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Towards a Taxonomy of Challenges in an Integrated IT Governance Framework Implementation

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ABSTRACT

The rapid adoption of IT governance (ITG) frameworks in organizations worldwide, along with the subsequent need to select and integrate overlapping ITG frameworks has presented practitioners with challenges in choice and integration of frameworks. In this respect, the purpose of this study was to explore the ITG frameworks integration (ITGFI) challenges faced by organizations worldwide; develop and test a theory-based integrated ITG challenges (IIC) taxonomy model created from extant literature; and validate and compare these with those empirically extracted from three case studies in the United Arab Emirates (UAE). The results present the audience with a taxonomy of a prioritized set of common global and region-specific (UAE) ITGFI challenges. The study thus aids practitioners to prioritize and focus on these areas of an integrated ITG frameworks implementation.

Keywords: IT governance integration; ITG frameworks; ITG integration challenge; taxonomy

INTRODUCTION

Information technology governance (ITG) has become an important topic for IT-based organizations worldwide (Ayat, Masrom, & Sahibuddin, 2011), and is considered critical for them (Aleem & Al-Qirim, 2012). Hence, to ensure that IT functions align with and support the enterprise's strategies and goals (Wessels & Loggerenberg, 2006), a balanced integration of ITG frameworks is necessary. From a financial perspective, Marrone and Kolbe (2010) commented that organizations that implemented ITG achieved profits 20% higher than those that did not. The adoption of ITG thus is a response to the growing pressure on all organizations to effectively manage and get returns from IT. ITG frameworks and standards have thus been described as high-level models designed to perform IT functionality professionally (De Haes and Van Grembergen (2008).

The increasing demands of the industry coupled with compliance requirements have forced organizations to implement and integrate multiple frameworks and standards. According to Gehrmann (2012), IT management must comprise a combination of two sets of frameworks. Among the many IT best frameworks used in improving business and achieving goals, namely Control Objectives for Information and Related Technology (COBIT), Information Technology

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Infrastructure Library (ITIL), International Organization for Standardization (ISO) and the International Electro technical Commission (IEC) are being widely adopted worldwide (Năstase, Năstase, & Ionescu, 2009). They have been integrated due to the overlapping nature of their control mechanisms. Researchers agree that COBIT, ITIL, and ISO 17799 (ISO 17799 has been renamed as ISO 27002 in 2007, and closely related to ISO 27001) are the most valuable, popular, and widely adopted frameworks currently being used for business growth and success (Chatfield & Coleman, 2011; Sahibudin, Sharifi, & Ayat, 2008; Ula, Ismail, & Sidek, 2011), but also argue that ITIL, COBIT, and ISO/IEC 27002 can be used by any organization as comprehensive solutions for IT management (Gehrmann (2012).

Many organizations implement multiple process frameworks and standards (Cater-Steel, Tan, and Toleman (2006). This was further proved in a Gartner survey on ITIL adoption in the Asia Pacific region, which shows that many organizations in Hong Kong, Singapore, and Australia implement ITIL, COBIT, Capability Maturity Model Integration (CMMI), and ISO 9001 concurrently (Heschl, 2004). Since all these frameworks overlap, using them independently prevents organizations from asserting full IT management and governance because each framework and standard has limitations in its application to the management of specific IT areas (Gehrmann, 2012). Integrating frameworks and standards provides a more comprehensive and efficient approach, enabling features that would be unavailable through individual frameworks (Cater-Steel et al., 2006; Gehrmann, 2012; Ula et al., 2011). Thus, given the numerous IT frameworks, choosing the best integrated framework is critical; while choosing how the frameworks should be integrated is a challenge (Von Solms, 2005). This leads to the research question regarding identifying the challenges of integrating ITG frameworks in organizations:

***What are the challenges of integrating ITG frameworks in organizations*?**

The ensuing sub-questions are:

- What are the challenges in implementing ITG frameworks as an integrated framework?
- What are the challenges in integrating common ITG frameworks as an integrated ITG framework?
- What are the challenges in implementing ITG frameworks separately?

Although research has been done on challenges in implementing ITG as a standalone framework and as integrated ITG frameworks, empirical studies that provide guidelines to academicians and practitioners on these challenges (1) from a taxonomic perspective, (2) comparative (global and Asian), and (3) ranked list, is lacking in the extant literature. In this regard, we deduced the existing challenges from extant literature and categorized them through the Othman model (Othman, Chan, Foo, Nelson, & Timbrell, 2011b) to develop an Integrated ITG Challenges Model (the IIC model). The model was empirically validated with the results obtained from the case studies undertaken in Dubai, resulting in taxonomy of global and localized ranked list of challenges for implementing an integrated ITG framework. The basis of this approach is to provide practitioners with taxonomy of challenges/factors to contextually understand as well as consider the challenges while undertaking an integrated ITG framework implementation (ITGFI). Moreover, the proposed taxonomy also provides guidelines to organizations that adopt ITG frameworks on specific knowledge regarding the challenges to focus on, and prioritize in different phases of ITG

implementation. For this research, ITG frameworks, standards, frameworks, and models have been collectively referred to as ITG frameworks.

This paper is structured as follows. The next section presents the ITG frameworks used in integrated ITG implementations (sub question 2), followed by the evaluation of the challenges in implementing ITG frameworks separately (sub question 3), as well as by integration (sub question 1). The third section justifies the research methodology, followed by section four, which analyzes three case studies to develop a taxonomy of challenges in an integrated ITG implementation. The discussion section answers the research questions, and the paper concludes with recommendations for practitioners, and possible areas of future research for academics.

INTEGRATED ITG FRAMEWORKS: AN OVERVIEW

A review of the existing literature on integrated ITG frameworks (in the ITG domain) endorsed COBIT, ITIL, and ISO 27000 series as the most widely used frameworks (Table 1), while a few generic governance models (Prince 2, and TQM) have also been cited in ITG literarure. Among the ITG frameworks used for integration, COBIT is considered quite comprehensive (Ahmed, 2011; Hardy, 2006b), and often referred to as an "integrator" because it facilitates bringing many disparate frameworks (ITG frameworks) under one umbrella (Năstase et al. (2009). Hill and Turbitt (2006) observed that COBIT provides guidelines for ITIL adoption and helps organizations drive their business needs by providing a mechanism for measuring organizational capability (i.e., people, processes, and technology). Moreover, ITIL provides frameworks (i.e., more comprehensive and detailed) processes (Hill & Turbitt, 2006) for IT service management (ITSM). Thus, ITIL and COBIT are complementary because their integration helps organizations manage IT from a business perspective, and facilitates managing IT services (ibid).

As the mapping of COBIT with other frameworks was increasingly used by organizations, ISACA (Information Systems Audit and Control Association is an independent, non-profit, global association, engaged in the development, adoption and use of globally accepted, industry leading knowledge and Frameworks for information systems) responded by undertaking a high-level mapping between the COBIT framework's control objectives and various control standards, guidelines, and frameworks, such as COSO, PRINCE 2, ISO 27002, ITIL, and PMBOK, (Heschl, 2004). Despite the effort of ISACA in mapping overlapping controls of ITG frameworks/standards as a guide to practitioners for integrated implementation, challenges persist. Nevertheless, Goosen and Rudman (2013) acknowledged COBIT, ITIL, and ISO 27002, since they are internationally recognized and adaptable to most industries. Moreover, (Năstase et al., 2009) stated that COBIT can be used at the highest level of IT governance where it provides an overall control framework, while ITIL and ISO/IEC 27002 can be used as detailed standardized processes, mapped with specific IT COBIT processes. Thus, COBIT addresses the full spectrum of IT governance and management tasks, while standards describe the tasks in more detail than COBIT does (Heschl, 2004). Organizations use COBIT as an overall control framework for ITG, and then use ITIL and ISO 17799 to supply detailed processes (Hardy, 2006a). This integration helps organizations understand how COBIT, ISO 17799, and ITIL can be integrated (Hardy, 2006a). This integration is possible because each COBIT process can be combined with the related ITIL and ISO sections. Since COBIT, ITIL, and ISO are considered the world's most widely used standards and frameworks (Goosen & Rudman, 2013) for helping organizations cover the three main areas of

control—governance, risk, and compliance—we decided to evaluate the challenges of integrating these three frameworks in our proposed study.

Authors / ITG frameworks	Hardy (2006)	Hill & Turbitt (2006)	Goosen & Rudman (2013)	Gehrmann (2012)	Sahibudin et al. (2008)	Ula et al. (2011)	Heschl (2004)	Sheikhpour & Modiri (2012)	Shivashankarappa et al. (2012)	Aileen et al. (2006)	NĂSTASE et al. (2008)	Latif et al. (2009)	Nicho (2012)	Coleman & Chatfield (2011)	Lawton (2007)
COBIT	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ITIL	●	●	●	●	●		●		●	●	●	●		●	●
ISO 27000 series, ISO 38500 & ISO9001	●		●	●	●	●	●	●	●	●	●			●	
FFIEC						●									
CGTF						●									
IISA						●									
CISWG						●									
PCI DSS						●							●		
COSO							●								
Tick IT							●								
NIST							●								
Prince 2							●		●						
CMMI							●		●	●		●			
TQM							●		●	●					

Table 1: Most adopted ITG frameworks.

CHALLENGES IN INTEGRATED ITG FRAMEWORKS IMPLEMENTATION (ITGFI)

For evaluating the challenges in an integrated ITGFI, we researched the background literature on those challenges from generic, standalone, and integrated ITG perspectives to develop a comprehensive taxonomy.

