IT Controls in Public Cloud: Success Factors for Allocation of Roles and Responsibilities

Shafaq Khan, University of Dubai, UAE
Mathew Nicho, Robert Gordon University, UK
Haifa Takruri, University of Salford, UK

ABSTRACT

The rapid adoption of cloud computing by organizations has resulted in the transformation of the roles and responsibilities of staff in managing the Information Technology (IT) resources (via IT governance controls) that have migrated to the cloud. Hence, the objective of this research is to provide a set of success factors that can assist IT managers to allocate the roles and responsibilities of IT controls appropriately to staff to manage the migrated IT resources. Accordingly, we generated a set of success factors from behavioural, and information systems (IS) literature. These success factors were verified using in-depth interviews of executives from the United Arab Emirates (UAE). The empirical intervention suggests that the role allocation is driven predominantly by people's skills, competencies, organizational strategy, structures, and policies. In addition, the research made clear that the most significant competency and skill for a person allocated to IT controls is to be able to evaluate and manage a cloud service provider especially in terms of risks, compliance and security issues related to public cloud technology. The findings of this study not only offer new insights for scholars, and practitioners involved in assigning responsibilities but also provide extensions for IT governance (ITG) framework authorities to align their guidelines to the emerging cloud technology.

Keywords: Cloud computing, Roles and responsibilities, Accountability and responsibility, success factors.

1. Introduction

There is an unceasing interest in research into cloud computing technology across the globe and it has rapidly become the hottest topic in the field of IT (Puthal, Sahoo, Mishra, & Swain, 2015). While some industry experts are predicting that more than 60% of enterprises will have at least half their infrastructure on cloud-based platforms by 2018 (Columbus, 2015), by the same year at least half of the IT spending is predicted to be cloud based (Cherrayil, 2016). Cloud technology is transforming the knowledge, skills and abilities of most IT job roles at an alarming rate (Marquis, 2014) which entails a corresponding restructuring of roles and responsibilities related to the changed internal IT controls in the new environment. With hardly any guidance available to IT practitioners from the academic as well as the non-academic forum, such cloud migration projects are fraught with challenges (Rashmi & Sahoo, 2012) resulting in failed private clouds (World, 2015) and failed IaaS implementations going as high as 63% (Ramel, 2014). Lack of focus on people (Bittman, 2015), lack of talent (Linthicum, 2013), and not allocating people with the right skills have been attributed as the causes of many failed cloud projects (Venkatraman, 2014). Governance in the cloud requires defining policies and implementing well-defined roles for the responsibilities of information technology assets, business processes, and applications as these elements are moved out of the traditional IT environment and into the cloud (Becker & Bailey, 2014). Information systems researchers have been urged to analyze the impact of information technology on the job and skill requirements of people and to suggest a prescription for the future (Palvia & Vemuri, 2016). Looking at the strong potential, but with the highest concerns related to the public cloud, we state our research question thus: **What are the key success factors in the allocation of IT personnel to the roles and responsibilities for the control of cloud based IT resources?**

'Success factors' in this paper refer to those inputs to the management system that lead directly or indirectly to the success of a project or business (Cooke-Davies, 2002). Current study is focused on all cloud services (IaaS, PaaS and SaaS) of the public cloud model since IT controls uniformly relate to the transformation of the roles and responsibilities of IT in them. Hence, by answering the research question,

we aim to provide a set of success factors that can assist IT managers to allocate the roles and responsibilities of IT controls appropriately to staff to manage the migrated IT resources.

The rest of the paper is divided into 6 sections. In section 2 researchers searched the literature in the information systems domain to determine the factors that influence how organizations allocate IT personnel to the roles and responsibilities of IT controls. Section 3 analyzes existing literature to build a set of success factors for role allocation, section 4 outlines the methodology, section 5 analyzes the in-depth interviews conducted for the research, while section 6 discusses the findings from the analysis, and section 7 concludes the paper.

2. Research Gap

We performed a title search using the words, 'roles and responsibilities', 'IT governance', and 'cloud computing' in the Association of Information Systems (AIS) database spanning the years 2008 to 2016 to identify relevant literature on the allocation of roles and responsibilities of IT controls in a cloud environment. The search resulted in papers focusing on the identification of the necessary steps for implementing the appropriate IT governance for a cloud environment (Becker & Bailey, 2014) and the critical success factors for the service receiver of IT outsourcing (Hodosi & Rusu, 2013). There were other papers discussing the organizational integration of green IS through specific roles and responsibilities (Loeser, 2013), suggestions to help IT practitioners in organizations to look beyond Sarbanes-Oxley Act (SOX) regulations on the governance of end-user developed content (Leon, Abraham, & Kalbers, 2010), organizational change resulting from IT innovations (Suo, Techatassanasoontorn, & Purao, 2011) and the importance of adequate IT management capabilities, manifested in IT governance (Kim, Shin, Kim, & Lee, 2011). The search in Google Scholar using similar words, spanning the years 2008 to 2016 did not yield any relevant results. However, changing the search to 'roles and responsibilities in IT governance', between 2008 and 2016, within Google Scholar, generated four results. One paper proposed an IT governance (ITG) model for partnering and value co-creation (Karayilan, 2013), another was about implementing and continually improving ITG (ISACA,

2009), yet another explores the changes in the roles and responsibilities of IT staff, in a cloud environment (Khan, 2012). Since, the allocation of IT decision rights between IT units and business units remains an important IT governance challenge, the study by Winkler and Brown (2013), addressed this at the application level, including the governance of applications delivered on premise versus those delivered with a software-as-a-service (SaaS) model. The above search results revealed that although cloud computing has been examined from several specific business perspectives, there is no research conducted to guide practitioners on the allocation of the roles and responsibilities of IT staff, for resources that have migrated to the cloud.

Allocation of roles and responsibilities of IT controls is an ITG decision making mechanism (Sambamurthy & Zmud, 1999). Among the range of ITG frameworks, Control Objectives for Information and Related Technologies (COBIT) and Information Technology Infrastructure Library (ITIL) are considered well-known frameworks that support the implementation of effective ITG processes (Coelho & Rupino da Cunha, 2009; Othman, Chan, & Foo, 2011; Stevens, 2011). COBIT identifies 37 processes spread over governance and management domains. Relevant to the research question, assignment to processes with the documented responsibility levels in COBIT takes place in the form of responsibility, accountability, consulted, and informed (RACI) charts (ISACAc, 2012). Similar to that, ITIL provides best practices related to the effective and efficient management of IT operations (Anthes, 2004; Gama, Sousa, & da Silva, 2013) and IT service management (ITSM). The framework of ITIL contains seven service life cycle stages, including service support, service delivery, planning to implement service management, security management, ITC infrastructure management, application management and the business perspective (Shang & Lin, 2010). For the successful execution of the each of the ITSM lifecycle stages, the roles and responsibilities of various activities are defined by using a RACI chart (ITIL, 2007).

