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Critical Success Factors (CSFs) For the Implementation Of

IT Governance (ITG) In Public Sector in Saudi Arabia

by

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ABSTRACT

With the rapid evolution of Information Technology (IT) applications and practices across the organization, appropriate IT Governance (ITG) has become essential to an organization's success. As IT is associated with risk and value opportunities, a comprehensive, high-level system is required in each organization to minimize the associated risks and optimize value. This requirement triggered the emergence of ITG. Many researchers have addressed this field; however, the role played by critical success factors (CSFs) in the successful implementation of ITG has, not yet, received adequate attention in Saudi Arabia. This gap in the research motivated the present study, with the main aim of defining the CSFs needed for the successful implementation of ITG in Saudi Arabia's public sector. A framework has been developed, containing the CSFs of ITG in the public sector in Saudi Arabia. Also, an instrument has been shaped, based on that framework, to measure the success of ITG implementation in the public sector in Saudi Arabia. A triangulation technique is used to confirm the framework through three dimensions: a literature review and two expert reviews obtained via survey questionnaires. The expert reviews draw on two groups: global ITG experts and cultural experts. CSFs were studied and extracted from the literature review and then analysed, categorised, and synthesised to create the initial Success Factors for IT Governance Framework (iSFITG). Next, an exploratory study was carried out, using questionnaires to confirm the contents and structure of the iSFITG framework. To confirm the framework, a quantitative study has been conducted through online questionnaires. 200 questionnaires have been distributed to ITG experts in countries across the world, including the UK, the US, Australia, Europe, Middle East, and Asia. After the confirmation of the framework, the validated SFITG has been used as an instrument in five comprehensive case studies to validate SFITG. All five cases were conducted in the public sector within organizations, with established ITG implementation. Qualitative and quantitative studies were conducted to validate SFITG. Focus groups, interviews, and online questionnaires with over 30 key participants in these organizations have been conducted to get the results in this phase. Finally, an evaluation phase has been conducted with those participants to get their feedback about the instrument. By this phase, SFITG is validated and ready to publish. This research will be among few such studies, so far, carried out in this field. It should assist government organizations in Saudi Arabia in their implementation of ITG by defining the factors critical for successful implementation of ITG.

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Definitions and Abbreviations

ITG Information Technology Governance

CSFs Critical Success Factors

SFITG Success Factors for Information Technology Governance

iSFITG 1 initial Success Factors for Information Technology Governance version one: This is the initial solution framework that combined the Success Factors that been extracted from literature review.

iSFITG 2 initial Success Factors for Information Technology Governance version2: This is the developed version of iSFITG2.

SA Strategic Alignment

FSA Frameworks and Strategies

EE Environmental Effect

OE Organizational Effect

RM Resource Management

RKM Risk Management

Chapter 1: Introduction

Contemporary developments in the field of information technology (IT) and emergence of new concepts and philosophies in terms of political and economics require continuous development in the efficiency and effectiveness of IT (Abu-Musa, 2009). In addition, the emergence of many challenges faced by business organizations in the IT era and efforts to address the constraints faced by private and government sectors lead to optimisation of the use of IT resources and minimisation of the risks associated with IT (Calder & Moir, 2009). A primary goal of IT is to achieve a secure and successful future for a business, if it is controlled and governed in an efficient way (Bloem, Doorn, & Mittal, 2006). Long-term success requires a strong connection between business and IT in organizations, to maximise benefits and reduce the uncertainties of IT projects (Grembergen, 2004). Therefore, IT governance (ITG) has become imperative for business organizations to meet the challenges presented by the business environment. In the competitive global stratum, information technologies impart a competitive advantage to multinational organizations that employ technologies to aid in increasing effectiveness, economising time and diminishing expenditures (Calder, 2005). To achieve the objectives of the technologies incorporated within the government sector, information technology governance has emerged to oversee the emerging technologies (Wilkin & Riddett, 2008; Pardo et al., 2009).

The global marketplace requires multinational corporations to achieve successful ITG to ensure optimal performance of their information systems and technology (Weill & Ross, 2004). The optimal performance of their information technology permits the organization to achieve its strategic goals and affords it to accomplish a competitive advantage. Information technology governance (ITG) is the structure that permits compatibility among the strategic goals of the corporation and the intentions that will aid the corporation realise a satisfactory stage of risk. ITG encompasses the guidelines, actions, functions and tasks of the employees of the organisation. Hence it assists any organization in controlling and get benefits of IT practises and investments. In this chapter, the definition and importance of ITG and the structure of the whole viva are presented.

This aim of this report is to assess the impact of ITG on the performance of IT systems and practices. Its goals are to inform the reader on the latest developments in the field, offering background information on the newest regional and international developments, including the implementation of new technology to secure better outcomes. Importantly, the report contributes to the body of knowledge on IT by providing direct evidence of the positive effect that ITG can have on IT frameworks.

As discussed herein, research has shown that because IT has become necessary for the

sustainability of business and for ensuring its continued growth ITG has also become a necessary focus, in particular for those companies with significant IT budgets. According to Gerrard (2010), CIOs have recognized ITG to be a top issue for the past several years and in more recent years it has become a priority. This is due, in part, to research that shows that the ROIs have shown above-standard returns, especially when compared to competitors in similar fields. Thus ITG is seen as a necessary part to not only ensuring superior returns but also improving the company's overall performance and place within industry. According to Symons (2005), companies must have ITG in order to succeed. To this end, many frameworks and best practices exist to help organizations design an ITG approach that fits their organizational model (e.g., COBIT).

It is a new way of assessing the validity of existing IT frameworks and also suggests potential future developments in the field. The aims of this study will be investigated later in Chapter 3, and are best fleshed out in that part of the study once definitions and frameworks have been identified and explained to the reader. There are a number of different potential research methodologies that could have been used for this study. This study utilized surveys and interviews because they provided insights into some of the barriers faced by actual companies and thus resulted in first-hand knowledge of the issues from those conduction business and dealing with daily IT struggles. As noted in Bernard (2000) when developing a research design for social measures the researcher must consider his epistemological position in regards to the work at hand. Thus, while these surveys do suffer some from small sample bias, and could be improved with larger samples, they are important for gaining an understanding of the actual circumstances in the marketplace. This is critical because one of the purposes of the study is determining the need for ITG in Saudi Arabia especially, as opposed to just the general need for ITG around the world, and thus generic literature on the topic can only offer so much. Furthermore, little research has been done on the specific IT environment or Saudi Arabia and even less on its business and technological frameworks, mostly because of the diversity within the country's approaches to business but also because the country has only recently made significant efforts to extend its business reach than historically. Surveys help to answer this question fill the gaps in the available research and spread some light in helping the study provide specific data related to the CSFs. While the CSFs used within the study were based on those reported in literature, the CSFs developed and studied here were designed for a specific framework and instrument and for use in Saudi Arabia specifically.

As for specific literature on the best methodology for on ITG itself, while some researchers have performed empirical studies (e.g., Brown and Grant, 2005), several researchers have argued that a better approach to understanding and thus implementing IPG is understanding different points of view from different vantage points within an organization. Thus this survey and interview

approach was utilized to gain this perspective and to better understand design science in action within an organization. Design artefacts specifically (i.e., constructs, models, methods, instantiations) are needed to obtain the key evaluation and build insight required to develop the research and thus to develop the CSFs (Schermann, Böhmann and Krcmar, 2009).

1.1. ITG definition

The term 'information technology governance' (ITG) term has come from the use of the term 'corporate governance' (governance), which emerged after several financial scandals at the global level in large corporations, in both the US and Europe (Calder, 2005).

In this context, there are many definitions of corporate governance; the following is the concept of corporate governance in accordance with the vision of the Organization for Economic Cooperation and Development (2004): *"The corporate governance include a set of relations between the company's management and board of directors, shareholders and other stakeholders and also provides corporate governance structure through which placed the company's objectives and identify ways of achievement of those objectives and monitoring performance"* (Arjoon, 2005).

The definition of IT governance from the Australian Institute of Corporate Governance Standards is a system that guides and controls the current use and future of information technology and evaluates plans, for and guides the use of, information technology to strengthen the institution and follow-up to this use of the completion of plans (Ali & Green, 2007). '*At its most basic definition, IT governance is the process by which decisions are made around IT investments*' (Symons, 2005). IT governance as defined in Calder and Moir (2009) is a matter of optimising the use of IT investments through strong collaboration and communication between the business and IT leaders and their strategies.

ITG domains concentrate on five main elements under the drivers and outcomes: value delivery and risk management are the outcomes, while strategic alignment, resource management and performance management are the drivers (ITGI, 2003). As this research focuses on the drivers of successful implementation, these drivers will be addressed in the research.

1.2. The importance of ITG

IT governance plays an active role in achieving the goals of an organization, which has led many researchers and scholars to contribute to this field (Nfuka & Rusu, 2011).

IT governance has become an urgent need for business organizations in different activities. The main approach is characterised by modernity, and intellectual leadership is characterised by its way

of thinking and the ability to meet the challenges faced by the business environment. '*Effective ITG generates real business benefits such as enhanced reputation, trust, product leadership, time- to-market and reduced costs, all of which increase stakeholder value*' (Lee et al., 2008).

In order to achieve the desirable objectives of ITG, there are some important factors that will ease the implementation if they are considered and could hinder it if they are not. These factors are called the critical success factors (CSFs). According to Rockart (1979), critical success factors (CSFs) are the *'few key areas that must go right for the business to flourish'.* If they are not performed well, it is unlikely that the mission, objectives or goals of a business or project will be achieved (Pollard & Cater-Steel, 2009). So from this definition of CSFs, it can be seen that they are not detailed practical steps to implement a system, they rather specific and sketchy factors that assist the implementation of systems.

Actually, one of the main driver for the emergence of the concept of Corporate Governance and its branches such as IT governance is to ensure compliance with the rules, regulations, and established practices and standards by the government body. The lack of IT governance could lead to the failure of compliance to regulations and rules (Juiz, Guerrero and Lera, 2013).

1.3. The structure of the report

This thesis is divided into 8 chapters, with the core investigation found in the following chapters:

Chapter 2: Literature review, where the related works are presented and analysed. A brief description of ITG standards and frameworks are presented here.

Chapter 3: Research discussion, where the contribution and efforts are explained. The research gap, questions, aims and the solution framework is presented in this chapter.

Chapter 4: Research methodology, where the detailed steps of getting the secondary and primary data and how the solution have been confirmed and analysed are presented.

Chapter 5: The exploratory study's results, analysis, and discussion.

The exploratory study's results, where the results of the exploratory study are exposed without any analyses or discussion.

The exploratory study's analysis, where the analysis of these results is presented.

The exploratory study's discussion, the results and analysis are discussed here and the final decisions on the solution are presented here.

Chapter 6: The case studies, where the validation of the framework are presented.

Chapter 7: Future work, where the recommendations for further works are obtainable.

Chapter 2: Literature Review

ITG is a broad topic and an umbrella for many IT components; therefore, many studies have been conducted to address ITG in general and these components in particular. Recently, ITG has become very essential for organizations to optimise the use of IT projects and minimise risk, which requires more studies on different aspects of ITG. A literature review has been carried out to study the related work and sources. The literature reviewed include the following:

ITG standards and frameworks that have been developed by well-known organizations in ITG. Such as COBIT and ISO ISO/IEC 38500: 2012 standard.

ITG frameworks and models that have been developed by ITG experts and researchers.

Other ITG studies, to help to understand the ITG implementation processes and related factors.

The results of the literature review have been extracted from these sources. Before showing the results, a brief description of the related standards and frameworks of ITG will be presented. To get reliable, confirmed, and validated results, a triangulation technique is used that consists of three dimensions: literature review, global experts review, and cultural experts review. Since this research aims to find the CSFs of ITG implementation, the main focus in this research will be on these factors that helps and encourage the success of the implementation rather than the detailed processes of implementing ITG.

This study adds to the body of research generally by providing an instrument based upon valid frameworks that can further aid in understand the role of ITG. It adds critical knowledge on the implementation of ITG not only in the world generally, but with specific qualities related to Saudi Arabia. There are specific constraints and barriers that currently exist in Saudi Arabia that do not exist elsewhere. Because this study more effective and completely covers those things, it is better geared to shine light on the existing situation in Saudi Arabia, allowing professionals to understand the unique circumstances that exist in Saudi Arabia that may impact successful implementation.

2.1. ITG standards and frameworks

ITG is broad topic including various components, drivers and outcomes such as risk management, project management and performance management. Each component has specific scope and elements, and thus has its own standards or frameworks (see Figure 2-1). However, recently ISACA released the COBIT 5 framework, which 'provides a comprehensive framework that assists enterprises in achieving their objectives for the governance and management of enterprise IT' (ISACA, 2012). In addition, '*ISO 38500 is the first international standard explicitly addressed the governance of ICT*' (Calder & Moir, 2009). The next section will give an overview of COBIT and ISO 38500.

2.1.1. The control objectives for information and related technology (COBIT)

Definition and scope

'*The Information Systems Audit and Control Association (ISACA) has produced COBIT, a widely used good practice framework for auditing IT Governance by control the information, IT and related risks*' (Calder & Moir, 2009). It is a framework that helps the organization to achieve its business and IT goals by governing IT practices and processes (ISACA, 2005). COBIT4.1 has 34 objectives and 4 domains that have been categorised under four domains: planning and organization, acquisition and implementation, delivery and support and monitoring (Hardy, 2006).

Importance to ITG

COBIT assists an enterprise in managing and governing its IT processes in a comprehensive manner and aligning IT to business goals, and was created to serve all enterprises regardless to its size or scope (ISACA, 2012). In 2012, ISACA released COBIT 5, which consolidates COBIT 4.1, Val IT (the best guidance for delivering the value of IT investments) and Risk IT into one framework that has been updated to align with current best practices, e.g., ITIL V3 2011, TOGAF (ISACA, 2012).

The main principles

COBIT 5 is based on five main principles:

Principle 1: Meeting stakeholder needs

Principle 2: Covering the enterprise end-to-end

Principle 3: Applying a single, integrated framework

Principle 4: Enabling a holistic approach

Principle 5: Separating governance from management

Enablers

COBIT 5 has defined seven categories of enablers:

Enabler 1: Principles, policies and frameworks

Enabler 2: Processes

Enabler 3: Organisational structures

Enabler 4: Culture, ethics and behaviour

Enabler 5: Information

Enabler 6: Services, infrastructure and applications

Enabler 7: People, skills and competencies

Are there CSFs in COBIT 5?

COBIT5 introduces success factors at the process level not at the governance level. These success factors are presented to ease the challenges that are faced during the implementation phases. However, these CSFs will be used as the basis of the solution framework. Besides, COBIT5 presents Process Capability Assessment Model (PAM), which will indicate the status of the processes, the second enabler. “By consequence, process assessments will not provide the full picture on the state of governance of an enterprise. For that, the other enablers need to be assessed as well” (ISACA, 2012).

2.1.2. ISO/IEC 38500: 2012 standard

Definition and scope

ISO/IEC 38500:2008 is the standard for corporate governance of information technology, is an advisory standard that provides a framework of principles for senior management and the Board of Directors to use while evaluating, directing and monitoring the use of IT in their organizations (Chaudhuri, 2011). ISO 38500 can be appropriate for any enterprise regardless to its size or scope. In addition, it is high-level guidance maintained by top management to facilitate the implementation of ITG rather than providing practical steps (Sylvester, 2011).

