtis 2010; IIA 2013).

An example of the need for and subsequent use of CM is provided by BDO (2015). A NYSE listed company determined that insiders had funneled in excess of \$1 million out of a project over a 34-month period using multiple schemes. Because of knowledge gained from their positions (in the Accounting and Procurement functions), the insiders were able to subvert internal controls, bypass the internal monitoring functions, and exploit their understanding of project variances to insert scores of bogus invoices into the system and receive a continuing stream of payments. The subsequent implementation of a CM system, designed to monitor internal controls and identify violations of accepted procedures, was used to prevent future occurrences of such schemes. However, earlier implementation of such technology would have saved the company over \$1 million in cash and much more in employee cost to investigate the fraud after the fact.

### Innovation

Competitive advantage in today's global economy can only be maintained through continuous innovation (Jiménez-Jiménez and Sanz-Valle 2008). The innovation value chain has three phases: idea generation, idea conversion, and idea diffusion (Hansen and Birkinshaw 2007). Innovation research has taken multiple paths, with each discipline operating at differing points in the value chain and at differing levels of analysis. At the organizational level, management scholars address innovation through the study of organizational strategies (Ravichandran 1999), while marketing researchers consider organizational inhibiters and stimulators of innovation to help suppliers market their products (Frambach and Schillewaert 2002). There, the concern is how to create and manage innovative organizations in order to increase idea generation and convert ideas to marketable products or services.

On the other end of the value chain, the predominant research stream in technological innovation deals with the spread and dissemination of technology that is already available to the end-user, which is the third phase of this chain (Ravichandran 1999). This stream of research has focused on technology diffusion—the consideration of how to get people to use software

[6] We differentiate continuous monitoring and auditing broadly as follows: monitoring is the use of the technology to enable more efficient operations and control of the business, while the auditing use relates to financial control and reporting, primarily focused on assurance. While there would be a large overlap in the data input into the two types of systems, the objectives and reporting needs would differ greatly.

[7] Originally formed in 1985 to sponsor the National Commission on Fraudulent Financial Reporting, COSO is a voluntary private-sector group dedicated to improving the quality of financial reporting through business ethics, effective internal controls, and corporate governance (IMA 2009). It is perhaps best known for its previous guidance on internal control, subsequently incorporated into Statement on Auditing Standards (SAS).

that is available to them within their organization (Bedard, Jackson, Ettredge, and Johnstone 2003; Bedard, Ettredge, and Johnstone 2006; Loraas and Wolfe 2006; Curtis and Payne 2008; Elbashir, Collier, & Sutton 2011).[8] In many cases, this actually comes down to how to get employees to do their jobs appropriately. The most common technology acceptance research employs factors such as perceptions of how the technology will help them do their personal jobs better (performance expectancy) and how much effort it will take to adopt the technology into their work-life (effort expectancy). However, given that the focus of that type of research is on acceptance of readily available technology, very little true innovation occurs in this third phase, which is where technology acceptance researchers contribute.

The type of innovation considered in this paper is at the second stage of the value chain: idea conversion. Our focus is on deciding whether the organization should adopt a particular type of technology (conversion of an idea to a reality), rather than acceptance of technology that the organization has already selected and implemented. Although very little research addresses this critical phase of the innovation value chain, it represents a greater factor in success than merely deciding whether to use existing software (i.e., Excel) and it requires a broader consideration of organizational factors than existing technology acceptance/use theories. As opposed to technology use, which is within an individual's job requirements, idea conversion as technology innovation is extra-role. Thus, it is more high-risk for the individual decision-maker and involves differing motivators and inhibitors.

An example of this difference is Elbashir et al. (2011). In this study, the integration and use of business intelligence (BI) systems is viewed as a bottom-up leveraging of organizational resources, particularly the absorptive capacity of operational managers. Our study differs from Elbashir et al. (2011) in several critical ways. First, the implementation of software that is championed by upper management (as in the Elbashir et al. [2011] study) is very different from the decision by staff accountants to, themselves, champion software adoption; responding to upper management may be considered idea diffusion, while introducing the software to your organization would be idea conversion—an earlier stage of innovation. Given that their study focused on managers, adoption would be considered in-role for these individuals, while the activity described in our study is clearly extra-role. In our case, the championing of the CM software could be considered a high-risk activity, while the *failure* to employ the BI software in the Elbashir et al. (2011) study could be high-risk to one's career.

Finally, the CM innovation itself is a cross between technological innovation and organizational innovation, which is "applying innovative ideas concerning structures, systems, and methods to new organizational settings" (Brimm 1988, 31). With CM, innovation is achieved by combining new technology with new management techniques rather than by the arrival of new equipment or machinery or the implementation of new software alone. Thus, CM requires a blend of organizational and technological innovation.

As mentioned above, innovation-related research tends to possess a top-down view of innovation, to the point that individual roles and contributions are ignored beyond the inclusion of a few demographic variables, and individual-related research tends to ignore actual innovation behaviors, instead focusing on how to convince employees to use previously implemented technology. We contend that adoption of CM typically must be championed by those most likely to identify its value to the organization—the individual management accountant. Thus, we explore the innovative behavior of employees, defined as idea conversion, which involves the introduction and application of new ideas within a work role, group, or organization, to profit role performance, the group, or the organization (Chang, Hsu, Liou, and Tsai 2013).

## Theory Development

### *Theoretical Foundation for Overall Model*

To guide the development of a model (see Figure 1) depicting factors influencing management accountants' *intention to champion CM innovation*, we scoured the psychology, organizational science, organizational behavior, human resources, marketing, and accounting information systems literatures on innovation and creativity to discover attributes relevant to the individual's decision to champion an innovation up through his or her organization.

Based on this literature, we focus our model on three factors which represent the primary influences on innovation: the individual, the organization, and the innovation itself (Frambach and Schillewaert 2002). Specifically, we consider the inputs to the innovator's decision-making to be the key decision maker's characteristics, perceptions of the organization's attitude toward innovation and innovators, and the innovation's perceived attributes.

To further explore the three primary factors, we surveyed the literature to identify specific facets related to each. Among the wide range of facets identified, we selected two for each factor that we believe best reflects that factor, but are individually

[8] Some distinguish between "adoption" and "diffusion" (Frambach and Schillewaert 2002). However, given that the idea diffusion phase in the innovation value chain theory refers to activities similar to use or acceptance in the TAM literature, we consider the term "diffusion" to relate to the use of technology currently adopted, implemented and available within the organization.

unique, guided by theory of the Innovation Value Chain. However, we in no way assert these to be the only constructs reflective of these three broad factors. Each of the factors and related facets is addressed in the following sections.

### *Individual Inclination to Innovate*

Champions of innovation are special people, with particular personality types and psychological profiles. Thus, a study of the championing of CM must include the consideration of the potential innovator. The foundations for this are the organizational change and creativity literatures, which offer a rich assortment of models for such research (see, for example, Kolodny 1998). Organizational change may be the result of any number of events, such as competitive opportunities or pressures, external technological change, or management initiative. The need for change may be identified by upper management or may be thrust upon the organization from outside (business partner, governmental agency, competitors, technology vendor, etc.). The change agents in most prior research were managers who had been assigned the task or hired for this job, or outside consultants whose expertise was in serving as a change facilitator. On the other hand, the creativity literature considers the generation of new and potentially useful ideas by the individuals at any level. Hamel (1999) cites numerous instances where game-changing innovations arose from individual initiatives within organizations. Examples include strategic initiatives, use of technology or other processes in innovative ways, or job redesign.