While role allocation in the form of responsibilities, accountability, consulted and informed (RACI) chart has been used in popular IT governance frameworks like COBIT (ISACA, 2012) and ITIL (ITIL, 2007), in COBIT its implementation is too generic for practical use (Zhang & Le, 2013) and ITIL

provides only generic guidelines for employing RACI in the non-cloud environment (Khan, Nicho, & Cooper, 2015). In an effort to find the allocation factors used by RACI charts in COBIT, a title search using the words "roles and responsibilities" and "RACI" was conducted in the AIS and Google Scholar spanning the years 2008 to 2016. While a search for research on "allocation of roles and responsibilities in COBIT" yielded no result, a search with the key words "roles and responsibilities allocation in COBIT" resulted in a very poor response, with a research paper proposing improvements to enhance the perception of "responsibility" in COBIT RACI charts (Feltus, Petit, & Dubois, 2009) and a paper pointing to a need for more studies to look at different ITG mechanics, IT-related capabilities, and contingent factors that provide benefits at the process and firm levels (Prasad et al., 2009). A similar search in the ITIL academic and practitioner literature resulted in only a few general attributes (ITIL, 2007) used for RACI allocation but unrelated to the cloud environment. This clearly indicates a research gap in terms of the allocation of roles and responsibilities in RACI charts for a cloud environment, in the COBIT and ITIL frameworks.

It is evident that literature in the information systems domain is deficient on the mechanisms to determine the factors that influence how organizations allocate IT personnel to the roles and responsibilities of IT controls, thus indicating a need for a framework, responding to this research gap.

3. Background literature

Many researchers have developed theories as an extension of existing theories or utilised frameworks from other disciplines (Alborz, Seddon, & Scheepers, 2003). Since, research needs to have a strong grounding in theory (Gregor, 2006; Lewin, 1945), the researchers looked at theories related to the research theme in order to deduce role and responsibility allocation success factors.

Migration to the cloud being an organisational issue (Beserra, Camara, Ximenes, Albuquerque, & Mendonca, 2012), researchers looked at the Stafford Beer's (Stafford, 1985) Viable System Model (VSM), that enables people to address organisational issues. It was particularly considered because of its usefulness for organisations using technology to distribute work amongst geographically separated

workers (Hilder, 1995). VSM has been used earlier as an ITG base model (Lewis & Millar, 2009) for evaluating ITG models (Davies, 2007) and for discussing theories of ITG (Dowse & Lewis, 2009). However, this model being very generic, was not found suitable for use in the ITG activity of role allocation. Migrating to the cloud being an organizational strategy (Iyer & Henderson, 2010), researchers looked at the strategic alignment model of Henderson and Venkatraman (1993). But, it was found to focus more on the role of IT in organisational transformation rather than on role allocation. Since, cloud migration affects both technology and people, especially in an ITG environment, an evaluation of the socio-technical theory of Bostrom and Heinen (1977) revealed that it concentrates only on providing guidelines from a system design approach. Focusing on a human resource approach (due to the topic "role allocation"), the researchers analyzed the human resource framework of Lepak and Snell (1999), but found that it identifies forms of human capital that can be used as a source of competitive advantage. Likewise, the task-technology fit model of Goodhue and Thompson (1995) could not be used to explain role allocation, since it provides guidance on the impact of IT on user performance.

To find the answers to the research question, this paper draws upon theories based on the three IS domains (explicit in the title), namely cloud computing, ITG and organisational theories.

3.1. Cloud computing

Cloud computing is described as a method of computational "outsourcing" to the cloud (Lei, Liao, Huang, & Heriniaina, 2014), as well as the latest trend to outsource some or complete IT operations to run a business from the public cloud (Dhar, 2012). Thus, a conscious decision was made to address the research question by studying the literature on IT outsourcing. Allocation of responsibilities in the form of a RACI chart has been used for outsourcing also (Ramakrishnan & Pro, 2008; Simonova & Zavadilova, 2011), however, the factors that impact the allocation of roles and responsibilities for IT controls is not evident even in the outsourcing literature. To derive factors, researchers built upon related outsourcing theories. The IT outsourcing relationship (Alborz et al., 2003) model presents factors that influence IT outsourcing relationship. Other researchers like Feeny and Willcocks (1998) also identified the IS capabilities required

to capitalise on the external market's ability to deliver cost-effective IT services in an outsourced environment. 'By combining both the perspectives, the researchers came up with eight success factors depicting the IS capabilities/skills for building a successful outsourcing relationship.

Cloud computing, considered to be the latest outsourcing trend (Dhar, 2012), inherits the "roles and responsibilities" factors from outsourcing. However, cloud computing enables ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort (Mell & Grance, 2011). Unique characteristics of cloud computing require a unique set of capabilities and skills to manage them effectively.

The public cloud model brings out increased quantities of customer data, increased dependency on remotely provided third-party IT services; and complex chains of responsibility management. Security concerns are higher in the public cloud environment (Pearson et al., 2012), where services can be used by competing clients and where the number of cloud users is much higher. The administrators of cloud are mainly concerned with security and compliance (Modi, Patel, Borisaniya, Patel, & Rajarajan, 2013) Puthal which introduces a number of cloud related risks and threats (Khan, 2012; Zissis & Lekkas, 2012), thus leading to a shift in the roles of the IT personnel (Gefen et al., 2012; ISACA, 2011; Pearson et al., 2012) to respond to such concerns. To manage the increasing business and operational risks inherent in a complex global environment, integrated governance risk and compliance has become one of the most important business requirements for organizations (Vicente & da Silva, 2011). Client organisations need to have capabilities to ensure the effective implementation of IT controls that respond to these concerns, thus emphasizing the 'security', 'risk' and 'compliance' management competencies.

Thus an analysis of the academic and the practitioner literature on IT outsourcing and public cloud computing, resulted in the induction of eleven success factors which have an impact on the allocation of people to roles and responsibilities, in a cloud environment. These eleven success factors are: 'strategy', 'vendor management', 'contract management', 'governance', 'technical skills',

'negotiation skills', 'performance management', 'knowledge management', 'security management', 'risk management', and 'compliance management'. It has been noted that organizational design also influences the decision-making process (Rowland & Parry, 2009) and personnel decisions (Carley, Prietula, & Lin, 1998), thus assisting in identifying the success factors that impact on the allocation of roles and responsibilities.

3.2. Organizational theories in role allocation

Organizational design is about creating roles, processes, and formal reporting relationships in an organization. Since organizations are composed of individuals, their performance significantly depends upon resources and capabilities (Sharma & Vredenburg, 1998). It has been noticed that organisational design influences the decision-making process (Rowland & Parry, 2009), including decisions related to roles and responsibilities allocation or personnel decisions (Carley et al., 1998). It has also been found to help in reshaping and channelling organisational structures and roles to meet the business strategy. The widely accepted organizational 'Star model' (Galbraith, 1995, 2011) has been used for channeling resources (Nadler & Tushman, 1997) and thus was useful in providing allocation success factors for our research too. It was also found to be deployed by practitioners for identifying the right people to manage innovation efforts (Deschamps, 2005), for driving business growth through new capabilities (Schuster & Kesler, 2011), for shaping human resources processes (Ulrich, 1998) and for redesigning activities in organizations (Mohrman, 2007). Thus, this model proposed five relevant success factors for role allocation namely 'strategy', 'structure', 'rewards', 'processes', and 'people'. Allocation of roles and responsibilities of IT controls, being an ITG decision making mechanism (Sambamurthy & Zmud, 1999), we also explored the ITG domain for identifying role allocation success factors.