Importance to ITG

ISO 38500 provides broad guidance on the role of a governing body; it encourages organizations to use appropriate standards for effective governance of IT and provides guidance about the effective use of information technology for directors of organizations including owners, board members, directors, partners, senior executives, or similar, on the effective, efficient, and acceptable use of IT within their organizations

The main principles

The directors and top management should evaluate, direct, and monitor IT activities based on these

six principles:

Principle 1: Responsibility

Principle 2: Strategy

Principle 3: Acquisition

Principle 4: Performance

Principle 5: Conformance

Principle 6: Human behaviour

Shortcoming

Its shortcoming is high-level guidance maintained by top management to facilitate the implementation of ITG rather than providing practical steps (Sylvester, 2011). This shortcoming includes the shortage of providing specific details about supporting areas such as critical success factors of ITG implementation

2.2. Other frameworks and studies

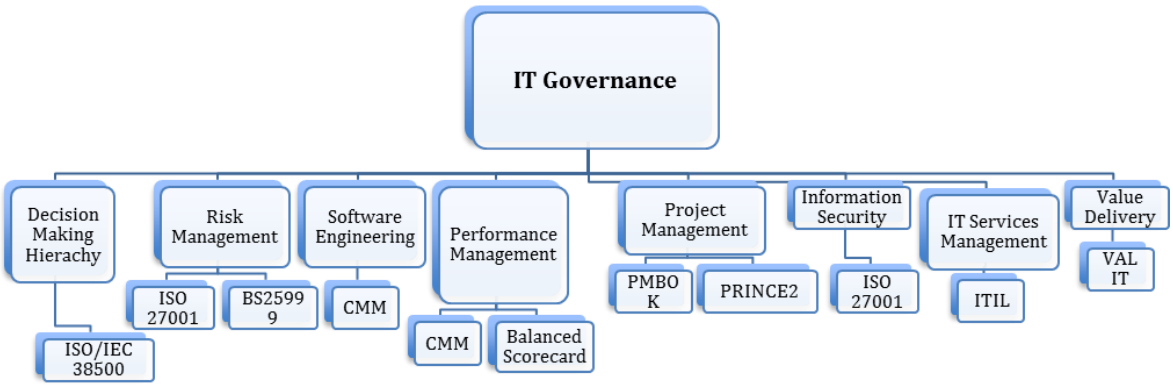
There are some other process frameworks and standards that have narrow and specific scope assigned to specific components and not affecting other ITG components. Val IT, the best guidance for delivering the value of IT investments, used to be a separate framework, but ISACA incorporated it with COBIT 5. Risk management is a main component and outcome of ITG, which targets managing and controlling the uncertainty that enterprises could face, and has ISO 27001 as the global standard. PMBOK and PRINCE2 are good practice frameworks for project management, which is an important driver for the implementation of ITG (Bhattacharjya & Chang, 2006).

2.3. ITG standards and frameworks discussion

It can be seen that there are different components of IT governance, and related standards and frameworks for each. However, COBIT and ISO/IEC 38500:2008 are the most comprehensive approach to implementing ITG. ISO/IEC 38500:2008 provides a high-level standard for IT governance, and COBIT provides additional insight about what can help with the implementation and improvement of the six principles that ISO/IEC 38500:2008 provides effective ITG and alignment between business and IT. Combining ISO/IEC 38500:2008 and COBIT enables the framing of a working relationship between governance and management by describing management activities in the governance system. As a result, the ISO/IEC 38500:2008 standard and COBIT

framework are very much complementary to achieving business – IT alignment and ITG (Chaudhuri, 2011). Thus, to implement successful ITG, an adoption of different standards and frameworks is required based on business needs and size. 'It is important to evaluate the strengths and weaknesses of the business and selectively adopt a combination of the relevant elements of best practice frameworks and standards' (Bhattacharjya & Chang, 2006). Hence, there is no single standard or framework that covers all ITG processes on its own and is sufficient to implement ITG completely and efficiently (Calder & Moir, 2009). Some standards and frameworks are generic and crucial to successful ITG implementation, such as ISO 38500, COBIT and VAL IT. ISO 38500 can be considered as umbrella for all these components, while VAL IT (ITGI, 2006) and other process frameworks are the basis for implementation, and COBIT is the connection between them.

Figure 2-1: ITG components and frameworks



2.4. Other related studies

A number of studies have explored factors related to the implementation of ITG. Such factors include barriers, inhibitors and CSFs. Othman et al. (2009) have presented a useful framework that defines the barriers to the adoption of ITG. However, this framework focuses only on the barriers to the adoption of ITG, excluding CSFs. In addition, the framework fails to examine ITG implementation. Another study concentrates on the relationship between inhibitors and success factors in ITG in the context of Korea (Lee et al., 2008). Nfuka's study (2010) into the role played by CSFs in effective ITG in Tanzania includes an excellent framework for evaluating CSFs; however, the framework was defined in the Tanzanian context and is without reference to related standards and frameworks such as COBIT and ISO/IEC 38500: 2012.

2.5. The critical success factors (CSFs)

The key success factors discussed above are the chief items, but there are others. For the strategic alignment between IT and business, resource management and performance management are main drivers of ITG, as mentioned in Chapter 1; the research has covered these aspects directly and

indirectly. In addition, for such vast IT projects, there are some barriers that could hinder success, and eliminating such barriers will help in such projects (Nfuka & Rusu, 2011). Hence, some of these barriers will also be covered in this research.

These factors have been discussed by many sources and expressed in different meanings, terms and under different topics, which required thorough analysis of these sources to extract the most important and related factors. Lee et al. (2008) summarised a framework for the inhibitors of ITG implementation, which is driven by CSFs in business and IS planning alignment. They also considered inadequate HR and management under inadequate stakeholder involvement, which is categorised in Nfuka and Rusu (2010) in the resource management category. Juiz, Guerrero, & Lera (2014) considered the involvement and support of management as one factor under the business alignment category, while involvement and support are different factors in Lee et al. (2008). Othman et al. (2009) considered lack of management support under the organizational context while it falls under inadequate stakeholder involvement in Lee et al. (2008). The first step is to find these factors. Some standards and frameworks, mentioned in the previous section, have included some success factors but mostly in implicit ways, so the first factors were extracted from these standards and frameworks. The next factors were taken from many sources that discussed ITG implementation. Some of the factors have been listed under success factors of ITG. Others were mentioned under barriers to successful implementation. Still other factors were expressed by different terms and expressions such as considerations, challenges, issues, and motivations. By understanding the context of these factors, the factors were categorised by context in order to find the best fit of categories. Some of these categories are mentioned frequently in other studies, while others are not. The next step was to align the factors to the categories. Many factors were expressed in similar terms and have similar meanings, so they fall under one category. As a result of this analysis, ten main categories represent all the others, as described in the following sections. The CSFs covered in this study provide a more valid basis for analysing the importance of ITGs in the implementation of successful IT systems. They are more geared toward the specific needs of the businesses covered in this study, which makes the study more applicable overall. In some cases, there is overlap between the CSFs covered in this work and CSFs covered in previous examples.

2.5.1. Stakeholders involvement

ITG implementation is a collaborative effort between different management levels and staff groups in the organization, with the effect of external parties and regulations. The first principle of COBIT, ‘meeting stakeholders needs’, and first and second principles of ISO 38500, ‘responsibility’ and ‘strategy’, cannot be achieved without the involvement of stakeholders. In addition, in all related studies, adequate stakeholders’ involvement is one of the most important factors for successful

implementation of ITG. The involvement of these stakeholders is one of the most important drivers to successful implementation of ITG (Nfuka & Rusu, 2010). Stakeholders should be from all business levels and in all implementation stages; otherwise, the implementation process will not succeed as required. To have a successful ITG project, adequate and the right stakeholder involvement are required during all the stages of implementation (Rau, 2006). ITGI and PwC (2009) stated that one of the key inhibitors for ITG is the absence of business in ITG initiatives and plans. The end users of IT projects are one of the main stakeholders who should properly be involved in any IT project. Spremić, Žmirak, and Kraljević (2008) concluded that one of the key barriers to success of IT projects in Croatian organizations is *'End Users not involved in projects'.* Luftman, Papp, and Brier (1999) found that the participation of IT people in strategy preparation is an important enabler of business-IT alignment. 'Lack of business people ownership in IT-enabled projects' is one of the main problems found in current ITG practices in the studied organisations (Nfuka et al., 2009). Therefore, adequate stakeholders' involvement is specified by many sources as a main driver for the successful implementation of ITG.

2.5.2. Management support

Management support is a further step after stakeholders' involvement, and its absence of will hinder the next steps of successful implementation of ITG. In addition, the support of any organization management and executives will not be gained without stakeholders' involvement. The support should be from all management levels for ITG implementation, and without it, the implementation will struggle. A study done by Lee et al. (2008) claimed that 'lack of senior managements' leadership' is another main inhibitor for ITG implementation. ITGI and PwC (2007) claimed that the first critical success factor for ITG is 'senior management commitment and vision'. Luftman et al. (1999) found that the first enabler of business-IT alignment is 'senior executive support for IT'. Senior management support is a key factor for successful ITG (Weill & Ross, 2004a). A study done by Othman et al. (2009) found that 'lack of top management support' is a major barrier to ITG adoption. A study done by the National Computing Centre concluded that 'obtaining top management buy-in and ownership' is a key success factor for ITG implementation (National Computing Centre, 2005). Spremić et al. (2008) concluded that one of the key barriers for successful IT projects in Croatian organizations is inadequate support of management. The ITGI and ISACA Global Status Report on the Governance of Enterprise IT (GEIT) revealed that 'lack of senior management commitment and support' is a challenge for implementing GEIT (ITGI & ISACA, 2011). Thus, getting top management support is an important point that must be addressed before starting the implementation of ITG (Calder & Moir, 2009).

2.5.3. Financial support

Historically, financial support is a big concern for any successful implementation of IT projects. IT projects usually cost more than other projects, and continuous fund support and budget availability are required for the success of these projects. The financial requirements could hinder the successful implementation of COBIT (Guldentops, Grembergen, & De Haes, 2001). The high costs and unclear benefits of major IT projects are a big concern for top management in engaging in such projects (Abu-Musa, 2007). *'Inadequate budget for required IT resources'* is one of the main problems found in the current ITG practices in the studied organisations (Nfuka et al., 2009). However, financial support does not seem an important factor in other studies. A study done by Lee et al. (2008) found that financial resources is not an important obstacle to successful ITG implementation. Based on that, financial support seems to be an important factor for successful implementation of ITG for some organizations but not for others, so it will be included in the framework waiting for the results confirmation stage.

2.5.4. Organizational effects (internal)

The organization structure, internal regulations and management hierarchy are examples of organizational effects. Therefore, the internal organizational effect is an important aspect that should be considered in the implementation of ITG. The internal effect is a very important factor to the success of any project, especially when it is a big project like ITG implementation. The organization structure and current governance are cases of that effect. ITGI and PwC (2007) stated that organizational structure is a fundamental factor for successful ITG implementation. A study done by ITGI and PwC (2009) considered organization culture the second important barrier to preventing enterprises from realising the full value of IT investments. A study done by the National Computing Centre (2005) stated that enabling and motivating the cultural change that is required for successful implementation of ITG is a critical success factor. ITGI and ISACA's Global Status Report on the Governance of Enterprise IT (GEIT) in 2011 considered organization culture as the second important factor that influences the implementation of GEIT practices. 'Kingsford et al. (2003) found that IT governance was influenced by organizational culture that proved to be incompatible with the federal IT governance model management attempted within the organization' (Willson & Pollard, 2009). Thus, enterprises should analyse their organisational culture and structure within ITG implementation to ensure a supportive organisational culture (Weill & Ross, 2004). Silo management is an important issue that must be resolved before starting the implementation of ITG (Calder & Moir, 2009). Hence, it's clear that the organizational or internal effect is an important aspect that should be considered in the implementation of ITG and included in the framework.

2.5.5. The strategic alignment between IT and business

The alignment, communication and relationship between IT and business are important aspects that should be considered in the implementation of ITG. In fact, ITG is matter of alignment between business and IT, and a strong relationship between both of them is needed to achieve good alignment. Luftman et al. (1999) found that a good connection and understanding of business and IT is an important enabler of business-IT alignment (1999). ITGI and PwC (2007) revealed that communication between IT and business is a critical success factor for ITG. A study done by Bhattacharjya and Chang (2006) found that enhancing the communication between IT and business helps to generate value from IT practices. A study done by Othman et al. (2009) found that 'lack of communication' is a major barrier to ITG adoption. 'Martin, Gregor, and Hart (2005) demonstrate that management support with understanding of ICT and strong relationships between IT and business management are important in achieving business and ICT alignment, a view also supported by Weill and Ross (2004)' (Willson & Pollard, 2009). 'Strategic alignment' between IT and business plans is the most serious problem regarding ITG implementation (Nfuka et al., 2009). Ribbers, Peterson, and Parker (2002) stated that ITG is affected by the relationship of business and IT and the integration of their strategy. It is clear that the alignment between IT and business is an important aspect that should be considered in the implementation of IT.

2.5.6. IT staffing management

For any IT-related projects, the management of IT staff plays a key role in the success of these projects. In ITG implementation, almost half of the efforts will be executed and administrated by IT team. Thus, IT staffing management is an important aspect that should be considered in the implementation of ITG. All points that are related to IT team, such as the team skills and size and the needed qualifications, will be under this factor. A study done by ITGI and PwC (2009) considered 'lack of skill base and training' a very important barrier preventing enterprises from realising the full value of IT investments. Othman et al. (2009) also found that lack of resources is a major barrier to ITG adoption. ITGI and ISACA's (2011) Global Status Report on the Governance of Enterprise IT (GEIT) revealed that an 'insufficient number of IT staff and IT skills' is the top issue experienced in IT projects implementation. Despite continuous efforts, finding skilled IT staff and keeping them is a major issue (Nfuka et al., 2009). Hence, IT staffing, skills and abilities are important aspects that should be addressed before the implementation of ITG.

2.5.7. IT structure

IT structure is a combination of the processes, principles and roles that are required to achieve the desired objectives of these processes. Current IT processes, roles, responsibilities and structure are

elements of IT structure factor. The most important finding of a study done by Lee et al. (2008) is that unclear IT principles and policies for optimizing IT values is a common issue for many Korean enterprises. Abu's study about COBIT application in Saudi organizations revealed that most of the participants believed that creating an environment of responsibility structure, performance management system and knowledge management to improve IT performance are good indicators for measuring ITG position in organizations. 'Inadequate or absent ICT policies and procedures; and lack of clear roles, responsibilities and accountability' are among the main problems found in current ITG practices in the studied organizations (Nfuka et al., 2009). It is clear that current IT processes and policies are important areas that should be dealt with before moving to ITG implementation.

2.5.8. Environment effect (external)

An enormous project such as ITG implementation should consider the environment and external effects before beginning. External effects should be considered in pursuing regulatory requirements and external policies to be in a competitively advantaged position in the global market. Spremić et al. (2008) concluded that one of the key barriers to successful IT projects in Croatian organizations is the absence of adapting to environmental changes. ITGI and ISACA's (2011) Global Status Report on the Governance of Enterprise IT (GEIT) considered 'the regulatory environment and specific compliance requirements' as an important factor that influences the implementation of GEIT practices. A study done by the National Computing Centre stated that constant enhancement and adaptation to the fast-changing IT environment is required to achieve successful ITG implementation (National Computing Centre, 2005). They also claimed that inadequate compliance to legal or regulatory requirements would adversely affect ITG success. Hence, environmental factors and external regulations should be addressed and met before the implementation of ITG.

2.5.9. Managing the implementation

The implementation of ITG is a huge project and accordingly requires effective management to achieve the desirable objectives and to control costs. A study done by the National Computing Centre concluded that 'treating IT governance initiatives as a project not a "one-off" step' is the first key to success for ITG implementation (National Computing Centre, 2005). ITGI and ISACA's (2011) Global Status Report on the Governance of Enterprise IT (GEIT) revealed that 'difficulties implementing applications' is the first major barrier preventing enterprises from realising the full value of IT investments. Good project management of the implementation can ease these difficulties by managing the time of the implementation project and allocating well-planned time. COBIT is a well-known framework for ITG and implementing it requires good project management

(Bhattacharjya & Chang, 2006). Furthermore, costs, benefits and risks are key elements that should be managed through the project; otherwise, unexpected results could occur (Ribbers et al., 2002). Therefore, the management of ITG implementation projects is a very important factor in securing the desired results.