This study seeks to extend the organizational change literature by considering creativity; that is, we look at an innovation that is an opportunity rather than necessity. These opportunities may be first identified by individuals who are not in a position to dictate the adoption of the innovation but rather must sell the idea and garner support for it. These individuals are called "innovators," because the ideas originate with them. Innovators are typically non-management employees who could perform their jobs without innovating. However, they identify an opportunity and feel responsible and empowered to bring it to the attention of management, possibly directing the implementation after high-level management has been persuaded. Innovators take on this role despite the fact that it may cost rather than benefit them: for example, implementations often mean more work on their part and may exhaust their political capital within the organization.

Inclination to innovate is influenced by characteristics that make the potential innovator more open to innovation and more confident in his or her ability to achieve the goal (Dowling 2009). Among the many individual factors prior literature has considered are creativity (Zhou, Shin, and Cannella 2008), self-efficacy (Ahmed 1998; Zhao, Seibert, and Hills 2005; Yang and Cheng 2009; Dowling 2009), motivation (Amabile, Conti, Coon, Lazenby, and Herron 1996; Adler and Chen 2011), persistence (Staw 1990), nonconformity (Staw 1990), internal locus of control (Riipinen 1994), vision (West and Farr 1990), job satisfaction (Venkatesh, Davis, and Morris 2007), personal innovativeness (Jackson, Yi, and Park 2013; Howell and Higgins 1990) and action orientation (Frohman 1997; Yi, Jackson, Park, and Probst 2006).

Of these many facets of individual inclination to innovate, Innovation Value Chain theory suggests two which are particularly relevant to the championing of CM. These encompass both the individual's perceived ability with information technology and their more general tendency to act on innovative opportunities.

First, self-efficacy is a necessary mediator in the development of entrepreneurial intentions (Zhao et al. 2005). Matthew (2009) proposes it as a necessary condition of creativity, while Ahmed (1998) finds self-confidence to be an important personality trait for innovation. Computer self-efficacy, derived from the broader concept of Bandura's self-efficacy (Marakas, Johnson, and Clay 2007), refers to a self-judgment of capability with information technology. Its focus is not on what an individual has done but on what the person believes they could do (Compeau and Higgins 1995). Stone, Arunachalam, and Chandler (1996) find computer self-efficacy reduces computer anxiety and increases IT usage. Both Lee (2004) and Tsai and Tsai (2003) support a direct relationship between an individual's computer self-efficacy and his or her tendency to adopt new technologies.

Second, an important determinant of inclination to innovate is someone's willingness to initiate innovation action. Just as an action orientation improves the performance of athletes (Beckmann and Kazén 1994) and job searchers (Song, Wanberg, Niu, and Xie 2006), and helps individuals adapt to change (DeShon and Gillespie 2005), those with high action orientation are motivated to take proactive steps to solve problems and to improve their organizations (Amabile 1996; Adler and Chen 2011). In the idea conversion stage of the Innovation Value Chain, "the hierarchy of imagination counts for far more than the hierarchy of experience" (Hamel 1999). Crant and Bateman (2000) among others suggest that proactivity at work is characterized by initiative, action, and behavior aimed at change. "Proactive people scan for opportunities, show initiative, take action, and persevere until they reach closure by bringing about change" (Bateman and Crant 1993, 105). Indeed, Kazén, Kaschel, and Kuhl (2008) find that action orientation has a direct influence on intention formation and Maurer and Chapman (2013) find that proactive personalities have unique effects on success not accounted for by a broad array of other variables.

Thus, based on our review of the literature, individual factors must be considered in a model seeking to explain innovative intentions. Further, we believe computer self-efficacy and action orientation are unique facets reflective of an individual's inclination to innovate:

**H1:** Greater individual inclination toward innovation is positively associated with intention to champion CM software.

**H1a:** Computer self-efficacy is reflective of individual inclination to innovate.

**H1b:** Action orientation is reflective of individual inclination to innovate.

### *Organizational Orientation Toward Innovation*

The management accountant's perception of the organization's interest, attitude, and aptitude toward innovation will influence his or her willingness to risk championing activities. Indeed, since innovation requires extensive effort, creative and innovative outcomes are unlikely without significant organizational support (King et al. 1994; DiLiello and Houghton 2006). While inspired individuals are important, there must also be a recognition of organizational excellence and organizations must ignite the entrepreneurial passions of their own people (Hamel 1999). For example, Shalley (1991) asserts that individual creativity must be studied in the context of personal discretion in work procedures, which can only be provided by the organization in which the potential innovator works. Chang et al. (2013) postulates that innovative behavior is not an individual factor alone, but rather a function of a continuous process of interactions between the individual and situations encountered. Hamel (1999) cites numerous instances where employees felt thwarted in their attempts to innovate, and instead took their ideas (and themselves) to other organizations that were more welcoming to their inclination to innovate.

For the championing of innovations to succeed, champions need procedural, resource, and social support (Jeyaraj, Rottman, and Lacity 2006; Coakes and Smith 2007). While someone may think CM should definitely be implemented, the risk-reward equation may not be in their favor (Hamel 1999). He or she may believe that investing emotional and professional capital would not be rewarded if the organization would not or could not support such an innovation. Extant literature on innovation suggests organization-level influences on individual innovation include such facets as support from top management (Ahmed 1998; Amabile 1988), rewards for innovations (Zhou et al. 2008), organizational support for innovation (Venkatesh et al. 2007), positive subjective norms toward innovation (Yi et al. 2006; Lee, Yen, Peng, and Wu 2010; Jackson et al. 2013), and trust (McAllister 1995).[9]

Of these possible facets of organizational orientation toward innovation, Innovation Value Chain theory suggests two of these are particularly relevant to the championing of CM. These are based primarily on the cultural characteristics of the organization, related to innovation and change (Ahmed 1998). First, the consideration of subjective norm in developing an intention to act originated from the theory of reasoned action (Fishbein and Ajzen 1975) and is widely considered in TAM and diffusion of innovation research (Venkatesh, Morris, Davis, and Davis 2003; Curtis and Payne 2008; Lee et al. 2010)[10]—although it is sometimes labeled social influence (Davis 1989). Lu, Yao, and Yu (2005) define subjective norms as a person's perception of how influential individuals within the organization view certain behaviors. Innovative organizations establish norms that individual innovation is valued and rewarded, such that innovators would be sensitive to potential image gains and losses from their activities (Yuan and Woodman 2010). Chang et al. (2013) assert that psychological safety is necessary for innovative behavior, referring to a sense of being able to invest oneself without fear of negative consequences. Perceptions that the organization's social system supports the relevant behavior is the main influence on safety. In the technology domain, both peer and superior influences have been shown to be strong determinants of subjective norm. Similarly, innovators are influenced by indicators of what is valued within their organization, and these subjective norms thus should impact their willingness to champion new technology.

Second, management support is broadly recognized as an essential component of innovative organizations; the support of top management gives innovative efforts credibility, thus encouraging innovation within the organization. Damanpour (1991) asserts managers' favorable attitudes toward change leads to an internal climate conducive to innovation. Ahmed (1998) determined that leadership commitment and involvement is a key cultural attribute to innovative organizations. Bradford and Florin (2003) cite top management support as one of the most important organizational factors in determining the success of innovations. Lee, Elbashir, Mahama, and Sutton (2014) identify top management support as one of the most critical factors in management control system innovation.