Challenges in implementing ITG frameworks

Several studies have reported challenges of implementing IT frameworks. Othman et al. (2011b)) found that the challenges of implementing ITG Frameworks included lack of top management support, communication, slack resources, centralization, formalization, industry/vendor support, regulatory environment, perceived benefits, and compatibility with existing Frameworks; complexity in the understanding and use of these frameworks; cost of new requirements; resistance to change; national culture; and politics. Another study revealed the challenges as change

management, communication issues, lack of senior management commitment and support, difficulties in demonstrating value and benefits, difficulties in obtaining the required business participation, ineffective current enterprise governance, high level of organization complexity, and trying to accomplish multiple tasks simultaneously (I. ISACA, 2011). During the same period, another study on five public sector organizations in Tanzania revealed that the top five issues inhibiting the adoption of ITG Frameworks include low acceptance of new IT applications and uses by business people; weak measurement of IT performance and value to business; inadequately defined IT-related roles, responsibilities, and accountability; insufficient staff members; and inadequate IT skills and competency (Othman et al., 2011b).

Since ITG frameworks overlap, this leads to implementation difficulties preventing organizations from adopting them (Pereira & Mira da Silva, 2012). Moreover, researchers found that the main issue concerning implementation challenges was related to organizations' internal and external factors, such as organizational culture and structure, strategy, size, regional differences, industry, maturity, ethics, and trust. Meanwhile, the most important contingent factors influencing ITG framework implementation are culture, structure, and industry (Pereira & Mira da Silva, 2012).

Challenges in implementing COBIT

It has been stated that COBIT cannot work alone as it is not very detailed, and shows what to do but not how to do (Mataracioglu & Ozkan, 2011). Moreover, its implementation was found to be difficult as it is too generic, and thus requires expert knowledge (Pereira & Mira da Silva, 2012). Accordingly, it always needs complementary ITG frameworks to facilitate the implementation of ITG Fframeworks. Pereira and Silva further stated that COBIT comprises complex frameworks with many dependencies between processes, making it difficult to implement.

From a sector-wise perspective, implementing the ITG framework COBIT in financial service organizations in Asia presented challenges concerning numerous issues—absence of a documented strategy, communication of strategy, derivation of tactical plans, technology-driven IT plans, data classification, absence of software documentation because of outsourcing, project ownership by business, stage-wise signoffs, configuration management, and IT performance assessment (Ramanathan, 2007). Some organizations lack formal business strategies, while others have outdated ones (ibid). Thus, misalignment between IT and a business strategy occurs when the IT department is technology-driven rather than strategy- or goal-driven.

Challenges in implementing ITIL

ITIL implementation challenges have been explored by different researchers from different perspectives, including lack of management commitment, too much time spent on complicated process diagrams, extended time taken to get results, lack of work instructions, failure to assign process owners, overconcentration on performance, excessive ambition, failing to maintain momentum, and allowing departmental demarcation (Sharifi, Ayat, Rahman, & Sahibudin, 2008). Shang and Lin (Shang & Lin, 2010) viewed ITIL challenges through a balanced scorecard (BSC).

From the customers' perspective, they found dissatisfaction about the gap between the degree of improved service quality and customers' perception and needs. From the financial perspective, costs were incurred due to the need for educational activities such as training courses, and the time lag between the investment in ITIL projects and performance created by the difficulty of measuring

the short-term implementation outcome (ibid). From the learning and growth perspectives, employees' resistance to change, and lack of integrative capabilities were the most noticeable barriers (Shang & Lin, 2010).

From a process perspective, the time lag between the investment in ITIL projects and performance outcomes, and conflicts among urgent needs in IT departments were seen to make ITIL implementation difficult. Through a case study, Othman et al. (2011b) found several challenges to ITIL adoption in a major public company in Malaysia, which included lack of awareness, standard terminology, enforcement, and clearly defined roles and responsibilities. Another challenge in implementing ITIL is the complexity with which the framework's processes are interrelated, such that implementing one process depends on the output of at least one (Pereira & Mira da Silva, 2012).

Challenges in implementing ISO 27 K (ISO 17799 prior to 2005)

Implementation of the ISO standard was also explored by researchers. ISO 27001 is implemented in organizations to ensure consistent, repeatable, and auditable means of addressing information security issues (Ashenden, 2008). However, many organizations find it difficult and challenging to implement this standard along with other information security management Frameworks (Susanto12, Almunawar, & Tuan, 2011). Being employed as a standalone guide and not being integrated into a wider framework for IT governance makes it difficult for organizations that adopt ISO 17799 to implement other ITG frameworks (Von Solms, 2005). Although ISO 17799 is effective for IS security management, it also has disadvantages (Mataracioglu & Ozkan, 2011; Von Solms, 2005). Some controls of ISO 27001 require expert knowledge, and others are very difficult to understand and implement due to lack of expertise at all levels (Ashenden, 2008; Susanto12 et al., 2011; Susanto12, Almunawar, & Tuan, 2012).

Othman and Chan (2013) found many challenges to implement ITG best Frameworks (i.e., ISO/IEC 38500, ISO/IEC 27001, ISO/IEC 20000, ITIL, and COBIT), including resistance to change, complexity, organizational politics, and lack of knowledge and skills. The authors also highlighted new and emerging factors not yet reflected in the formal ITG literature, which are the lack of middle management support, management mobility, lack of geographical proximity, and weak receptivity to internal or external mandates.

Challenges in integrating/mapping ITG frameworks

Given the numerous ITG frameworks, choosing the best integrated framework is critical, while choosing how the Frameworks s should be integrated is a major challenge (Von Solms, 2005). Several questions arise when organizations decide to implement an ITG framework. Practitioners not only need to choose the appropriate frameworks for their integrated ITG environment, but also need to determine how to integrate them. Thus, finding the optimal sequence for integrating and implementing ITG frameworks is not easy due to their inter-relationships (Cater-Steel et al., 2006). Defining roles and responsibilities poses further challenges for any ITG adoption as the success of integration between ITIL and a framework such as CMMI is highly dependent on clear interpretations and definitions of departmental and staff roles and responsibilities (Latif, Din, & Ismail, 2010). Organizations also face challenges posed by terminologies when integrating ITG frameworks. For ITIL, COBIT, and ISO 17799 it was found that different words are sometimes used for similar issues or processes (Wallhoff, 2004). Thus, multiple factors influence

organizations' implementation of integrated frameworks (i.e., ITIL, COBIT, CMMI, ISO 9001), including complexity of implementing multiple frameworks simultaneously (Cater-Steel et al., 2006).

An organization's desire to maintain a balance between ITG and the corresponding expenses poses another challenge to framework integration as organizations are struggling to achieve growth and governance affordably (Năstase et al., 2009). We have summarized the challenges from extant literature in tables 2 through 6 into categories based on the Othman model. From the literature we have identified 73 challenges that have been differentiated into challenges in implementing ITG frameworks, implementing any ITG Framework separately, integrating ITG frameworks, and integrating the three common frameworks namely COBIT, ITIL, and ISO (Tables 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11 are in Appendix 1). Some of the overlapping challenges have been combined.

In order to organize the deduction and induction of challenges in an integrated ITG framework implementation, we chose the revised theoretical model of Othman (M. F. I. Othman, T. Chan, E. Foo, K. Nelson, & G. Timbrell, 2011a) as it deals with barriers to ITG adoption, corresponding to the topic of study. From the perspective of the original Othman's model (Figure 1), the 73 challenges (Tables 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11) were classified under the four contexts of the model (Othman et al., 2011a). Furthermore, the model was expanded to add two other contexts (shaded boxes in Figure 2) namely "integration of Frameworks," and "level of IT implementation maturity" to map challenges that could not be classified under the existing four.

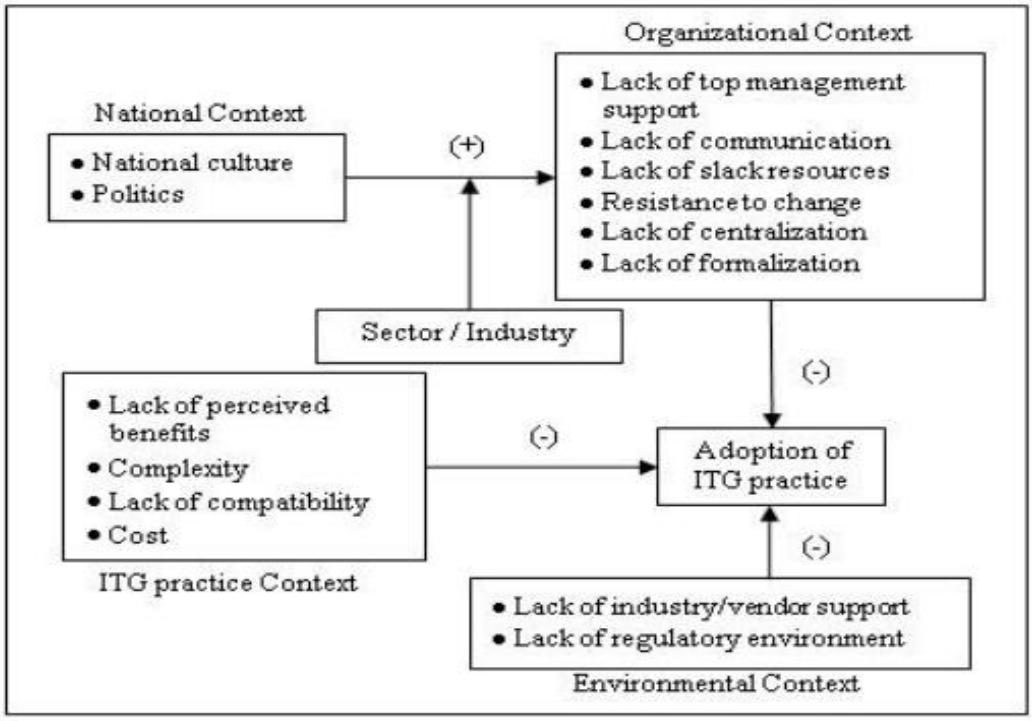

Figure 1: Othman, Chan, Foo, Nelson, and Timbrell's model, 2011a).