2.5.10. Preparation

The preparation for the implementation of ITG is a critical stage that requires attention before beginning implementation. As with any business and IT implementation project, there are many preparation factors that should be addressed to be sure that the whole organization is ready for the project. The first factor here is the status of the current governance in the organisation. ITGI and ISACA's (2011) Global Status Report on the Governance of Enterprise IT (GEIT) revealed that 'current ineffective enterprise governance' is a challenge for implementing GEIT. The organisation should be clear of all ITG processes and procedures before adopting and implementing ITG practices. 'Lack of clear ITG processes' is one of the major barriers to ITG implementation (Lee et al., 2008). To implement successful ITG, good preparation is required, including analysis of the current situation and how to reach the target (Weill & Ross, 2004). In addition, it is necessary to evaluate organisational readiness for implementing an ITG framework or standard (Rau, 2006). It is important before starting the implementation to know the requirements and decide on the best combination of ITG standards and frameworks (Bhattacharjya & Chang, 2006). Preparing the stakeholders, employees and users of ITG practices is important before starting the implementation, which could be achieved through good change management strategy and initiatives (Warland & Ridley, 2005). Weill (2004) agreed as well that 'education of IT governance' is a critical success factor for effective ITG. 'Lack of IT governance awareness and guidelines' is among the main problems in the current ITG practices of the studied organizations (Nfuka et al., 2009). Analysing the main elements and assigning the main roles and responsibilities before starting the implementation are CFSs of ITG implementations (Pollard & Cater-Steel, 2009). Hence, it can be seen that the preparation factors of the implementation of ITG are major factors that must be covered and analysed before moving to other phases (Van Grembergen, 2016).

2.6. The lifecycle of the ITG implementation

The implementation of any project goes through different stages in order to achieve successful implementation of its goals. Some sources focused on factors of only one stage of ITG, while some others have no clear differentiation between them. The following section gives a brief description of the lifecycle of ITG implementation.

2.6.1. ITG adoption

This is the first stage that should be addressed before implementation. The implementation of any new concept requires complete adoption of that concept and understanding its details. “The adoption of IT Governance (ITG) continues to be an important topic for research” (Othman et al., 2009). This research will not cover this phase as a main aspect as it is assumed that the organization has already adopted the implementation of ITG idea. However, some found factors that could be used to facilitate and speed up the adoption stage. In COBIT 5 this stage consists of three phases; what are the drivers, where are we now and where do we want to be.

2.6.2. Pre-implementation

Here the preparation for the implementation will be established. To implement an ITG framework successfully, it is important for the organization to be prepared for the coming steps (Weill & Ross, 2004). Hasibuan and Dantes (2012) defined the life cycle as pre-implementation, implementation, and post-implementation. Most of the studies did not speak about this stage explicitly. This stage is represented by what needs to be done phase in COBIT5.

2.6.3. Implementation

The main efforts will be in this stage, in implementing the chosen and appropriate standards, frameworks and/or methods. Most studies concentrate on this stage only. This stage is represented by how do we get there phase in COBIT5.

2.6.4. Post-implementation

Follow up and making continuous improvements are important for the success of any IT project. This research will not directly cover this stage, but the found factors can be used to assure continuing success. In COBIT 5 this stage has two phases: did we get there and how do we keep the momentum going.

2.7. Summary

In the literature review, there are different success factors, considerations, barriers and challenges that have been discussed in the sources. Therefore, those have been analysed and extracted, and then classified into ten main categories that each has similar definitions and factors. Under each main factor, there are sub factors or different explanations from different resources. In addition, some of the factors have been mentioned in the same expression but in different meanings or contexts. Therefore, they have been dealt with based on their meanings or contexts.

The alignment between business and IT seems to be the most important factor that has been mentioned and discussed in many sources. Other important factors are managing the implementation and preparation for ITG implementation. The unexpected finding based on the literature review is that financial support is not consistently as critical a factor for successful implementation of ITG practices as the other factors.

The lifecycle stages of ITG implementation as enumerated above are the adoption, pre-implementation, implementation, and post-implementation. Although there is no clear differentiation between those stages in most previous studies, it can be seen that the implementation stage is the most frequently addressed stage in those studies.

However, all categories and factors will be discussed thoroughly in this research, and the main study will confirm or adjust the results of the literature review findings through the other two methods of the triangulation technique.

These related studies have been summarised in Table 2-1.

Table 2-1: The current studies in ITG

The studies in	**Number of studies**	**Examples and references**
ITG in general	>100	COBIT, ISO 38500, 3
CSFs for ITG	<10	7, 15, 23, 24, 25, 28, 29, 30
In developing countries	<5	27, 28, 30
In public sector	<3	27, 30
In Saudi Arabia	Zero	--

Chapter 3: Research Discussion

3.1. Research gap

ITG is primarily responsible for optimising the use of IT resources and managing the risks of IT projects and practices. In addition, ITG can provide good solutions for all organizations, whether they are government or private, especially large ones. Simply put, ITG is contemporary development and advanced guidance for IT management and business alignment, which requires deep investigations, various studies and specialised research.

There are many studies about ITG (e.g. Calder & Moir, 2009; Calder, 2005; Willson & Pollard, 2009), and some reports from leading firms in ITG such as by ITGI and ISACA. However, these studies are not at the same level of ITG importance in some aspects.

Developing countries should focus more on optimising the use of IT to get the maximum benefits with lower risks and costs as the failure of IT projects has excessive impacts on these countries' economies (Edephonce Ngemera Nfuka & Rusu, 2010). In addition, ITG offers many solutions for the organizations in developing countries, especially those countries aiming to become advanced. Abu-Musa (2007), Nfuka and Rusu (2010) and Othman et al. (2009) are examples of studies that have been conducted in developing countries. Despite that, there is a shortage of ITG studies in developing countries.

Saudi Arabia is one of the developing countries, but it has special advantages, as it has one of the highest economic positions globally, the world's largest oil reserves, the world's sixth largest natural gas reserves and the 13th largest country around the world (Al-Janadi, Rahman, & Haji

Omar, 2013). A country with this size of economy needs to emphasise optimising the use of IT investments and practices to develop the whole country and optimise oil and gas resources (Abu-musa, 2007). Studies carried out by Abu-Musa in 2007 and 2009 are one of the few studies that have been conducted in Saudi Arabia, clearly indicating there are not enough studies in Saudi Arabia. In addition, some ITG studies have focused specifically on public sectors (e.g. Lee et al., 2008; Nfuka & Rusu, 2010), but it is difficult to find studies in the public sector in Saudi Arabia. Therefore, based on my intensive search, there is no specific study of ITG in the government sector in Saudi Arabia.

It is clear that to implement successful ITG, adoption of different standards and frameworks are required based on organization size and requirements, as mentioned in the previous section. These standards and frameworks aim to guide the implementation of some components of ITG based on scope and attention (Gunasekaran, 2016). There are some important factors that encourage the success of the implementation of ITG and give good indications of that success. 'IT-governance-related success factors must be entrenched and adhered to in order to do away with inadequate governance effectiveness, which has negative consequences for the IT contribution to public service delivery' (Nfuka & Rusu, 2011). Some of these ITG standards and frameworks have mentioned such factors implicitly under different terms and meanings such as enablers or challenges (De Haes, 2015). However, they are not providing a comprehensive framework for measuring the success of overall ITG implementation. COBIT 5 introduced CSFs for the ITG processes but they cannot be used as CSFs for the entire ITG implementation or can help in assessing the success status of ITG. Besides, COBIT5 presented seven categories of enablers, which aim to ease and enable the implementation of ITG, but they do not measure the success. ISO 38500 introduced six principles, which provide a strong base for the implementation of ITG, but they are not CSFs. However, there are a few studies that address the CSFs of ITG in their studies (e.g., ITGI & ISACA, 2011; Lee et al., 2008), and fewer studies in developing countries (e.g., Nfuka & Rusu, 2010; Othman et al., 2009), but none of them have been carried out in Saudi Arabia. Therefore, it can be said that this study is one of the preliminary studies in this field, and it will enrich the studies targeting CSFs of ITG implementation in developing countries in general and in Saudi Arabia in particular. The summarized factors will be grouped in a framework under different categories. This solution framework will be called Success Factors for IT Governance (SFITG).

3.2. Research aims and objectives

The main study's objective is to investigate and identify the factors that encourage the successful implementation of ITG in the government sector in the Kingdom of Saudi Arabia, which will be called in this research Critical Success Factors (CSFs). In addition, the study is designed to discuss

some of the existing barriers to successful implementation, as well as providing help for some of the existing gaps in literature. The study will create a framework by which one can successfully analyse the current IT situation, as well as providing insights into the future role of government in improving IT systems, security, and performance. Furthermore, the other aims are:

1. Identifying the obstacles and success factors of ITG in general.
2. Identifying the status of ITG in Saudi Arabia, especially in government sectors.
3. Finding the factors that encourage successful implementation of ITG in public organizations in Saudi Arabia.
4. Creating a validated, revised and reviewed framework of the extracted and analysed factors.
5. Conducting case studies on government organizations in Saudi Arabia to measure their ITG implementation's success.
6. Creating a well-organised, reviewed, and validated instrument, able to measure the success of ITG implementation in public organizations in Saudi Arabia.

ITG is needed in Saudi Arabia because of the diverse ways different companies go about their business in the country and furthermore because of the way IT investments are not only spread throughout the company but spent on mere maintenance, upgrades, and other routine business that does not result in either growth or competitive edge. According to Shpilberg, Berez, Puryear and Shah (2007), most organizations spend nearly 80% of their IT budgets on said maintenance, with the remaining funds going for growth such as ITG. Clearly this does not lead to ROI nor does it help fledgling organizations (such as those in Saudi Arabia) develop new applications and gain a stronger edge in world business, something that is particularly important as Saudi Arabia aims to increase its stake in worldwide business. Increasingly, Saudi Arabia is a place where large multinational companies conduct their business. It can be, at times, the Wild West when it comes to business innovation and companies trying to get an edge on other companies. Thus Saudi Arabia must not only consider a solidified effort among business the country must also take advantage of existing ITG frameworks as well as established best practices put in place by organizations such as ITL and COBIT. In particular for a country like Saudi Arabia with such diverse business and furthermore ways of conducting business the growth of the country's commerce demands that leaders adopt a framework based on best IT practices and structures based on the country's unique environment. With this in mind, governance can provide some standards for implementation of new frameworks. In fact, governance is required to successfully implement ITG and adapt the framework and instrument to the country's diverse needs. This helps to protect companies and the marketplace, of course, but it is also in place to protect consumers and clients. Because so many

different companies operate in Saudi Arabia with so many varying standards for IT, it is necessary to utilize some prevailing standards for all, which can only be obtained through successful governance.

3.3. Research questions

To achieve the objectives and expected contributions of the study, the answers of the following main research questions will be sought:

1. What are the CSFs for the implementation of ITG?
2. What is the most appropriate framework that comprises these factors and applicable in the government sector in Saudi Arabia?
3. Is the validated SFITG an appropriate instrument to measure the implementation success of ITG in government organizations in Saudi Arabia?

3.4. The solution framework – iSFITG1 and iSFITG2

Since this study deals with research and analysis, it requires a theoretical framework to guide the pace of the researcher through the various stages and aspects of ITG implementation (Spafford, 2003). Thus, the proposed answer to the second research question, ‘
What is the most appropriate framework that comprises these factors and applicable in the government sector in Saudi Arabia?‘ will be presented here. The results of the literature review have been studied, analysed and the factors have been extracted. Some of these factors have been explicitly mentioned, so they can be used in the framework as is. Others have been expressed in different terms but have the same meanings, so a common term has been used to combine their meanings. Others have been used in the same terms but in different contexts, so they fall into different categories based on their contexts. The extracted, analysed and modified factors have been summarised, classified and sorted based on their importance, relativity, and the proper sequence.

Finding of these factors went through different steps as follows:

1. Find the most relevant standards and frameworks and study them thoroughly.
2. Extract the important factors for the successful implementation of ITG, whether they are challenges, barriers, CSFs or enablers.
3. Search and thoroughly read the related sources for successful implementation of ITG.
4. Extract the important factors for the successful implementation of ITG, whether they are challenges, barriers, CSFs or enablers.
5. Find the main categories for these factors based on similar meaning and scope.
6. Categorizing the factors with similar meanings and scopes.

7. Align the categories with the life cycle of ITG implementation.

The results are shown in the following framework, Table 3-1.

Table 3-1: iSFITG1- initial Success Factors for ITG1 Framework

Time			Cat no	Category	CSF no	Factor	Ref No
			1	Preparation	1	Clear ITG policies and principles	23, 41, 25
					2	Strengths and weaknesses evaluation	3
					3	Change management	39, 32
					4	Costs, benefits and risks analysis	34
					5	Organizational readiness	33
					6	Adequate analysis	35
					7	Ineffective current enterprise governance	17
					8	ITG education	40
					9	Good ITG awareness and guidelines	27
			2	Stakeholders involvement	1	Sufficient business involvement	19, 25
					2	Relevant participants involvement	33
					3	End users involvement	35
					4	Business unit and operating group involvement	36
					5	Business people ownership	27
		Adoption	3	Management support	1	Executives & IT management support	23, 41,19
					2	Top management support	30
					3	Top management buy-in and ownership	26
					4	Top management support	35
					5	Senior management commitment and support	17
			4	Financial support	1	Adequate support for financial resources	23
					2	The size of the investment	2
					3	Increasing it costs	17
					4	Adequate budget for required IT resources	27
			5	Organizational affect (internal)	1	Adequate organizational cultures	19
					2	Culture of the organization	18
					3	Cultural change involvement	26
					4	The culture of the organization	17
					5	Organizational culture	44
					6	The limitations of organizational structure	41
			6	Alignment between IT & business	1	The communication between IT & business	19, 25
					2	Communication between IT and business	41
					3	Adequate communication	30
					4	Strategic integration of business and IT decisions	34
	During the implementation						
		Pre Implementation					

						5	Communications issues	17
						6	The communications between stakeholders	44
						7	Strategic alignment	27
				7	Environment effect (external)	1	IT environment	26
						2	Regulatory environment, industry/vendor support	30
						3	Adjust to environmental changes	35
						4	Environmental contribution	2
						5	Regulatory environment & compliance requirements	17
				8	Current IT structure	1	Clear IT principles and policies	23, 41
						2	Climate of empowerment & responsibility	2
						3	Clear roles, responsibilities & accountability	27
Post Implementation				9	IT staffing management	1	Adequate staffing level	3
						2	Adequate skill base & training	18
						3	Adequate resources	30
						4	Adequate human resources	35
						5	Adequate number of IT staff & IT skills	17
						6	Human resource management	27
				10	Managing the implementation	1	Project time	23
						2	Good project management methodology	3
						3	Implementing applications complexity	18
						5	ITG as a project & managing expectations	26
						6	Project management	32

iSFITG1 has been developed and filtered again by adding the factors found in COBIT and ISO 38500, removing the repetitions and creating border content for similar factors. In addition, some unimportant factors that have very few supported resources have been removed. In addition, the life cycle of the framework is no longer needed, as these factors should be considered during all the implementation stages. The further steps here are:

8. Add the found factors from the related standards and frameworks.
9. Remove the repetitions.
10. Remove the none-important factors.
11. Remove the life cycle of ITG implementation, as all factors should be considered during the whole life cycle of ITG implementation.
12. Adjust the categories, based on the main drivers of ITG and the internal and external effects.
13. Assign factors to their corresponding categories.

The results of the filtering are shown in next framework, the success factors for ITG (iSFITG2), Table 3-2.