[9] Research on learning organizations shares a similar focus on organizational culture. The development of a learning culture should be particularly relevant to our study because organizations open to new ideas and methods should also demonstrate increased willingness to consider new approaches to organizational needs. Thus, an organization with a learning focus should instill a greater willingness to champion innovation—both because individuals tend to share the focus of their organization, and because this focus will communicate to their members an openness to innovation, fostered by learning.

[10] A critical difference is that, in technology acceptance and diffusion, the norm relates to use of technology, whereas here it relates to the act of innovating, itself.

We therefore assert that the extent to which the individual perceives his or her organization encourages innovation among its employees will affect willingness to champion CM. Further, we believe subjective norms toward innovation and top management support of innovation are unique facets reflective of an organization's orientation toward innovation:

**H2:** Greater perceived organizational orientation toward innovation is positively associated with intention to champion CM software.

**H2a:** Organizational norm for innovation is reflective of perceived organizational orientation toward innovation.

**H2b:** Management support for innovation is reflective of perceived organizational orientation toward innovation.

### *Innovative Characteristics of the CM Technology*

We propose that an individual's likelihood of championing CM depends on his or her perceptions of the innovation, itself, particularly the extent to which it will be used by those within the organization (Coderre, Verver, and Warren, Jr. 2005). Because an innovator would not rationally pursue technology that would never be used, the perceived attributes of the innovation follow a somewhat similar path as the technology diffusion literature, although with a broader focus—technology diffusion perceptions are related to the person while our perceptions are related to the organization.

The adoption of information technologies by individuals and organizations remains one of the most challenging issues facing the information systems (IS) field, despite its more than 35 years of research (Moore and Benbasat 1991). Since Rogers' (1983) seminal work on innovation diffusion, researchers have studied many innovation characteristics and their relationships with system adoption. Davis' (1989) well-accepted technology acceptance model (TAM) proposes that characteristics of the technology determine whether technology is accepted by users (Jackson, Chow, and Leitch 1997). Innovation diffusion theory advances this idea, proposing that technology spreads through an organization and between organizations when the relative advantage of an innovation is perceived as being greater than that of its precursor (Agarwal and Prasad 1999). A major focus of the diffusion of innovation literature has been on how potential users' perceptions of the information technology innovation influence its adoption (Tornatzky and Klein 1982; Jeyaraj et al. 2006). Consistent with the technology acceptance literature, it seems reasonable that individuals would become champions, staking their reputations and possibly careers on such a non-compulsory activity, only if they had confidence that the organization and individual users would accept the resulting software. Thus, we propose that managerial accountants' willingness to champion CM innovation will be influenced by their perceptions of the technology's acceptability and usefulness to others in the organization.

Generally, studies of technology acceptance begin by considering the original Davis (1989) TAM model, which proposes perceived usefulness and perceived ease of use determine whether a technology is accepted by users (Jackson et al. 1997; Agarwal and Prasad 1999). While other studies have modified these two basic technology characteristics (Moore and Benbasat 1991; Venkatesh et al. 2003), most technology acceptance research recognizes these two facets as the overriding determinants of technology acceptance (Karahanna, Straub, and Chervany 1999; Gonzalez, Sharma, and Galletta 2012a).

First, perceived usefulness is the degree to which an innovation is seen as being better or offering more value than its precursor (Agarwal and Prasad 1999). A significant body of TAM research has shown that perceived usefulness is a strong determinant of user acceptance, adoption, and usage behavior (Venkatesh, Davis, and Morris 2007). In a broad review of the technology adoption literature, Jeyaraj et al. (2006) found perceived usefulness to be one of the best predictors of individual IT adoption. Similarly, the technology diffusion literature (Rogers 1983) focuses on the consequences of actually using the technology. The tangible, observable effect of a technology's usefulness increases the potential adopter's implementation efforts (Moore and Benbasat 1991). Gonzalez et al. (2012a) find perceived usefulness to be a predictor of CM adoption in some circumstances. Second, ease of use is the degree to which an innovation is perceived as being difficult or effortful to use (Moore and Benbasat 1991). As with usefulness, ease of use is one of the primary components of the technology acceptance model (Davis 1989) and has been highly explored in that literature (e.g., Venkatesh et al. 2003).

Management accountants should have higher intentions to champion CM systems if they perceive it will be easier for users to assimilate the CM systems into their job responsibilities. The lower the learning curve that the CM system presents, the easier it will be for users to start using the system efficiently. Interestingly, Gonzalez et al. (2012a) found effort expectancy, a form of ease of use, was only marginally significant or not significant in their study of intention to use CM. We believe that our more robust model, expanded beyond the technology acceptance literature, will allow the influence of this variable to emerge. Additionally, providing an explicit description of the type of CM that should be considered, as described below, will facilitate the participants' ability to visualize the impact of CM technology in their own organizations.

Folding the technology acceptance and innovation diffusion literatures into our model, we propose perceived qualities of the technology should impact management accountants' intention to champion CM within their organizations:

**H3:** Greater perceived qualities of the technology are positively associated with intention to champion CM software.

**H3a:** Technology usefulness is reflective of the perceived qualities of the technology.

**H3b:** Technology ease of use is reflective of the perceived qualities of the technology.

Additionally, among the system characteristics frequently considered, complexity has shown consistent associations with IT acceptance (Tornatzky and Klein 1982; Rogers 1983). Specifically, complexity represents "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers and Shoemaker 1971, 154). The findings from Tornatzky and Klein's (1982) meta-analysis show that complexity is generally assumed to have an inverse relationship with innovation adoption and implementation. In other words, an increase in complexity would lead an individual to have a decreased attitude toward innovation (Taylor and Todd 1995a). In regard to ERPs, Bradford and Florin (2003) found companies that perceive their adopted ERP system to be a complex business solution tend to diffuse it slowly and in limited capacity, thus not realizing its full benefits. Therefore, individuals who perceive a particular system to be complex may hesitate to champion it due to concerns that the required skills and knowledge may be beyond their organization's capabilities; they may also fear user rejection (Rogers 1983).

Prior technology acceptance studies have shown that complexity is negatively related to perceived ease of use (Davis, Bagozzi, and Warshaw 1989; Keil, Beranek, and Konsynski 1995; Ziefle 2002). This has been demonstrated across a wide range of technology, from word processors (Venkatesh and Davis 1996) to mobile phones (Ziefle 2002). We therefore predict software complexity has a negative impact on individual's perceived ease of use of the championed CM software and would lead to lower intention by management accountants to champion CM within their organizations.

**H3c:** Greater CM software complexity is negatively associated with intention to champion CM software and this relationship is mediated through perceived qualities of the software.