Our model shown in Figure 2 was built on the Othman model and populated with the 73 challenges from section 3. In the IIC model, the relationship between the five contexts (ITG frameworks, level of IT implementation maturity, integration of Frameworks, organizational, and environmental) is

negative, as these negatively affect the implementation of ITG. Meanwhile, the relation between the national and organizational contexts is viewed as a positive relationship where the former contributes to the latter. Empirical validation of the model was done through case studies.

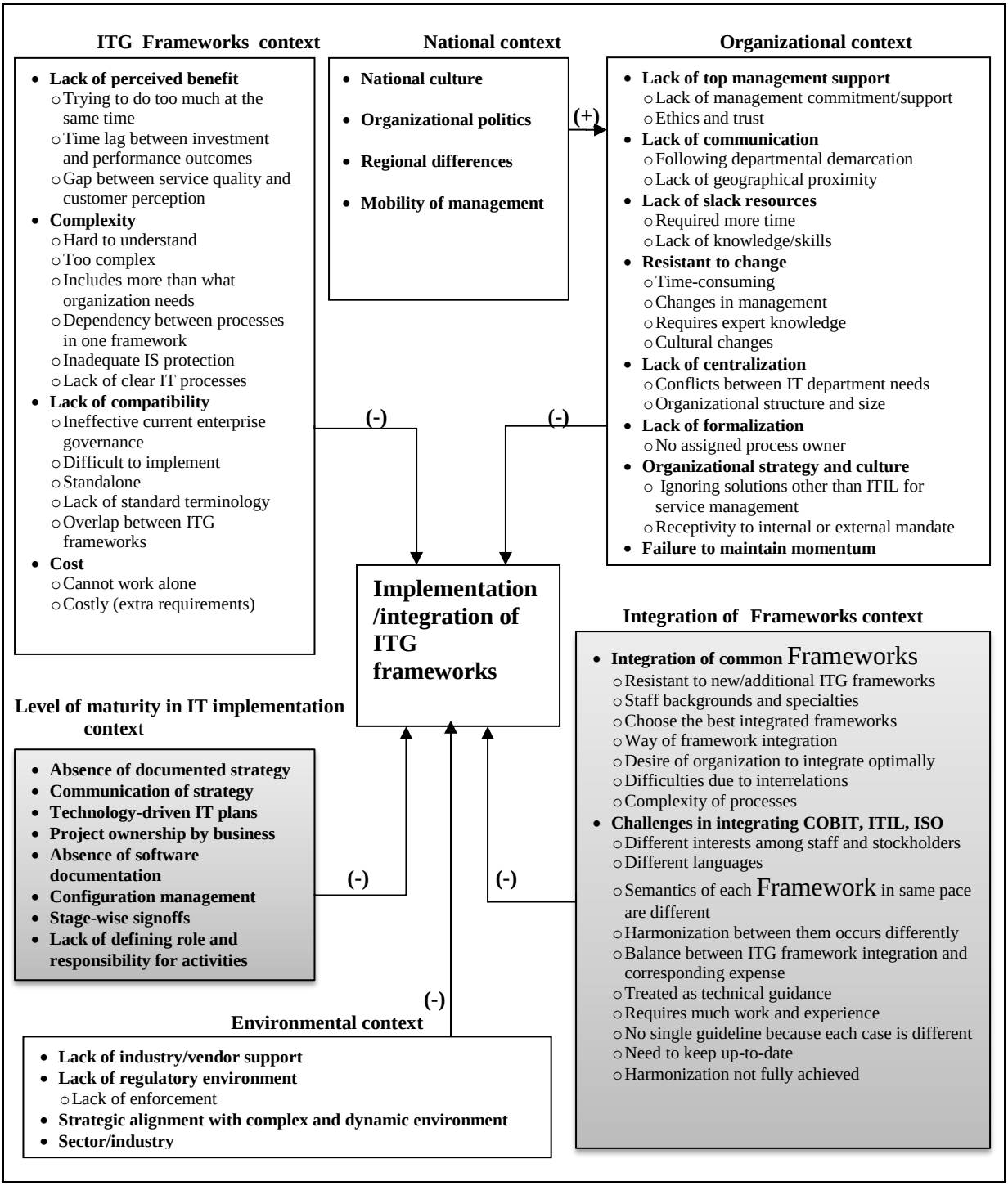

Figure 2: ITG implementation challenge model (IICM) (adapted from Othman et al, 2011a).

RESEARCH METHODOLOGY

We use the research onion (Saunders, Lewis, & Thornhill, 2012) to provide a roadmap of the research methodology. The research philosophy for this study is interpretive since it is assumed that our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents, tools, and other artifacts (Klein & Myers, 1999). Consequently, we follow the inductive research approach as it enables an understanding of the way humans [respondents] interpret their social world (Saunders et al. (2012). The above two concepts lead us to study the research strategy, used to investigate a contemporary phenomenon [IT governance integration] within its real-life context (Dubé & Paré, 2001). The research choice is qualitative not only due to its (qualitative research's) ability to focus on the actual Framework in situ, looking at how organizations are routinely enacted (Silverman, 1998), but also its emphasis on the study of a social problem (Andrade, 2009). We choose the cross sectional time horizon since we target only four cases within a time span of five months. Finally, data is collected through interviews of managers in the ITG domain. Dubai was chosen as the target city, due to its strength in implementing ITG frameworks. As early as 2000, the Dubai government commissioned information system audit to provide effective ITG and to encourage the adoption of ITG Frameworks within government entities (ISACA, 2014). It conducts regular information system audits, and recognizes the need to promote, formalize, and improve ITG Frameworks within Dubai. Due to the nature of voluminous qualitative data generated through indepth interviews, as well as the subsequent phased approach in data anlalysis, we decided to follow the granular five step qualitative data analysis process outlined by LeCompte (2000).

Organizational profile

Four organizations from the UAE have been selected for the study. The first case (case A) involves a mid-sized retail and commercial bank based in Dubai. Established in 1969, it has 24 branches throughout UAE with 1,200 employees, offering a full range of services for corporate, commercial, and consumer banking. The second case (case B) is that of a semi-government organization established to support the economy of the emirate of Dubai. Established in 1965, it has four branches and several representative offices covering many business areas in Dubai. Its main activities include creating a favourable business environment for the company's 15,000 members, supporting the development of business, and promoting Dubai as an international business hub. The third case (case C) is a government-owned company established in 2005, with interests in five industry clusters—information and communication technology (ICT), media, education, life sciences, and clean technology. The fourth case (case D) is a private consultancy established in 2002, having two branches, one each in Abu Dhabi and Chennai, India. The company provides end-to-end information security consulting and training solutions for enterprises operating in various business segments, such as commercial enterprises, government departments, law enforcement, the judiciary, and the armed forces. Table 5 provides a summary profile of the respondents interviewed in these four organizations.

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	Sector	Business	Interviewees	Date	Recording duration (minutes)	Location
A	Private	Financial services retailing & commercial	Head of IT strategy & planning	24/2/2014	54	Respondent's office, IT department
B	Semi-government	Commercial services	IT Quality Assurance Manager	25/2/2014	50	Respondent's office, IT department
C	Public	Government/ investment services	Executive Director: Information Security & Operations	2/3/2014	33	Respondent's office, IT department
D	Private	Consultancy: IS Security & Governance	Director & CEO	5/3/2014	37	Respondent's office

Table 2: Respondent profiles.

ANALYSIS

This section describes the first three of the five steps outlined by LeCompte (2000), namely tidying up, finding items, and creating a stable set of items; while the subsequent section discusses the last two steps, namely creating patterns, and assembling structures. The interviews were recorded using digital voice recorders (I-phone 5 voice memos and Olympus DM 620), copied, and saved in one folder sorted by date. In the tidying-up phase, the interviews were transcribed, where missing/vague items were validated through a second round of interviews with two respondents. The final transcripts were mapped to the interview questions to ensure completeness of data. In the second stage (finding items), the researcher perused all four transcripts and extracted ninety-three nodes from them. In the third phase, the nodes it were organized into groups and categories through comparing and contrasting them with the identified challenges, resulting in a refined set of challenges.

Analysis of Findings (Tidying, finding, and creating stable sets of items)

The outcome of step three (creating stable sets of items) is presented in Tables 13, 14, 15, 16, 17, and 18. Each table presents one of the six contexts defined in the IIC model. To test the validity of the contexts in the model with the emergent contexts (themes), we used the Spradley (1979) semantic relationships.

Regarding ITG frameworks (Table 13), respondents have not only confirmed the convergence of the identified sixteen challenges but have added two new challenges to the list (in italics), namely the lack of defined targets and measurements. Lack of defined target relates to what should be achieved and the corresponding expected deliverables. In this regard, the respondents mentioned that every employee has different perceptions of the targets within the organization, such that the expected deliverables and goals are undefined. Lack of objective measurement refers to the

difficulty in measuring controls. In this regard, one respondent stated, "most standards being generic do not give an objective way of measuring something. Sometimes objectivity in measurement comes from frameworks, but the issue still persists."

Themes	Sub themes	Items/Nodes
ITG Frameworks Context	Lack of perceived benefit	Trying to do too much at the same time
		Time lag between investment and performance outcome
		Gap between service quality and customer perception
		Lack of defined target
	Complexity	Hard to understand
		Too complex
		Includes more than what the organization needs
		Dependency between processes
		Inadequate IS protection
		Lack of clear IT processes
		Lack of objective measurement
	Lack of compatibility	Ineffective enterprise governance
		Difficult to implement
		Standalone
		Lack of standard terminology
		Overlap between ITG frameworks
	Cost	Cannot work alone
		Costly (extra requirements)

Table 3: Items/node categorization of ITG Frameworks context.

