A Model for ISO 9000 Quality Management System Maintenance

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This study examines the roles of perception and belief in influencing ISO 9000 practitioners to maintain the quality management system during the post-certification period. The creation of a model to examine the causal relationships between practitioners' beliefs and ISO 9000 maintenance was guided by a cross-disciplinary approach that was based on the theory of reasoned action and the technology acceptance model. The model was founded on two paths: conceptual learning and operational learning. The former involves learning via a structured approach, while the latter relates to unstructured influences from ISO 9000 practitioners' peers and management. Data were gathered from 210 subjects, and structural equation modeling was used to analyze and test the model. The tests determined that both quality management systems practitioners' beliefs and peer and management support have a positive effect upon sustainable ISO 9000 maintenance.

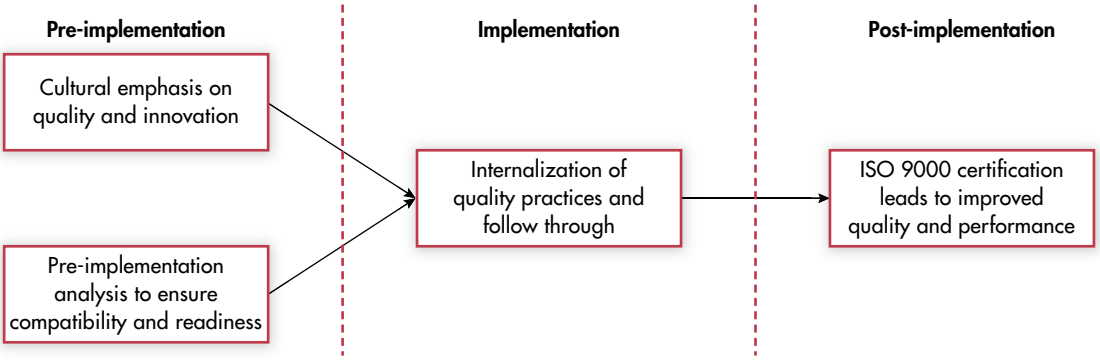
Key words: cross-disciplinary study using TAM, ISO 9000 quality management system maintenance, structural equation modeling

INTRODUCTION

In an attempt to improve organizational processes with the aim of meeting customers' ever-increasing expectations, Ivanovi and Majstorovi (2006) pointed out that organizations use quality management as a strategy to improve efficiency and effectiveness. The ISO 9000 international quality standards series (including ISO 9001, ISO 9000, and ISO 9004) provides a framework for such a quality management system (QMS) (Rusjan and Alic 2010). According to Pan, Lin, and Tai (2009), ISO 9000 certification has become a commercial necessity that is difficult for organizations to ignore, as these standards specify the minimum requirements for establishing and maintaining a documented QMS that will instill in customers confidence that the firm can meet its requirements. Since its release in 1987, it has attained an unparalleled level of acceptance within the global business community (Hernandez 2010). Through December 2013, more than 1,129,446 ISO 9000 certificates have been issued in 187 countries (ISO 2013). This phenomenon can be attributed to the effects of globalization, since customer demands often fuel the need for organizations to seek ISO 9000 certification as a prerequisite during the supplier selection process. In other instances, ISO 9000 certification is perceived to be the "passport" for easier trade entry into some countries. The ISO quality system is gaining popularity even in sectors where ISO 9000 certification is not required by customers, as more and more organizations adopt it to differentiate themselves from their competitors or to improve their organization's image.

Cheng and Tummala (1998) pointed out that the process by which organizations adopt the ISO 9000 QMS is composed of three stages: the

Figure 1 Key phases involved when adopting ISO 9000 QMS



Source: Briscoe, Fawcett, and Todd 2005.

establishment stage, the implementation stage, and the maintenance stage. In the same vein, Briscoe, Fawcett, and Todd (2005) identified the three stages as pre-implementation, implementation, and post-implementation. Figure 1 depicts the key phases involved when organizations adopt ISO 9000.

The pre-implementation or initial phase involves laying the foundation to embed a quality-oriented culture and preparing the staff to embrace the QMS. The internalization of quality practices in accordance with ISO 9000 standard requirements occurs during the implementation phase. Attaining ISO 9000 certification marks the beginning of the post-implementation (post-certification maintenance) phase where the quality and performance of organizations should improve over time as a result of the continual improvement of the QMS.

The ever-growing demand by organizations worldwide seeking ISO 9000 certification has inspired numerous studies on the subject of quality management. Multiple studies can be found on how to carry out and implement a QMS (Hernandez 2010). Among the voluminous studies carried out on ISO 9000 or quality management-related topics, Van der Wiele et al. (2005) found that empirical studies conducted within the quality management domain revolved around six key areas. Table 1 depicts these areas and the related studies.

The literature focusing on the post-certification stage (maintenance of ISO 9000) is limited, as it has been given too little attention and has been studied with the use of conceptual models rather than by means of empirical testing (Wahid and Corner 2009; van de Water 2000).

In an attempt to fill this knowledge gap, this study employs a human behavior perspective to investigate how QMS practitioners perceive the usefulness of ISO 9000 and how these interpretations (manifested through their beliefs) in turn influence their behavior with respect to the continuation of ISO 9000 maintenance during the post-certification period and beyond. Specifically, the paper addresses four main questions: 1) Does QMS practitioners' level of understanding about the requirements of ISO 9000 standards affect the post-certification phase of QMS implementation? 2) Do QMS practitioners' beliefs in the usefulness of ISO 9000 have an impact on the way they maintain the QMS? 3) Are attitudes and behaviors considered to be important attributes for effective maintenance of ISO 9000? 4) Do peer and management support shape QMS practitioners' beliefs about the usefulness of ISO 9000?

Additionally, there is a consensus that empirical study on ISO 9000 lacks theoretical groundings (Naveh and Marcus 2005; Singh and Smith 2003; Pan, Lin, and Tai 2009). Hence, this research attempts to develop a theoretical model to explain the causal relationships between QMS practitioners' beliefs toward and use of ISO 9000. The desired outcome for the model development was achieved by jointly considering two theories: the theory of reasoned action (TRA) (Fishbein and Ajzen 1975)

Table 1 Key area on quality management

Area of study	References
The relationship between ISO 9000 and TQM: Does ISO 9000 contribute to the TQM journey?	(Askey and Dale 1994; Bradley 1994; Stephens 1994; Meegan and Taylor 1997; Van der Wiele et al. 1997; Brown et al. 1998; Kanji 1998; Quazi and Padibjo 1998; McAdam and McKeown 1999; Lee 1995; Jones, Arndt, and Kustin 1997; Singels et al. 2001; Yahya and Goh 2001; Williams 1997; Kochan 1993; Brecka 1994)
Perceptions about the benefits of ISO 9000: Do the benefits exceed the costs of implementation?	(Singels et al. 2001; Llopis and Tarí 2003)
The relationship between ISO 9000 and organizational improvement: Does it lead to organizational improvements?	(Heras et al. 2002; Buzzel and Wiersema 1981; Craig and Douglas 1982; Phillips et al. 1983; Jacobson and Aaker 1987; Capon et al. 1990; Rust et al. 1994; Maani et al. 1994; Flynn et al. 1995 and 1997; Forker et al. 1996; Caruana and Pitt 1997; Adam et al. 1997; Ebrahimpour et al. 1997; Mann and Kehoe 1994; Buttle 1997; Quazi and Padibjo 1998; Lloyd's Register of Quality Assurance 1993; Institute of Quality Assurance 1993; Brecka 1994; Terziovski and Power 1997; Corrigan 1994; Henkoff 1993; Johannsen 1995; Stephens 1994)
The usefulness of ISO 9000 for different sizes and types of organizations: Is it universally applicable to all types of situations?	(Brown et al. 1998; Heras et al. 2002)
The long-term effects of ISO 9000: Does implementation lead to long lasting improvements?	(Gotzamani and Tsiotras 2001; Terziovski et al. 2003)
The motivation to implement ISO 9000: Is pressure within the supply chain and/or governmental regulation more important than quality improvement?	(Gotzamani and Tsiotras 2001)

Source: Van der Wiele et al. 2005.

and the technology acceptance model (TAM) (Davis 1986). The former emphasizes the deliberative foundations of individuals' behaviors, while the latter focuses on using behavioral intention as a proxy to explain users' acceptance of system usage.