Table 3-2: iSFITG2, initial Success Factors for ITG2 Framework

Cat No	Category	CSF no	CSFs	*Source*
1	Strategic alignment	1	Adequate stakeholders involvement	*COBIT, VAL IT, ISO 38500, 19, 25, 33*
		2	Adequate management support and ownership	*COBIT, VAL IT, ISO 38500, 91, 30, 26,17*
		3	Effective alignment and communication between IT and business strategy	*COBIT, VAL IT, ISO 38500, 34, 27, 30*
		4	Effective communication between IT and business	*COBIT, VAL IT, ISO 38500, 34, 27, 30*
2	Environmental effect (external)	1	Regulatory environment & requirements compliance	*COBIT, VAL IT, ISO 38500, 17, 30*
3	Organizational effect (internal)	1	Clear ITG policies, principles & responsibilities	*COBIT, VAL IT, ISO 38500, 23, 41, 25*
		2	Effective current Enterprise Governance	*ISO 38500, 17*
		3	Appropriate organizational culture	*ISO 38500, COBIT, 19, 18, 44*
		4	Clear IT strategy, principles & policies	*COBIT, VAL IT, ISO 38500, 23,41, 27*
		5	Good organization change strategy	*ISO 38500, COBIT, VAL, 39, 32*
4	Performance management	1	Adequate analysis, evaluation of the current and future use of IT	*ISO 38500, 3, 34, 35, 41*
		2	Good project management methodology	*COBIT, 3, 26*
		3	Effective performance management strategy	*ISO 38500, COBIT*
5		1	Sufficient financial support	*23, 2, 17, 27*

	Resource Management	2	Adequate IT skills & staff	*COBIT, ISO 38500, 18, 3, 17*
5	***categories***	***15***	***Critical Success Factors (CSFs)***	***Total***

As it can be seen in Table 3-2, only the main critical success factors are included in the framework without going deeply in the complete process of implement such factor or category.

Next, iSFITG2 will go through the confirmation process conducted through global and cultural experts' reviews. After that, the validated framework will be developed to be an instrument that can be applied in five case studies. There is a critical difference between the framework and the instrument. The framework is meant to be a more generalized theory, i.e., a basic structure for the underlying system, while the instrument is a tool for the implementation of IT players and systems within an existing IT framework meant to address specific organizational issues. The instrument, then, is used to implement the ITG design and the framework is the foundation—or basis structure—on which the instrument is built and thus utilized. Both framework and instrument will need to be tweaked and adjusted in order to take account of the existing assumptions that are present within the industry and within the organization itself. Then, an evaluation process will be conducted to get the participants' feedback about the instrument. The last two steps will validate the framework.

Chapter 4: Research Methodology

This chapter describes the methodology used to conduct the research and collect data. There are a number of different potential research methodologies that could have been used for this study. This study utilized surveys and interviews because they provided insights into some of the barriers faced by actual companies and thus resulted in first-hand knowledge of the issues from those conduction business and dealing with daily IT struggles. While these surveys do suffer some from small sample bias, and could be improved with larger samples, they are important for gaining an understanding of the actual circumstances in the marketplace. This is critical because one of the purposes of the study is determining the need for ITG in Saudi Arabia especially, as opposed to just the general need for ITG around the world, and thus generic literature on the topic can only offer so much. Furthermore, little research has been done on the specific IT environment or Saudi Arabia and even less on its business and technological frameworks, mostly because of the diversity within the country's approaches to business but also because the country has only recently made significant efforts to extend its business reach than historically. Surveys help fill the gaps in the available research and provide specific data on the CSFs. While the CSFs used within the study were based on those reported in literature, the CSF developed and studied here were designed for a specific framework and instrument and for use in Saudi Arabia specifically.

As for specific literature on the best methodology for ITG itself, while some researchers have performed empirical studies (e.g., (Brown and Grant, 2005), several researchers have argued that a better approach to understanding and thus implementing IPG is understanding different points of view from different vantage points within an organization. Thus this survey and interview approach was utilized to gain this perspective and to better understand design science in action within an organization. Design artefacts specifically (i.e., constructs, models, methods, instantiations) are needed to obtain the key evaluation and build insight required to develop the research and thus to develop the CSFs (Schermann, Böhmann and Krcmar, 2009).

Therefore, the research follows the stages defined in the iSFITG2 framework, which were defined in Chapter 3 (see Table 3.4-1). This study is based on a descriptive analytical method using quantitative analysis to find, confirm and validate the CSFs for ITG implementation in Saudi Arabia's public sector. A triangulation technique has been adopted to find reliable and validated results. The triangulation technique consists of three dimensions: a literature review, a global expert review and a cultural expert review (see Figure 4-1).

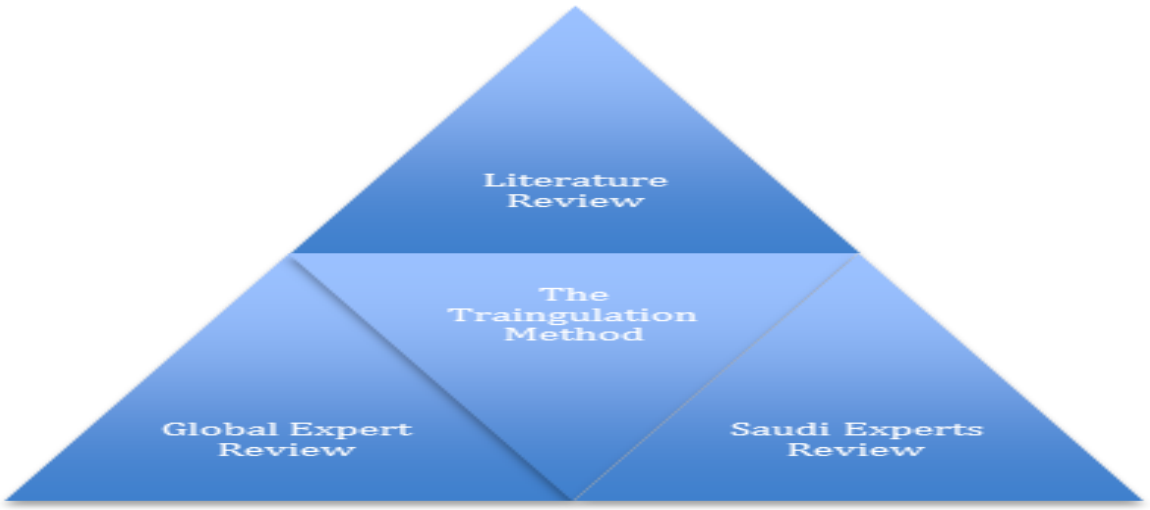


Figure 4-1: Triangulation technique

The literature review is the initial source of the main factors which been collected from many well-known standards and frameworks of ITG, and from related studies about Critical factors of ITG. The extract of the literature is formed in the initial framework (iSFITG1). iSFITG1 has gone through filtering, developing, and formulation phases to create iSFITG2. Then, the global and cultural expert reviews have been consulted and discussed through quantitative studies to generate the validated framework (SFITG). Once the framework has been validated, it has been used as a research instrument in five case studies that have been carried out in the Saudi public sector. After conducting the case studies, the participants have been asked about their opinion about the instrument (see Figure 4-2). These cases studies have been conducted in Education, Health and Financial sectors. These case studies and their evaluation will then validate the instrument and the solution framework (SFITG). A detailed description of the research methods used is given below.

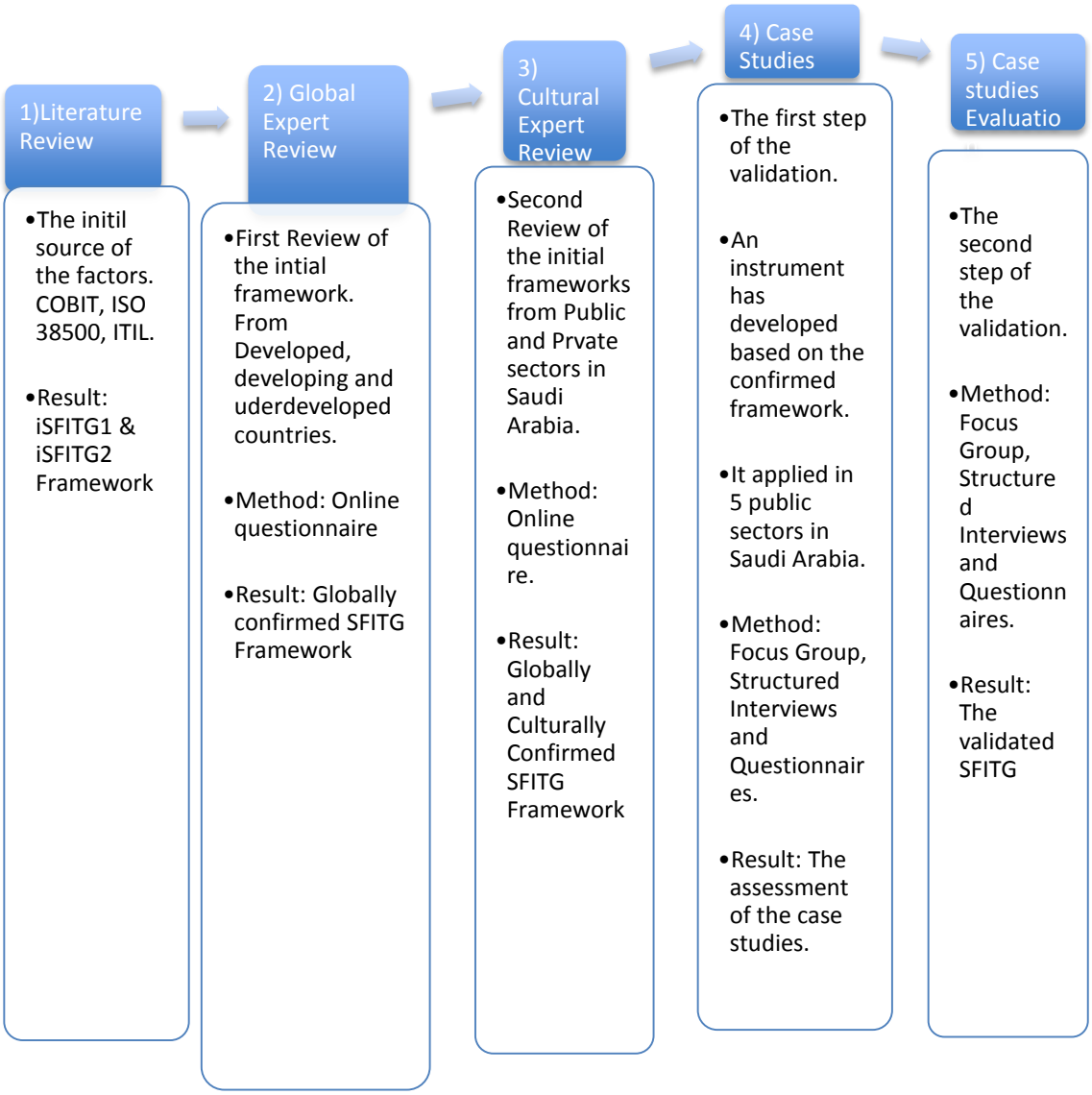


Figure 4-2: The Research Process

4.1. Research scope

The main target of this research is to devise a framework that includes the critical factors for successful implementation of ITG during the entire ITG lifecycle regardless to the adopted ITG framework or standard. The study field of the research is the public sector in Saudi Arabia. During the confirmation process, the study population consists of two sets of experts in ITG and IT: global ITG experts and experts with knowledge of Saudi culture. For the five case studies, the study population consists of key employees in organizations in the Saudi public sector at senior,

supervisory and middle management levels. The main aim of the research instrument is to measure the success of ITG implementation, based on the validated framework, not to measure the implementation status of ITG. Therefore, the research instrument gives an indication of the success of the implementation of ITG in an organization, not how far they are from the completion of the implementation.

The study itself has some limitations that must be understood before one proceeds with attempting to flesh the value out of the study. For one, some of the CSFs are notoriously difficult to calculate. Part of the reason for this is because CSFs tend to be cyclical as opposed to other measures such as KPIs (key performance indicators), which tend to be timely and also tend to be measured repeatedly. For this reason, some researchers such as Rockart (1979) consider CSFs to be inappropriate for analysis because of their somewhat random and cyclical nature. Furthermore, because many of these the CSFs are qualitative factors, it can sometimes be difficult to know the direct calculation of these factors, i.e., how to calculate them and to determine their ultimate value. For instance, it can difficult to know how well an IT strategy is aligned with the business's overall situation and goals using CSFs because it is difficult to quantify this relationship and its impact on a company's operating success. Furthermore, it can be especially difficult to assess the state of CSFs within an organization again to do the above-stated variability and cyclical nature of these measures. This helps to limit the overall effectiveness of this study, but it does not destroy its usefulness. It is just the nature of the field, and must be taken into account by one seeking to understand the role of ITG. It must also be noted that while CSFs have their limitations they are important to both accomplishing and measuring an organization's goals and for ensuring performance organization-wide, in particular because they have such a direct correlation to an organization's present and future success (Boynton and Zmud, 1984). Therefore, while CSFs may have obvious limitations they are most appropriate here because the study aims to measure the "success" of ITG implementation not the actual implentation itself (as is the case for KPIs).

4.2. Initial data from the literature review

Initial data have been gathered via the literature review, as presented in Chapter 2. Information and references were sourced from books, journal papers, reports, conferences and scientific websites. These sources are used as the basis for the different factors and categories in the proposed framework. These factors and categories are confirmed and further developed by the triangulation technique. This thesis takes into account many previously defined ITG frameworks, models and standards (as outlined in Chapter 2) in order to answer the first research question:

"What are the CSFs for the implementation of ITG?" To identify these factors, the researcher analyses:

1. Relevant standards and frameworks to identify the best solution for implementing ITG and to highlight all factors required for successful implementation.
2. Related studies, focusing mainly on ITG implementation and CSFs.
3. Other ITG studies in order to gain an understanding of ITG implementation processes and related factors.

At the end of this phase, which is equivalent to the first stage of the triangulation technique, the requirements for the SFITG framework have been identified. These findings are developed further in the next phase.

4.3. Primary data from experts

At this stage of the study, we confirmed the iSFITG2 framework with reference to two expert reviews: a global ITG expert review and a culture expert review (the other two methods of the triangulation technique). As this research is an exploratory study, a survey strategy was adopted to obtain the primary data, using a questionnaire-based approach. This approach allows for the collection of quantitative data, which can be analysed later using quantitative analysis techniques. The researcher designed a survey consistent with the objectives of the research and its research questions. The survey was based on the proposed framework (iSFITG2). The target at this stage was to learn whether the proposed framework had captured all the important factors, and to ensure that the framework was both globally acceptable and appropriate for the Saudi context.

4.3.1. Review by global ITG experts

The iSFITG2 framework was initially confirmed by recommendations from a review by global ITG experts. The development of iSFITG2 was driven by studies that were conducted globally. A review by global ITG experts was, therefore, important to ensure that the framework did not deviate from globally accepted frameworks. Questionnaires were developed based on the iSFITG2 framework. The web-based SurveyGizmo tool was used to design the questionnaire, and to distribute and collect the responses. The validity and reliability of this tool can be measured using scientific methods. Participants gave their opinion about each factor and category as well as their connections with each other. In addition, the questionnaire allowed participants to add or remove factors and categories. The questionnaire was sent to over a hundred ITG experts around the world

from different sectors in both developed and developing countries such as the UK, the US, Australia and Malaysia. Analysis of the questionnaire results was used to confirm the CSFs for the proposed ITG framework.

This survey targeted ITG experts, who could best help in refining the ideas and findings of the research, whether they were executives, managers, IT professionals or researchers. The researcher also contacted leading ITG organizations such as ISACA and ITG Institutes, as these bodies have lists of experts in this field. We acknowledge the help offered by these bodies. ISACA, for example, offered to post the survey questionnaire on its website.

All participants were contacted via email and invited to complete the questionnaire. Emails included a direct link to the questionnaire. Alternatively, participants were told that they could complete the questionnaire from the ISACA website.

4.3.2. Review by cultural experts

This review was conducted directly after the global review to provide greater understanding of the status of ITG in Saudi Arabia, and to confirm whether the proposed framework was appropriate for use in Saudi Arabia or whether any adjustments were required. As there is a good understanding of ITG implementation in the Saudi private sector, private sector experts were included in this review. Questionnaires and surveys were developed, based on the iSFITG2 framework, and sent to 120 experts in both the public and private sector, in different industries such as telecommunication companies, universities, research institutes and government ministries. Figure 4-3 illustrates the number of questionnaires sent out in each review.