3.3. IT governance (ITG)

Commonly deployed frameworks namely COBIT and ITIL support the implementation of effective ITG processes (Coelho & Rupino da Cunha, 2009; Stevens, 2011). Implementation of IT processes/controls in

COBIT and ITIL are commonly effected through the deployment of RACI charts which defines the roles and responsibilities of the different stakeholders in the IT processes; but it does not provide success factors for its usage. 'Governance' identified as a role allocation factor in ITG literature, is based on three constructs namely structures, processes, and relational mechanisms (Grembergen, Haes, & Guldentops, 2004; Haes & Grembergen, 2008; Peterson, 2004; Weill & Ross, 2004). Whereas ITG structures and processes correlate with those of Galbraith's model, ITG helped in identifying a new criterion, namely 'relational mechanisms'. All the processes that are geared towards building interpersonal and collaborative relationships between business and IT management are grouped under the "relational mechanisms" factor.

3.4. Success Factors for Allocation of Roles and Responsibilities

The theoretical perspectives of cloud computing, organizational design and ITG contribute to the understanding of how firms may manage their roles and responsibilities allocation of IT controls, thus, leading to nineteen success factors (table 1) As shown in figure 1, some of the success factors derived from these three IS domains overlap with each other. The 'strategy' criterion, dictating the differentiating factors of an organization, has been identified both by cloud computing as well as the organizational theories. Subsequent criterion 'Structures' defining the shape of the organization, key roles, power and authority, has been identified as a criterion by organizational as well as by the ITG theories. Another common criterion between ITG and the organizational domain is 'processes' which defines the work flow between the roles. In addition, ITG literature identifies 'relational mechanisms' as a criterion that defines the mechanisms of collaboration between units and departments and thus impacts on the roles and responsibilities allocation. Organizational theory identifies 'rewards' as an additional criterion, according to which people will be allocated to roles and responsibilities in order to motivate them. Other success factors identified by the cloud computing literature outline the required skills and competencies of people allocated to the cloud based controls.

Table 1. Theoretical background for roles and responsibility allocation

Theoretical Perspective	Implications for roles and responsibility allocation	Success Factors
Organizational Theory	This model emphasizes that people's roles within an organization depends upon the strategy adopted by the organization (whether to build internal capabilities or to exploit external capabilities); Roles and responsibilities also upon structures that determine type and numbers of job specialties used in performing the work; the number of people constituting the departments at each level of the structure; distribution of power; and basis for forming departments at each level of the structure; It emphasizes the role of processes, which are defined as connected set of activities that show the movement of information; This model emphasizes the importance of people's competencies, skills and mind-sets required to execute the strategic directions of the organization; According to this model, people are rewarded by allocating them to motivating tasks.	Strategy, structures, processes, people, rewards
Cloud Computing Theories	Outsourcing model and literature emphasized people's capabilities and skills to build a successful outsourcing relationship and to capitalise on the external market's ability to deliver effective IT services. Additionally, cloud computing literature urges skills and capabilities to address the ever-increasing security, risk and compliance management concerns, related to the technology.	Knowledge management, technical competencies, supplier management, contract management, performance management, negotiation skills, governance, conflict management, security management, risk management, compliance management.
ITG Theory	ITG defines processes as strategic IT decision making or IT monitoring procedures; to allocate IT resources that help in managing external partners and to control IT resource planning. ITG uses structures for distributing IT-related decision making rights and for distributing responsibilities of IT staff. ITG follows relational mechanisms to allocate roles and responsibilities in a way that helps in forming a link between business and IT.	Structures, processes, relational mechanisms

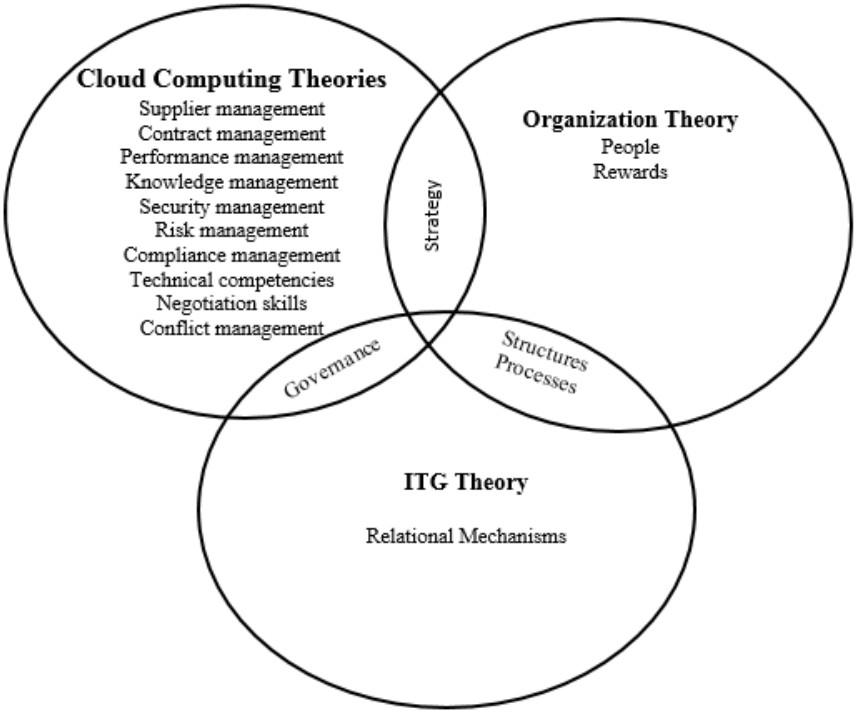

Figure 1. *Overlapped success factors*

Aggregating (with redundancies removed) all the success factors derived from cloud computing, organizational theories, and ITG literature resulted in a set of sixteen success factors (table 2) for the allocation of people to roles and responsibilities of IT controls in a public cloud. We call this set of success factors version 1.

Table 2. Success factors -version 1.