The challenges under organizational context (Table 14) also corresponded with the 15 identified in the literature, but with the addition of five new challenges (in italics). Budgetary constraints and lack of awareness of the benefits among staff have been cited as the major constraints. One respondent lamented that the benefits of the frameworks are unclear and undefined to the staff even after training and certification. Two respondents said that this is not because of a lack of training as although the staff can be trained and certified, they still need time to feel the benefits. Regarding lack of unified standards between IT and other departments, two respondents stated that in some organizations each department has its own standards and rules. With respect to the 'dilution of authority' in the organization, respondents stated that the lack of clear delegation of authority for those responsible for ITG implementation leads to difficulties in obtaining resources for implementation. Finally, the respondents lamented the lack of performance measurements to evaluate the success of the activities (difficult to measure key performance indicators [KPI]) under this context.

Themes	Sub themes	Items/Nodes
Organizational Context	Lack of top management support	Lack of management commitment/support
		Ethics and trust
	Lack of communication	Following departmental demarcations
		Lack of geographical proximity
	Lack of slack resources	Require more time
		Lack of knowledge/skill
		No budget (budgetary constraints)

	Resistance to change	Time consuming
		Change of management
		Requires expert knowledge
		Cultural changes
		Lack of awareness of the benefits among staff
	Lack of centralization	Conflicts among IT departments' needs
		Organizational structure and size
	Lack of formalization	No assigned process owner
		Lack of unified standards between IT and other departments
	Organizational strategy and culture	*Authority in the organization is diluted*
		Ignoring solutions other than ITIL for service management
		Receptivity to internal or external mandate
	Failure to maintain momentum	*Difficult to measure KPI*

Table 4: Items/node categorization result of organizational context.

The respondents responding under this theme (Table 15) fully confirmed all the presented challenges as applicable to their environment. However, no new UAE-oriented challenges were identified under this theme.

Themes	Sub themes	Items/Nodes
Integration of ITG best Frameworks	Integration of common Frameworks	Resistant to new or additional ITG Frameworks
		Staff backgrounds and specialties
		Choosing the best integrated frameworks
		Method of frameworks integration
		Desire of organization to integrate optimally
		Tasks are difficult due to their interrelations
		Complexity of processes
	Challenges to integrate COBIT, ITIL, ISO	Differing interests among staff and stockholders
		Different languages
		Semantics of identical Frameworks are different
		Frameworks are not perfectly harmonized
		Balance between ITG framework integration and corresponding expense
		Treated as technical guidance
		Requires work and experience
		No single guideline as each case is different
		Need to keep up-to-date
		Harmonization not fully achieved

Table 5: Items/node categorization result of Integration ITG Frameworks Context.

Under the level of IT implementation maturity context (Table 16), all respondents fully agreed with all the presented challenges as applicable to their environment. Regarding the absence of documented strategy, all respondents stated that they have documented IT strategies. Hence, they all affirmed that lack of documented strategy is a challenge. The challenges were further categorized into two subcategories (sub themes) namely IT strategy and technology.

Themes	Sub themes	Items/Nodes
Level of maturity of IT implementation	IT strategy	Absence of documented strategy
		Communication of strategy
		Technology-driven IT plans
		Project ownership by business
		Lack of defining role and responsibility for activities
	Technology	Lack of software documentation
		Configuration management
		Stage-wise sign-offs

Table 6: Level of maturity of IT implementation context.

From an environmental perspective (Table 17), respondents not only confirmed the convergence of the identified challenges, but also have added one new challenge to the list (in italics)—"lack of industry expertise." Companies find that consultants lack real-world experience with the standards. One respondent mentioned that "consultants lack field experience and expertise when working on standards." He further stated that planning for implementation' and 'implementation' are two different things. For the former, one can refer to books or guidelines, but for the latter, things are different.

Themes	Sub themes	Items/Nodes
Environmental context	Lack of industry/vendor support	*Lack of industry expertise*
	Lack of regulatory environment	Lack of enforcement
	Strategic alignment with complex and dynamic environment	*No further items*
	Sector/industry	*No further items*

Table 7: Items/node categorization result of Environmental Context.

The respondents in this theme (Table 18) fully confirmed all the presented challenges as applicable to their environment except 'national culture'. All four respondents agreed that this (ntional culture) could be a challenge in a different environment than their own. In this regard, they stated "Everyone adapts to the culture, and we did not really see any cultural issues in the organization, and it is irrelevant and not a challenge because employees try to adapt and improve, at least in the context of Dubai."

Themes	Sub themes	Items/Nodes
National context	National culture	*Not applicable*
	Organizational politics	*No further items*
	Regional differences	*No further items*
	Mobility of management	*No further items*

Table 8: Items/node categorization result of National context.

DISCUSSION

This section discusses the fourth and fifth steps of the qualitative data analysis of "creating patterns" and "assembling structures." Pattern matching is done by comparing the deduced challenges from the literature with the induced one from the respondents.
As an initial step, the importance of each challenge and its context among the participants is ascertained by measuring the percentage for each item and the node (context in the model) it represents. Use of counting words have been recommended by many qualitative researchers as a method of evaluating or increasing legitimation, or both (Leech & Onwuegbuzie, 2007). Subsequently, the three most significant challenges cited by the respondents are ITG Frameworks, organizational context, and integration of best Frameworks contexts, representing 30%, 29%, and 22% of the nodes respectively (Figure 3).

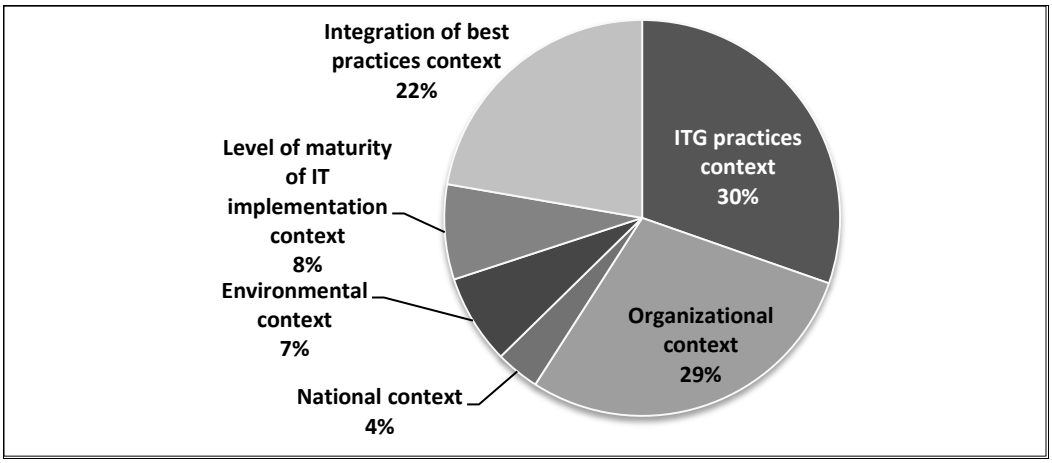

Figure 3: Percentage of challenges in UAE organizations among the six contexts.

Among the sub contexts, the top five for UAE organizations are integration of COBIT, ITIL, and ISO 27 K; complexity of frameworks; integration of common Frameworks; lack of perceived benefit; and resistance to change (see Figure 4) with the first three having equal importance.

Regarding integrating the three common Frameworks (i.e., ITIL, ISO, and COBIT), all respondents stated that "harmonization among these frameworks has not been fully obtained and will never be, especially if they are required to keep up-to-date with new versions." Considering the severity of the challenge, respondents stated the lack of a common guideline, and different terminologies producing different semantics for common frameworks. However, two respondents claimed that keeping a balance between ITG Framework integration and expenditures is a challenge.

One of the main reasons for "complexity" is that most IT frameworks include more than what organizations need. This is applicable not only to the processes but also to each process component. However, most respondents stated that not only are some of the IT processes difficult to understand, but even the IT staff finds it difficult to comprehend information in the Frameworks manuals. Most respondents also indicate that the dependency among the processes within

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Frameworks is a challenge because the input of one process can be the output of another, such that when an organization fails to implement a required process, it must devise alternative solutions.

With regard to integrating common frameworks effectively, respondents stated that organizations need to have full control of their IT functions. This is a major challenge as all respondents indicated that resistance to new and additional Frameworks and work is a challenge. Three respondents added that the background of their organizational staff does not equip them with the ability to align and choose the best integration Frameworks. Moreover, most respondents consider the ITG process complex because of the interrelations among its Frameworks, and even among the sub processes within each framework.