## III. RESEARCH METHOD

### Instrument

#### *Development of Instrument*

We adapted scales from prior research to measure intention to champion CM, as well as the facets reflecting individual inclination to innovate, organizational orientation toward innovation, and characteristics of the CM technology. We conducted several pilot tests using upper-level accounting students with work experience to create a parsimonious set of measures for each theoretical construct.[11]

#### *Dependent and Independent Variables*

The survey opens with a description of CM, which is discussed below. Following this, we measure the construct Intention to Champion CM (INTENT). These measures are derived from Venkatesh et al. (2003), revised from adoption to championing. Since we do not have the ability to assess whether the responding accountants will champion CM to their organization, we must rely on prior research, which demonstrates that intent to act will lead to action, given adequate behavioral control (Davis et al. 1989; Taylor and Todd 1995b; Dowling 2009; Ajzen 1991; Anderson and Agarwal 2010; Johnston and Warkentin 2010; Venkatesh et al. 2003).

There are three sets of independent variables in our model.[12] The first set is Individual Inclination to Innovate (IF). We employ the Compeau and Higgins (1995) measure of computer self-efficacy (SELF_EFF) and we adapted Frohman's (1997) level of action framework in developing three items to measure action orientation with regard to technology (ACT). The second set is Organizational Orientation toward Innovation (OF). We adapt the well-accepted Venkatesh et al. (2003) scale to address the organizational norms regarding innovation within an organization (SUB_NORM) and we modified Bradford and Florin's (2003) instrument to measure management support in our context (TP_MGT). The final set of independent variables is

[11] We employed design and statistical techniques to reduce the risk of common method bias. Design techniques include protecting respondent anonymity (non-business email addresses for those who desired to be included in the drawing were the only identifying formation collected), employing previously validated scales to reduce risk of ambiguity in items, and use of negatively phrased items intermittently to remove common scale anchors (P. Podsakoff, MacKenzie, Lee, and N. Podsakoff 2003). Additionally, we followed the statistical technique employed by Dowling (2009) by using Harmon's single-factor test. Our proposed measurement model was a much better fit than the single-factor model. In addition, we conducted a confirmatory factor analysis comparison by loading all items (reflectively) onto a single-factor model. Our multi-factor outcome possesses greater variance explained than the single-factor model.

[12] Decisions are influenced by perceptions rather than facts (Moore and Benbasat 1991). In assessing an individual's likelihood of innovating, therefore, we must assess that person's perceptions of the factors discussed here, rather than the system's primary attributes.

Innovative Characteristics of the CM Technology (TF). It includes perceived usefulness (USE), which is measured by three questions designed to elicit perceptions of organizational benefits, as opposed to the typical technology acceptance assessment of personal benefits. Ease of Use (EOU) is measured with questions from Bradford and Florin (2003).

### *CM Description*

To manipulate the complexity of the system, we varied the description of the proposed continuous monitoring system (CICA/AICPA 1999; Coderre et al. 2005; Debreceny, Gray, Ng, Lee, and Yau 2005; Malaescu and Sutton 2015) they were asked to consider. The described systems differ on two technical dimensions—degree of integration of software tools with the organization's other systems and frequency of application of automated assessment procedures—and these characteristics should result in differences in perceived complexity (Bradford and Florin 2003). One system is relatively simple (independent continuous monitoring module or ICMM), while the other is relatively complex (embedded continuous monitoring module or ECMM).[13] The survey opened with a definition of continuous monitoring (Kogan, Sudit, and Vasarhelyi 1999), followed by the description of one of the two CM systems (randomly assigned) shown at the top of the computer screen. The dependent measures relate directly to the specific system described and therefore had the description depicted on the pages where those questions appear. In our analyses, CMTYPE is coded 1 for ECMM and 0 for ICMM.

## Participants

Three hundred thirty-one members of the Institute of Management Accountants (IMA) completed the survey. Eleven surveys contained incomplete answers, resulting in a final sample of 320.[14] Participants had mean (S.D.) age of 44 (9.0) years and management accounting experience of 14.5 (10) years. Their mean (S.D.) experience with complex accounting systems was 13.3 (7.8) years and self-rated skill with such systems was 5.5 (1.1) on a scale of 1 = poor and 7 = excellent, respectively. Their mean (S.D.) experience and training with information technology, both on a scale of 1 = very little and 7 = great deal, were 5.8 (1.1) and 4.9 (1.4), respectively. Thus, our participants had significant experience in working with technology and complex accounting systems, and considered themselves well-trained in these areas.

The participants worked in 17 different industries, although one-third of them were concentrated in manufacturing. Predominant certifications held by participants include 46 percent with CMA (Certified Management Accountant) and 28 percent with CPA (Certified Public Accountant). Forty-four percent had undergraduate degrees, while 54 percent had master's degrees, with 76 percent of the degrees in accounting and finance. Finally, they rated their current organizations as fairly non-innovative. Specifically, when asked to rate their corporate strategy as 1 = defender versus 10 = innovator (Miles, Snow, Meyer, and Coleman 1978), their mean (S.D.) response was 5.8 (2.4). When asked their organization's history of adoption of management accounting innovation including ABC, Balanced Scorecard, and benchmarking, mean (S.D.) response was 3.1 (1.5), on a scale of 1 = very little use to 7 = great deal. These demographics are presented in Table 1.

## Procedure

The experiment was developed employing a between-subjects design, varying complexity through the description of the specific CM system they should consider. The instrument was deployed as a web-based survey. Practitioner members of the Institute of Management Accountants (IMA) were sent an email, asking that they participate. The email contained a description of the research and a clickable web address. Participants were offered a cash award of $25 for every fifth person who completed the survey. Please see the Appendix for the relevant questions included in the instrument.

The solicitation email was sent to a sample of IMA members practicing as management accountants in the U.S. at the time. Approximately 15 percent of those individuals who opened the IMA's email completed the survey (see Bryant, Hunton, and Stone [2004] for a discussion of online experiments, including response rates). Average completion time was approximately 30 minutes.

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[13] Independent continuous monitoring module (ICMM) involves an automated data extraction tool, which captures transaction data as it is processed. In this approach, the data are extracted during processing and stored in a file that is in the accountant's environment—although it may reside either on the main computer or accountant's computer system. Embedded continuous monitoring module (ECMM) involves the addition of one or more modules to the accounting applications. In this approach, the assessment software is a part of the information system, maintained and run by IT (Groomer and Murthy 1989, 2018). This alternative is more expensive and complex, in that it must be programmed into the existing accounting system (Debreceny, Gray, Tham, Goh, and Tang 2003).

[14] For surveys of this nature, statistical tests are often performed to identify differences between early and late responders (Oppenheim 1966). However, 68 percent of our participants responded the first day and 90 percent responded within the first three days the survey was available. Additionally, we did not send out a second notice for participation. Therefore, this study is not at risk for bias from the timing of responses. This study was approved by the appropriate Institutional Review Board (IRB).