The period of this research saw the revision of two standards within the ISO 9000 family—ISO 9001 and ISO 9004. With the introduction of the ISO 9001:2008 edition in November 2008, organizations worldwide that were certified under the previous edition (2000 version) had to upgrade their QMS to meet the requirements of ISO 9001:2008 within a three-year period or face losing their certification status. Given such a rare opportunity, this research capitalized on the transition period and studied QMS practitioners' belief-intention-behavior patterns. The ISO 9004 series, on the other hand, underwent a facelift in the third quarter of 2009. The revised ISO 9004:2009 was developed with the aim of helping ISO 9001 users obtain long-term benefits from a broader and more in-depth QMS implementation that was intended to build capacity for achieving sustained success (ISO 2009).

Understanding ISO 9000 Requirements

The necessity of understanding the quality concepts and ISO 9000 requirements is not new because such understanding by the staff of an organization contributes toward successful QMS implementation. Studies have identified that problems with interpreting the clauses of ISO 9000 standards and understanding the quality concepts contribute to subsequent difficulties in implementing the QMS (Landin 2000; Park et al. 2007; Ali, Zairi, and Mahat 2008; Idrois, Mcewan, and Belavendram 1996). From another perspective, Magd and Curry (2003) argued that having a high level of understanding of the purpose of ISO 9000 standards can lead to successful QMS implementation, and Wahid and Corner (2009) also considered such understanding to be a critical factor in successful ISO 9000 maintenance.

Perception and Belief

Because the functioning of an ISO 9000 QMS depends on people, Taylor and Wright (2003) speculated that without improvement of individuals' perceptions of the quality system and better alignment between perceptions and implementation practices, there will likely be an issue with the sustainability of the QMS. The employee perception of ISO 9000 is an overall cognitive assessment of the utility or value of ISO 9000 certification to firms (Latif and Abdullah 2003). Although different people express different opinions about the implementation of a universal QMS, it remains clear that beneath these differences is the common denominator of the individuals' perceptions and beliefs as to whether they find ISO 9000 useful in the first place. Taken together, the studies by Boiral (2003) and Karapetrovic, Fa, and Saizarbitoria (2010) demonstrate the need to understand the fundamental perceptions and beliefs about the usefulness of ISO 9000 as a prelude to the perceived benefits of ISO 9000. Perception and belief have been used interchangeably in most ISO 9000 literature (e.g., Jones, Arndt, and Kustin 1997; Taylor 1995; van der Wiele et al. 2005; Yeung, Lee, and Chan 2003).

Attitude and Behavior

A study by Askey and Dale (1994) on the attitude and behavior of managers in ISO 9000-certified organizations found that managers tended to revert to their traditional practices upon attaining ISO 9000 certification. Askey and Dale (1994) added that managers fall back to their "fire-fighting" mode in dealing with their processes rather than planning and engaging their workforce in preventive actions and continual improvement. When this happens, there is no real permanent change in attitude and behavior (Terziovski and Power 2007). Cheng and Tummala (1998, 860-861) added that:

> "The attitude and behavior of these people working in the organization is critical in achieving the ISO 9000 registration and maintaining the certified quality system. . . . The way they behave, are involved in, and change their attitudes toward developing and applying policies, procedures, and work instructions will affect the success in the establishment and implementation of the documented quality system for ISO 9000 registration."

Furthermore, a study with a sample of 100 ISO 9000-certified firms in the United Arab Emirates by Magd and Nabulsi (2012) indicated that for a successful implementation of ISO certification to take place, firms have to overcome certain obstacles; for example, the ability to change the old system as a requirement for ISO fit, and the way the organization thinks about change, organizational culture, and employee resistance to change. Their study emphasized the importance of organizational behavior toward quality management at the pre-implementation stage. Similarly, Hipkin and De Cock (2000) postulated that successful implementation of maintenance interventions depends on positive managerial attitudes and action at senior levels.

Peer and Management Support

In order to carry out the maintenance after ISO 9000 certification, top management commitment, the organization's commitment to quality, the establishment of a good reward system, and the creation of a quality awareness culture are all essential factors (Wahid 2012). Focusing on the notion of management commitment during the QMS maintenance phase, top management must still be supportive, involved, and committed, for these are essential factors to an integrative environment, change, and improvement (Low and Omar 1997; Cheng and Tummala 1998). In addition, Mantura (2008) stressed the parallel responsibility required from managers at other levels to lead members of the lower levels as well as executors.

For the rest of the organizational members, Cheng and Tummala (1998) highlighted that the supervision-level and staff-level employees are involved mostly in the implementation and maintenance of the QMS, while the operators assumed a more passive role and followed instructions for a successful ISO 9000 registration as well as the subsequent maintenance thereof.

THEORETICAL BACKGROUND

With the focus of this study placed on the human factors in relation to ISO 9000 maintenance, it is obvious that behavioral-based theory will be appropriate for the underlying theoretical foundation. According to Glanz and Bishop (2010), theories in the behavior domain can be classified into explanatory theory and change theory. The former is used to explain behavior, while the latter is used to develop more effective ways to influence behavior. Because the emphasis of this research is to unearth the human factors influencing ISO 9000 maintenance, emphasis will be placed on theories that are explanatory oriented (rather than change oriented). This is an important first step in understanding why people perceive ISO 9000 in a dissimilar fashion, and in identifying information that can be useful in designing intervention strategies to effectively sustain ISO 9000 maintenance.

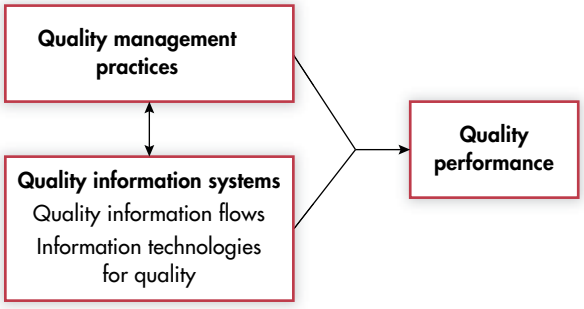
Literature in the field of information systems (IS) was identified as a suitable reference for behavior-based theories, because research has long studied how behavior shapes the way individuals accept and adopt IS. For example, Yi and Hwang (2003) illuminated how the underutilization or abandonment of IS is caused by lack of user acceptance. Relating this argument to the topic of quality management, the same consequence applies in the sense that any lack of acceptance of ISO 9000 by QMS practitioners would result in underutilization, where the QMS is implemented superficially only to comply minimally with the standards requirements. Nonetheless, the QMS would not likely be abandoned due to the fact that it is operating under a mandatory usage environment in which people are expected to use the system.