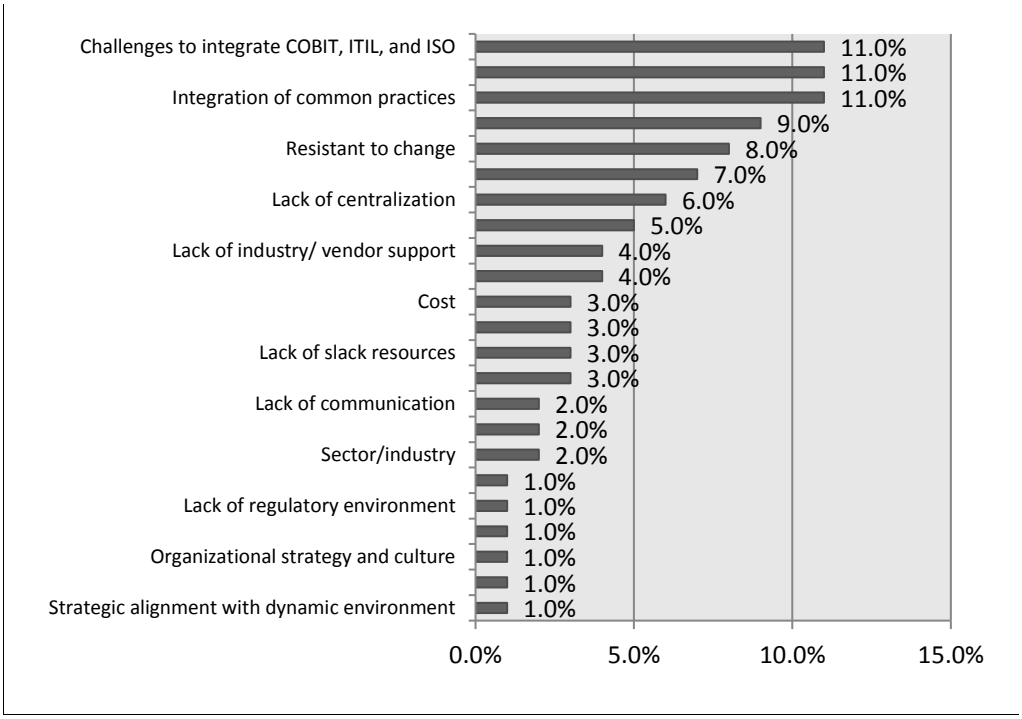

Figure 4: Percentage of challenges in UAE organizations among the sub contexts.

The fourth significant challenge subcategory is the lack of perceived benefit, in the ITG Frameworks taxonomy. This is a most comprehensive challenge, given the manner in which it was described during the interviews. Four reasons were given by the respondents. First, three respondents indicated that normally there is no defined target at the beginning of ITG implementation. Second, all respondents stated that there is a time lag between investment and performance outcomes, which complicate implementation. However, two respondents stated that the company is trying to do too much at the same time, and that in some Frameworks (such as the ITIL framework), there is a gap between service quality and customer perception.

Finally, the fifth challenge in the subcategory is resistance to change in the organizational context. This is cited as a barrier to the success of ITG adoption for many reasons. All respondents stated that it is time-consuming because it requires a great deal of activity and approvals for IT processes that were not required before. The second reason for this is the change in the governance/management style, which causes some employees to worry about their jobs. The third

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reason most respondents cited is the lack of knowledge of ITG among staff. Moreover, all respondents cited that the cultural change introduced by ITG is seen as a threat by the staff. Finally, two respondents stated the lack of awareness of ITG's benefits among IT staff as a reason.

Answering the research question

Figures five to 11 clarify the result for each sub question, which in turn answers the research question. The challenges drawn from the literature review were set against the list of challenges obtained in the interviews. Different font sizes used to distinguish among the challenge levels are listed below:

1. Font size 9, bold: All four respondents are affirmative on this challenge.
2. Font size 9, underline font style: Three out of the four respondents are affirmative on this challenge.
3. Font size 9: Two out of the four respondents are affirmative on this challenge.
4. Font size 9, italic font style: Only one out of the four respondents is affirmative on this challenge.
5. In addition, we used grey colour to indicate the indirect challenges (i.e., those derived from the literature review) considered by participant(s) as a reason for other challenges in the final model.

The answers for the questions pertaining to ITG-related challenges are described as follows:

- What are the challenges in implementing ITG Frameworks as an integrated framework?
- What are the challenges in implementing the common ITG frameworks (COBIT, ISO 27000 series, and ITIL) as an integrated framework?
- What are the challenges in implementing ITG Frameworks separately?

Challenges in implementing any ITG Frameworks as an integration Frameworks

Figure 5 compares the challenges in implementing any ITG frameworks as an integrated framework obtained in the deductive and inductive studies, grouped according to the degree of support given by the interviewees on the opposite side. The inductive study's result supported that of the deductive study, but at different levels. Four out of seven challenges were mentioned by most respondents (three out of four), while the other three challenges were mentioned by a minority (one out of four).

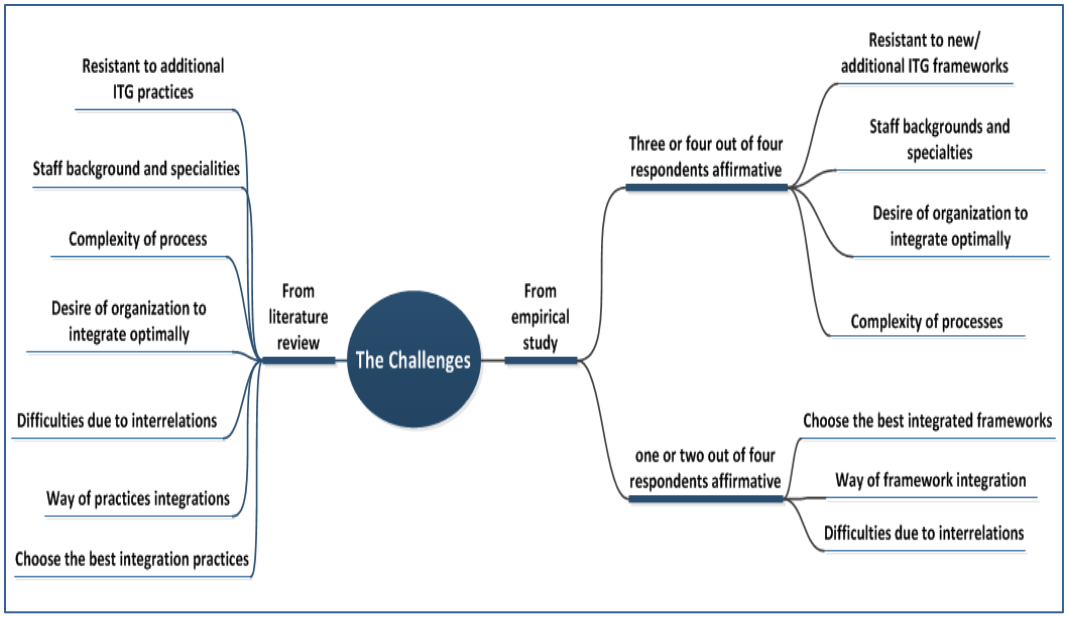

Figure 5: Challenges in implementing integrated ITG frameworks in UAE.

Challenge in implementing common ITG frameworks (COBIT, ITIL, ISO)

The second goal of this research is finding the challenges in implementing any ITG Framework in UAE organizations. Figure 6 compares the challenges in implementing any ITG Framework as an integrated framework obtained in the deductive and inductive studies, grouped according to the degree of support given by the interviewees on the right side of the figure. The result of the inductive study supported that of the deductive study to a considerable extent. In this regard, four of the ten challenges were mentioned by most respondents (three out of four), while the other six challenges were mentioned by one to two respondents.

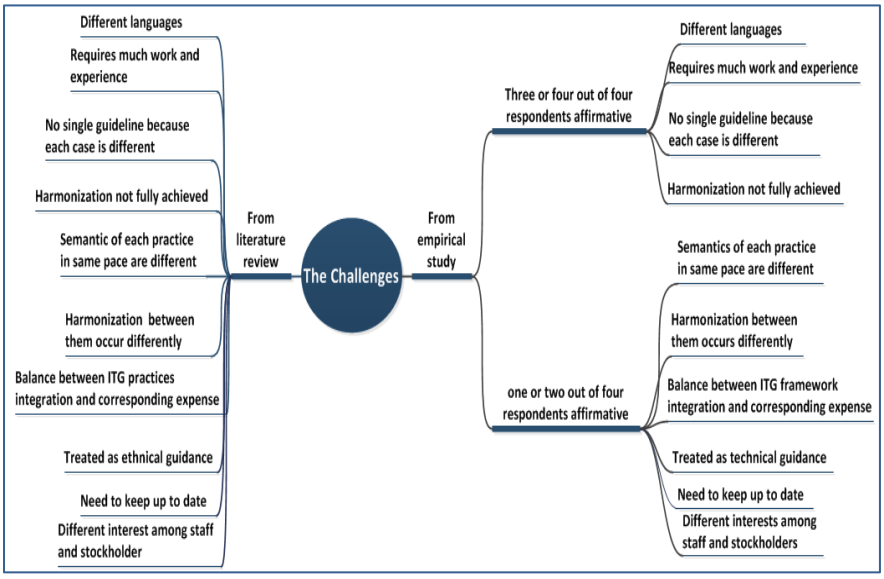

Figure 6: Challenges in implementing commonly used ITG frameworks in UAE.

Challenges in implementing ITG Frameworks separately

Figures seven to eleven in this section present the challenges in implementing ITG Frameworks separately, where each diagram presents the challenges related to each context. In each figure, the challenges obtained from literature are shown on the left side while those obtained from empirical research are on the right.

Figure 7 presents the organizational challenge; the result indicates that the study supports the results of the deductive study. Moreover, respondents provided new challenges, namely "lack of awareness among the staff" (under the "resistance to change" category), "no budget" (under "lack of slack resources"), "lack of formalized standards between IT department and other departments" (under "lack of formalization"), "dilution of authority in organization" (under "organizational strategy and culture"), and "difficult to measure KPI" (under "failure to maintain momentum").