**TABLE 1**

**Demographics**

| | Mean | SD |
|---|---|---|
| Age | 44.1 | 9.0 |
| Overall work experience | 24.0 | 10.1 |
| Professional work experience | 19.1 | 8.7 |
| Experience in management accounting | 14.4 | 10.0 |
| Experience with complex accounting systems | 13.3 | 7.8 |
| Self-rated skill at using complex accounting systems (1 = poor, 7 = excellent) | 5.5 | 1.1 |
| Experience with using information technology (1 = very little, 7 = great deal) | 5.8 | 1.1 |
| Training in information technology (1 = very little, 7 = great deal) | 4.9 | 1.4 |
| Certifications | | |
| CMA | 46% | |
| CPA | 28% | |
| Education | | |
| Undergraduate only | 44% | |
| Master's degree | 54% | |
| Major in accounting or finance | 76% | |
| Organization | | |
| Organization strategy (1 = defender with just a few stable products/services, 10 = frequent innovator) | 5.8 | 2.4 |
| Adoption of recent innovations (ABC, Balanced Scorecard, and Benchmarking) | 3.1 | 1.5 |

## IV. RESULTS

### Preliminary Analyses of Measures

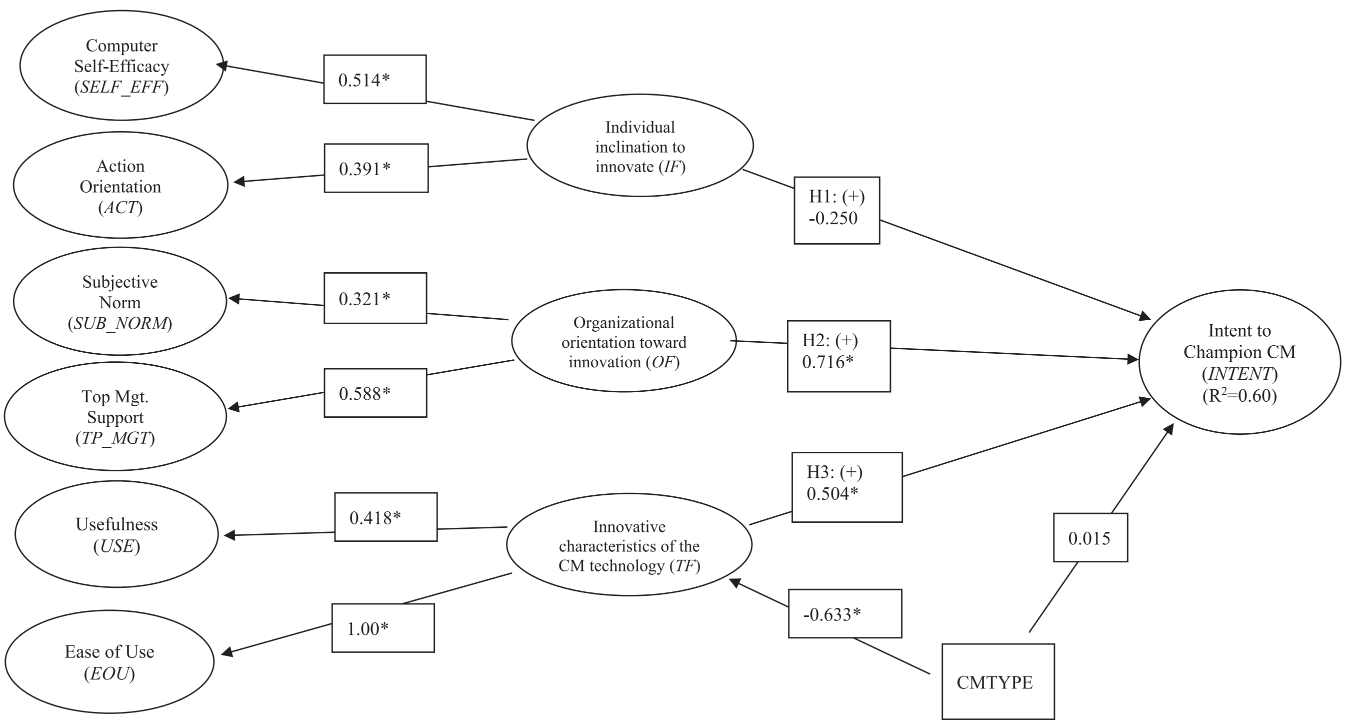
A standard assessment approach allows for the validation of the proposed structural equation model which provides a model to test the hypotheses of this study. Following the recommendation of Anderson and Gerbing (1988), we tested the proposed model presented in Figure 2 using the two-step structural equation procedure. The first step of the analysis involves evaluating the measurement model.

Confirmatory factor analysis (CFA) on the measures allows us to assess validity of the scales (Gefen, Straub, and Boudreau 2000), estimating the model and assessing the significance of the item loadings of the factors measured with reflective items. This step resulted in the elimination of four scale items due to low loadings.[15] Table 2 depicts item loadings and factor reliability measures. Most loadings meet the excellent level (loadings in excess of 0.70), and all are over 0.70, exceeding the acceptable level (loadings in excess of 0.50) as specified by Comrey's (1973) rule for acceptance. To assess the reliability of the scales, we calculated Coefficient (Cronbach's) Alpha, composite (construct) reliability, and average variance extracted (AVE) for each. These three measures are used to assess internal consistency of the facets, and their values are depicted at the bottom of Table 2. The reliability of all scales described here meet the minimum desired score of 0.70, and the AVEs are higher than 0.50 (Nunnally 1978). Few kurtosis and skewness values in Table 2 are over 1 in magnitude, thus, supporting the assumptions of SEM. Hair, Black, Babin, and Anderson (2010) state that as data deviate from multivariate normality, the ratio of respondents per item needs to increase and that an acceptable ratio is 15 respondents per item. With a total sample size over 300, our study minimizes problems with deviations from normality.

We next tested the fit of the measurement model. For each of the second-order factors (IF, OF, and TF), the first-order facets are treated as reflective because our goal for parsimony led us to limit the number of first-order facets to represent each

[15] Specifically, we dropped one question in the Subjective Norm scale that stated, "People who influence my behavior think that I should use information technology." Additionally, the Top Management Support scale originally contained six questions, which split evenly on two factors. We employ the three-question sub-scale as it is more relevant to our research question.

**FIGURE 2**
**Results of Hypothesized Relationships**
**Structural Model[a]**




* Represents significance levels of 0.01.
Numbers on path are standardized coefficients.
[a] p-values are two-tailed.

second-order factor (Schumacker and Lomax 2010; Henderson, Bradford, and Kotb 2016). To assess the measurement model, we consider multiple fit indices: the normed chi-square (chi-square statistic divided by its degrees of freedom); the goodness of fit index (GFI); the normed fit index (NFI); the comparative fit index (CFI); the non-normed fit index (NNFI), which also is called the Tucker Lewis Index (TLI); and the root mean square error of approximation (RMSEA). All fit indices exceed the conventional benchmarks (Kline 2011). Specifically, chi-square/df is 1.45, GFI is 0.931, NFI is 0.942, CFI is 0.981, NNFI is 0.981, and RMSEA is 0.038.

## Preliminary Analysis of Results

Correlations reported in Table 3 also provide preliminary evidence regarding our hypotheses and suggest relationships between these variables and subject demographics. All six reflective facets are significantly, positively related to Intent.

### *Test of Model*

Following the recommendation of Anderson and Gerbing (1988), the second step in the analysis involves evaluating the complete hypothesized structural model. The results of the analysis are depicted in Figure 2.

As with the measurement model, all fit indices meet or exceed conventional benchmarks for the structural model. Specifically, chi-square/df is 1.84, GFI (0.903), NFI (0.918), CFI (0.961) and NNFI (0.961) are above the minimal value of 0.90, and RMSEA (0.051) is at the accepted value of 0.05. Therefore, we conclude that the theorized model provides a satisfactory fit to the data (Arbuckle 2005; Kline 2011). Total variance explained for the dependent variable, Intent, is 0.60.