Success Factors	Definition	Sources
1. Strategy	– Defines whether to build capabilities (like skills, processes, technologies, human abilities) internally or exploit external capabilities available in the form of cloud services. Strategy of an organization leads to the tasks to be performed.	(Alborz et al., 2003; Aubert, Rivard, & Patry, 2004; Galbraith, 2011; Laabs, 1993)
2. Structure	– Outlines the specialization which determines the type and numbers of job specialties used in performing the work. – Defines the shape that refers to the number of people constituting the departments at each level of the structure (size). – Determines the distribution of power either to the department dealing directly with issues critical to its mission, or centralization or decentralization of this authority	(Alborz et al., 2003; Galbraith, 2011; Smith & McKeen, 2009).
3. Processes	– Connected set of activities that show the movement of information. When these processes cross the organizational boundaries in a cloud environment, clear articulation of roles and responsibilities at the boundary interfaces is required.	(Alborz et al., 2003; Galbraith, 2011; Smith & McKeen, 2009).
4. People	– Fundamental set of competencies, skills and mind-sets required from employees at all levels.	(Galbraith, 2011)
5. Relational mechanisms	– Collaboration, relationship, teams, networks, integrative roles and matrix connections building attributes to build interpersonal and collaborative relationships among units and organizations.	(Galbraith, 2011; Haes & Grembergen, 2008; Peterson, 2004)
6. Risk management	– Competencies to identify all potential risk that may be associated with critical assets like intellectual property, personally identifiable information etc. that will be stored with the cloud service provide (CSP).	(EMC, 2011; Khan, 2012; Pearson et al., 2012)
7. Compliance management	– Knowledge of internal and external organizational policies and ensuring the maintenance of same compliance, even when operating in cloud. – Knowledge of national and international regulations that constrain the flow of information and mandate the vulnerability assessment of data in the public cloud. – Competency to assist holding cloud (and other) service providers accountable for how they manage personal, sensitive and confidential information in the public cloud.	(EMC, 2011; ISACA, 2011; Khan, 2012; Pearson et al., 2012)
8. Security management	– Competencies to handle security concerns in public cloud where services can be used by competing clients and where the number of cloud users is much higher. – Competencies to handle cloud security concerns like information assurance, data privacy, and ownership issues arising in public clouds due to the risk of an unauthorized data disclosure and lack of user control on client data. – Competencies to ensure the deployment of data privacy mechanisms by CSPs that are compliant with the regional legal regulations.	(EMC, 2011; Khan, 2012; Pearson et al., 2012)
9. CSP management	– Skills are required for handling activities to evaluate and select CSPs.	(Alborz et al., 2003; Chaudhury, Nam, & Rao, 1995)(Anne & Will 2004)
10. Contract management	– Skills to structure contracts for effective pricing, access rights, data ownership, risk management and for ensuring the availability of data and reports. Specific SLA can be added to the contract.	(Alborz et al., 2003; Ho, Ang, & Straub, 2003; Parkes, 2004; Rivard & Aubert, 2007)
11. Technical competencies	– Competencies to evaluate the on-demand, self-service cloud based solutions, coordinate and integrate the cloud services with the legacy systems to create new opportunities and to reduce cost.	(Anne & Will 2004)(Endeavor Management, 2011; Khan, 2012)
12. Negotiation skills	– Skills to negotiate the contact terms to ensure the firm's rights and obligations for both parties.	(Anne & Will 2004)(Kim; Zhao & Watanabe, 2008)
13. Performance management	– Competencies required for setting quality levels, monitoring the CSP against the SLAs and rating the CSP performance	(Alborz et al., 2003; Parkes, 2004)(Fitzgerald and Willcocks 1994)(Anne & Will 2004)
14. Conflict management	– Skills to assess and avoid negative impact of establishing new business ties or terminating the existing business with a CSP.	(Anne & Will 2004)(Kim; Zhao & Watanabe, 2008)
15. Knowledge management	– Attributes required for sharing or transferring knowledge with the CSP, to build trust which will result in supplier improved commitment and thus better results.	(EMC, 2011; Khan, 2012; Pearson et al., 2012)
16. Rewards	– To motivate people to perform and address organizational goals.	(Galbraith, 1995)

4. Research methodology and data

Roles and responsibilities allocation in a cloud environment being a new and less researched topic, this study relied on the literature and case studies of organizations that have migrated IT resources to the cloud. The answer to the research question outlined in section 2 not only assists in answering the 'what' (success factors) but also the underlying 'how' (providing guidelines) of the research question. In this regard, this research follows the Type V theory of 'design and action' where the primary constructs are users, work context, information requirements, and system architecture (Gregor, 2006). This type of theory is about the methodologies and tools used in the development of information systems (Gregor, 2002). While case research, can be used with any philosophical perspective, be it positivist, interpretivist, or critical, the positivist paradigm explicitly tests as well as builds theory (Dubé & Paré, 2003), as is the case with this research. In order to obtain a rich and detailed insight into the process being enacted (Eisenhardt & Graebner, 2007), the case studies will investigate the methodology of *'allocating roles and responsibilities of IT controls when IT resources migrated to the cloud'* (the research problem) from the perspective of the IT department within an organization, using in depth interviews and document analysis methods. To justify the qualitative interpretive case study approach, the researchers focused on selecting large private and/or government organizations that have migrated or are in the process of migrating to public cloud. For a contextual analysis, 12 IT decision makers from multiple organizations were selected to verify the success factors. This has been found to be desirable when the intent of the research is theory testing (Benbasat, Goldstein, & Mead, 1987), refining exiting theory (Gordon, Blake, & Shankaranarayanan, 2013), or allowing for replication in multiple settings (Johnston, Leach, & Liu, 1999). Qualitative methodology was deemed the appropriate technique for testing the theory (Yin, 2014) and for capturing reality from the point of view of the participants (Kaplan & Maxwell, 1994; Leech & Onwuegbuzie, 2007). Prior research shows that qualitative methodology using semi-structured interviews has been used for testing a framework (Das & Dayal, 2016). Researchers decided to use abduction, using both induction and deduction (Alrajeh, Fearfull, & Monk, 2012) to deduce theory based on past research

in the domains of research themes (cloud computing, ITG and organizational theory), followed by induction to verify the success factors.

There is insufficient research done on the topic under consideration in general and none of that relates to the UAE region in particular. Moreover, in order to capture a broad spectrum of this ITG practice, the literature review was not scoped down to the UAE market. However, to acquire the UAE perspective, these success factors were verified in different organizations in UAE. The selection of the UAE as the location of the study was based on the advanced state of IT governance implementation in the UAE (ISACA, 2014a), the state of readiness for the uptake of cloud technology by the different sectors of the economy with 95% of enterprises having already implemented or planning to implement a cloud computing model (Desk, 2015), strong growth of the public cloud model (Dartnell, 2015), and the fact that the Information Systems Audit and Control Association (ISACA) UAE chapter is the largest, oldest and an award winning chapter in the Middle East (ISACA, 2014b), indicating the IT maturity of respondents. Supporting factors include the location and active participation of one of the researchers in the ISACA UAE chapter.

Out of 40 respondents in 32 organizations, to whom we had communicated our intention, and of the few who responded favorably, we identified 12 respondents from 11 organizations to verify the success factors. The respondent's profile is given in table 3. Due to the nature of expertise required to verify the success factors, we interviewed only those respondents within the organizations, who are at an IT decision-making level, have related professional certifications like CGEIT, CISA, CISM, CRISM or CISSP, and/or have experience of working on the cloud projects. For the purpose of anonymity the names of the respondents have been replaced with codes. The researcher selected organizations that have adopted or that plans to adopt cloud technology. Private organizations are comparatively more involved in cloud computing ventures; thus, 66.7% of the organizations (referred as 'cases' hereafter) are from the private sector, while the remaining 33.4% are from the government sector.