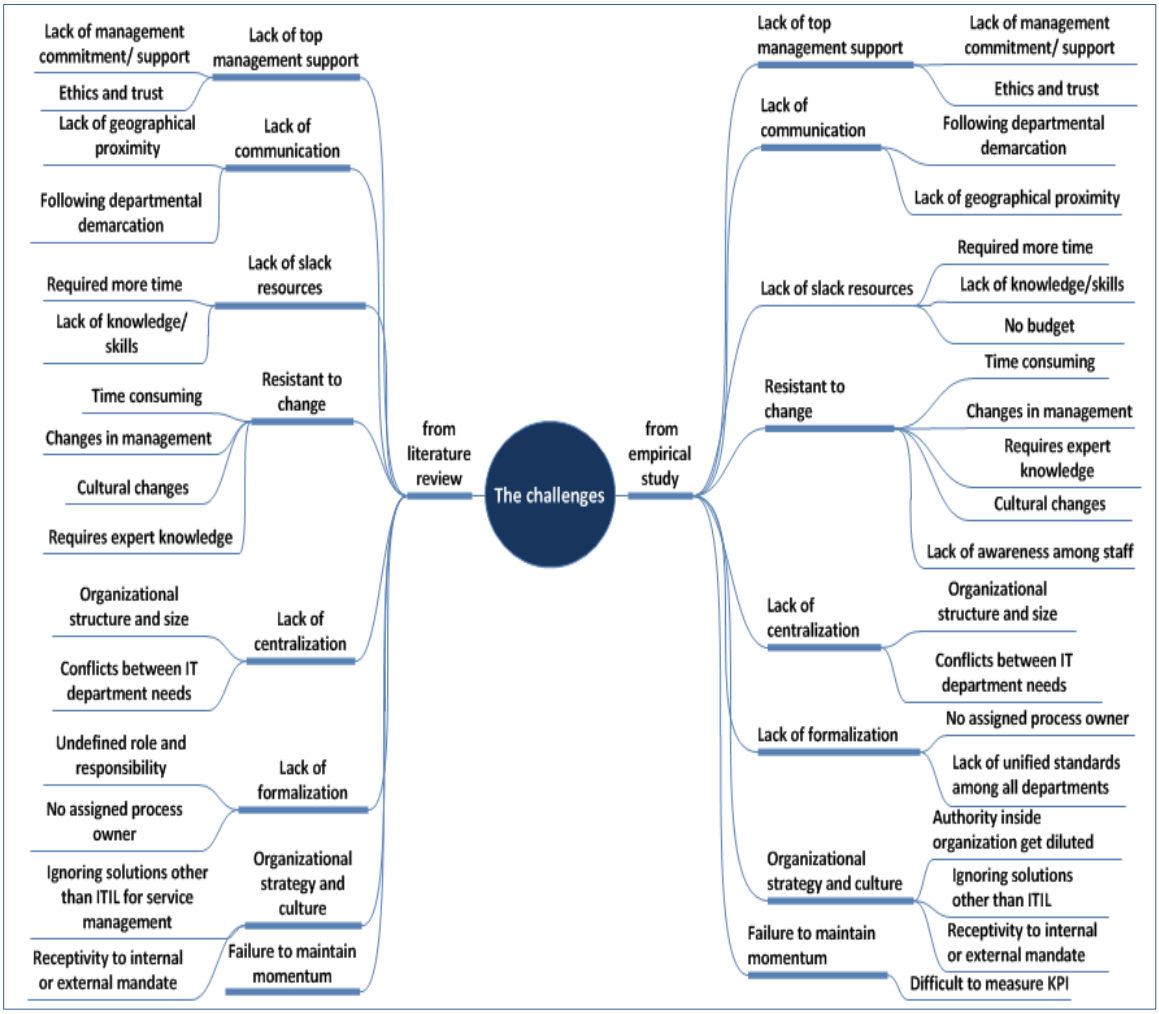

Figure 7: Challenges in implementing ITG frameworks separately (organizational context).

Figure 8 shows that the empirical study supports the deductive study concerning the challenges related to the ITG Frameworks context. Challenges that emerged include "lack of defined target" (under "lack of perceived benefit"), and "lack of objective measurement" (under "complexity"). With respect to the challenges related to the level of IT implementation maturity (Figure 9), the study supports the deductive challenges with no addition of further challenges.

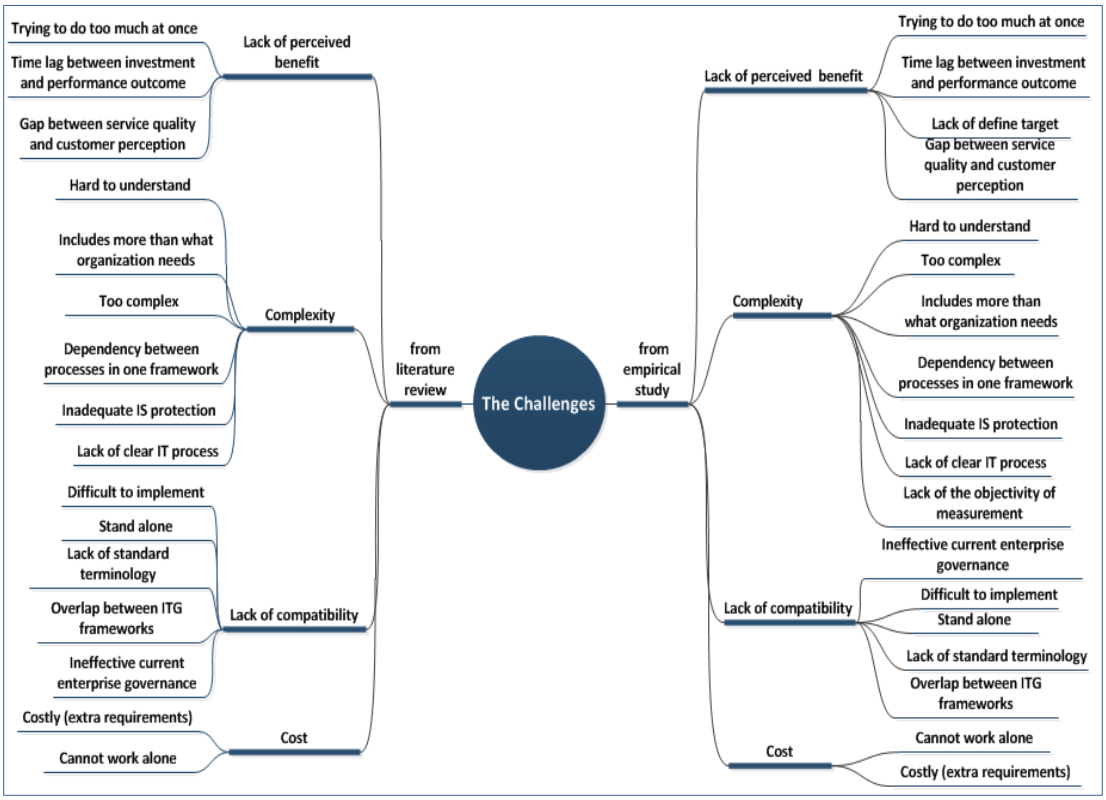

Figure 8: Challenges in implementing ITG frameworks separately (ITG Frameworks).

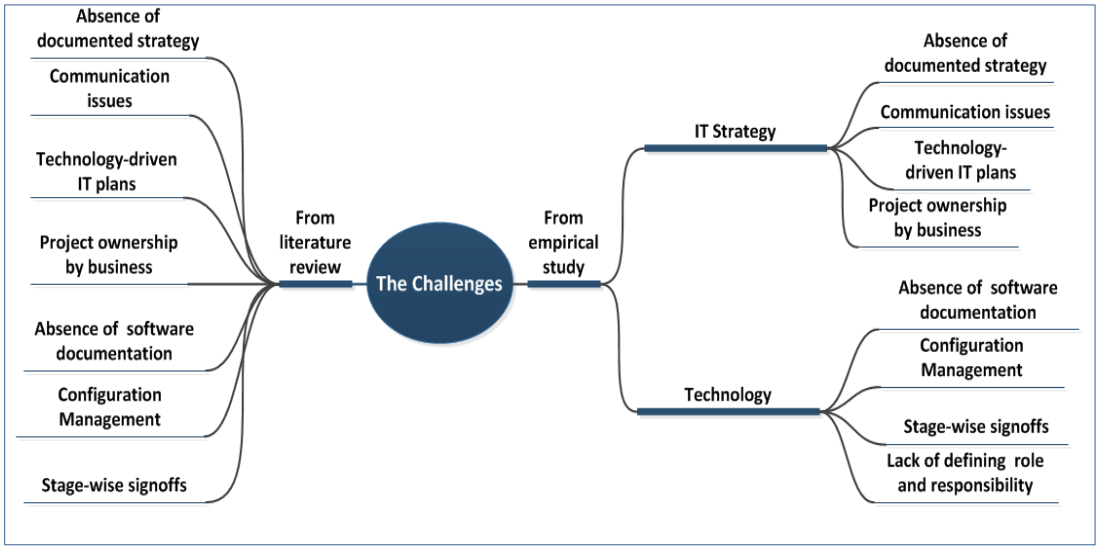

Figure 9: Challenges in implementing ITG frameworks separately (level of IT implementation maturity)

Concerning the challenges related to national context, there is complete correlation between deductive and inductive results, with no further added challenges (Figure 10).

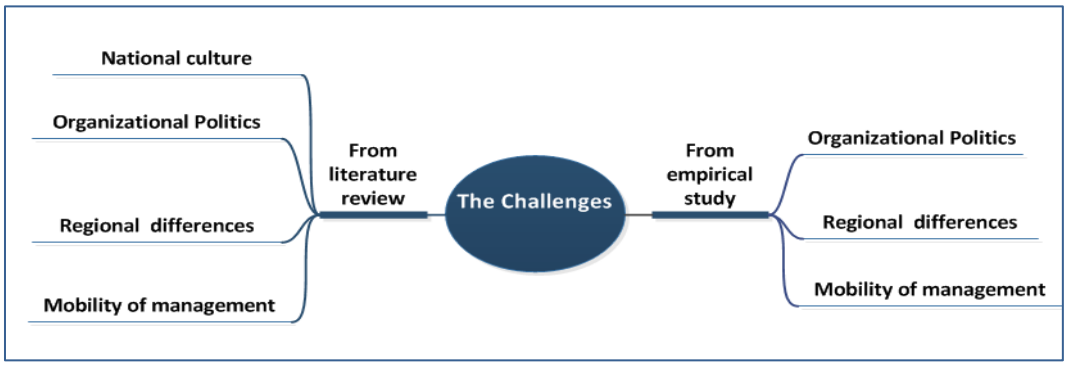

Figure 8: Challenges in implementing ITG frameworks separately (national context).