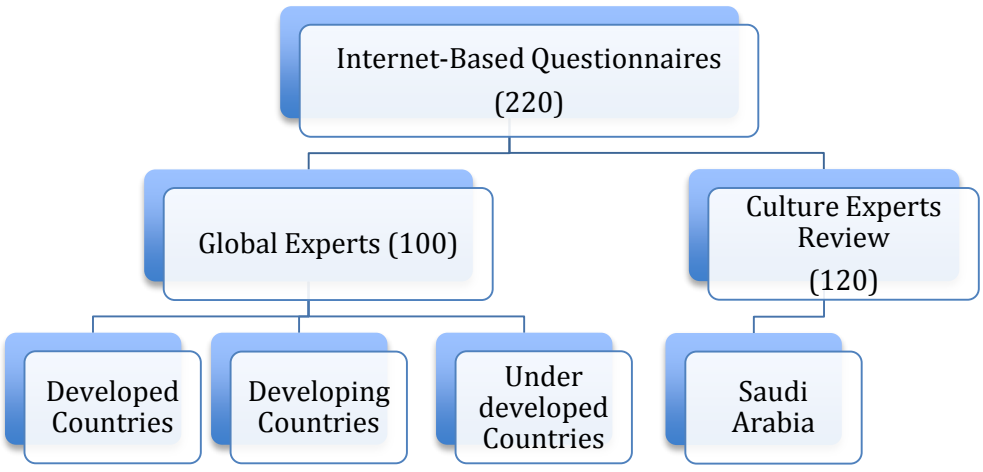


Figure 4-3: Questionnaire Methods

4.4. Validating SFITG

To ensure the solution framework (SFITG) is applicable and reliable in real life, it should be applied and tested in its context, which will make it a validated framework. Validation as defined in PMBOK guide (Project Management Body of Knowledge is *"the assurance that a product, service, or system meets the needs of the customer and other identified stakeholders. It often involves acceptance and suitability with external customers. Contrast with verification."* Validation of the framework in this context is a testing process to ensure its applicability. In order for a framework to be valid, and thus able to be worked into an instrument for real world use, it must demonstrate applicability in similar settings. This is only possible through back-testing and analysis to ensure that the framework is even being applied properly in the existing context. In this research, since there are few experts with a thorough understanding of ITG – and since few organizations in Saudi Arabia have applied ITG in the public sector – conducting case studies in a number of these organizations will help validate the SFITG. This will allow the researcher to apply this framework directly with participants and ensure they are fully aware of the study targets and approaches. Further, the solution framework is a collection of CSFs of different categories, without any guidance for the application, which makes conducting the case studies directly with SFITG inaccurate and nearly impossible. Consequently, the SFITG framework has been developed as an instrument to measure the success of ITG implementation in the targeted organizations; more details surrounding the case studies and the SFITG framework will be discussed later. Once validated, the proposed framework of iSFITG2 will be refactored, analysed, and adjusted. In turn, the study design will be revised to reflect the changes and ensure the validated SFITG. Then, the validated framework and related research data (including the preparation of the instrument) will be ready for submission. The research instrument, based on the validated SFITG framework, was designed to measure the success of ITG implementation in the public sector in Saudi Arabia. In order to validate SFITG, an instrument has been developed from the validated SFITG framework and applied in five case studies, specifically in five large public organisations in Saudi Arabia. Then, the case study participants were asked to share their opinion on the precision and quality of the instrument and the extent to which the results reflected the ability of the organization to fulfill its main purpose. These steps are summarised in Figure 4-4. The sample specification of the participants is shown in Table 4-1.

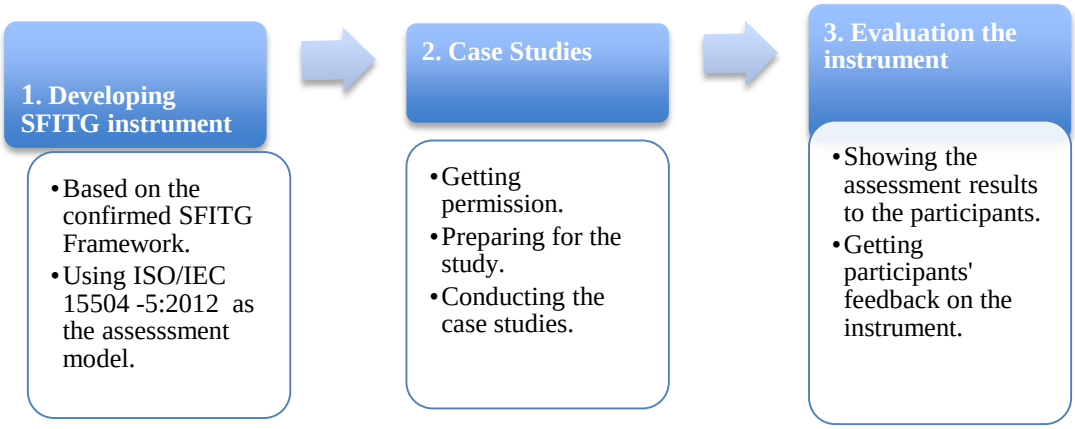


Figure 4-4: Validation Process

4.5. Developing the SFITG instrument

The research instrument is based on the validated SFITG framework, and it was developed to measure the success of the ITG implementation in the public sector in Saudi Arabia. As COBIT is the most common framework for ITG, the ISO/IEC 15504-5:2012 IT Process Assessment Standard has been used as a guideline for the Process Maturity Model (PAM). This research follows the same standard process for the assessment, as well as the same standard for the development of the measurement metrics for the various factors involved. Each factor has been measured based on the metrics listed in Figure 4-5.

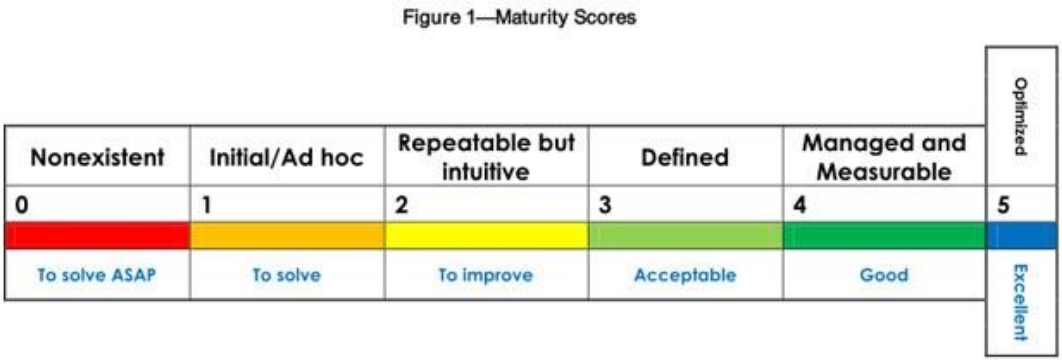


Figure 4-5: Maturity Scores (COBIT 5 PAM Book, 2012)

Pilot research was conducted to shape the instrument appropriately before conducting the case studies. The piloting stage was conducted prior to the main case studies, and it was piloted on a small sample, similar to the main sample of the primary case study. The targeted sample is the King Abdulaziz City for Science and Technology and the Planning and Technology General Directorate (PTD) in the Ministry of Education (MOE), which is similar to the main study sample – specifically because it's Saudi, in the public sector and has implemented ITG. This pilot research combined two research methods, quantitative research (questionnaires) and qualitative research (focus groups

and interviews). The instrument was validated after the pilot research and before the main study, and it will be discussed in greater detail in Chapter 6: The validation Phase.

4.6. Case studies

This is the first practical phase of the SFITG instrument validation. The instrument has been used in public organisations in Saudi Arabia that have fully or partially implemented ITG. Consequently, five case studies were carried out with the aim of measuring the success of five companies' implementation of ITG by way of the SFITG instrument. The organisations in the case studies were the Ministry of Education, the Ministry of Trading and Manufacturing, the Ministry of Health, the Ministry of Civil Services and the King Abdulaziz Medical City. These case studies were designed to assess the extent to which the implementation of ITG in these applied organisations proved successful, based on the SFITG instrument. After obtaining and analysing the results of the pilot, qualitative and quantitative studies were conducted based on the SFITG instrument. The qualitative study used both semi-structured and structured interviews to obtain results, while the quantitative study relied on online and paper questionnaires. These two studies were conducted in parallel, based on the participants' positions and preferences.

Subsequently, the results of these case studies were shown to the participants, at which point a quantitative study was conducted to complete the validation of the SFITG instrument.

4.6.1. Preparing for the study

Before conducting these case studies, the first step was to gain permission from the five organisations. Communication with these organisations began with their governance office, IT management or CIO, who served as the point of contact during the study. Unofficial meetings, emails and phone calls were the main ways in which we communicated with these executives.

Then, meetings with the main contact were held to provide detailed explanations of the study and its outcomes, including who should be involved in the study. These meetings were conducted through emails, phone calls and in person.

Obviously, SFITG consists of many factors – pertaining to different categories – that affect different fields in the business and IT departments, such as top management, the IT department, project management and quality management. In addition, studies on IT governance require top management, who have sound knowledge of IT governance and IT practices in their organisations, to be directly involved in the study. The study, moreover, relied on revealing the sensitive

information of many practices and organisational processes. In Saudi Arabia, the participant system in these studies was very complex.

Consequently, ensuring that participants were well-versed on the status of all SFITG instrument items proved nearly impossible. As a result, getting more than one accurate SFITG instrument questionnaire was not achievable.

The only option, therefore, was to get one accurate assessment of ITG in these organisations. This feat was undertaken by the focus group, which was the best option under the circumstances. The focus group combined the governance office, IT and/or top management with extensive knowledge of the status of all SFITG instrument items in their organisation. Members of the focus group were nominated by the governance office.

The main target of the focus group was to collaborate in order to provide a completed questionnaire on behalf of members' organisation. This was made possible through online questionnaires, structured interviews and semi-structured interviews.

4.6.2. Conducting the main study

To ensure a clear and accurate assessment of the success of ITG implementation in the targeted organisations, a structured questionnaire was used to elicit participants' responses. Therefore, the SFITG instrument was converted by the SurveyGizmo software tool, while the COBIT Maturity Model was used to develop the questionnaire. The latter is available both online and manually.

Next, the members of the focus group were interviewed to get a clear view of the study, including their own roles. The sample consisted of 4 to 12 participants, all from different levels and departments (executives, governance officers, IT managers, etc.).

Later, the main study was conducted with the focus group members through structured interviews. The resulting questionnaire based on the SFITG instrument was presented to the participants and their answered were recorded. This method gave the participants the comfort and confidentiality they needed to accurately complete the questionnaire.

After collecting the results of each case study, rigorous calculations took place to get the assessment results. Then, each part of the assessment was shown in the form of radar and bar charts to the participants, with the full implications of these results. More details surrounding these calculations are located in Chapter 6:The validation Phase.

4.7. Evaluation of the case studies

After obtaining and analysing the results of these case studies, a quantitative study was conducted to complete the validation of the SFITG instrument. This study targeted the participants in the case organisations, asking them to answer the third question: "Is the validated SFITG an appropriate

instrument to measure the implementation success of ITG in government organizations in Saudi Arabia?" The online and paper questionnaires were used for the quantitative study. The respondents were shown the results of the case study, at which point they were asked if they agreed with the results in terms of the actual success status of ITG implementation in their organisation. They were asked about the SFITG instrument's ability to measure the extent to which the ITG implementation proved successful not only in their organisation, but in other public organisations in Saudi Arabia.

Table 4-1: SFITG Framework Sample Summary

Phase	**Stage**	**Sample location**	**Sector**	**Instrument**	**Sample size**
Confirmation	Global expert review	US, UK, Malaysia, Australia	Public and private	Questionnaires	35
	Cultural expert review	Saudi Arabia	Public and private	Questionnaires and surveys	75
Validation	Cultural expert review	Saudi Arabia	Public	Focus Groups and interviews	30
				Questionnaire	20
Total					150

Chapter 5: The Exploratory Study

In this chapter, the results of the exploratory study will be presented. Then, the analysis of these results is shown after. Finally, the discussion of these results and analysis will be revealed in the last section of this chapter.

5.1. Results of the Exploratory Study

As mentioned in Chapter 4, a quantitative study was carried out to confirm the iSFITG2 framework for ITG. The main goal was to ensure that the proposed CSFs, the categories and their connections with each other were correct and that nothing important to successful ITG implementation was missing. This study was undertaken in two stages via two expert reviews that polled global ITG experts and cultural experts, respectively. For both reviews, online questionnaires were used to reach the target experts. The web-based SurveyGizmo tool was used to design, publish and collect the questionnaires and responses. As requested by the university, the questionnaire was built on the anonymity of the respondents. Accordingly, Ethics Form *ERGO/FOPSE/8771* has been completed. A copy of the questionnaire is included in Appendix A: The global questionnaire. In addition, all respondents were asked to read and agree a consent form before they could start answering the questionnaire. These forms were utilized in order to provide more validity for the student and more protection for the people answering the study. These consents are:

1. I have read and understood the introduction section and have had the opportunity to ask questions about the study.
2. I agree to take part in this research project and agree for my data to be used for the purpose of this study.
3. I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected.
4. I understand that all data is anonymous and no personal information will be stored or linked to the participant.

For both reviews, the questionnaire was divided into four sections:

Section 1: Demographic questions (about the respondent and his/her institution)

Section 2: Questions about the proposed framework categories

Section 3: Questions about the proposed CSFs

Section 4: Questions about the proposed relationships between the framework categories and the CSFs

Answer formats comprised rating scales, texts and dropdown lists, based on the question objective and type. Further details are given below.

5.1.1. Global expert review

The review by global ITG experts included experts from outside Saudi Arabia. The objective of the questionnaire was to ensure that the proposed iSFITG2 framework was globally acceptable and that nothing required for successful ITG implementation was missing from the proposed framework. The targeted respondents were ITG experts with at least five years ITG experience. The experts who responded were from different countries including the US, the UK, Australia and Malaysia. Participants were sent an email containing an overview of the researcher, the research, the goal of the study and a direct link to the questionnaire, which was also available from the ISACA website. The introductory email was sent to over a hundred ITG experts, IT professionals, executives and researchers. The number of respondents was 35. Of these, 17 did not complete the questionnaire fully, six failed to meet the minimum requirements; twelve participants completed the questionnaire fully and met the requirements.

Questions in sections 2, 3 and 4 of the questionnaire require an answer based on a rating scale from 1 (strongly disagree) to 4 (strongly agree). An open-ended question enabled respondents to suggest additional framework categories, CSFs or/and relationships between them. A sample t test was used to analyse the results. Since the rating scale was 4, the Test Value was 2.5, with a P Value of 0.05.

Actually, results from sample Global Experts questionnaires (17 global experts responded) are statistically small to allow for confidence in the results. Nevertheless, gaining sound understanding of key areas of global expert views provided good guidance for conducting questionnaires, focus groups and structural interviews of Culture Experts in Saudi Arabia and a statistically sound number of responses (40) were obtained. The results for each section of the questionnaire are presented below.

Section 1: Demographic questions

This section of the questionnaire asked questions about country of residence (in order to find out background and context); ITG experience in years (three years ITG experience was the minimum acceptable); and job position (to identify how close the participant was in terms of decision making on ITG practices in his/her organization). The following pie charts show the statistical results for

this section of the questionnaire. Answers to other demographic questions are shown in Appendix B: The other demographic information in global review.