A study conducted by Forza (1999) revealed the interconnectivity between the role of information systems and quality management practices. Figure 2 presents the connection between IS and QMS. The relationship between IS and QMS is further substantiated by a study carried out by Fok, Fok, and Hartman (2001) to examine the potential relationship between the two systems when they are adopted by organizations as strategies to gain competitiveness. The authors contend that both IS and QMS are used as vehicles to improve efficiency and productivity among organizations (Fok, Fok, and Hartman 2001). When applied together, IS and QMS provide strong benefits to organizations (Ahmed and Ravichandran 1999; Chou, Yen, and Chen 1998; Funilkul et al. 2006). Given this potential, Fok, Fok, and Hartman (2001) believe that there may be important connections and synergies when IS and QMS are considered together. The fact that IS and QMS have been studied in unison suggests that there are underlying commonalities. Another point of commonality anchors on the reliance of both on people; the human factors are "the driver" that leads to the desired outcomes. Hence, it is reasonable to adopt behavioral-based theories commonly used in the IS domain for studying the determinants of system usage behavior in the QMS setting.

Theory of Reasoned Action

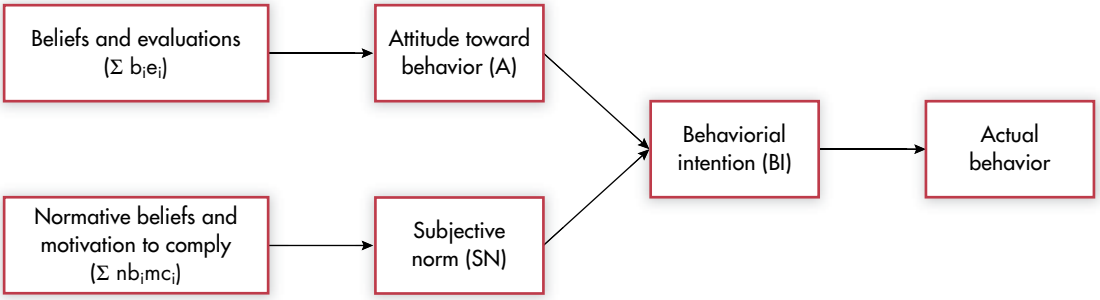
The TRA has dominated research in the field of attitude-behavior since its inception (Olson and Zanna 1993). It is a well-researched intention model developed for predicting and understanding the relationship between attitude and behavior. Figure 3 presents the TRA model. The variable names in this model reflect psychological constructs and have special meanings within the theory (Francis et al. 2004). The most immediate and important predictor of behavior in TRA is the person's intention to perform it (Langdridge, Sheeran, and Connolly 2007); for example, "I intend to exercise for at least 15 minutes

Figure 2 Connection between IS and QMS



Source: Forza 1999.

Figure 3 The theory of reasoned action (TRA)



Source: Davis, Bagozzi, and Warshaw 1989.

each day in the forthcoming month." The crux of a behavioral intention is the extent to which manifesting the behavior is a high-priority personal goal for the individual (Friedkin 2010). In general, behavioral intentions are "indicators of a person's readiness to perform a behavior" (Fishbein and Ajzen 2010). To elaborate, Ajzen (1991, 181) explained that:

> "Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior. As a general rule, the stronger the intention to engage in a behavior, the more likely should be its performance."

In essence, TRA postulates that what people think about a behavior (intention) and the subsequent formation of intention is then translated into actual behavior. On the basis of the TRA model, the intention to perform a behavior stems from the attitude toward the behavior as well as from the subjective norm. Attitude is the person's overall evaluation of what it would be like to perform a behavior, whereas subjective norm refers to the person's perceptions of social pressure to perform, or not to perform, the behavior (Langdridge, Sheeran, and Connolly 2007).

Technology Acceptance Model

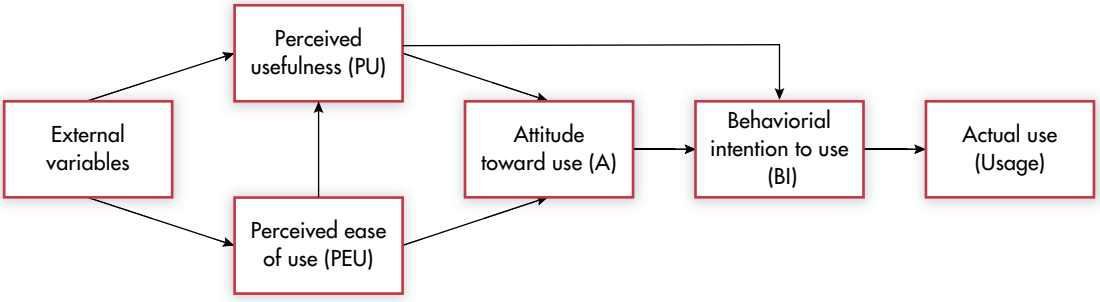
The TAM was conceived by Davis (1986) in his doctoral thesis to predict and explain factors associated with computer usage behavior. Over the years, TAM has gained popularity in the IS domain and is now the most influential and commonly employed theory for describing an individual's acceptance of IS (Lee, Kozar, and Larsen 2003; Straub Jr. and Burton-Jones 2007; Morris and Dillon 1997; Suh and Han 2002). The TAM assumes that the behavioral intention to use a particular technology is a very important factor that determines whether users will actually use it (Teo 2010). TAM has come to be one of the most widely used models in IS, in part because of its understandability and simplicity (King and He 2006). Figure 4 depicts the TAM model.

TAM explains the effect of a user's perception of system characteristics on the user's acceptance of IS. TAM provides a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions (Davis, Bagozzi, and Warshaw 1989). TAM adopts the TRA model's causal relationship to illuminate two particular beliefs—perceived usefulness and perceived ease of use—which are most significant to IS acceptance behaviors (Suh and Han 2002). TAM posits that a user's internal beliefs can be determined by perceived usefulness and perceived ease of use. The definitions of both beliefs, as provided by Davis (1989), are as follows:

- Perceived usefulness: the degree to which a person believes that using a particular system will enhance his or her job performance.
- Perceived ease of use: the degree to which the prospective user expects the target system to be free of effort.

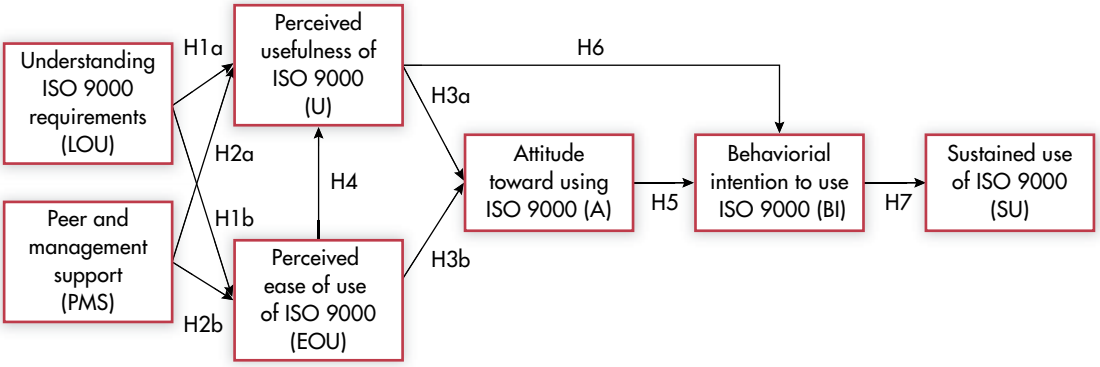
The impact of external variables on behavioral intentions is mediated by these two beliefs (Yi and

Figure 4 Original technology acceptance model (TAM)



Source: Davis, Bagozzi, and Warshaw 1989.

Figure 5 Proposed conceptual model



Note: Modified from technology acceptance model (Davis, Bagozzi, and Warshaw 1989).