Regarding the challenges in implementing ITG frameworks separately related to the environmental context as Figure 8 shows, the empirical study supports the study. In this context, only one challenge was added during the interview, namely "lack of industry expertise" (under "lack of industry/vendor support").

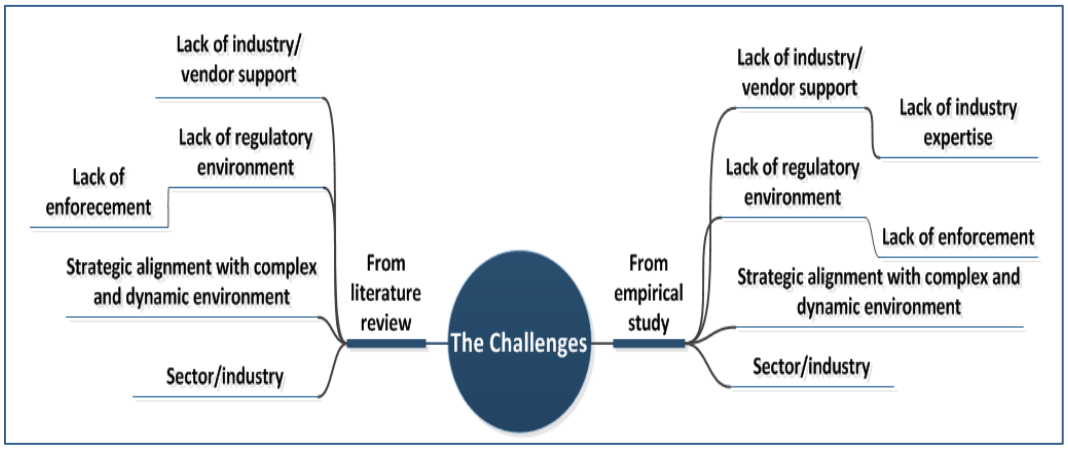

Figure 11: Challenges in implementing ITG frameworks separately (environmental context).

Assembling structure (Step 5)

In this section, we present the revised IICM research model (Figure 12). This study validated the challenges in implementing ITG frameworks not only as a standalone but also as integrated frameworks. However, we found that there are common global challenges, as well as those unique to UAE. Different font sizes used to distinguish among the challenge levels are listed below:

1. Font size 9, bold: All four respondents are affirmative on this challenge.

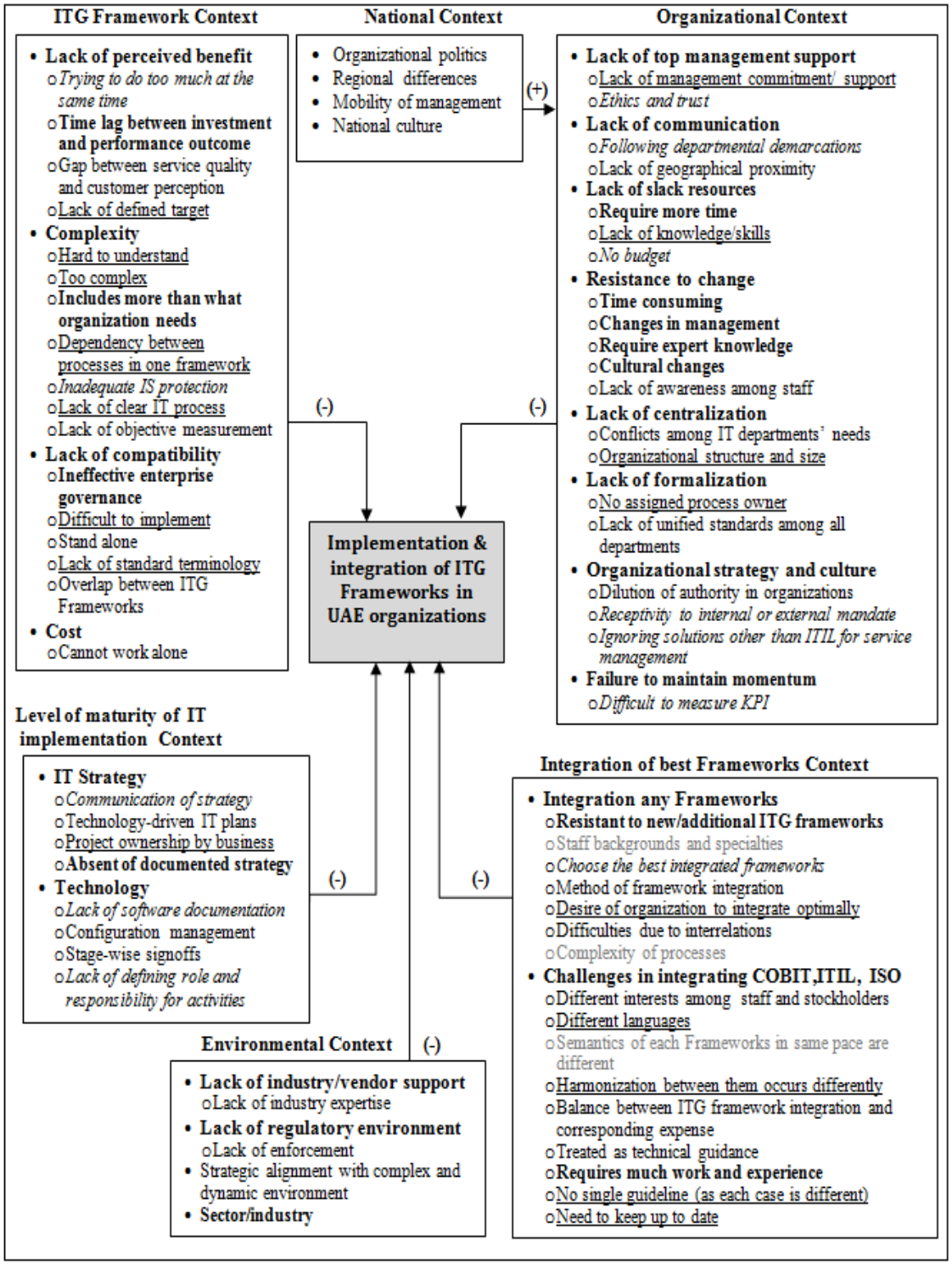

Figure 9: Revised IICM.

2. Font size 9, underline font style: Three out of the four respondents are affirmative on this challenge.
3. Font size 9: Two out of the four respondents are affirmative on this challenge.

4. Font size 9, italic font style: Only one out of the four respondents is affirmative on this challenge.
5. In addition, we used grey colour to indicate the indirect challenges (i.e., those derived from the literature review) considered by participant(s) as a reason for other challenges in the final model.

Regarding the challenges related to the organizational context, 10 are identified as common critical challenges—"lack of management commitment support" (under "lack of top management support"), "required more time," "lack of knowledge and skill" (under "lack of resource"), "time consuming," "change management," "requires expert knowledge," "culture change" (under "resistant to change"), "conflict between IT department needs," "organization structure and size" (under "lack of centralizations"), "no assigned process owner" (under "lack of formalization").

The top management and staff generally support ITG implementation, but their commitment is not very high because of the complexity of the ITG frameworks; and the extra time, resources, and skills required. In addition, ITG implementation involves restructuring that may be viewed from a negative perspective by some staff.

There are 10 common critical challenges for the ITG Frameworks context namely "time lag between investment and performance outcome," (under "lack of perceived benefit"), "hard to understand," "too complex," "include more than what organizations need," "dependencies between processes in one framework," "lack of clear IT processes" (under "complexity"), "ineffective current enterprise governance," "difficult to implement," "lack of standard terminology," (under "lack of compatibility," and "extra requirement" (under "cost"). In this regard, it is clear that the ITG Frameworks is not easy to implement because the Frameworks contain many IT processes written in confusing language with huge dependencies and interrelations among them. In addition, this kind of implementation requires three to four years for benefits to accrue, where one of the benefits stated was enhancing the credibility of their organization in the sector. Finally, respondents cited instances where the existing model or internal Frameworks were not implemented properly; or could be outdated impeding compatibility with ITG implementation.

Regarding the integration of Frameworks context, eight challenges were identified that are distributed between two sub categories, namely the "integration of any ITG Frameworks" and the "integration of common frameworks" (COBIT, ITIL, and ISO). For the first sub category, the challenges were "resistant to new or additional ITG Frameworks," "staff background and specialities" "desire of organization to implement optimally," and "complexity of processes." The decision to implement more than one Framework was not welcomed by most staff because of the need for additional work such as new documentations and signatures; requirement of specialized skills; skill and knowledge about multiple integration; and knowledge regarding new Frameworks. For the second sub category, the identified challenges were "different language," "no single guideline," and "harmonization not fully achieved." Respondents stated that the diversity of ITG Frameworks has a positive impact in managing IT functionalities given that these ITG frameworks improve the involvement of management in IT, and the measurement IT performance. Furthermore, the different terminologies used in the different ITG frameworks make integrated ITG implementation a difficult task.

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Under the environmental context, most challenges relate to "sector and industry" given that the adoption of ITG relies heavily on compliance to regulation and awareness for industry standards and benchmarks. Regarding the national context, it was found that "organizational politics" is the most critical challenge such that decisions are made based on self-interest and belief.

Regarding the "level of IT implementation maturity context," most challenges focus on "project ownership by business," and "technology-driven IT plan." From an IT perspective, respondents stated that IT-related projects should be IT-driven rather than business-driven, since IT is too technical for business to handle.