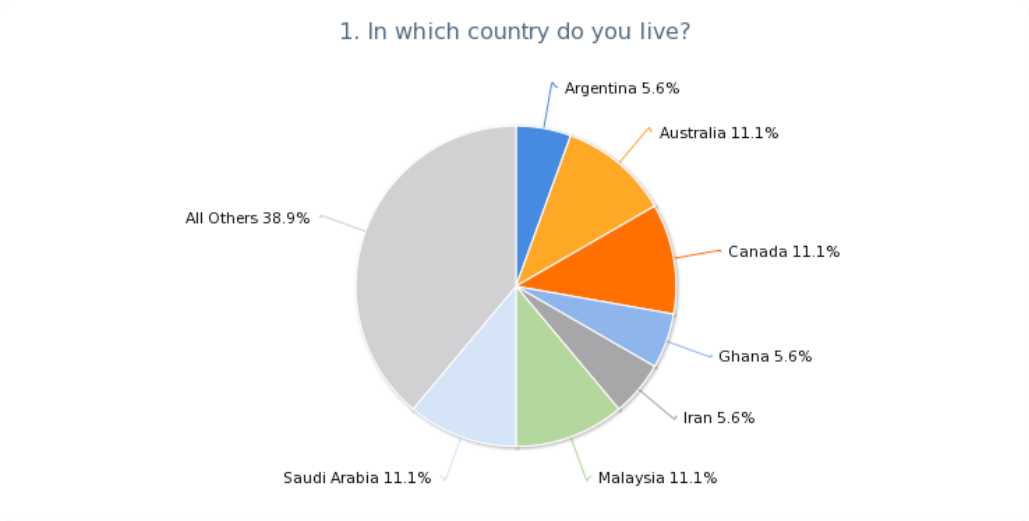


Figure 5-1: Country – Global Review

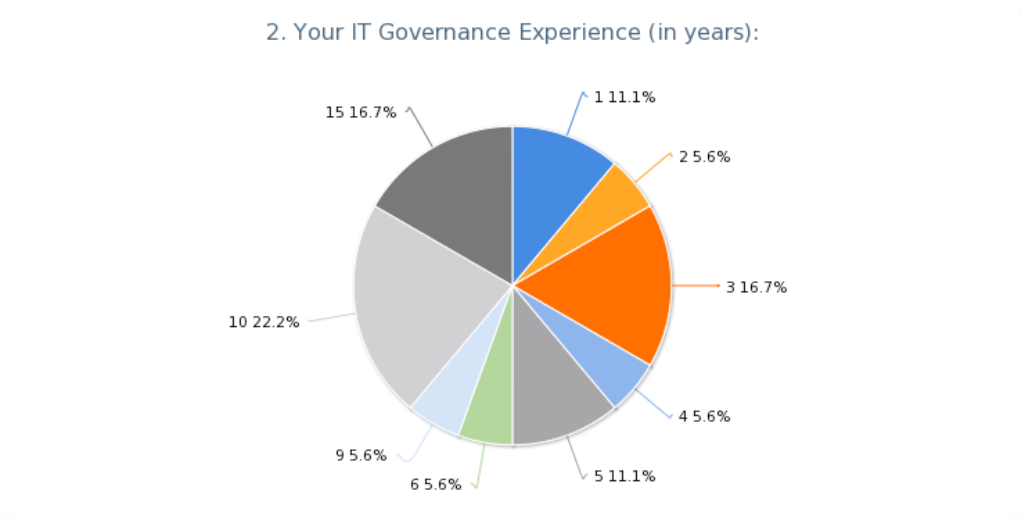


Figure 5-2: Experience – Global Review

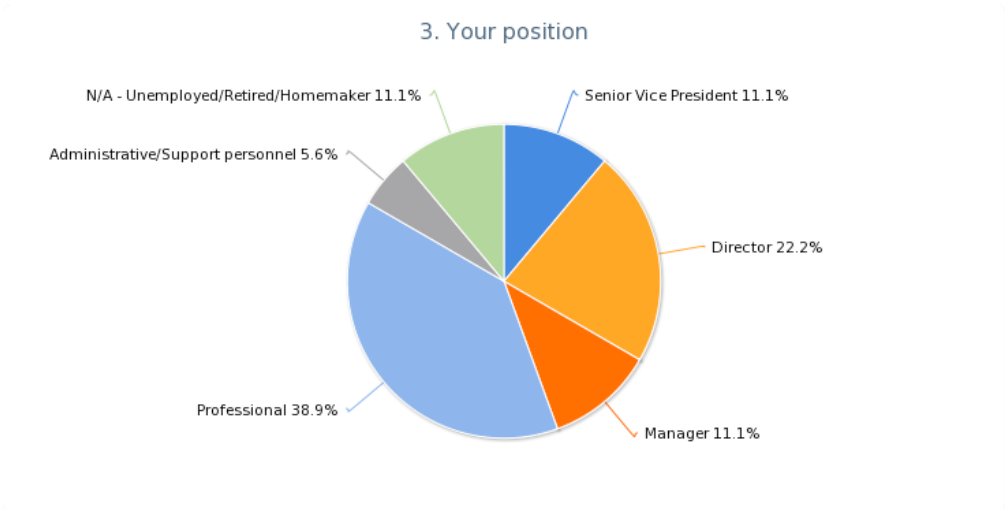


Figure 5-3: Position – Global Review

Section 2: Proposed framework categories

Questions in this section were related to the proposed categories of the iSFITG2 framework. The following question was asked for all categories: "To what extent do you agree that each of the following is an appropriate category of CSFs of IT Governance?" This was to ensure that every category was appropriate for the framework. Answers are shown in Table 5-1.

Table 5-1: Proposed Categories – Global Review

Category	N	Mean	Sig. (2-tailed)	Stats Consequence
Strategic alignment	16	3.75	< .001	Significantly important
Environmental effect (external)	16	3.50	< .001	Significantly important
Organizational effect (internal)	16	3.56	< .001	Significantly important
Performance management	16	3.63	< .001	Significantly important
Resource management	16	3.56	< .001	Significantly important

The statistical results analysis of the proposed iSFITG2 categories shows that all proposed categories were statistically significant for implementing ITG. In addition, the reliability analysis shows that Cranach's Alpha of results for all categories is (α = 0.874), which means that the internal consistency of these results is high.

Respondents were also asked: "Do you think there are other important categories not mentioned here? If yes, what are they?" The answers are presented in Table 5-2.

Table 5-2: Categories Recommendations – Global Review

Response
Benefits realization, Risk optimization
Competency effect, Board (of directors) enterprise technology governance effect
Control and compliance, Risk management
Framework adoption
Human resources
Risk management
Risk management and Benefit management
Responsibility and Human behaviour

Section 3: The proposed CSFs

Section 3 included questions about the proposed CSFs for the iSFITG2 framework. The following question was asked about all the CSFs: "Do you agree that each of the following is a Critical Success Factor (CSF) of IT Governance?" This was to ensure that every CSF was appropriate for implementing successful ITG. The results are shown in Table 5-3.

Table 5-3: Proposed CSFs – Global Review

CSF no	CSFs	N	Mean	Sig. (2-tailed)	Stat Consequence
1	Adequate stakeholder involvement	14	3.14	.008	Significantly important
2	Adequate management support and ownership	14	3.57	< .001	Significantly important
3	Effective alignment and communication between IT and business strategy	14	3.64	< .001	Significantly important
4	Effective communication between IT and business	14	3.64	< .001	Significantly important
5	Regulatory environment and compliance requirements	14	3.57	< .001	Significantly important

6	Clear ITG policies, principles and responsibilities	14	3.71	< .001	Significantly important
7	Effective current enterprise governance	14	3.64	< .001	Significantly important
8	Appropriate organizational culture	14	3.36	< .001	Significantly important
9	Clear IT strategy, principles and policies	14	3.64	< .001	Significantly important
10	Good organization change strategy	14	3.36	< .001	Significantly important
11	Adequate analysis, evaluation of current and future use of IT	14	3.50	< .001	Significantly important
12	Good project management methodology	14	3.14	< .001	Significantly important
13	Effective performance management strategy	14	3.43	< .001	Significantly important
14	Sufficient financial support	14	3.36	< .001	Significantly important
15	Adequate IT skills and staff	14	3.29	< .001	Significantly important

The statistical results analysis of the proposed CSFs for the framework show that all proposed CSFs are statistically significant for implementing a successful ITG. In addition, the reliability analysis shows that Cranach's Alpha of all the results is (α = 0.883), which means that the internal consistency of these results is high.

The respondents were then asked: "Do you think there are other important CSFs not mentioned here? If yes, what are they?" The answers are given below in Table 5-4. These recommendations have been given in different syntax but with similar meaning and objectives.

Table 5-4: CSFs Recommendations – Global Review

Response	**Freq**
Definition of IT Strategy in organization strategy	4
Comprehensive responsibility of BODs of IT Decisions	3
Adequate and relevant Technology & Infrastructure	2
Clear Risk Management Strategy	2

Leadership and commitment of top management to the adoption of risk management strategy	3
IT Risk is accessed and managed	2
Business Risk is assessed and managed	2

**Freq: Frequency (number of how many times mentioned by expert)*

Section 4: Proposed relationship between the framework categories and CSFs

This section included questions about the proposed relationship between categories and CSFs. As shown in the iSFITG2 framework, particular CSFs are related to each category. The respondents were asked about the proposed relationship between each category and the related CSFs. The results are shown in the following tables.

Table 5-5: Strategic Alignment (SA) – Global Review

Q: Do you agree that each of the following CSFs belongs to the "SA" Category?				
CSFs	**N**	**Mean**	**Sig. (2-tailed)**	**Statistical Consequence**
Adequate stakeholder involvement	14	2.93	0.158	Not significantly related
Adequate management support and ownership	14	3.36	< .001	Significantly related
Effective alignment and communication between IT and business strategy	14	3.64	< .001	Significantly related
Effective communication between IT and business management	14	3.43	.001	Significantly related

The statistical results analysis of the proposed relationship between categories and CSFs in the iSFITG2 framework show that the Adequate stakeholder involvement factor is not statistically significantly with regard to the Strategic alignment category; the relationship for all other factors, however, was statistically significant.

Table 5-6: Environmental Effect (EE) – Global Review

Q: Do you agree that the following CSF belongs to the "EE" Category?

CSF	N	Mean	Sig. (2-tailed)	Statistical Consequence
Regulatory environment and compliance requirements	13	3.38	< .001	Significantly related

The statistical results analysis shows that the relationship between the Regulatory environment and compliance requirements factor and the Environmental effect (external) category was statistically significant.

Table 5-7: Organizational Effect (OE) – Global Review

Q: Do you agree that each of the following CSFs belongs to the "OE" Category?				
CSFs	**N**	**Mean**	**Sig. (2-tailed)**	**Statistical Consequence**
Effective current Corporate Governance	13	3.54	< .001	Significantly related
Clear ITG policies, principles & responsibilities	13	3.46	< .001	Significantly related
Clear IT strategy, principles & policies	14	3.43	< .001	Significantly related
Appropriate organizational culture through	14	3.36	< .001	Significantly related
Good change management strategy	12	3.42	< .001	Significantly related

The statistical results analysis shows that the proposed relationships between categories and CSFs in Table 5-7 are statistically significant.

Table 5-8: Performance Management (PM) – Global Review

Q: Do you agree that each of the following CSFs belongs to the "PM" Category?				
CSFs	**N**	**Mean**	**Sig. (2-tailed)**	**Statistical Consequence**
Adequate analysis, evaluation of the current and future use of IT	14	3.14	.008	Significantly related
Good project management	13	2.85	.095	Not Significantly

methodology				related
Effective performance management strategy	14	3.14	.008	Significantly related

The statistical results analysis of the proposed relationship between categories and CSFs in iSFITG2 shows that the Good project management methodology factor is not statistically significant in relation to the Performance management category, whereas the relationship with all other factors in Table 5-8 was statistically significant.

Table 5-9: Resource Management (RM) – Global Review

Q: Do you agree that each of the following CSFs belongs to the "RM" Category?				
CSFs	**N**	**Mean**	**Sig. (2-tailed)**	**Statistical Consequence**
Sufficient financial support	14	3.07	.004	Significantly related
Adequate IT skills & staff	14	3.21	< .001	Significantly related
Adequate IT Governance awareness and training	14	3.14	.008	Significantly related

The statistical results analysis shows that the proposed relationships between all categories and CSFs in Table 5-9 are statistically significant. In addition, the reliability analysis shows that Cronbach's Alpha of all relationship results is (α = 0.874), which means that the internal consistency of these results is high.

The respondents were then asked: “Do you suggest any modifications in these relationships between categories and factors?” The answers are given in Table 5-10.

Table 5-10: Relationship Recommendations – Global Review

Response
Adequate and relevant technology is also a strong resource
Programme and project management is different from performance management
In my opinion the link between organization performance management systems and enterprise business technology reporting and governance at board level is most usually broken.
If you consider "change management strategy" as Organizational Effect you maybe have to include "Effective performance management strategy" too

For more details about the statistical results of the expert reviews, refer to Appendix C: More details about the global review's results.

5.1.2. Cultural expert review

After receiving the results of the first review, important feedback and recommendations from the review were incorporated into the framework. Experts in Saudi business culture then carried out a second review. The objective of this survey was to ensure that each framework category, each CSF, and the relationships between them were correct and culturally acceptable in Saudi Arabia. The targeted respondents were ITG and IT experts, with at least three years working experience in Saudi Arabia. All respondents were sent an introductory email, which introduced the researcher, gave an overview of the research, the goal of the study and a direct link to the questionnaire. Other respondents completed the questionnaire through the ISACA website. The introductory email was sent to over 150 ITG experts, IT professionals, executives and researchers. The number of respondents was 75. Of these, 41 did not complete the questionnaire fully and two failed to meet the minimum requirements; thirty-two respondents completed the questionnaire fully and met the minimum requirements.

Questions in sections 2, 3 and 4 of the questionnaire require an answer based on a rating scale from 1 (strongly disagree) to 4 (strongly agree). An open-ended question enabled respondents to suggest additional framework categories, CSFs or/and relationships between them. A sample t test was used to analyse the respondents' results. Since the rating scale was five, the Test Value was3.5 with a P Value of 0.05.

The results for each section of the questionnaire are presented below.

Section 1: Demographic questions

This section of the questionnaire asked whether respondents worked in Saudi Arabia (only those who worked in Saudi Arabia could be included in the survey); what was their ITG and/or IT experience in years (three years relevant experience was the minimum acceptable); and what job position they held (to identify how close the participant was in terms of decision making on ITG practices in his/her organization). The following pie charts show the statistical results for this section of the questionnaire. Answers to other demographic questions are shown in Appendix B: The other demographic information in global review.