Table 3. Respondents and organizational profiles

	Respondents Profile			Organizational Profile		
	Code	**Position**	**Knowledge of IT Governance**	**Industry**	**Sector**	**Organization Details**
1	AD	Senior Manager - Infrastructure	More than 13 years of experience at various IT management positions.	Utility services	Govt.	It is a leading public service infrastructure in UAE with almost 10,000 overall and 3000 + in the IT department. Initiated deployment of IaaS cloud model.
2	AZ	Chief IT Restructuring Officer	At a very senior IT management position. More than 30 years of IT management experience in IT industries. An MBA with certification in CGEIT.	Technology	Govt.	It is a leading Dubai based ICT service provider in UAE. It is a subsidiary of the organization with more than 50,000 employees. There are more than 90 people working in the ICT provider branch.
3	AY	Head of IT	More than 20 years of IT management experience in IT industries. An engineer with certification in CISSP and PMP.	Investment	Private	Total number of employees exceeding 700. Currently 26 employees in the IT department and having a target of 65 by the end of the year. Hybrid cloud model adopted.
4	AK	Vice President Information Technology	More than 16 years of experience in IT industries. Chartered accountant and global CIO.	Real Estate	Private	Company with a centralized IT department for all of its subsidiaries. Number of employees exceeds 400 with 10 (plus outsourced) in the IT department. Public cloud model adopted.
5	HI	Chief Information Security Officer	More than 15 years of experience in IT industries. Holds 39 certifications, including CGEIT, CISSP, and CFE.	Banking	Private	Bank with nearly 800 employees, with 60 in the IT department. Public cloud model adopted.
6	MR	Consulting Engineer	More than 18 years of experience in IT industries. Master's degree in engineering. Holds certifications including CCIE, CISSP, and VCP.	Technology	Private	Global leader in IT with a revenue of US$ 47.142 billion and an office in UAE. Number of employee's exceeding 70,000 with 200 + in the UAE office. This organization is a cloud enabler with its own cloud.
7	KR	Group CIO	More than 11 years of experience at the senior IT management level. Holds an honorary doctorate and two master's degrees.	Retail	Private	Number of employees close to 10,000 and organization has adopted public cloud.
8	GH	Head systems and storage	More than 15 years of experience at the IT management level. Holds a BE and MBA (IT) and has certifications in ITIL, MCP, CCNA, CAN, VCP, and PMP.	Banking	Private	Number of employees equals 2500 with 90 in the IT department. Cloud models adopted are private, public and hybrid
9	ST	Head of IT	More than 17 years of experience at the IT management level. Holds an MBA (finance) and has certifications in PMP, CISA, and CGEIT.	Real Estate	Private	One of the largest real estate developers in UAE, operating internationally, having a revenue of more than $3 billion. Numbers of employees exceed 10,000 with 200 + in the IT department. Cloud models adopted include private, public and hybrid.
10	JN	Senior Manager, Information Security, IT	More than 30 years of experience at the IT management level. Holds an M.Tech and has certifications in Oracle DBA (7, 8, 9i, 10i), IBM AIX Administrator (4.x), HPUX Administrator (7,8), CISSP, PMP, ABCP, CISM, CGEIT, and CRISC.	Manufac-turing	Govt.	It is a leading global producer with number of employees exceeding 7,000 having 160 + in the IT department. Their cloud adoption is in a very early stage.
11	MM	Manager Information Security and Risk	More than 11 years of experience at the IT management level. An engineer with certifications in ISO 27001 implementer, ISO 27001 auditor, and ISO 27000 auditor.	Technology	Govt.	It is a leading Dubai based ICT service provider in UAE. It is a subsidiary of the organization with more than 50,000 employees. There are more than 90 people working in the ICT provider branch.
12	MD	VP Information Technology and services	More than 22 years of experience at the IT management level. Holds an MSc and MBA and has certifications in ITIL, CISCO, PMP, and CCSIP.	Banking	Private	One of the largest banks in UAE by assets. Number of employees in the IT department exceeds 200. Cloud model adopted is confidential.

Face-to-face interviews with respondents were conducted over a period of seven months during 2015, with each interview (interview protocol attached in appendix) lasting an average of 55 minutes. All interviews were audio recorded with the exception of one respondent (MD) who cited organizational confidentiality as a justification for the refusal. Hence, in this particular case, the researcher took extensive notes during the interview. For analysis purpose, the audio files were verbatim-transcribed using 'O-Transcribe' and loaded into the qualitative data analysis software NVIVO 10.

5. Analysis of Data

For analyzing and interpreting qualitative data, the researchers decided to follow the five step guideline given by LeCompte (2000) namely 'tidying up', 'findings items', 'creating stable sets of items', 'creating patterns' and 'assembling structures'. The analysis phase involve the first three stages of the five step guidelines.

The tidying up (first stage) involved preparing the data for analysis. In line with the data analysis guidelines, preparing data for analysis included saving copies of digital files in secure locations, deleting files from the digital recorder (for data security), using a consistent format in naming the files (in the order of the interview dates), and identifying missing data. For the identification of missing data further interviews were conducted with respondents.

The second stage of analysis involved segmenting the responses into nodes (using NVIVO software) based on pre-determined themes/factors (these terms will be used interchangeably) as well as open coding. Since, researchers have already identified 16 success factors (version 1) (table 2), constant comparison analysis (Glaser & Strauss, 2009) was undertaken deductively to code data into pre-determined (16) themes. The constant comparison analysis feature of NVIVO was used to generate the word count in terms of 'percentage coverage' (table 4) which shows the number of characters as a percentage of the total source. This word count depicts the positive emphasis given by respondents to the

identified factor (Leech & Onwuegbuzie, 2011). In this regard, Leech and Onwuegbuzie (2007) found word count to be useful if the researcher can assume that frequency of words, categories, or themes provide a good indication of meaningfulness. Negative values display the negative emphasis of the factor by the respondents. Since, the content of factors overlap with each other, the combined 'percentage' of words for the particular theme (shown in the second last column) aggregates to 346.5%. This figure has been reduced to 100% and re-calculated to reveal the 'true percentage' in the last column aggregating to 100%. Table 4 summarizes the verification/evaluation results of the success factors (table 2), in the order of their citations by the respondents.