From the UAE perspective, eight challenges have been identified by the respondents in three contexts (ITG Frameworks, organizational, and environmental contexts). For the ITG Frameworks context, "lack of defined target" (under "lack of perceived benefit"), and "lack of objective measurement" (under "complexity") are relevant. The reason provided was that the ITG framework implementers are not clear regarding what is to be achieved, and the expected deliverables from the IT processes. In this regard, they stated that with every employee having different understanding and different targets, there is no common understanding within the organization. In addition, benefits are not defined and there is no performance measurement to evaluate the success of IT process activities. Regarding the organizational context, the stated challenges were "lack of awareness among the staff" (under "resistance to change"), "no budget" (under "lack of slack resources"), "lack of formalized standards between IT and other departments" (under "lack of formalization"), "dilution of authority in organizations," (under "organizational strategy and culture"), and "difficult to measure KPI" (under "failure to maintain momentum"). Finally, under the environmental context, the challenge was "lack of industry expertise" (under "lack of industry/vendor support").

CONCLUSION

In this research, we developed a comprehensive taxonomic model of challenges that practitioners need to consider when implementing and integrating industry-relevant ITG frameworks. This research further prioritized and compared the challenges in implementing and integrating IT governance and security frameworks and standards as an integrated framework in organizations in the UAE, with those gleaned from the extant literature. As this research investigates the challenges in implementing ITG Frameworks in an integrated environment, it was found that:

- The results of the empirical study represented in the final research model (Figure 12) generally support the initial model derived from literature reviews, with some modification because of additional challenges that were not discovered earlier.
- ITG framework integration challenges are mostly global in nature with minor variations between countries.
- The most common context between the original and the revised IICM model is the integration of the Frameworks context, while the least similar is the organizational context.

There is consensus among respondents that integration of ITG frameworks are generally slow due to the frameworks being lengthy, generic, and not easy to understand. Thus, the contribution of this research is relevant as it covers all challenges in implementing the ITG Frameworks in a global environment.

The study is not without its limitations, since it was done in one country and in only four organizations. Hence, we encourage researchers to validate the revised IICM model in multiple regions and diverse sectors. Another area of future research is to view the challenges from a behavioral perspective linking the five contexts using Hofstede's four cultural dimensions. Another area of concern, we identified is the need to differentiate the challenges at different stages of ITG implementation.

From an organizational perspective, practitioners can consider these challenges in their implementation and integration of ITG frameworks to take countermeasures to overcome these challenges.

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APPENDIX 1

No.	Challenges in implementing ITG Frameworks	Source
1.	Too complex	(Othman & Chan, 2013) (Othman et al., 2011) (Pereira & Mira da Silva, 2012) (Tongren & Warigon, 1997)
2.	Time consuming	(Pereira & Mira da Silva, 2012) (Tongren & Warigon, 1997) (Sharifi et al., 2008) (Nfuka, Rusu, Johannesson, & Mutagahywa, 2009)
3.	Change management	(I. ISACA, 2011)
4.	Trying to do too much at the same time	(I. ISACA, 2011)
5.	Ineffective current enterprise governance	(I. ISACA, 2011) (Lee, Lee, Park, & Jeong, 2008)
6.	Communication issues	(I. ISACA, 2011) (Ramanathan, 2007)
7.	Lack of management commitment/support	(Othman & Chan, 2013) (Othman et al., 2011) (Lee et al., 2008) (Sharifi et al., 2008) (I. ISACA, 2011)
8.	Costly	(Othman et al., 2011) (Shang & Lin, 2010) (Nicho, 2011)
9.	Lack of perceived benefits	(Othman et al., 2011) (Shang & Lin, 2010) (I. ISACA, 2011) (Sharifi et al., 2008)
10.	Staff is resistant to change	(Othman et al., 2011) (Othman & Chan, 2013) (Shang & Lin, 2010) (Nfuka et al., 2009) (Grüttner, Pinheiro, & Itaborahy, 2010)
11.	Organizational politics	(Othman & Chan, 2013) (Othman et al., 2011)
12.	Lack of communication	(Othman et al., 2011) (Lee et al., 2008)
13.	Lack of slack resources	(Othman et al., 2011)
14.	Lack of centralization	(Othman et al., 2011)
15.	Lack of industry/vendor support	(Othman et al., 2011)
16.	Cannot work alone	(Shivashankarappa et al., 2012) (Mataracioglu & Ozkan, 2011) (Gehrmann, 2012) (Ula et al., 2011)
17.	Lack of compatibility	(Othman et al., 2011)
18.	National culture	(Othman et al., 2011)
19.	Overlap between ITG frameworks	(Pereira & Mira da Silva, 2012)
20.	Organizational structure and size	(Pereira & Mira da Silva, 2012)
21.	Regional differences	(Pereira & Mira da Silva, 2012)
22.	Ethics and trust	(Pereira & Mira da Silva, 2012)
23.	Strategic alignment with complex and dynamic environment	(Pereira & Mira da Silva, 2012)
24.	Organizational strategy and culture	(Pereira & Mira da Silva, 2012)
25.	Lack of clear ITG process	(Lee et al., 2008)
26.	Undefined roles and responsibilities	(Othman et al., 2011) (Latif et al., 2010)
27.	Lack of regulatory environment	(Othman et al., 2011)
28.	Complexity	(Othman et al., 2011)
29.	Cost	(Othman et al., 2011)
30.	Sector/industry	(Othman et al., 2011)
31.	Lack of formalization	(Othman et al., 2011)

Table 9: Challenges in implementing ITG Frameworks.

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No.	Challenges in integration ITG Frameworks	Sources
1.	Resistant to new/additional ITG frameworks	(Cater-Steel et al., 2006) (Wallhoff, 2004)
2.	Staff backgrounds and specialties	(Cater-Steel et al., 2006) (Latif et al., 2010)
3.	Choosing the best integrated frameworks	(Von Solms, 2005)
4.	Ways of framework integration	(Von Solms, 2005)
5.	Desire of organization to integrate optimally	(Cater-Steel et al., 2006)
6.	Difficulties due to interrelations	(Cater-Steel et al., 2006)
7.	Complexity of processes	(Cater-Steel et al., 2006)

Table 10: Challenges in integrating generic ITG Frameworks.

No.	Challenges in integrating COBIT, ITIL, and ISO 27K	Sources
1.	Different languages	(Wallhoff, 2004)
2.	Semantics of each Framework in same places are different	(Wallhoff, 2004)
3.	Harmonization between Frameworks occurs differently	(Wallhoff, 2004)
4.	Balance between ITG framework integration and corresponding expenses	(Năstase et al., 2009)
5.	Treated as technical guidance	(Năstase et al., 2009)
6.	Requires much work and experience	(Năstase et al., 2009)
7.	No single guideline because each case is different	(Năstase et al., 2009)
8.	Must be kept up-to-date	(Năstase et al., 2009)
9.	Harmonization not yet fully achieved	(Năstase et al., 2009)
10.	Different interests among staff and stockholders	(Cater-Steel et al., 2006)

Table 11: Challenges in integrating COBIT, ITIL, and ISO.

No.	Challenges in implementing COBIT, ITIL, and ISO 27K	Source
1.	Lack of knowledge/skills	(Othman & Chan, 2013) (Shang & Lin, 2010)
2.	Mobility of management	(Othman & Chan, 2013)
3.	Lack of geographical proximity	(Othman & Chan, 2013)
4.	Receptivity to internal or external mandate	(Othman & Chan, 2013)

Table 12: Challenges in implementing COBIT, ITIL, and ISO 27K.

No.	Challenges in implementing COBIT, ITIL	Source
1.	Dependencies between processes	(Pereira & Mira da Silva, 2012)

Table 13: Challenges in implementing COBIT, ITIL .

No.	Challenges in implementing ITIL, ISO 27K	Source
1.	Gap between service quality and customer perception	(Shang & Lin, 2010)

Table 14: Challenges in implementing ITIL, ISO 27K.

No.	Challenges in implementing COBIT	Source
1.	Project ownership by business	(Ramanathan, 2007)
2.	Absent software documentation	(Ramanathan, 2007)
3.	Configuration management	(Ramanathan, 2007)
4.	Stage-wise signoffs	(Ramanathan, 2007)
5.	Absence of documented strategy	(Ramanathan, 2007)
6.	Including more than what the organization needs	(Tongren & Warigon, 1997)

Table 15: Challenges in implementing COBIT.

No.	Challenges in implementing ISO 27K, COBIT	Source
1.	Technology-driven IT plans	(Ramanathan, 2007), (Ashenden, 2008), (Susanto12 et al., 2012)
2.	Hard to understand	(Ashenden, 2008; Susanto12 et al., 2012; Tongren & Warigon, 1997)
3.	Requires expert knowledge	(Pereira & Mira da Silva, 2012) (Ashenden, 2008) (Susanto12 et al., 2012)
4.	No assigned process owner	(Sharifi et al., 2008)
5.	Following departmental demarcation	(Sharifi et al., 2008) (Susanto12 et al., 2012)

Table 16: Challenges in implementing ISO 27K, COBIT.

No.	Challenges in implementing ISO 27K	Source
1.	Standalone	(Mataracioglu & Ozkan, 2011)

Table 17: Challenges in implementing ISO 27K.

No.	Challenges in implementing ITIL	Source
1.	Ignoring solutions other than ITIL for service management	(Sharifi et al., 2008)
2.	Failing to maintain momentum	(Sharifi et al., 2008)
3.	Conflict among IT department needs	(Shang & Lin, 2010)
4.	Lack of standard terminology	(Othman et al., 2011)
5.	Lack of enforcement	(Othman et al., 2011)
6.	Time lag between investment and performance outcome	(Shang & Lin, 2010)
7.	Required more time	(Sharifi et al., 2008)

Table 18: Challenges in implementing ITIL.

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