Hwang 2003). Furthermore, perceived ease of use is a determinant of perceived usefulness because, other things being equal, users consider a system more useful when it is more effort-free (Yi and Hwang 2003). According to Burton-Jones and Hubona (2005), the decision to use a particular system based on the TAM involves four key stages:

- External variables and users' beliefs relationship: Users consider external variables (e.g., their individual abilities, the type of system, the task, the situational constraints) to assess the significance of using the system. Their overall assessment is manifested in their beliefs about the system's usefulness and its ease of use.
- Users' beliefs and attitudes relationship: Users' beliefs about the effect of using the system will drive their attitude toward the behavior of using the system.
- Attitude and behavioral intention relationship: The positive (favorable) or negative (unfavorable) attitudes of the users toward using the system determine the extent to which they intend to use the system.
- Behavioral intention and behavior relationship: Behavioral intention formed by the users about using the system drives their action as to whether they will use the system.

CONCEPTUAL MODEL AND HYPOTHESES DEVELOPMENT

From the beliefs-attitudes-intentions-behaviors paradigm, the conceptual model (see Figure 5) established for this study, consistent with TAM, postulates that ISO 9000 maintenance (sustained use) is influenced by behavioral intentions to use

the QMS, attitudes toward using it, user beliefs, and external variables.

Since the conceptual model of this study is constructed based on the TAM, the hypotheses established for this study are therefore consistent with those expressed in the TAM, except that the present study anchors on those relationships in an ISO 9000 context. At this juncture, it would be appropriate to relate the research questions that were derived earlier to the various hypotheses. In the TAM, external variables (e.g., user training) influence user beliefs about using the system (Burton-Jones and Hubona 2006). As mentioned earlier, TAM posits two belief constructs: perceived usefulness and perceived ease of use. Relating to research questions no. 1 and no. 4, the two specific external variables identified for this study—level of understanding, and peer and management support—it is possible to put forth the following hypotheses:

- **H1a:** QMS practitioners' level of understanding of ISO 9000 standards requirements will have a significant positive effect on the perceived usefulness of ISO 9000.
- **H1b:** QMS practitioners' level of understanding of ISO 9000 standards requirements will have a significant positive effect on the perceived ease of use of ISO 9000.
- **H2a:** Peer and management support will have a significant positive effect on the perceived usefulness of ISO 9000.
- **H2b:** Peer and management support will have a significant positive effect on the perceived ease of use (EOU) of ISO 9000.

TAM postulates that user beliefs influence their attitudes about using a system (Burton-Jones and Hubona 2006). Specifically, perceived usefulness and perceived ease of use have a significant influence on attitude toward usage (Davis and Venkatesh 1996; Cheung and Huang 2005; Burton-Jones and Hubona 2006). These observations, when related to research question no. 2, lead to the following hypotheses:

- **H3a:** Perceived usefulness will have a significant positive effect on attitude toward using ISO 9000.
- **H3b:** Perceived ease of use will have a significant positive effect on attitude toward using ISO 9000.

In addition, perceived ease of use has been shown to influence perceived usefulness (Teo et al. 2009), based on the notion that users are likely to find the system useful when they perceive it to be easy to use (Teo 2010; Yi and Hwang 2003). Hence, the following hypothesis is formulated:

- **H4:** Perceived ease of use will have a significant positive effect on perceived usefulness of ISO 9000.

TAM posits that behavioral intention is jointly determined by the person's attitude toward using the system as well as the perceived usefulness (Davis, Bagozzi, and Warshaw 1989). In connection with research question no. 3, then, it is possible to formulate the following hypotheses:

- **H5:** Attitude toward using will have a significant positive effect on behavioral intention to use ISO 9000.
- **H6:** Perceived usefulness will have a significant positive effect on behavioral intention to use ISO 9000.

Last, but not least, actual usage of the system is determined by behavioral intention (Burton-Jones and Hubona 2006; Yi and Hwang 2003). Hence, the last hypothesis is written as follows:

- **H7:** Behavioral intention to use will have a significant positive effect on sustained use of ISO 9000.

METHODOLOGY

Sample

Dillman, Smyth, and Christian (2009) suggested obtaining directory listings of specialized groups related to the target population. On the basis of this recommendation, an online directory of ISO 9000-certified companies in Singapore (Marshall Cavendish Business Information 2009) was used. This study has identified the management representative and the assistant management representative as the targeted respondents, as they are deemed to be the QMS practitioners who are the key custodians of the ISO 9000 QMS within their respective organizations. According to this view, one may assume that these individuals probably have the broadest overall view of their organization's quality management maintenance initiatives.

Measurement Development

Scales measuring the variables established in the theoretical model were developed by adapting/modifying questionnaires from published journals in the IS domain. Reference was made to studies by Yeung, Lee, and Chan (2003) and Theng and Wan (2007) to measure the "level of understanding" and "peer and management support" variable. "Perceived usefulness" and "perceived ease of use" were measured on item scales adopted from Davis, Bagozzi, and Warshaw (1989) and modified to suit this study. The scales used to measure "attitude" were derived from past studies (e.g., Taylor and Todd 1995; Morris and Dillon 1997; Suh and Han 2002; Lanseng and Andreassen 2007). Identical items measuring "intention" were adopted from Francis et al. (2004), Morris and Dillon (1997), and Suh and Han (2002) and modified to suit the context of this study. Items for "sustained usage" were obtained from previous studies (e.g., Igbaria, Parasuraman, and Baroudi 1996; Al-Gahtani, Hubonna, and Wang 2007; Davis, Bagozzi, and Warshaw 1989). Consistent with the aforementioned studies, this research adopted a seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7).

Pretest

Prior to administering the main study, a pilot study was carried out to get an indication as to whether the individual questions and scales appeared to be functioning as intended (Dillman, Smyth, and Christian 2009). This is an essential step because the variables selected were predominantly used in studies drawn from the IS context; thus, the pilot study serves as a means by which to determine whether the proposed questionnaire is appropriate for use in a QMS context. A total of 100 respondents were selected, using a convenience sampling approach, to participate in the pilot study. All participants possessed knowledge relating to ISO 9000 and were experienced with ISO 9000 implementation. Following the pilot testing, an exploratory factor analysis was conducted. The analysis and additional feedback from the respondents resulted in the refinement of measurement items from 26 items to 20 items representing the seven constructs postulated in the conceptual model that was used for the main study (see Appendix – Measurement Items).

Data Collection – Main Study

A pre-notice letter was sent to individuals who had been selected to possibly participate in the survey. This was followed by a survey package containing a cover letter with an information sheet explaining the purpose of the survey, an explanation about why their response was important, and the questionnaire. A reminder letter with a thank-you letter was subsequently sent to all potential participants to express appreciation for their time and effort in participation.

In total, 210 usable completed questionnaires were received from 1,625 survey packages sent. The response rate of 12.92 percent is within the acceptable range because postal surveys conducted in Singapore typically yield a response rate of between 10 and 15 percent, as reported by numerous studies (e.g., Wang, Wee, and Koh 1998; Harzing 1997; Harzing, 2000). Also, a sample of 210 responses is deemed a large enough sample for structural equation modeling (SEM) analysis (Kline 2010). Cook, Heath, and Thompson (2000) argued that response representativeness is more important than response rate in survey research. Most of the respondents worked in the manufacturing sector (32.9 percent), followed by building and construction (20.5 percent), service sector (17.1 percent), engineering (12.4 percent), trading (7.1 percent), and marine and shipbuilding (5.7 percent). The remaining 4.3 percent was composed of those in other industries such as medical, information technology, automation, oil and gas, and so on. In line with the statistics from Singapore Ministry of Manpower (MOM) (2010), the top three groups of respondents in this study are consistent with the top three industry players in Singapore's economy.