Table 4. Verification of success factors-version 1

		Sources												Percentage Coverage	
No.	Factors	AD	AK	AY	AZ	GH	HI	JN	MD	MM	MR	KR	ST	346.50%	100%
1	Structure	7.10%	8.02%	8.41%	8.90%	5.82%	13.39%	2.17%	4.63%	0.97%	0.48%	0.41%	3.88%	64.18%	18.5%
2	Compliance mgmt.	1.61%	15.71%	1.65%	6.13%	4.82%	3.95%	1.32%	0.34%	0.37%	2.07%	0.41%	0.50%	38.88%	11.2%
3	Security mgmt.	0.79%	0.71%	0.39%	2.15%	5.96%	4.52%	5.07%	2.59%	0.25%	3.07%	0.41%	4.20%	30.11%	8.7%
4	Strategy	2.01%	2.68%	0.37%	0.42%	1.36%	0.35%	1.96%	4.51%	0.30%	6.66%	0.41%	5.56%	26.59%	7.7%
5	CSP mgmt.		3.23%	1.63%	2.31%	2.91%	2.76%	1.52%	1.55%	0.07%	3.49%	0.41%	5.24%	25.11%	7.2%
6	People		1.49%	8.58%	2.87%	4.03%	1.22%	1.23%	0.07%	0.33%	1.18%	0.41%		21.42%	6.2%
7	Relational mechanisms	3.35%	1.64%	2.93%	3.82%	4.42%	1.34%	0.49%	0.35%	0.08%	1.45%	0.41%	0.94%	21.22%	6.1%
8	Rewards		1.60%	0.37%	3.28%	4.08%	2.15%	0.34%	2.38%	0.26%	2.96%	0.41%	2.39%	20.22%	5.8%
9	Performance mgmt.	8.52%	2.11%	0.07%	4.53%		0.10%	0.09%	0.26%	0.90%	0.13%	2.80%		19.51%	5.6%
10	Risk mgmt.	0.79%	4.80%	0.37%	0.12%	6.99%	0.37%	0.08%	3.36%	0.22%	1.57%	0.41%		19.09%	5.5%
11	Processes	0.74%	0.94%	6.38%	2.67%	2.74%	3.62%	1.17%	1.91%	0.10%	0.22%	0.41%	-2.05%	18.86%	5.4%
12	Negotiation skills		10.66%	0.83%		0.41%	1.25%	0.61%	0.80%	0.14%	0.12%	0.41%	0.10%	15.34%	4.4%
13	Contract mgmt.	0.67%	1.58%	0.43%	1.48%	0.18%	0.13%	1.26%	0.57%	0.32%	1.92%	0.41%		8.96%	2.6%
14	Knowledge mgmt.	1.89%	0.43%	0.53%	0.23%	1.33%	0.29%	0.73%	0.87%	0.02%	1.44%	0.41%		8.17%	2.4%
15	Conflict mgmt.	1.82%		0.95%	0.33%		0.20%	0.75%	0.86%	0.15%	0.22%	0.41%		5.69%	1.6%
16	Technical competencies	-4.13%	-3.32%	0.04%	-1.08%	-13.12%	-1.92%	1.06%	0.61%	0.18%	0.82%	0.41%	-0.81%	3.12%	0.9%

It was evident from table 4, that respondents have overtly emphasized 'structure', and 'compliance management'. Seven respondents (AD, AY, AZ, AK, ST, HI, GH) are of the view that cloud computing will reduce the requirement for the number of IT professionals. Structure will impact role

allocation by helping in identifying people that can be allocated to IT controls on cloud (AY), by distributing IT personnel to different departments (AD) and by re-allocating their workload to different kinds of jobs (AK). The compliance factor was found to be important in the UAE context, as the government has laid some data compliance restrictions on government organizations to store data only within the country.

Moderate emphasis (<10% and >5%) has been placed on 'security management' 'strategy', 'cloud service provider (CSP) management', 'people', 'relational mechanisms', 'rewards', 'performance management', 'risk management', and 'processes'. In contrast, relatively low emphasis (<5%) have been placed on 'negotiation skills' 'contract management', 'knowledge management', 'conflict management' and especially on technical competencies. Only one respondent cited 'technical competency' as a theme by stating that it is only relevant while the organization is still on the journey of migrating to cloud. Apart from the deduced 16 themes correlating with the version-1 success factors (table 2), eight new themes also emerged from the interviews (table 5), resulting in a total of 24 themes.

Table 5. Emerged themes during the empirical research

No	Success Factors	Coverage	Sources	Summarized content of the themes
1	Training	16.43%	AZ, AY, ST MR, KR, GH, MD	Motivating staff through technical as well as managerial training will help to align them with the new technology and new framework of work and to reduce challenges.
2	Policies	8.51%	AD, KR	People with knowledge of forming and adhering to stringent cloud policies required.
3	HR policies	7.96%	ST, HI	People will be allocated based on their workload specified by HR policies.
4	Financial controls	6.03%	JN, AZ	Cloud decisions are based on financial implications.
5	Change management	4.9%	AK, KR, GH, MR	People ready to change and adopt the new technology needed. Allocation is based on people's aptitude, ability to take up challenges and readiness to adopt the new technology needed
6	Quality	1.95%	JN, AD, AZ	People need to know how to get quality services from the cloud providers.
7	Organizational size	1.52%	MR	Allocation of roles and responsibilities will depend upon the number of people in the organization to run the IT.
8	Service-based	0.54%	JN, AK, JN	Allocation of resources will be based on availability requirement, criticality and nature of the cloud services.

During stage three, we undertook domain analysis of 24 themes utilizing Spradley (1979)'s semantic relationship based on the identification of key topics, to create 'stable sets of items'. Analysis of the transcript from a contextual perspective revealed many relationships between the success factors (see

figure 2). We found 'policies' to be a part of 'compliance', while 'HR policies, and 'financial controls' can be grouped under 'strategy'. Similarly, 'quality' can be grouped under 'performance management', 'organizational size' under 'structure', 'training' categorized under 'rewards' and 'service-based' part of 'processes'. Thus, it was observed that all (except 'change management') emerged themes (table 5) are embedded indirectly in the induced themes of success factors-version 1 (table 2). However, since 'change management' (number 5 in table 5 discussing about people's abilities to handle the change) does not relate to the predetermined themes in the table 2 success factors, it was appended to the success factors (version 2) as an additional criterion (table 6).

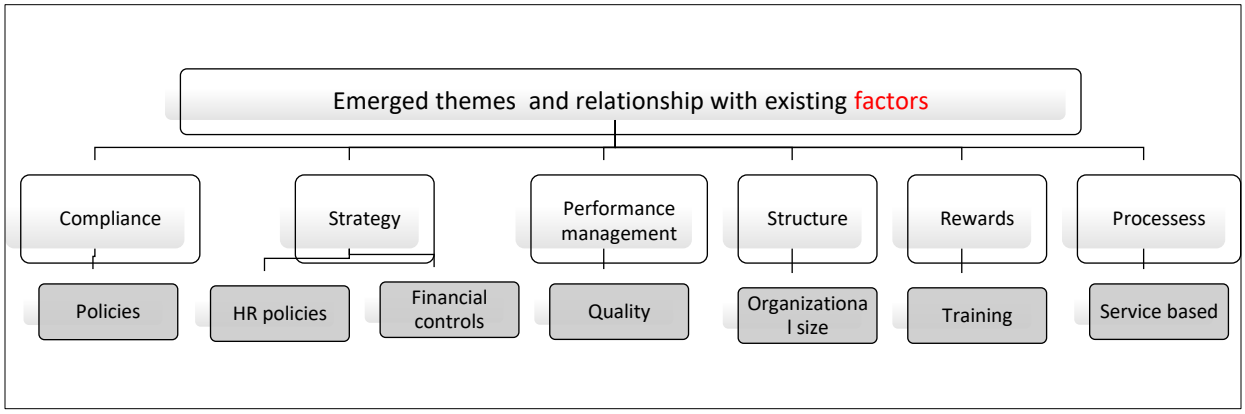

Figure 2. Grouping the emerged themes under relevant success factors-version 1.