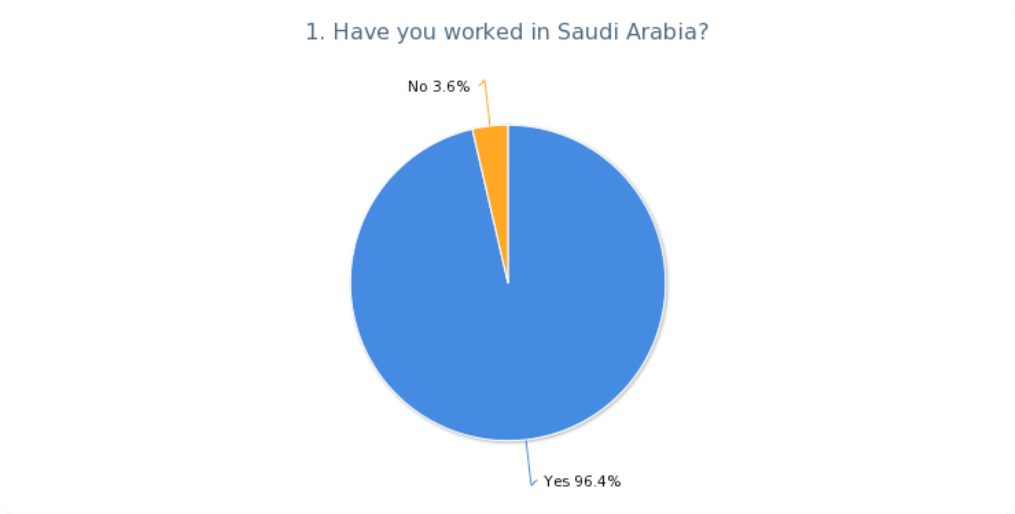


Figure 5-4: Worked in Saudi – Cultural Review

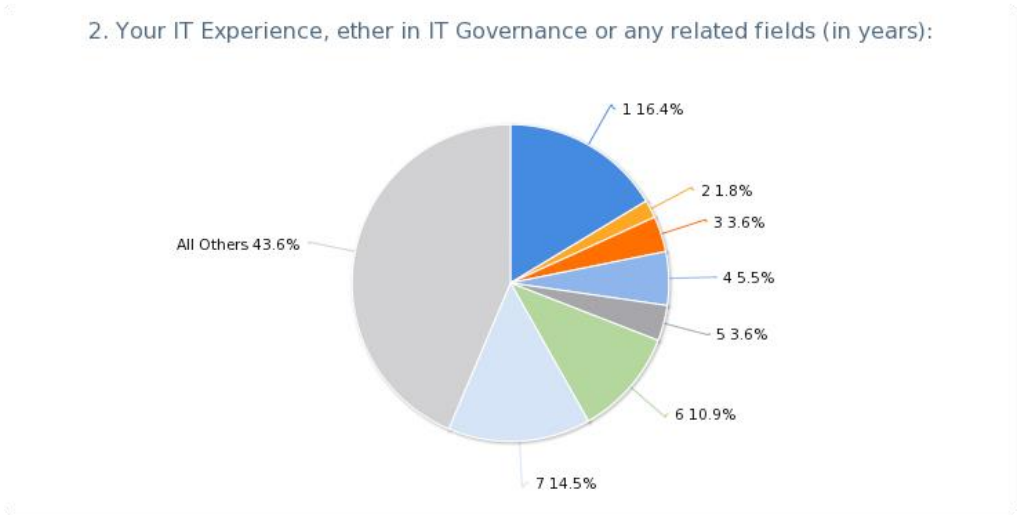


Figure 5-5: Experience – Cultural Review

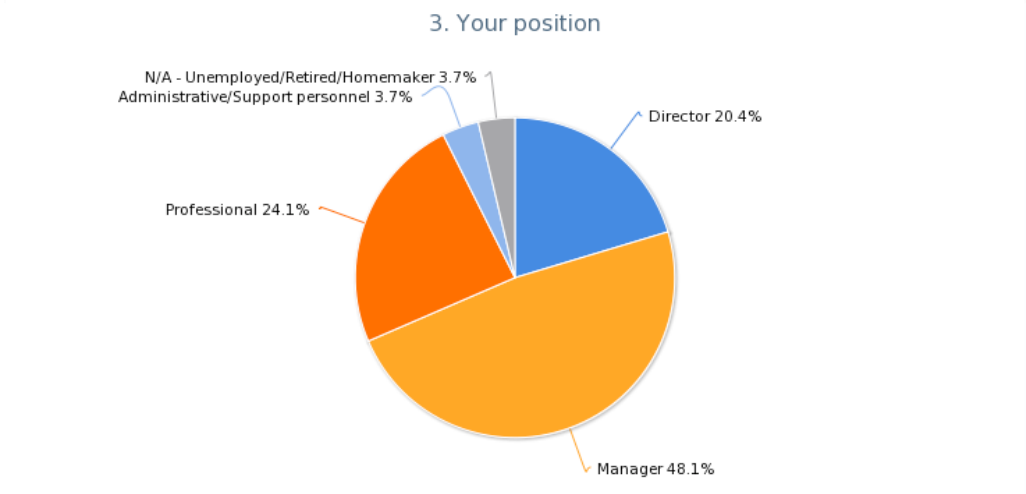


Figure 5-6: Position – Cultural Review

Section 2: The proposed categories

Questions in this section were related to the proposed categories of the iSFITG2 framework. The following question was asked for all categories: "To what extent do you agree that each of the following is an appropriate category of CSFs of IT Governance?" This was to ensure that every category was appropriate for the framework. Answers are shown in Table 5-1.

Table 5-11: Proposed Categories – Cultural Review

Categories	N	Mean	Sig. (2-tailed)	Statistical Consequence
Strategic alignment	32	4.06	.004	Significantly important
Environmental effect	32	3.72	.190	Not significantly important
Organizational effect	32	4.31	< .001	Significantly important
Performance management	32	4.00	.004	Significantly important
Resource management	32	3.94	.017	Significantly important
Risk management	32	3.81	.057	Not significantly important

The statistical results analysis of the proposed iSFITG2 categories shows that Strategic alignment, Organizational effect (internal), Performance management and Resource management are statistically significantly categories for ITG in Saudi Arabia. However, the Environmental effect (external) and Risk management categories were not statistically significant in Saudi Arabia.

In addition, the reliability analysis shows that Cronbach's Alpha of the results for all categories is (α = 0.909), which means that the internal consistency of these results is high. The respondents were then asked: "Do you think there are other important categories not mentioned here? If yes, what are they?" The answers are presented below.

Table 5-12: Categories Recommendations – Cultural Review

Response
Best practices
Change management
Culture
Development, Maintenance
Processes quality
The maturity of understanding of the high management regarding IT Governance
Value Delivery

Outsourcing management,
Something related to ROI or Business Value

Section 3: The proposed CSFs

Section 3 included questions about the proposed CSFs for the iSFITG2 framework. The following question was asked about all the CSFs: "Do you agree that each of the following is a Critical Success Factor (CSF) of IT Governance?" This was to ensure that every CSF was appropriate for implementing successful ITG. The results are shown in Table 5-13.

Table 5-13: Proposed CSFs- Cultural Review

CSF no	CSFs	N	Mean	Sig. (2-tailed)	Statistical Consequence
1	Adequate stakeholder involvement	32	4.22	< .001	Significantly important
2	Adequate top management support and ownership	32	4.56	< .001	Significantly important
3	Effective alignment between IT and business strategy	32	4.28	< .001	Significantly important
4	Effective communication between IT and top management	32	4.28	< .001	Significantly important
5	Clear Definition of IT Strategy in business strategy	32	4.56	< .001	Significantly important
6	Comprehensive responsibility of BODs of IT Decisions	32	4.25	< .001	Significantly important
7	Regulatory environment and compliance requirements	32	4.16	< .001	Significantly important
8	Clear ITG policies, principles and responsibilities	32	4.25	< .001	Significantly important
9	Effective Corporate Governance	32	4.00	.004	Significantly important
10	Appropriate organizational culture	32	3.91	.012	Significantly important
11	Clear IT strategy, principles and policies	32	4.25	< .001	Significantly important
12	Good organization change strategy	32	3.94	.017	Significantly important
13	Adequate analysis, evaluation of the	32	4.28	< .001	Significantly

	current and future use of IT				important
14	Good project management methodology	32	4.03	.005	Significantly important
15	Effective performance management strategy	32	4.13	< .001	Significantly important
16	Sufficient financial support	32	4.13	.003	Significantly important
17	Adequate IT Governance skills and Competencies	32	4.38	< .001	Significantly important
18	Adequate and relevant Technology and Infrastructure	32	4.13	.001	Significantly important
19	Clear Risk Management Strategy	32	4.09	< .001	Significantly important
20	Leadership and commitment of top management to the adoption of risk management strategy	32	4.16	< .001	Significantly important
21	IT Risk is accessed and managed	32	4.03	.001	Significantly important
22	Business Risk is assessed and managed	32	4.06	< .001	Significantly important

The statistical results analysis of the proposed CSFs shows that all proposed CSFs in Table 5-13 are statistically significantly for ITG in Saudi Arabia. In addition, the reliability analysis shows that Cranach's Alpha of all CSFs results is (α = 0.981), which means that the internal consistency of these results is high. In addition, the respondents were asked: "Do you think there are other important CSFs have not mentioned here? If yes, what are they please?" The answers are shown in

Table 5-14. These recommendations have been given in different syntax but with similar meaning and objectives.

Table 5-14: CSFs Recommendations – Cultural Review

Response	**Freq**
Effective Information Security Strategy	4
IT manager is effective member of top management/ board of directors	4

A competitive advantage strategy is defined and followed	2
Adequate IT Governance awareness and training	3
Effective IT Management Standards/ Frameworks	2
IT projects and investments are compliance with internal laws and regulations	2
Effective ITG Standard/ Frameworks are adopted and followed	3
Effective IT Outsourcing strategy is defined and followed	2
Effective Quality Management strategy	2
A clear definition of Regulatory requirements	3

**Freq: Frequency (number of how many times mentioned by expert)*

Section 4: Proposed relationships between the framework categories and CSFs

This section included questions about the proposed relationship between framework categories and CSFs in the proposed iSFITG2 framework in the context of Saudi Arabia. As shown in the iSFITG2 framework, particular CSFs are related to each category. Consequently, the respondents were asked about the proposed relationship between each category and the related CSFs. The results are shown in the following tables.

Table 5-15: Strategic Alignment (SA) – Cultural Review

Q: Do you agree that each of the following CSFs belongs to the "SA" Category?				
CSFs	**N**	**Mean**	**Sig. (2-tailed)**	**Statistical Consequence**
Adequate stakeholder involvement	31	4.13	.001	Significantly related
Adequate top management support and ownership	31	4.29	< .001	Significantly related
Effective alignment between IT and business strategy	31	4.29	< .001	Significantly related
Clear Definition of IT Strategy in business strategy	31	4.35	< .001	Significantly related
Comprehensive responsibility of BODs of IT Decisions	31	4.25	< .001	Significantly related
Effective communication between IT and top management	31	4.19	< .001	Significantly related

The statistical results analysis of the proposed relationship between the framework categories and CSFs in iSFITG2 shows that all factors in Table 5-15 are statistically significant.

Table 5-16: Environmental Effect (EE) – Cultural Review

Q: Do you agree that the following CSF belongs to the "EE" Category?				
CSF	**N**	**Mean**	**Sig. (2-tailed)**	**Statistical Consequence**
Regulatory environment & compliance requirements	31	4.00	.004	Significantly related

The statistical results analysis of the proposed relationship between categories and CSFs in iSFITG2 shows that the Regulatory environment and compliance requirements factor is statistically significant with regard to the Environment effect (external) category.

Table 5-17: Organizational Effect (OE) – Cultural Review

Q: Do you agree that each of the following CSFs belongs to the "OE" Category?				
CSFs	**N**	**Mean**	**Sig. (2-tailed)**	**Statistical Consequence**
Effective current Corporate Governance	31	4.10	< .001	Significantly related
Clear ITG policies, principles & responsibilities	31	4.26	< .001	Significantly related
Clear IT strategy, principles & policies	30	4.23	< .001	Significantly related
Appropriate organizational culture	31	3.94	.002	Significantly related
Good change management strategy	31	3.90	.019	Significantly related

The statistical results analysis of the proposed relationship between categories and CSFs in iSFITG2 shows that all CSFs in
Table 5-17 are statistically significant with regard to the Organizational effect (internal) category.

Table 5-18: Performance Management (PM) – Cultural Review

Q: Do you agree that each of the following CSFs belongs to "PM" Category?

CSFs	N	Mean	Sig. (2-tailed)	Statistical Consequence
Adequate analysis, evaluation of the current and future use of IT	32	3.15	.065	Not significantly related
Good project management methodology	32	4.06	.001	Significantly related
Effective performance management strategy	31	4.23	< .001	Significantly related

The statistical results analysis of the proposed relationship between categories and CSFs in iSFITG2 shows that the Adequate analysis, evaluation of the current and future use of IT factor is not statistically significant with regard to the Project management category, whereas the relationship between all other factors and Project management is statistically significant.

Table 5-19: Resource Management (RM) – Cultural Review

Q: Do you agree that each of the following CSFs belongs to the "RM" Category?				
CSFs	**N**	**Mean**	**Sig. (2-tailed)**	**Statistical Consequence**
Sufficient financial support	32	4.09	< .001	Significantly related
Adequate IT skills & competencies	31	4.13	< .001	Significantly related
Adequate IT Governance awareness and training	32	4.28	< .001	Significantly related
Adequate & relevant Technology and Infrastructure	31	4.13	< .001	Significantly related

The statistical results analysis of the proposed relationship between categories and CSFs in iSFITG2 shows that all CSFs in Table 5-19 are statistically significantly with regard to the Resource management category.

Table 5-20: Risk Management (RKM) – Cultural Review

Q: Do you agree that each of the following CSFs belongs to the "RKM" Category?				
CSFs	**N**	**Mean**	**Sig. (2-**	**Statistical**

			tailed)	Consequence
Clear Risk Management Strategy	32	4.34	< .001	Significantly related
Leadership and commitment of top management to the adoption of risk management strategy	32	4.31	< .001	Significantly related
IT Risk is accessed and managed	32	4.25	< .001	Significantly related
Business Risk is assessed and managed	32	4.19	< .001	Significantly related

The statistical results analysis of the proposed relationship between categories and CSFs in iSFITG2 shows that all CSFs in Table 5-19 are statistically significant with regard to the Risk management category. In addition, the reliability analysis shows that Cronbach's Alpha of all relationship results is (α = 0.948), which means that the internal consistency of these results is high.

The respondents were then asked: “Do you suggest any modifications in these relationships between categories and factors?” No suggestions were made. For more details about the statistical results of the experts’ reviews, refer to Appendix E: More details about the cultural review’s results.

5.2. Analysis of the Exploratory Study

Chapter 6 analyses the responses to the surveys. Each section of the questionnaire is analysed in-depth. The main aim of the analysis is to look at the statistical consequences of the results in detail. The analysis shows which categories and CSFs are statistically appropriate for successful ITG. In addition, the analysis confirms where there is a good relationship between the categories and CSFs.

5.2.1. Global expert review

Section 1: Demographic questions

This section of the questionnaire collected demographic information about the participants. As indicated in Figure 5-1, the participants are from different countries, including developed countries such as Australia and UK, developing countries such as Saudi Arabia and Malaysia, and less economically developed countries (LEDCs) such as Ghana and Iran. Gaining perspectives from such a range of countries helped make the study results more reliable. In addition, Figure 5-2 shows that over 83% of qualifying participants had three or more years ITG experience, which is a good result for such a new field. This also strengthens the reliability and quality of the results. Furthermore, over 83% of participants are seniors, vice presidents, directors, managers and professionals; they are, accordingly, the people most closely involved in ITG processes and its implementation. This also has a good impact on the results. For more details, see Chapter 5.

Section 2: The proposed categories

This section asked one question for all categories "To what extent do you agree that each of the following is an appropriate category of CSFs of IT Governance?" The results show that more than 95% agreed that all are categories were appropriate. A sample t test also shows that are all categories are statistically significant. In addition, the reliability analysis shows that Cronbach's Alpha of results for all categories is (α = 0.874), which means that the internal consistency of these results is high.

The statistical analysis of the proposed categories of iSFITG2 shows that all proposed categories are statistically significant for implementing successful ITG.

Suggestions for additional categories are shown in Table 5-2. Risk management and factors such as Benefits realization and risk optimization are the most frequent recommendations. Other suggestions are already covered by existing categories or factors with slightly different names. For example, Human Behaviour is covered by the existing Adequate ITG awareness and training factor in the Resource management category. The Competency effect is similarly covered by Adequate IT

skills & staff. Framework adoption is the same as Effective Current Enterprise Governance within the Organizational effect (internal) category. The status of these categories will be discussed in the Chapter 7.

Section 3: The proposed CSFs

The section asked one question for all CSFs: "Do you agree that each of the following is a Critical Success Factor (CSF) of IT Governance? "The results show that more than 86% agreed that adequate stakeholder involvement is an important CSF. More than 95% agreed that the others in the list were also CSFs. In addition, a sample t test shows that all CSFs are statistically significant. The reliability analysis shows that Cranach's Alpha of all CSF results is (α = 0. 883), which means that the internal consistency of these results is high.

The statistical results analysis of the proposed CSFs shows that all proposed CSFs are significantly important factors for implementing a successful ITG.

As shown in Table 5-4, the suggestions for additional CSFs are important and has been recommended by many experts more than one time as shown in frequency column.

Section 4: Proposed relationships between the categories and CSFs

This section asked one question for all categories: "Do you agree that each of the following CSFs belongs to this Category?" Firstly, the reliability analysis shows that Cranach's Alpha of all relationship results is (α= 0.874), which means that the internal consistency of all results is high. Each category will be discussed separately.