A nonresponse bias test was carried out to examine and estimate the likelihood of survey response bias. Dealing with nonresponse bias involves comparing early responses and late responses (Donald 1960). In this study, the first 50 cases (early respondents) were

Table 2 Comparison between early and late respondents

Descriptive statistics (First 50 respondents)	N	Min	Max	Mean	Std. deviation
Position	50	1	4	2.88	1.118
Appointment	50	1	2	1.18	0.388
Years in current appointment	50	2	6	3.42	1.230
Prior experience	50	0	1	.48	0.505
Gender	50	1	2	1.76	0.431
Age	50	1	4	2.88	0.918
Education	50	1	4	2.72	0.834
Industry/Business sector	50	1	6	3.18	1.913
Company size	50	1	6	2.92	1.426
Valid N (listwise)	50				
Descriptive statistics (Last 50 respondents)	**N**	**Min**	**Max**	**Mean**	**Std. deviation**
Position	50	1	4	2.40	1.262
Appointment	50	1	2	1.24	0.431
Years in current appointment	50	1	6	3.24	1.302
Prior experience	50	0	1	.40	0.495
Gender	50	1	2	1.52	0.505
Age	50	1	4	2.60	0.881
Education	50	1	4	2.42	0.785
Industry/Business sector	50	1	6	3.12	2.057
Company size	50	1	6	3.04	1.309
Valid N (listwise)	50				

Table 3 Discriminant validity for the measurement model (construct level)

Construct	LOU	PMS	U	EOU	A	BI	SU
LOU	(0.81)						
PMS	0.43**	(0.86)					
U	0.31**	0.64**	(0.85)				
EOU	0.38**	0.51**	0.46**	(0.76)			
A	0.29**	0.53**	0.57**	0.39**	(0.85)		
BI	0.30**	0.58**	0.61**	0.43**	0.50**	(0.92)	
SU	0.32**	0.67**	0.56**	0.38**	0.60**	0.56**	(0.78)

Note: Diagonal in parentheses: average variance extracted from observed variables (items); Off-diagonal: variance shared between the construct and other constructs.
** $p < 0.01$

compared with the last 50 cases (late respondents). The result of the comparison (see Table 2) revealed that the outcomes between the first 50 respondents and the last 50 respondents produced comparable results. Therefore, it is possible to conclude that response bias is likely to be minimal.

Data Analysis

SEM technique using the Statistical Package for Social Sciences (SPSS) version 18.0 for Windows and Analysis of Moment Structures (AMOS) version 18.0 statistic applications were used in this study for the purpose of data analysis. Fundamentally, SEM is a statistical methodology that allows the examination of relationships among observed and latent (unobserved) variables (Hoyle 1995). It is an extension of the general linear model and serves a purpose similar to that of multiple linear regressions. The use of SEM allows researchers to investigate the extent to which variations in one variable correspond to variations in one or more variables based on correlation coefficient (Hoe 2008), while testing whether theoretically plausible models provide a good fit for the collected data (Kember and Leung 2005). This provides a comprehensive means for assessing and modifying theoretical models (Anderson and Gerbing 1988).

The composite reliability of the variables are level of understanding (0.77); peer and management support (0.84); perceived usefulness (0.83); perceived ease of use (0.72); attitude toward use (0.83); behavioral intention (0.91); and sustained usage (0.75). Discriminant validity for the measurement model is shown in Table 3.

RESULTS

Assessment of Measurement Model

The measurement model was assessed for goodness of fit. The hypothesized measurement model has a chi-square value of 351.768 with

a p-value of 0.000 and degrees of freedom of 149. The goodness of fit measures were relative chi-square (χ^2/df) = 2.361, Tucker-Lewis index (TLI) = 0.923, comparative fit index (CFI) = 0.940, root mean square error of approximation (RMSEA) = 0.08, and standardized root mean square residual (SRMR) = 0.0493.

Given that the data of this study were found to be non-normal, the ML-based chi-square will likely be inflated (Curran, West, and Finch 1996) and therefore should not be used to assess the overall model fit. The bootstrapping procedure was used to correct for the non-normality. So, the Bollen-Stine p-value (Bollen and Stine 1993) is used rather than the usual ML p-value to assess overall model fit, as the former can provide the corrected p-value for chi-square statistics to assess overall model fit. On the basis of the 500 bootstrap samples from AMOS, the Bollen-Stine bootstrap p-value of overall model fit is p = 0.002. The mean chi-square value obtained for the 500 bootstrap samples is 201.534. Using a conventional significance level of 0.05, a significant chi-square (i.e., when $p < 0.05$) suggests that the model does not fit the sample data (Weston and Gore 2006). In this instance, the Bollen-Stine bootstrap p-value is less than 0.05 (p = 0.002), and hence the measurement model is rejected.

To resolve the issue of an unacceptable overall model fit, a respecifying of indicators was carried out. Anderson and Gerbing (1988) recommended four basic approaches: 1) relating the indicator to a different factor; 2) removing the indicator from the model; 3) relating the indicator to multiple factors; and 4) using correlated measurement errors. Among them, the first two approaches were preferred, as they preserve the potential for unidimensional measurement (Anderson and Gerbing 1988). The analysis proceeded with an exploratory approach to determine which parameters within the hypothesized measurement model are misspecified. This step involved the use of AMOS to identify alternative measurement models by removing indicators from the model. Multiple criteria, including theoretical, statistical, and practical considerations, were taken into account during the assessment of model adequacy (Byrne 2000). Following the specification search procedure, a revised measurement model with acceptable results was found.

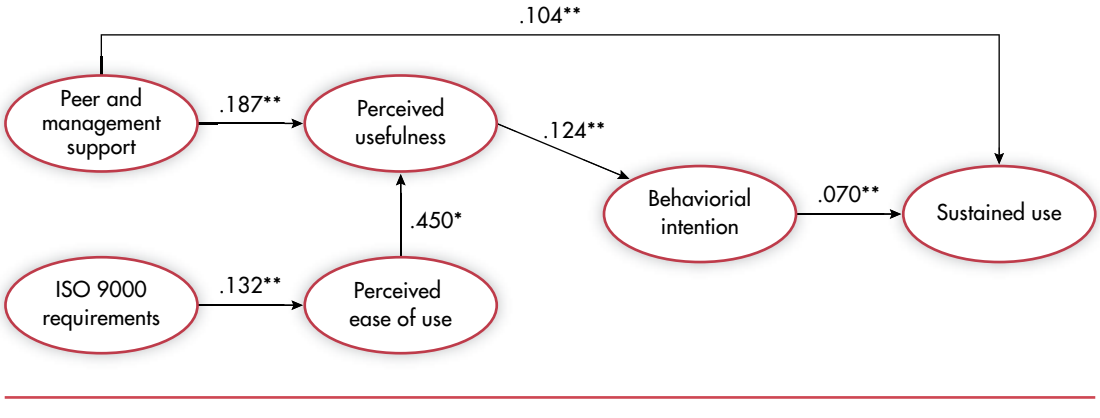
The adjusted measurement model has an ML chi-square of 104.202 with a p-value of 0.000 and degrees of freedom of 56. The mean chi-square value obtained for the 500 bootstrap samples is 75.589. With the same degrees of freedom, the mean chi-square from bootstrap is lower than the chi-square expected under joint multivariate normality using ML estimate. The mean chi-square from bootstrap samples was used as the critical chi-square value against which the obtained ML chi-square of 104.202 was compared. When the obtained chi-square is compared to 75.589, the p-value associated with that hypothesis test is 0.07 and is not statistically significant. A nonsignificant bootstrap mean chi-square value ($p > 0.05$) is therefore indicative of a model that fits the data well (Weston and Gore 2006). The measurement of goodness of fit yielded results (TLI = 0.965, CFI = 0.979, RMSEA = 0.064, and SRMR = 0.0339) that further supported a good fit model.