The results of stage 2 and 3 (of analysis) found substantial verification of the version 1 success factors (table 2), supporting the success factors derived from theory, with the addition of one more criterion (change management). Further analysis and interpretation of the themes based on its context assisted us in the redefining the success factors to make it more relevant to the cloud environment (see subsequent section on discussion).

Table 6: Refined success factors- version 2

Success Factors	Definitions
1. Strategy	Defines whether to build capabilities (like skills, processes, technologies, human abilities) internally or exploit external capabilities. It defines the tasks to be performed.
2. Structure	Determines the location of decision-making power and authority by setting out the reporting relationships, power distribution, and communication channels
3. Processes	When moving to the cloud, processes undergo changes requiring people to have different skills for handling different set of processes, crossing the organizational boundaries.
4. People	Fundamental set of competencies, skills and mind-sets required from employees at all levels.
5. **Rewards**	People are rewarded by allocated them to cloud related tasks, as it gives them an opportunity for growth, motivation, recognition and challenge of learning new technology.
6. Relational mechanisms	Role and responsibilities allocation will be made to build interpersonal and collaborative relationships among units and organizations.
7. Risk management	Competencies/skills to identify and manage all potential critical, legal and compliance related risks associated with clouds.
8. Compliance management	Competencies to ensure compliance to internal as well as external policies, regulations and accountability mechanisms, when operating in the cloud.
9. Security management	Competencies to evaluate cloud vendors to ensure deployment of security mechanisms related to information assurance, data privacy, data confidentiality, ownership and technology related issues.
10. Vendor evaluation and management	Competencies and skills to evaluate and manage cloud vendors
11. Contract management	Skills to develop and manage contracts for effective SLAs, pricing, access rights, data ownership, risk management and for ensuring the availability of data and reports.
12. Technical competencies	Competencies to coordinate with the cloud provider and integrate cloud services with the existing systems.
13. Negotiation skills	Skills to negotiate the contact terms to ensure the firm's rights and obligations for both parties.
14. Performance management	Competencies required for setting quality levels, monitoring the CSP against the SLAs and rating the CSP performance.
15. Conflict management	Skills to assess and avoid negative impact of establishing new business ties or terminating the existing business with a CSP.
16. Knowledge Management	Skills to share knowledge between cloud user and vendor, both ways, to build trust which will result in improved commitment and thus better results
17. Change management	Allocation is based on people's aptitude, ability to take up challenges and readiness to adopt the new technology

The analysis phase also involves creating patterns (stage 4) and assembling the themes (stage 5) into a meaningful model. The initial step in this respect is the creation of patterns by grouping success factors/themes that are related to each other or that integrate in a meaningful way. The researchers observed that the factors in table 6 were not mutually exclusive, but that they were overlapping and inclusive based on the explicit and implicit statements of the respondents. Next, based on the respondent's opinion, and Spradley (1979)'s relationships, the researchers identified the relationships between the

success factors such as "negotiation is linked to vendor management", "conflict management is like vendor management" and so on. Similarly, when the respondents discussed 'risk management', they considered it to be a component of 'compliance management' (Appendix: figure 3). In the same manner, 'compliance management' was linked to 'security management'. Based on their responses, these three success factors were aggregated under 'risk, compliance, and security management'. Further analysis of the transcripts led the researchers to aggregate them under "vendor evaluation and management," which in turn was considered to be a part of the 'people' factor.

Similarly, as stated by the respondents, 'contract management', 'performance management', 'knowledge management', 'negotiation skills', 'conflict management', 'change management' and 'technical competencies' were all considered to be part of 'vendor evaluation & management', which in turn was defined as people skills and competencies and were thus placed under the 'people' criterion (Appendix: figure 3). The respondents associated 'processes' with domain competencies thus aggregating it under the 'competencies and skills (people)' criterion. The respondents deemed 'structure', 'strategy', 'rewards', and 'relational mechanisms' exclusive of 'competencies and skills (people)' to be a separate factor.

Meaningful aggregation of success factors (identified in stage 4) under respective themes resulted in the verified final success factors (table 7). The empirical results not only verified the success factors but also customised them to better fit the cloud environment by aggregating existing success factors into meaningful themes. Thus, the major refinement of the version 2 success factors was the aggregation of all the factors, divided into five main success factors and ten sub-factors. The resulting verified final success factors (table 7) with a corresponding set of 15 success factors aids in managerial decisions to allocate roles and responsibilities for IT controls in a cloud-based environment. While 'skills' mentioned in table 7 refer to general skills, 'competencies' are role specific skills possessed by people.

Table 7. Verified final success factors.

Success Factors			Definitions
1. Competencies and skills (People) (57%)	**1.1. Vendor evaluation and management (90%)**	**1.1.1 Risks, compliance, and security management (59%)**	—Competencies to identify and manage all potential critical, legal, and compliance-related risks associated with the cloud. —Competencies to ensure compliance with internal as well as external policies, regulations, and accountability mechanisms when operating in the cloud. —Competencies to evaluate cloud vendors to ensure deployment of security mechanisms related to information assurance, data privacy, data confidentiality, ownership, and technology-related issues.
		1.1.2 Contract management (11%)	—Skills to develop and manage contracts for effective SLAs, pricing, access rights, data ownership, risk management, and to ensure the availability of data and reports.
		1.1.3 Performance management (9%)	—Competencies required for setting quality levels, monitoring the vendor against the SLAs, and rating their performance.
		1.1.4 Knowledge management (9%)	—Skills to share knowledge between cloud users and vendors in both directions, building trust that will result in improved commitment and better overall results.
		1.1.5 Negotiation skills (7%)	—Skills to negotiate the contract terms to ensure the rights and obligations for both parties.
		1.1.6 Conflict management (2%)	—Skills to assess and avoid any negative impact from establishing new business ties or terminating existing business with a cloud provider.
		1.1.7 Change management (2%)	—Ability to handle challenges, and readiness to adopt the new technology.
		1.1.8 Technical competencies (1%)	—Competencies to coordinate with the cloud vendor and integrate the cloud services with the existing systems.
	1.2. Processes (10%)		—Competencies to handle different sets of processes that cross departmental and organizational boundaries.
2. Structures (18%)			—Roles and responsibilities allocation is based on the location of decision-making power and authority that establishes the reporting relationships, power distribution, and communication channels.
3. Strategy (11%)			—IT strategy which is in alignment with business objectives will define whether to build capabilities (like skills, processes, technologies, human abilities) internally or to exploit external capabilities. It defines the tasks to be performed.
4. Rewards (9%)			—People are rewarded by being allocated to cloud-related tasks, so as to give them opportunity for growth, motivation, recognition, and the challenge of learning new technology.
5. Relational mechanisms (5%)			—Roles and responsibilities allocation depends on building interpersonal and collaborative relationships among units and organizations.