We test the factors of organizational orientation toward innovation (OF), individual inclination to innovate (IF) and innovative characteristics of the CM technology (TF) on intent to champion CM (INTENT) as formative factors (Figure 2). Therefore, each factor's relationship with INTENT is tested in the presence of the other factors. Thus, while a factor may be individually significant, it may not be significant when considering the influence of other factors on the DV. H1 predicts that

**TABLE 2**

**Scale Item Loadings and Descriptives**

| | Factors | | | | | | | Descriptives | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Measures** | **INTENT** | **SELF_ EFF** | **ACT** | **SUB_ NORM** | **TP_MGT** | **USE** | **EOU** | **Mean** | **Std. Dev.** | **Skewness** | **Kurtosis** |
| Intent1 | 0.869 | 0.023 | 0.079 | 0.096 | 0.198 | 0.275 | 0.151 | 4.210 | 1.556 | −0.335 | −0.740 |
| Intent2 | 0.882 | 0.000 | 0.079 | 0.105 | 0.196 | 0.278 | 0.163 | 4.160 | 1.544 | −0.344 | −0.767 |
| Intent3 | 0.793 | 0.108 | 0.012 | 0.106 | 0.164 | 0.205 | 0.268 | 4.590 | 1.642 | −0.479 | −0.575 |
| Self_Eff1 | −0.030 | 0.758 | 0.164 | 0.057 | 0.046 | 0.103 | −0.011 | 5.170 | 1.376 | −0.908 | 0.489 |
| Self_Eff2 | 0.076 | 0.837 | 0.036 | 0.016 | 0.047 | 0.025 | 0.074 | 5.830 | 1.175 | −0.990 | 0.823 |
| Self_Eff3 | 0.050 | 0.854 | 0.058 | 0.116 | −0.010 | 0.042 | 0.074 | 5.430 | 1.335 | −1.007 | 0.939 |
| Act1 | 0.113 | 0.104 | 0.770 | −0.029 | −0.034 | −0.040 | 0.084 | 4.360 | 1.159 | −1.391 | 0.564 |
| Act2 | 0.021 | 0.114 | 0.818 | 0.060 | 0.067 | 0.009 | 0.034 | 4.260 | 1.168 | −1.310 | 0.122 |
| Act3 | −0.014 | 0.031 | 0.838 | 0.103 | 0.075 | 0.055 | 0.037 | 3.940 | 1.362 | −0.758 | −1.137 |
| Sub_Norm1 | 0.071 | −0.003 | 0.050 | 0.838 | 0.053 | 0.141 | 0.145 | 4.953 | 1.328 | −0.845 | 0.681 |
| Sub_Norm2 | 0.032 | 0.017 | 0.091 | 0.824 | 0.015 | 0.104 | 0.118 | 4.260 | 1.516 | −0.427 | −0.241 |
| Sub_Norm3 | 0.141 | 0.202 | −0.002 | 0.723 | 0.067 | 0.128 | 0.064 | 5.394 | 1.474 | −1.130 | 1.106 |
| Tp_Mgt1 | 0.167 | 0.001 | 0.086 | 0.037 | 0.868 | 0.076 | 0.144 | 3.900 | 1.474 | −0.133 | −0.600 |
| Tp_Mgt2 | 0.089 | 0.026 | 0.045 | 0.006 | 0.910 | 0.155 | 0.064 | 4.007 | 1.599 | −0.126 | −0.662 |
| Tp_Mgt3 | 0.205 | 0.072 | −0.010 | 0.102 | 0.747 | 0.064 | 0.199 | 4.195 | 1.591 | −0.359 | −0.464 |
| EOU1 | 0.128 | 0.105 | −0.026 | 0.150 | 0.067 | 0.885 | 0.118 | 4.330 | 1.516 | −0.522 | −0.433 |
| EOU2 | 0.214 | 0.031 | 0.042 | 0.098 | 0.136 | 0.849 | 0.123 | 3.890 | 1.546 | −0.187 | −0.878 |
| EOU3 | 0.192 | 0.086 | 0.006 | 0.092 | 0.065 | 0.893 | 0.182 | 4.286 | 1.526 | −0.407 | −0.542 |
| EOU4 | 0.185 | 0.010 | 0.013 | 0.133 | 0.089 | 0.830 | 0.195 | 4.110 | 1.463 | −0.256 | −0.620 |
| Use1 | 0.196 | 0.026 | 0.047 | 0.135 | 0.192 | 0.154 | 0.769 | 4.310 | 1.573 | −0.465 | −0.323 |
| Use2 | 0.184 | 0.078 | 0.072 | 0.124 | 0.139 | 0.223 | 0.858 | 5.100 | 1.385 | −0.987 | 0.991 |
| Use3 | 0.145 | 0.069 | 0.085 | 0.134 | 0.116 | 0.207 | 0.892 | 5.010 | 1.401 | −0.887 | 0.651 |
| Cronbach's Alpha | 0.927 | 0.765 | 0.754 | 0.760 | 0.847 | 0.889 | 0.931 | | | | |
| Composite (Construct) Reliability | 0.885 | 0.858 | 0.850 | 0.838 | 0.881 | 0.922 | 0.879 | | | | |
| Variance Extracted (AVE) | 0.721 | 0.668 | 0.655 | 0.635 | 0.713 | 0.748 | 0.798 | | | | |

Table 2 reports item loadings and construct reliability measure for the measurement model.+

These variables measure the potential innovator's perceptions of:
INTENT = intention—intention to champion CM;
SELF_EFF = computer self-efficacy—individual's capability to use a computer. It also represents an individual's confidence in using technology;
ACT = action orientation—the likelihood of individual taking the initiative to innovate in a wide range of corporate functional areas such as technology, marketing, production, human resources, and general management;
SUB_NORM = subjective norm—individuals who are respected within this organization innovate;
TP_MGT = top management support—management supports innovation by its employees;
EOU = ease of use—the extent to which this potential innovation will be easy for the organization and employees to use to achieve their goals; and
USE = useful to the organization—an innovation that is perceived as being better or offering more value than its precursor.

greater individual inclination to innovate (IF) is associated with greater intention to champion CM. We used a second-order factor, IF, to test this relationship with Intent. This second-order factor has two significant facet loadings, 0.514 (p-value $<$ 0.01) for computer self-efficacy (SELF_EFF) and 0.391 (p-value $<$ 0.01) for action orientation (ACT). The standardized path coefficient for IF to INTENT is −0.250 (p-value $>$ 0.05). Thus, while the individual facets are significantly, positively correlated with Intent, the factor is not significant when evaluated in the presence of the other two factors, as described below.

H2 predicts organizational innovativeness (OF), which has a positive relationship with the intention to champion CM. We used a second-order factor, OF, to test this relationship with INTENT. The standardized path coefficient in Figure 2 is 0.716 (p-value $<$ 0.01). This second-order factor has two significant facet loadings: 0.321 (p-value $<$ 0.01) for subjective norm (SUB_NORM) and 0.588 (p-value $<$ 0.01) for top management support (TP_MGT).