Assessment of Structural Model

Having established a measurement model that is consistent with the data, the structural model was evaluated next. The initial structural model has ML chi-square = 218.648 with a p-value of 0.000 and degrees of freedom of 66. The goodness of fit measures were χ^2/df = 3.313, TLI = 0.907, CFI = 0.932, RMSEA = 0.106, and SRMR = 0.1027. On the basis of the 500 bootstrap samples from AMOS, the Bollen-Stine bootstrap p-value of overall model fit is p = 0.002. The mean chi-square value obtained for the 500 bootstrap samples is 90.432. In this instance, the Bollen-Stine bootstrap p-value is less than 0.05 (p = 0.002) and hence the initial structural model is rejected.

Because the initial structural model did not represent a good fit, the next step was a series of specification searches with the aim to optimize the respecification process (Kline 2010). Following the specification search procedure, the final structural model included an ML chi-square of 78.372 with a p-value of 0.001 and degrees of freedom of 44. The goodness of fit measures were χ^2/df = 1.781, TLI = 0.971, CFI = 0.981, RMSEA = 0.061, and SRMR = 0.0328. The mean

Figure 6 ISO 9000 maintenance model



Note: * significant at p < 0.05 level (two tailed)
** significant at p < 0.001 level (two tailed)

Table 4 Results of hypotheses testing

Path	Hypothesis	CR Value	Result
Level of understanding → Perceived usefulness	H1a	–1.393	Not supported
Level of understanding → Perceived ease of use	H1b	7.661**	Supported
Peer and management support → Perceived usefulness	H2a	3.552**	Supported
Peer and management support → Perceived ease of use	H2b	–1.228	Not supported
Perceived usefulness → Attitude toward use	H3a	–	Not tested
Perceived ease of use → Attitude toward use	H3b	–	Not tested
Perceived ease of use → Perceived usefulness	H4	2.156*	Supported
Attitude toward use → Behavioral intention	H5	–	Not tested
Perceived usefulness → Behavioral intention	H6	5.603**	Supported
Behavioral intention → Sustained use	H7	3.442**	Supported
Peer and management support → Sustained use	–	5.421**	Supported

Note: * significant at p < 0.05 level (two tailed)
** significant at p < 0.001 level (two tailed)

chi-square value obtained for the 500 bootstrap samples is 61.119 with a p-value of 0.142. Using the conventional significance level of 0.05, the final structural model would not be rejected, and hence it can be concluded that the hypothesized conceptual model established is sufficiently close to the observed data with the remaining differences attributed to sampling fluctuations. The resultant model for ISO 9000 maintenance is presented in Figure 6, and a summary of the hypotheses tested is shown in Table 4. As a result of the model respecification process, an additional relationship path was established. The additional relationship path was established from peer and management support having a direct influence on sustained usage. Although human factors such as belief, attitude, intention, and behavior stemmed from the psychological and behavioral domain, the relationship between the peer and management construct and the sustained usage construct established in this study can perhaps best be explained using the network theory of social influence. This network theory relates to the dynamic of interpersonal influence in a group

(Friedkin 2001; Friedkin and Johnsen 2003) and opens the door for this study to further understand the effect of interpersonal (peer and management) influence on the use of ISO 9000. To this end, Fishbein and Ajzen (2010) stressed the importance of social environment as a determinant of human action. As a caveat, the workplace setting of a business organization is a network setting that enables individuals to draw on the organization's human resources to support the effective functioning of the business. According to this understanding, the direct influence of peer and management support on QMS practitioners' usage patterns of ISO 9000 is valid based on the argument by Fishbein and Ajzen (2010) that behavior of individuals and the indicators of various outcomes can vary greatly as a function of the social environment.

DISCUSSION

The results of this study suggest that, as a whole, QMS practitioners' beliefs about the ease of use of ISO 9000 are derived from their understanding of the standard's requirement. The positive effect of QMS practitioners' understanding of ISO 9000 requirements on perceived ease of use suggests that structured trainings relating to quality management may enhance their self-efficacy and serve to clarify the misconception that ISO 9000 procedures are too rigid and little more than bureaucratic red tape for the organization to deal with. This suggests that training programs could foster an individual's self-confidence and perception concerning the system (Liao and Landry Jr. 2000).

Training programs should therefore promote a perception of ISO 9000's usefulness among QMS practitioners, and instill confidence that the QMS is easy to use given an adequate level of understanding. Without adequate training to appreciate and understand ISO 9000, QMS practitioners are likely to experience implementation problems relating to use of the system. Faced with a lack of understanding, they may find it taxing to follow the established quality procedures as they struggle to align their work processes in compliance with the stipulated ISO 9000 requirement. As a consequence, they may think that ISO 9000 is too difficult to use and that the desired benefits of using the QMS are overshadowed by the often tedious effort needed to comply with the quality procedures; this, in turn, might cause them to develop a sense of reluctance (or worse still, resistance) to the use of ISO 9000.

Separately, this study found that QMS's practitioners' beliefs about the usefulness of ISO 9000 is shaped by the support they receive from their peers and management as well as from their beliefs about the ease of use of ISO 9000. The influence of peer and management, which refers to the amount of support QMS practitioners received from significant others within their organization pertaining to implementation/maintenance issues surrounding the use of ISO 9000, had a direct effect on QMS practitioners' perceptions of the usefulness of ISO 9000. It seems possible that, other than relying on their own assessment of the ease of use of ISO 9000, which in turn influences their perceptions of its usefulness, QMS practitioners also conceived their beliefs regarding ISO 9000's usefulness through the support they received from their peers and management.

The results of this study demonstrate the relative contribution of belief constructs in influencing QMS practitioners to sustain their system usage as part of the ongoing efforts needed for ISO 9000 maintenance. Specifically, the results identify the key mediating role of perceived ease of use and perceived usefulness in promoting ISO 9000 maintenance (i.e., sustained system usage), and demonstrate the utilitarian and rational underpinnings of the decision to sustain the system maintenance in ISO 9000-certified organizations. In essence, QMS practitioners are likely to use ISO 9000 as part of their work processes if they believe that it is easy to use and that following the established quality procedures in the course of their work will increase their performance and productivity.

Findings from the current study suggest that QMS practitioners are more willing to use ISO 9000 if the QMS is perceived to be beneficial in helping them perform their daily jobs. By the same token, "no amount of ease of use will compensate for low usefulness" (Keil, Beranek, and Konsynski 1995). This may suggest that QMS practitioners are driven to accept ISO 9000 primarily on the basis of the functions it performs for them in the course of their work and, secondarily, because of its

ease of use. This trend also revealed possible signs that QMS practitioners may be willing to cope with difficulties with complying with ISO 9000 requirements if they find that complying with the established quality procedures enhances the effectiveness of their job.

Given the importance of perceived usefulness in this study, it emerged that QMS practitioners' perception of the usefulness of ISO 9000 (beneficial outcomes associated with using ISO 9000) point to this perception's being a salient predictor of behavioral intention. This finding indicates that QMS practitioners' intentions to maintain ISO 9000 can be influenced by their perceptions regarding the usefulness of ISO 9000 in improving their job performance. As observed by Davis (1989), a system that is perceived to be useful is one that a user believes to have a positive use-performance relationship. Similarly, "a system that does not help people perform their jobs is not likely to be received favorably in spite of careful implementation efforts" (Robey 1979). Taken together, QMS practitioners who perceive ISO 9000 to be useful will develop a behavioral intention that is likely to see them using the system more regularly. On the contrary, when QMS practitioners perceive ISO 9000 to be less useful, their intention to use the system will be reduced and may result in the situation where they only prepare for the annual audit administered by the registrars without really benefiting from the QMS implementation in the course of their daily work. The resultant effect may lead to a maintenance of ISO 9000 that is only superficial. When such situations arise, sustained usage without any specific purpose or usefulness will lead to a decline in usage over time.