6. Discussion

In verified final success factors (table 7), the 'competencies and skills' (people) in a cloud environment encompass a set of eight sub-factors. While researchers have described people's 'competencies and skills' as important for executing the strategic direction of the organization (Galbraith, 2011), the empirical study re-established them as the decisive success factors in role allocation, with the highest coverage of 57%. In this regard, one respondent (AZ) has stated: "*While adopting the cloud strategy, it is extremely important to have people on board that have the skills and capabilities to deal with all the issues and concerns created by the technology".* According to another respondent (AD), ***"****one of the biggest challenges is to identify the right competencies require to handle cloud*. Interpretation of respondents statements revealed that the highest desired competency and skill of people allocated to IT controls are, to evaluate and manage cloud vendors (with an emphasis of 90%), especially in terms of risk, compliance and security. Contrary to the literature which stated that people need profound 'technical competencies for integrating cloud resources with internal systems (Lacity & Reynolds, 2014), our results indicate that cloud vendors take control of the technical part of the cloud, replacing people's technical competency requirements with business skill requirements. In this regard, one of the respondents (AK) articulated that cloud computing is changing people's roles from technology to administration by stating (personal communication, October 06, 2015):

> *"The roles definitely change, they become more administrative. They just login into the admin console and assign permission, upgrade uses and things like that. They get away from a lot of other tedious work of patching the servers, taking backups etc."*

Those who supported its (technical competencies) inclusion, desired a much diminished role (1%) of this criterion stating that technical competencies are needed while the organization is still on the journey of migration to clouds.

'Structures' within an organization determine the type and number of job specialties used in performing the work. Task allocation depends upon the number of people in the department at each level of the structure (Galbraith, 2011). Respondents also correlated the impact of cloud technology with the

size of the IT department. According to five respondents, cloud-computing technology will not only reduce the necessary number of IT professionals in the organization, but also relocate them to different departments, thus resulting in re-allocation of their roles. Structures also constitute the location and distribution of power (Galbraith, 2011; Peterson, 2004), establishing clear-cut job descriptions and objectives.

The 'strategy' of an organization also impacts on the role allocation (11% emphasis). Strategy dictates the cloud based products to be used, tasks to be performed, and the organization's personnel hiring policies, to match their competitiveness, differentiation and financial goals. 'Rewards' has an impact on allocation as people are rewarded by getting them trained, by being allocated to new and challenging cloud related tasks, thereby giving them recognition, motivation and growth opportunity. Finally, 'relational mechanisms' with an emphasis of 5%, is also factored in role allocations in order to build interpersonal relationships through collaboration, job rotation, and teamwork.

Subsequently, one could conclude that people's allocation to roles and responsibilities is driven by their competencies and skills, by the strategy, structure and policies of the organization. A significant finding among the constructs is people's competency to manage the risk, compliance and security related to cloud issues.

7. Conclusion

While transitioning from the internal IT environment to the public cloud, the organisation cedes control over IT assets to the CSP, and yet its accountability and responsibility rest with the IT department within the organisation. In this respect, our research models the allocation success factors for the roles and responsibilities (RACI) of IT personnel for IT controls of IT governance frameworks/standards like COBIT, ITIL, and ISO 27K series. The final set (table 7) presents five constructs and the correlating success factors and sub-factors for allocating the roles and responsibilities of IT controls in a public cloud based environment. Empirical intervention employing in-depth interviews with IT decision makers,

having experience with cloud-based projects helped not only in verifying the success factors, but also in moving from generic to cloud specific. Qualitative research input helped in converting generic success factors (due to the lack of literature on cloud computing) deduced from the literature into modified, re-defined and re-arranged final success factors relevant and specific to the cloud environment. Thus, the major refinement is the aggregation of the 15 factors to five main constructs.

From a practitioner's perspective, our final success factors can be deployed in organizations using public cloud services, to mitigate the risk in the accountability and responsibility for managing IT controls. The results of this research aid IT decision makers to make informed decisions on hiring and allocating people with the right skills and competencies for successful control of IT resources which have migrated to cloud. Furthermore, the results should also help IT decision makers to assess their workforces' capabilities to meet their business needs.

Our study highlights several directions for future research. It provides a ground for future researchers who can modify these success factors in a non-cloud environment, as well as for different cloud deployment models (private and hybrid). Future studies can also be undertaken to evaluate the effectiveness of these success factors using the DeLone and McLean (2003) model of IS success. Since, the scope of the study has been limited to eight private and four government organizations within one country (UAE), a global study encompassing countries of diverse cultures and different sectors can aid the validation of these success factors. The UAE is proactive in adopting the latest trends in the information systems domains. In this regard, 95% of the organizations in the UAE have already applied or have a plan to apply a cloud computing model (D'Mello, 2015). Hence, industry experts are predicting a massive shift to cloud adoption by businesses in the UAE (D'Mello, 2015). Nevertheless, while the cloud looks so attractive and is opening up opportunities, organizations are facing challenges with cloud adoption as UAE regulations are still evolving. Furthermore, the IT industry within the UAE is relatively small and relies on acquiring skills from abroad, which apart from increasing costs and reducing efficiency, leads to instability and job insecurity. Impact of such job market conditions on the allocation

of people to roles and responsibilities is a potential future research area. Additionally, researchers intend to take this research further through a Delphi study in order to validate the verified success factors as well as to rank them.

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ABOUT THE AUTHORS

Shafaq Khan
University of Dubai
United Arab Emirates

Shafaq Khan is an Assistant Professor at the University of Dubai. Since joining this university, she has received 'Excellence in Teaching' and the 'Best Faculty' awards. Her educational qualifications include a Masters in 'Computing and Information Systems', Masters in Electronics, Post Graduate Diploma in Computer Applications and Bachelors in Electronics. She is a certified cloud infrastructure specialist, certified project management professional (PMP), and a SAP certified ERP foundation consultant. Her research work has been published in several ranked journals and conference proceedings. Her current research interests are in cloud computing, IT governance, and IS security.

Mathew Nicho
Robert Gordon University
United Kingdom

Mathew Nicho is a lecturer in the School of Computing and Digital Media at Robert Gordon University in United Kingdom. He holds a Master's degree in Information Systems, and a doctorate from the School of Computing and Mathematical Sciences of Auckland University of Technology, New Zealand. His current research interests are in the areas of information systems (IS) security management, IS vulnerabilities and mitigation, advanced persistent threats, information security governance, and information technology governance frameworks namely COBIT, ITIL, and PCI DSS. His research has appeared in several journals and conference proceedings, including Communications of the Association of Information Systems, International Journal of Information Security and Privacy, Information Systems Audit and Control journal, and Hawaii International Conference on System Sciences.

Haifa Takruri
University of Salford
United Kingdom

Haifa Takruri is a full Professor at the university of Salford, UK. She obtained her BSc degree in Electrical Engineering from Birzeit University in Palestine, 1984, and her MSc and PhD in Instrumentation and Measurement from UMIST, UK, 1987 & 1990. An electronics engineer with a multidisciplinary practice, Prof Takruri's current teaching focuses on mobile and wireless networking. Her research focuses on integrating networking technologies and instrumentation, in particular wireless sensor networks and their applications in intelligent buildings, networked appliances, precision agriculture and energy saving. She supervises a number of multidisciplinary PhD studies including sensor networks, mobile networks, e-commerce and

gender in engineering and science. She also has extensive experience in successfully managing EU research and higher education funded projects.