Finally, H3 predicts a positive relationship between innovative characteristics of the CM software (TF) and intention to champion CM. We used a second-order factor, TF, to test this relationship with the Intent. The standardized path coefficient in Figure 2 is 0.504 (p-value $<$ 0.01). This second-order factor has two significant facet loadings, 1.00418 (p-value $<$ 0.01) for ease of use (EOU) and 0.418 (p-value $<$ 0.01) for usefulness (USE). We had no expectations regarding the relative influences

**TABLE 3**

**Construct Correlations and Square Root of Average Variance Extracted[a]**

| | DV | Technology | | Individual | | Organization | |
|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| 1. INTENT | 0.849 | | | | | | |
| 2. USE | 0.463** | 0.841 | | | | | |
| 3. EOU | 0.502** | 0.425** | 0.0.865 | | | | |
| 4. SELF_EFF | 0.136* | 0.152** | 0.157** | 0.817 | | | |
| 5. ACT | 0.135* | 0.157** | 0.063 | 0.210** | 0.809 | | |
| 6. SUB_NORM | 0.271** | 0.320** | 0.321** | 0.186** | 0.139* | 0.797 | |
| 7. TP_MGT | 0.419** | 0.354** | 0.272** | 0.098 | 0.114* | 0.164** | 0.844 |

*, ** Represent significance levels of 0.05 and 0.01, respectively.
Table 3 presents construct correlations and the square root of the average variance extracted (AVE) on the diagonal for the primary variables. Discriminant validity is considered to be achieved if the square root of AVE exceeds the interconstruct correlation.
[a] p-values are two-tailed.

These variables measure the potential innovator's perceptions of:
INTENT = intention—intention to champion CM software adoption;
USE = useful to the organization—an innovation that is perceived as being better or offering more value than its precursor;
EOU = ease of use—the extent to which this potential innovation will be easy for the organization and employees to use to achieve their goals;
SELF_EFF = computer self-efficacy—individual's capability to use a computer. It also represents an individual's confidence in using technology;
ACT = action orientation—the likelihood of individual taking the initiative to innovate in a wide range of corporate functional areas such as technology, marketing, production, human resources, and general management;
SUB_NORM = subjective norm—individuals who are respected within this organization innovate; and
TP_MGT = top management support—management supports innovation by its employees.

of the three factors, but we did expect the individual characteristics would have a more pronounced role in the decision of the intrapreneur.

### *Test of Technology Complexity*

H3c predicts that system complexity (CMTYPE) will impact intention to champion CM and be mediated by TF. Mean (S.D.) scores for questions asking how easy the system would be to use, on a scale of 1 = difficult/disagree to 7 = easy/agree, were 4.89 (1.01) for the ICMM and 3.15 (1.31) for the ECMM. As depicted in Figure 2, the standardized path coefficient from CMTYPE to TF is −0.633 (p-value $< 0.01$) and to Intent is 0.015 (p-value $> 0.10$). The indirect effect of CMTYPE on Intent is −0.3192 (p-value $< 0.01$). Thus, participants perceived greater benefits from the less complex CM system, and this influences their intention to champion CM.

## V. DISCUSSION

We develop and test a model of the determinants of intrapreneurship, that is, the innovation by employees in a bottom-up context. With a sample of management accountant practitioners, we explore factors influencing an employee who determines that continuous monitoring (CM) will benefit his or her organization and sets about selling that idea upward through the organization.

Using structural equation modeling, we find that characteristics of the individual influence intention to innovate, including computer self-efficacy and the individual's willingness to initiate technology innovation action. Self-efficacy has been studied in the management literature to evaluate entrepreneurial intentions (e.g., Ahmed 1998; Zhao et al. 2005). Our results provide a link between the use of technology demonstrated in the accounting and IT literatures to the higher-level impact of self-efficacy on promoting creativity.

Action orientation has been associated with success in a number of fields (Beckmann and Kazén 1994; Song et al. 2006). Our findings add to this body of knowledge by demonstrating that action orientation is associated with intention to champion activities within one's organization. Action orientation has additional importance to the model as a whole, in that Norman, Sheeran, and Orbell (2003) find that individuals with a strong action-orientation are more likely to turn intentions into actions. Given that our causal variable is a measure of intention, strong support for a positive association between action-orientation and intention provides indirect support for the assumption that intention could become action, given the opportunity.

In regard to the organization, we found that top management support and the social norm of promoting technology use were both significant. This finding regarding top management support is consistent with the management literature related to innovative organizations (Ahmed 1998). The significance of social norms on intentions is consistent with technology acceptance research in the accounting literature, which has found that the influence of important others motivated the use of software in the financial audit context (Loraas and Wolfe 2006; Curtis and Payne 2008). Our findings are consistent with Brimm's (1988) notion of innovation where innovative ideas are crossed with organizational behavior that is conducive to change.

Measures related to the CM technology itself are also significant determinants of intention to champion CM, reflected by the traditional TAM factors of ease of use and usefulness. This finding links our study to the diffusion of innovation literature (Rogers 1983). It is entirely reasonable that intrapreneurs would be influenced by the predicted success of their efforts, and expected acceptance of the technology (Davis 1989) they are considering championing should be an overwhelming factor in their intentions. Additionally, we found that the complexity of the proposed CM system negatively influenced perceptions of ease of use, which mediates the relationship between complexity and intention. This suggests that management accountants are more comfortable with, and therefore more inclined to champion the adoption of, less complex configurations of CM software. Finally, we find that professional certification and professional experience, but not demographic characteristics, affect factors in our model. Future studies could investigate these relationships further.

Our study may serve to inform companies as to why and how to encourage bottom-up innovation by their management accountants. As we gain a better understanding of how bottom-up innovation occurs and the impediments management accountants and others may face in such endeavors, organizations are empowered to refocus innovation efforts on those lower in the organization and provide support for intrapreneurial activities by such individuals. These changes could include greater top management support, cultural changes to promote social norms of innovation, and selection policies to seek out individuals who have the personal qualities necessary for intrapreneurship. Additionally, not only does innovation through intrapreneurship aid the organization, but prior evidence suggests that those who have opportunities to manipulate their environments and to be creative at work are more satisfied and better adjusted than those who do not or cannot (West and Farr 1990). Thus, the benefits of intrapreneurship can accrue to the individual as well as the organization.

This study makes a number of contributions to the accounting literature. Although innovation is recognized as an important factor in organizational performance, little attention has been paid to the bottom-up innovation modeled here. Additionally, accountants are seldom viewed as innovators, although they are often in a unique position to identify opportunities that could benefit the organization. We introduce the term "intrapreneur" to the accounting literature to describe the employee, such as a managerial accountant, who takes an entrepreneurial attitude toward his or her organization. Additionally, we identify individual-level characteristics that may make a managerial accountant particularly effective in this role. For example, we demonstrate that individual creativity must be studied in the organizational context in which the intrapreneur seeks to innovate.

Additionally, our manipulation and the ease of use construct demonstrate that accountants do perceive differences in system complexity and that they prefer to champion less complex systems even though more complex systems may provide greater utility. The environment in which management accountants operate may be so complex that the addition of complicated software is less appealing than the addition of easier-to-use, but perhaps less beneficial, software. Future research may explore ways to reduce complexity in order to motivate the adoption of more beneficial software. For example, Tang, Eller, and Wier (2016) found that presentation format affected the extent to which more frequent reporting can improve detection of management reporting manipulation by financial analysts.

As compared to the ordinary view of continuous auditing software, which is typically viewed as an audit tool rather than a management tool, we consider a continuous monitoring system that has strategic as well as operational uses. Therefore, identifying factors that may encourage management accountants to champion CM systems may provide benefit to the organization as a whole. Anecdotally, some individuals who completed the survey contacted us to discuss the software, demonstrating the enthusiasm of management accountants about the promise of CM.