QMS practitioners' behavioral intentions fully mediated the effect of usefulness on self-reported usage patterns of ISO 9000 maintenance. Looking at the behavioral outcome of this study, the sustained usage of ISO 9000 is a result of QMS practitioners' behavioral intentions and the support received from peer and management. Contrary to the accepted assumption that holds that behavioral intention is the most important antecedent/proximal cause of behavior (Fishbein and Ajzen 2010; Trafimow 2009), this study found that external variables could have direct effects on usage behavior over and above their indirect effects. In essence, the results from this study yield six key insights regarding the determinants of QMS practitioners' use of the QMS as a representation of ISO 9000 maintenance:

1. The extent of QMS practitioners' maintenance efforts (manifested through their usage pattern) can be predicted accurately from their intentions.
2. QMS practitioners' perceived usefulness of ISO 9000 is a major determinant of their intention to use it.
3. QMS practitioners' perceived ease of use is a secondary determinant of their intention to use ISO 9000.
4. QMS practitioners' beliefs regarding the ease of use of ISO 9000 can be affected by their level of understanding of the ISO 9000 requirements.
5. QMS practitioners' beliefs about the usefulness of ISO 9000 can be affected by the perceived ease of use of ISO 9000 as well as by peer and management support.
6. Peer and management support has a significant impact, both direct and indirect, on the extent to which QMS practitioners maintain the ISO 9000 QMS.

The paths toward the sustainability of ISO 9000 maintenance can perhaps be best articulated by Kim's (1993) two facets of learning: conceptual and operational. Drawing a distinction between the two, the former relates to the acquisition of *know-why*, which involves articulating and understanding why things are done in the first place (Kim 1993). Operational learning, on the other hand, reflects the acquisition of skill, or *know-how*, and involves learning at the procedural level, where one learns the steps involved to complete the given task, such as filling out forms and operating a machine (Kim 1993). Much know-how is gained through a process of trial and error (Milo and Schuldiner 2009). Providing further differences, Mukherjee and van Wassenhove (1997) maintained that operational learning is based on experimentation, while conceptual learning is based on formally acquired knowledge like professional training.

Conceptual Learning Path

The conceptual learning path (see Figure 7), beginning with the ISO 9000 requirements, portrayed the conceptual level of understanding that QMS practitioners are

Figure 7 Conceptual learning path

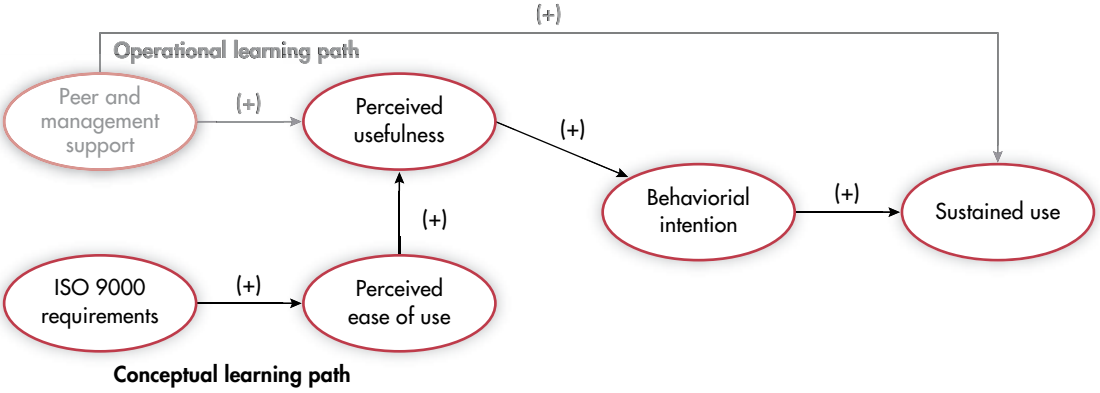
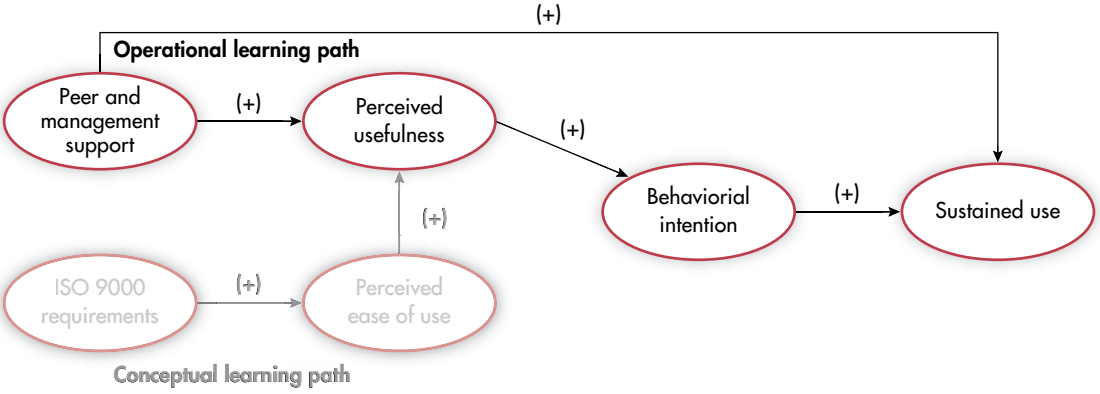


Figure 8 Operational learning path



exposed to during the course of overseeing the development of various phases (e.g., adoption, implementation, and certification) leading to ISO 9000 maintenance in their respective organizations. Arguably, as the current study has found, the extent of QMS practitioners' understanding of the ISO 9000 requirements will shape their beliefs about the ease of use of the QMS.

Because the perceived ease of use measures user assessments of ease/difficulty of use and ease/difficulty of learning, the ease of use belief deals with user motivation that is based on assessing the intrinsic aspects of using the system (Gefen and Straub 2000). The assessment of the intrinsic aspects of ISO 9000 would entail understanding the standard's requirements and its interaction with various supplier-organization-customer processes relating to the implementation/use/maintenance of ISO 9000. In a nutshell, perceived ease of use is basically a function of user friendliness in which QMS practitioners may find ISO 9000 requirements to be either easy to interpret and implement or difficult to interpret and tedious to implement.

Operational Learning Path

As against the introduction of explicit knowledge-based training programs as a structured approach to the development of an understanding of the ISO 9000 via the conceptual learning path as presented in the preceding section, the findings of this study suggest that the organizational influence path plays a more important role in shaping the maintenance of ISO 9000—both directly and indirectly. The operational learning path is presented in Figure 8. Two routes of influence stem from peer and management support, with a direct positive effect on sustained usage and an indirect positive effect on sustained usage via the usefulness-intention path.

As pointed out by Lambert and Ouedraogo (2008), ISO 9000 implementation begins with the appropriation of the organization of members' knowledge (understanding of the standard's requirements), its codification, and then its dissemination to other members within the organization. As such, the first impact of peer and management support upon QMS practitioners is to redistribute knowledge through sharing, after codifying the ISO 9000 standards' requirements.

The formation of an ISO working committee to oversee the effective QMS implementation is not mandated as part of the ISO 9000 standards requirement. A study by Cheng and Tummala (1998) found that the formation of a steering committee is an optional element during the maintenance stage. Findings from the current study reveal that a majority of organizations had put in place an ISO steering committee to oversee effective ISO 9000 implementation, and this provided further justification for the idea that peer and management support has significant influence on QMS practitioners' usage pattern of the QMS.