Our model's assumptions should be acknowledged. Most important is the assertion that bottom-up innovation with a tool such as CM is plausible. When presented to practitioners, approximately 80 percent of attendees were very convinced this is the path this innovation should take, while the remaining 20 percent were not convinced. We hope that organizations will demonstrate a willingness to allow accountants to innovate in ways that impact the organization as a whole. Second, we do not measure actual championing of innovation, and instead rely on extant research to support the intention-to-action link. Gonzalez et al. (2012b) found strong similarities between the models for those who planned to adopt and those who did not plan to adopt CM.[16] Third, for parsimony, we chose to test only two of the many facets available for each of our model factors. We in no way assert these six facets to be the only relevant ones and encourage future researchers to explore other facets reflective of our

[16] We also performed various analyses to demonstrate no significant differences between the two complexity groups. For example, an independent-samples t-test demonstrates the two groups have no significant differences in organizational structure, prior use of ABC, prior use of Balanced Score Cards, or use of benchmarking in their jobs.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model's factors. Finally, although our survey was administrated by the IMA to its members, our study has the potential for nonresponse bias.

A few caveats regarding intrapreneurship should also be made. In a study of six cases of employee-driven organizational innovation, Brimm (1988) finds that organizational innovation was often hazardous to the innovator's career. One reason is the pressure and stress that innovators must apply to the organizations around them to push an idea into an implemented solution. The single-mindedness needed to achieve success can alienate friends and provide ammunition to detractors. Additionally, since innovation is slow to occur and difficult to observe, organizations can have difficulty evaluating such projects and their sponsors. However, since it is only through innovation that organizations can achieve and maintain strategic advantages, intrapreneurs are vital. And it is possible that the study of the facets of innovation can identify solutions to the many obstacles to intrapreneurship.

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## APPENDIX A

### Instrument Measures

The survey opened with a definition of continuous monitoring, followed by the description of one of the two CM randomly assigned to them (either ICMM/ECMM) shown at the top of the computer screen.

**Welcome—this survey relates to the technology commonly referred to as Continuous Monitoring.**

Continuous Monitoring may be defined as a type of software that produces reports of financial and operational activities simultaneously with, or a short period of time after, the occurrence of relevant events. The reports often contain comparative data, such as budgets or benchmarks. The reports may be in typical print form or displayed pictorially in "dashboards," individually tailored for each user (executives and managers).

In this survey, we will first describe one specific type of continuous monitoring software that we would like you to consider as you answer several questions. We will then ask you more general questions regarding your organization and your personal attitudes.

**Thank you for participating in this survey.**

**(Continuous Monitoring Methodologies—**one of the following was displayed next.**)**

**Independent Continuous Monitoring Modules (ICMM)**

The Continuous Monitoring software we would like you to consider involves an automated data extraction tool, which captures relevant portions of the company's operational and financial data as it is processed. This software is installed outside of the company's accounting application system, and therefore is not required to be compatible with your company's accounting system. The CM system will run once or twice a day, updating managers' and executives' dashboards from the extracted data—similar to a batch processing system. The data shown in the dashboards represents the company's operation at a point in time. Although the information provided by this CM software is not up-to-the-minute as compared to real-time processing, this CM software is relatively inexpensive, easy to navigate and to operate/maintain. Results will be displayed in individually tailored "dashboards" along with benchmarks for comparison purposes.

**Embedded Continuous Monitoring Modules (ECMM)**

The Continuous Monitoring software we would like you to consider is embedded in the company's accounting system and is similar to a real-time process system. This software involves the addition of one or more modules to the company's accounting system and must therefore be compatible with the company's accounting system. Managers' and executives' dashboards will be updated constantly so that they will be able to get the most up-to-date information about the company. Although the information provided by this CM software is up-to-date, this CM software is relatively expensive, complex in nature, and relatively difficult to maintain. Results will be displayed in individually tailored "dashboards" along with benchmarks for comparison purposes.

**MEASURES:** (Items remaining after factor analyses. Unless specifically indicated, all measures were on a 7-point scale. End points will be indicated, where appropriate.)

INTENT TO CHAMPION CM (INTENT): (End points: Completely unfavorable/Completely favorable)

a. The likelihood that I would recommend this CM to my superiors is . . . (Intent1)
b. The likelihood that I would encourage my organization to adopt this CM is . . . (Intent2)
c. The likelihood that I would strongly support the adoption of CM in my organization is . . . (Intent3)

INDIVIDUAL INCLINATION TO INNOVATE (End points: Strongly disagree/Strongly agree)

1. Computer Self-Efficacy (SELF_EFF)

I could complete a job or task using an unfamiliar computer system. . .

a. If I could call someone for help if I got stuck. (Self_Eff1)
b. If I had a lot of time to complete the job for which the software was provided. (Self_Eff2)
c. If I had just the built-in help facility for assistance. (Self_Eff3)

2. Action Orientation (ACT)
   a. If I provide information to a machine or over the Internet, I can never be sure it really gets to the right place. (Act1) (End points: 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = neither agree or disagree, 5 = slightly agree, 6 = moderately agree, 7 = strongly agree)
   b. If I met someone at a professional meeting who described a software package that sounded perfect for my organization, I would. . .(Act2)
   (End points: 1 = do nothing, 2 = tell someone, 3 = ask someone else, 4 = ask for approval, 5 = begin researching, 6 = recommend we acquire the package, 7 = insist we acquire the package)
   c. If my organization had a problem that I knew could be solved by an available software solution, I would. . .(Act3) (End points: 1 = do nothing, 2 = tell someone, 3 = ask someone else, 4 = ask for approval to research, 5 = begin researching the package)



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ORGANIZATIONAL ORIENTATION TOWARD INNOVATION (End points: Strongly disagree/Strongly agree)

1. Top Management Support (TP_MGT)
   a. It seems to me that we have a lot of employees who have the same knowledge and skills and few who can introduce new ideas or add knowledge to this department and company. (Tp_Mgt1)
   b. I would receive strong active support from top management in regard to this innovation. (Tp_Mgt2)
   c. Upper management would provide adequate financial and other resources to the implementation efforts for this system. (Tp_Mgt3)
2. Subjective Norms (SUB_NORM)
   a. People around me who use information technology have more prestige than those who do not. (Sub_Norm1)
   b. People who use information technology have a high profile. (Sub_Norm2)
   c. Using information technology is considered a status symbol among my friends. (Sub_Norm3)

INNOVATIVE CHARACTERISTICS OF THE CM TECHNOLOGY (End points: Strongly disagree/Strongly agree)

1. Usefulness (USE)
   a. Applying this CM methodology in any managerial reporting application could provide assurance that those data and reports are valid. (Use1)
   b. Applying this CM methodology in any area could enhance managers' ability to react quickly and appropriately to operational issues. (Use2)
   c. Applying this CM methodology in any area could enhance managers' ability to react quickly and appropriately to financial issues. (Use3)
2. Ease of Use (EOU)
   a. It will be easy for firm employees to get this system to do what we want it to do. (EOU1)
   b. Learning to use the system described here will be easy for employees. (EOU2)
   c. Overall, the system described here will be easy to use. (EOU3)
   d. This system described here will not be overly complex to understand and use. (EOU4)