Lambert and Ouedraogo (2008) explained that two distinct activities of the ISO 9000 steering committee include regular meetings to exchange knowledge and experiences, and to reflect on the possibility of transferring some practices between units of the organization. During the process of knowledge transfer, it is argued that benefit and system usefulness perceived by peers and management form part of the transaction. This sort of effect is just like a painter who is passionate about his painting in which the passion may well rub off onto those with whom he shares it (Thompson 2010). Such a rub-off effect can be exemplified by drawing upon the theoretical argument, psychological pathways of internalization and identification that were posited by Kelman (1958). As Lewis, Agarwal, and Sambamurthy (2003, 662) maintained:

> "Via internalization, the individual incorporates the opinion of an important referent as part of her own belief structure: in essence, the referent's beliefs become one's own. Via identification, the individual seeks to believe and act in a manner similar to those possessing referent power."

Therefore, compelling signals received from significant others (peers and management) may directly influence QMS practitioners' thoughts about the perceived usefulness of ISO 9000 and also the extent of system usage. Tracing the theoretical roots of the current study, it is interesting to note that TAM excludes social influence from its formulation (Davis, Bagozzi, and Warshaw 1989) during the model's infancy stage, due to its uncertain psychometric properties. This exclusion contradicts the underlying TRA that TAM was founded because TRA has traditionally posited that social influence affects usage intentions in a manner similar to that of attitude (e.g., Taylor and Todd 1995; Karahanna, Straub, and Chervany 1999). However, subsequent additions to the TAM model saw the inclusion of social influence as a factor that was important to beliefs about the usefulness of a technology (Venkatesh and Davis 2000). The findings of this study lend further support to the significance of the relationship between social influence and belief.

Managerial Implications

The current study has found the understanding of ISO 9000 requirements as well as peer and management support to be the exogenous factors that influence QMS practitioners' efforts to maintain ISO 9000. Hence, having a better understanding of these exogenous factors may enable organizational leaders to formulate strategies toward sustaining ISO 9000 maintenance. As a starting point, this research provides a better understanding of the underlying human factors associated with ISO 9000 maintenance and also a better understanding of the factor of peer and management support. Taken together, findings from this study suggest that human factors can lead to differing usage patterns among ISO 9000 QMS practitioners. Armed with knowledge of the various behavioral perspectives that are instrumental in the effective maintenance of ISO 9000, organizational leaders can better identify appropriate management interventions. For instance, the knowledge that users' level of understanding of the ISO 9000 requirements has a direct influence on their perceived ease of use is a signal that organizations need to move beyond the provision of basic

ISO 9000 awareness training and start identifying additional trainings that might be necessary to enhance the knowledge and deepen the understanding of quality management concepts among QMS practitioners. Such trainings should not be a one-off effort; they should be carried out on a sustainable basis that can continually rejuvenate the minds of the QMS practitioners.

Because QMS practitioners' perceptions of ISO 9000's usefulness is influential in determining their usage intentions, organizational leaders should continue to nurture and fortify QMS practitioners' beliefs about the usefulness of ISO 9000 as a critical leverage point for sustaining the maintenance of the QMS. In terms of peer and management support, it was found from this study that more than one-third of the organizations did not form an ISO working committee. While the formation of such committees is not a mandatory part of the ISO 9000 requirements, the results of this study suggest that having a steering committee in place will improve the overall maintenance of the QMS, because peer and management support was found to be one of the important factors that has direct influence on perceived usefulness and sustained usage of ISO 9000.

While the guidelines of ISO 9000 standards stipulate that an organization's top management appoint a member of their management to be the management representative (ISO 2008), it was observed from the profile of the respondents in this study that close to one-third of the respondents hold executive (nonmanagement) positions. As a strategy moving forward, organizational leaders need to ensure that the management representative designate is in a good position to exercise influence within organizations to orchestrate the proper implementation and maintenance of ISO 9000.

Future Research

This study considered peer and management support as a single entity to assess the existence of possible influence of both factors upon QMS practitioners' beliefs and behaviors. As the results of this study reveal peer and management support to have a direct influence on users' sustained usage and an indirect influence via perceived usefulness, it is recommended that future research look at the effect of peer and management support separately, with the aim of uncovering specific similarities and differences between them. Moreover, the network theory of social influence can be incorporated into subsequent research endeavors in order to deepen the understanding of the effects of interpersonal (peer and management) influence on ISO 9000 maintenance.

This study also led to significant findings with respect to ISO 9000 maintenance in the form of system usage at the individual level (i.e., from the QMS practitioner perspective); hence, practitioners may find this research to be timely and useful. Future research can consider taking a multilevel approach, as suggested by Kozlowski and Klein (2000), that "entails more than one level of conceptualization and analysis." Goodman (2000) added that a multilevel approach could better examine the linkages between various levels within the organization (e.g., to discover how individual contributions generate and sustain communities).

Organizations are made up of individuals; thus, the sustainability of ISO 9000 can be independent of any specific QMS practitioner but not independent of all individuals. This study includes a construct to reflect social and organizational influences (i.e., peer and management support). Future research could emphasize multilevel research, and help to understand the practitioner influences in ISO 9000 maintenance. Emphasizing further, multilevel research can also contribute to a deeper understanding of ISO 9000 usage by studying the organizational and social perspectives in detail to gain new perspectives on the nature of system usage, as well as its emergence and maintenance.

CONCLUSION

This study has revealed the importance of QMS practitioners' beliefs (individual factors) as well as peer and management support (social and organizational factors) on sustainable ISO 9000 maintenance. That is, a high level of perceived usefulness coupled with strong peer and management support can better contribute to an effective maintenance of the QMS. With

the anticipation that future studies will emphasize the post-certification phase of ISO 9000, it is envisaged that the current study will lead to a synergistic understanding of how each individual, social, and organizational factor contributes to and complements the effective functioning of other factors within the setting of an ISO 9000-certified organization. In closing, it is hoped that the model for ISO 9000 maintenance developed from this study can play a role in contributing to this process.

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BIOGRAPHIES

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APPENDIX – MEASUREMENT ITEMS

Construct	Item	Question
Level of understanding	LOU-1	I am fully aware of the general requirements of the ISO 9001:2000 standards.
	LOU-2	I can understand all the clause requirements of the ISO 9001:2000 standards.
	LOU-3	I know how to relate the ISO 9001:2000 clause requirements to my company processes.
	LOU-4	I would rate my level of understanding of ISO 9001:2000 as high.
Peer and management support	PMS-3	My colleagues acknowledge my contributions as the company's management representative/ assistant management representative.
	PMS-4	The top management (managing director or equivalent) acknowledges my contributions as the company's management representative/assistant management representative.
Perceived usefulness	U-2	Using the ISO 9001:2000 quality system increases my productivity.
	U-3	Using the ISO 9001:2000 quality system enhances the effectiveness of my job.
Perceived ease of use	EOU-1	Learning to implement ISO 9001:2000 quality system was easy for me.
	EOU-2	Using the ISO 9001:2000 quality system does not require a lot of my mental effort.
	EOU-3	It was easy for me to become proficient at using the ISO 9001:2000 quality system.
	EOU-4	Overall, I find the ISO 9001:2000 quality system easy to use.
Attitude toward use	A-1	Using the ISO 9001:2000 quality system is a wise/foolish idea.
	A-2	Using the ISO 9000 quality system has been a(n) pleasant/unpleasant experience.
	A-4	Using the ISO 9001:2000 quality system is a good/bad idea.
Behavioral intention	BI-1	I intend to increase the frequency of usage of the ISO 9000 quality system when/following the new ISO 9001:2008 edition is/being implemented in my company.
	BI-2	I want to increase the frequency of usage of the ISO 9000 quality system when/following the new ISO 9001:2008 edition is/being implemented in my company.
	BI-3	I expect to increase the frequency of usage of the ISO 9000 quality system when/following the new ISO 9001:2008 edition is/being implemented in my company.
Sustained use	SU-1	I would rate my usage pattern of ISO 9001:2000 quality system as frequent/infrequent.
	SU-2	To what extent do you use the ISO 9001:2000 quality system in your area of work?