Strategic alignment (SA) category

Six CSFs are proposed for the SA category. More than 71% of respondents agreed that the adequate involvement (ASI) factor belongs to the SA category. However, although the sample t test showed that that this was statistically significant for ITG implementation, the sample t test on the relationships between CSFs and categories shows that the ASI factor was not statistically significant in relation to SA. More than 97% agreed that all others CSFs (Adequate management support and ownership, Effective alignment and communication between IT and business strategy, Definition of IT Strategy in business strategy, responsibility of BoDs on IT decisions and Effective communication between IT and business management) belong to the SA category and all are statistically significant with regard to SA, based on the sample t test.

Environmental effect (external) (EE) category

One CSF was proposed for the EE category. More than 99% of respondents agreed that the Regulatory environment & compliance requirements (RECR) factor belongs to EE. The sample t test shows that RECR is statistically significant in relation to EE.

Organizational effect (internal) (OE) category

Five CSFs were proposed for the OE category: Effective current Corporate Governance; Clear ITG policies, principles & responsibilities; Clear IT strategy, principles & policies; appropriate organizational culture; and Good change management strategy. More than 99% of respondents agreed that all proposed factors were related to OE. In addition, the sample t test shows that all these factors are statistically significant in relation to OE.

Performance management (PM) category

Three CSFs were proposed for the PM category. More than 69% of respondents agreed that the Good project management methodology (GPMM) factor belongs to PM. However, although the sample t test on the importance of GPMM shows that it is a statistically significant factor for ITG implementation, the sample t test on the relationships between CSFs and categories shows that GPMM is not statistically significant with regard to PM. On the other hand, more than 78% agreed that the other two CSFs (Adequate analysis, evaluation of the current and future use of IT and Effective performance management strategy) belong to PM and all were statistically significant with regard to PM based on the sample t test.

Resource management (RM) category

Three CSFs were proposed for the RM category: Sufficient financial support; Adequate IT skills & staff; and Adequate IT Governance awareness and training. More than 80% agreed that all proposed factors belong to RM. The sample t test also shows that all these factors are statistically significant with regard to RM.

Table 5-10 shows the recommended changes to the relationship between the proposed categories and CSFs. Adequate and relevant technology is suggested as a factor by one participant. Another participant suggests that Project management (PM) is not properly part of Performance management. Another interesting comment was made about the broken link between performance management systems and enterprise business technology reporting, although this is mostly covered by the Effective alignment and communication between IT and business strategy factor. The final recommendation here was to place the Effective performance strategy factor in the OE category.

5.2.2. Cultural expert review

Section 1: Demographic questions

This section of the questionnaire collected demographic information about the participants. The targeted participants in this survey were experts who worked in Saudi Arabia either in IT or ITG. Figure 5-4 shows that 96.4% of the participants worked in Saudi Arabia and over 81% have three or more years IT or ITG experience (see Figure 5-5), although ITG experience is rare in Saudi Arabia as ITG has not yet been adopted by many Saudi organizations and companies. This strengthens the reliability and quality of the results. Furthermore, over 92% of those participants are directors, managers and professionals who are the most closely involved in ITG processes and its implementation. This also has a positive impact on the results. For more details about demographic information, see Chapter 5.

Section 2: The proposed categories

Section 2 of the questionnaire asked one question for all categories: "To what extent do you agree that each of the following is an appropriate category of CSFs of IT Governance?" More than 79% of participants agreed that Risk management (RM) is an important category and more than 95% agreed that SA, OE and PM are appropriate categories. In addition, a sample t test shows that are all categories are statistically significant. However, although more than 58% agreed that EE and RKM are appropriate categories, the sample t test shows that these proposed categories are not statistically significant for implementing successful ITG in Saudi Arabia.

Finally, the reliability analysis shows that Cronbach's Alpha of results for all categories is (α = 0.909), which means that the internal consistency of these results is high.

Recommendations for additional categories were put forward, as shown in Table 5-12. However, most of these suggestions were either covered by other categories or factors with slightly different names. For example, Culture and Change management are both covered by the OE category. The Value delivery, something related to ROI or Business Value and the Maturity of understanding of the high management regarding ITG factors are also covered by the PM category. Other important suggestions, which are not covered by any current categories or factors, are Best practices, Outsourcing management, Maintenance, and Processes quality.

Section 3: The proposed CSFs

Section 3 of the questionnaire asked one question for all CSFs: "Do you agree that each of the following is a Critical Success Factor (CSF) of IT Governance?" More than 70% of respondents agreed that appropriate organizational culture and Good organization change strategy factors were

important CSFs and more than 95% agreed on the other factors. In addition, the sample t test shows that all CSFs are statistically significant. The reliability analysis shows that Cronbach's Alpha of all CSF results is (α = 0. 981), which means that the internal consistency of these results is high. The statistical results analysis of the proposed CSFs shows that all proposed CSFs are significantly important factors for implementing a successful ITG in Saudi Arabia.

The participants recommended adding important factors such as IT manager should be effective member within BoDs, the definition of regulatory requirements, and the integration between these frameworks are important and good information security strategy.

Suggestions put forward for additional CSFs are partly covered by existing categories or factors with slightly different names. For example, Adopting ITG as a continuous practice, is partially covered by the Effective performance management strategy and adequate analysis, evaluation of the current and future use of IT factors. Another suggestion, Proactive Environment, is partially covered by the existing EE category.

Section 4: Proposed relationships between the categories and CSFs

Section 4 of the questionnaire asked one question for all categories: "Do you agree that each of the following CSFs belongs to this Category?" Firstly, the reliability analysis shows that Cronbach's Alpha of all relationship results is (α= 0. 948), which means that the internal consistency of all results is high. Each category will be discussed separately.

Strategic alignment (SA) category

Six CSFs are proposed in the SA category: Adequate stakeholder involvement; Adequate top management support and ownership; Effective alignment between IT and business strategy; Definition of IT Strategy in business strategy, responsibility of BoDs on IT decisions and Effective communication between IT and top management. More than 96% of participants agreed that all these CSFs belong to SA. All are statistically significant with regard to SA, based on the sample t test.

Environmental effect (external) (EE) category

One CSF is proposed for the EE category. More than 98% agreed that the Regulatory environment and compliance requirements (RECR) factor belongs to the EE category. The sample t test also shows that the RECR factor is statistically significant with regard to the EE category.

Organizational effect (internal) (OE) category

Five CSFs are proposed for the OE category. More than 96% respondents agreed that Effective current Corporate Governance; Clear ITG policies, principles & responsibilities; Clear IT strategy, principles & policies; and appropriate organizational culture belong to the OE category, while 72% agreed that the Good change management strategy factor belongs to OE. In addition, the sample t test shows that all these factors are statistically significant with regard to OE.

Performance management (PM) category

Four CSFs are proposed for the PM category. More than 69% of respondents agreed that the adequate analysis, evaluation of the current and future use of IT (AAEIT) factor belongs to PM. More than 94% agreed that the other CSFs (Good project management methodology and Effective performance management strategy) also belong to PM. With the exception of the AAEIT factor, all are statistically significant with regard to PM, based on the sample t test.

Resource management (RM) category

Four CSFs are proposed for the RM category: Sufficient financial support; Adequate IT skills & staff; Adequate IT Governance awareness and training; and Adequate & relevant Technology and Infrastructure. More than 96% of respondents agreed that all proposed factors belong to the RM category. In addition, the sample t test shows that all these factors are statistically significant with regard to RM.

Risk management (RKM) category

Four CSFs are proposed for the RKM category: Clear risk management strategy; Leadership and commitment of top management to the adoption of risk management strategy; IT Risk is accessed and managed; and Business Risk is assessed and managed. More than 96% agreed that all proposed factors belong to RKM. In addition, the sample t test shows that all these factors are statistically significant with regard to RKM.

5.3. Discussion of the Exploratory Study

This chapter discusses the results and analysis of the exploratory study and looks at how they affect the main thesis. As explained in Chapter 4, with regard to the triangulation technique (see Figure 4.1), the initial data for the proposed framework was gathered from the literature review. An exploratory study was then conducted by carrying out two surveys: a global ITG expert survey and a culture expert survey. This chapter looks at each section of the questionnaire. For each section, a brief comparison is made between results from the three reviews (literature, global experts and cultural experts).

A number of the proposed categories and CSFs in our framework for ITG have been clearly identified in numerous studies and in existing frameworks and standards. In this chapter, we refer to such categories and CSFs as being "always" identified in the literature. Others have been clearly identified in a few studies or referred to ambiguously in research. We refer to such categories and CSFs as being "often" identified in the literature. Others are rarely mentioned in the research; we refer to such categories and CSFs as being "rarely" identified in the literature.

This exploratory study aims to confirm the proposed framework and to highlight any missing elements or any elements that should be excluded. As the targeted respondents of the exploratory study are experts, most of their recommendations and comments were considered for inclusion in the framework. Most of the global ITG experts' recommendations were covered before the cultural review; others are discussed in this chapter.

The following sections explore the results of the triangulation technique for the proposed framework.

5.3.1. Section 1: Demographic Information

The global review was based on expert responses from more than seven countries around the world, whereas the cultural review sought responses only from those working in Saudi Arabia, the country which is the context of this research. Over 83% of the global experts had three or more years ITG experience, and over 81% of the cultural experts had three or more years IT experience, either in ITG or other related fields. The majority of the global experts who responded to the survey were professionals, directors and managers. A similar profile applied to the cultural experts. The experience and job profile of the participants in both reviews is an additional success factor for the study.

5.3.2. Section 2: The proposed categories

Comments and recommendations relating to framework categories will be discussed first. The results are summarized in Table 5-21.

1- ***Risk management (RKM):*** This category was suggested by global ITG experts. They suggested other related factors that could be placed in this category. This category was therefore included in the questionnaire for the cultural expert survey. RKM has been considered as a main outcome of ITG in many studies and frameworks. It is included as a sub-section within COBIT.

2- ***Framework/Best Practice/Strategy Adoption:*** This was suggested as a new category by both reviews, which underlines its importance. It is, therefore, added to the proposed framework. All related factors about adopting frameworks, standards, best practice or strategies will be included within this category. Examples include Adoption of project management methodology, and Performance and Change management strategies. This category was named the Framework/strategy adoption (FSA) category.

3- ***Performance management (PM):*** This category was associated with four CSFs. Three of these (GPMM, CDIV and AAEIT) will be moved to different categories, as the exploratory study did not confirm their position under PM. The fourth CSF, EPMS, will be moved to the new FSA category as all such factors have been moved to this category. Accordingly, the PM category will be removed from SFITG.

Table 5-21 summarizes the above comments and the two reviews. The confirmed status means that this category is confirmed as a main category of the SFITG framework. Note that the letter R for recommended in the Global and/or Cultural review columns indicates that this category is a new recommended category, confirmed by one or both groups of experts.

Table 5-21: Categories Comparison

Category	Literature Review	Global review	Cultural Review	Status
Strategic alignment (SA)	Always	Yes, 95%	Yes, 95%	Confirmed
External Environmental effect (EE)	Always	Yes, 95%	No, 58%	Confirmed
Internal Organizational effect (OE)	Often	Yes, 95%	Yes, 95%	Confirmed
Performance management (PM)	Rarely	Yes, 95%	Yes, 95%	Removed
Resource Management (RM)	Often	Yes, 95%	Yes, 79%	Confirmed
Risk Management (RKM)	Often	R	No, 58%	Confirmed
Framework/ Strategy Adoption (FSA)	Often	R	R	New

*** Yes: Significantly related, No: Not significantly related, R: Recommended**

As can be seen, the SA, OE and RM categories are always or often recommended, or mentioned in the related literature. Sample t tests also show that they are statistically significant, both globally and culturally, with the agreement of more than 95% of the participants in both reviews. As a result, all these categories are confirmed as important and appropriate categories for successful implementation of ITG.

Although the sample t test on the cultural review shows that the EE and RKM categories are not statistically significant, EM is always mentioned in the related literature and RKM is often mentioned. These categories are also statistically significant for the global experts: 95% (EE) and 80% (RKM). Moreover, all the factors in these categories are statistically significant, both globally (95%) and culturally (75%). Hence, the RKM category is confirmed for use in the framework.

The PM category is rarely mentioned in the related literature. The sample t test shows that it is statistically significant and has the agreement of more than 95% of the global participants. However, as mentioned above, all the factors in this category have been moved to different categories. The category has therefore been removed from the framework.

The FSA category is a new category, recommended by both global and cultural participants, and it is often mentioned in the literature. This category will go through to a confirmation process at the beginning of the next stage.

5.3.3. Section 3: Proposed CSFs

The comments and recommendations related to CSFs will be discussed first. The results of are summarized in Table 5-22. A confirmed status means that a factor is confirmed as a CSF for the SFITG framework. A recommended status means that a factor is a new recommended CSF that has been confirmed as it was suggested by one or both sets of experts.

1- ***Risk management (RM):*** The global review, supported by the literature, suggested four main CSFs in the RM category: Clear risk management strategy; Leadership and commitment of top management to the adoption of risk management strategy; Information Security Strategy, IT Risk is accessed and managed; and Business Risk is assessed and managed.
2- ***IT manager is effective member of board of directors:*** This very important factor was suggested in the cultural review.
3- ***Compliance:*** Global experts have suggested this as a new category. There are, in fact, two main aspects to compliance: external and internal. External compliance is already covered in the EE category; internal compliance will be included as a factor in the OE category. The

definition of the regulatory requirements is important start to achieve the required compliance.

4- ***ITG & IT Frameworks Adoption:*** These two factors are part of the new Frameworks/strategy adoption (FSA) category and were suggested in both reviews.

5- ***Outsourcing and Quality:*** These factors were suggested by both the cultural and global experts. As this research is concerned with the CSFs for ITG implementation and not the detailed process of the implementation, the adoption of both factors was considered from a strategic perspective only. These factors are included in the new FSA category.

6- ***IT Governance awareness:*** This very important factor was suggested in the cultural review.

7- ***Competitive advantage & proactive environment***: These factors were suggested by the cultural experts. The adoption of both factors was considered from a strategic perspective only. They are included in the EE category as this category aims to gain the competitive advantage over external competitors by enabling the organization to be proactive in relation to the environment and new technologies.

Table 5-22: CSFs Comparison

CSF No	CSFs	LR	GR	CR	Status	Level
1	Adequate stakeholder involvement	Always	Yes, 86%	Yes, 95%	Confirmed	High
2	Adequate top management support and ownership	Always	Yes, 95%	Yes, 95%	Confirmed	High
3	Effective alignment between IT and business strategy	Always	Yes, 95%	Yes, 95%	Confirmed	High
4	Effective communication between IT and top management	Often	Yes, 95%	Yes, 95%	Confirmed	High
5	Good Compliance with the Regulatory requirements	Always	Yes, 95%	Yes, 95%	Confirmed	High
6	Clear ITG policies, principles & responsibilities	Always	Yes, 95%	Yes, 95%	Confirmed	High
7	Effective current Enterprise Governance	Rare	Yes, 95%	Yes, 95%	Confirmed	High
8	Appropriate organizational	Rare	Yes,	Yes,	Confirmed	Low

	culture		95%	70%		
9	Clear IT strategy, principles & policies	Often	Yes, 95%	Yes, 95%	Confirmed	High
10	Good organization change strategy	Rare	Yes, 95%	Yes, 70%	Confirmed	Low
11	Adequate analysis, evaluation of the current and future use of IT	Rare	Yes, 95%	Yes, 95%	Confirmed	Med
12	Good project management methodology	Rare	Yes, 95%	Yes, 95%	Confirmed	Med
13	Effective performance management strategy	Rare	Yes, 95%	Yes, 95%	Confirmed	Med
14	Sufficient financial support	Rare	Yes, 95%	Yes, 95%	Confirmed	Med
15	Adequate IT skills & Competencies	Often	Yes, 95%	Yes, 95%	Confirmed	High
16	Clear Definition of IT Strategy in business strategy	Always	R	Yes, 95%	Confirmed	High
17	Comprehensive responsibility of BODs of IT Decisions	Often	R	Yes, 95%	Confirmed	High
18	Adequate and relevant Technology & Infrastructure	Rare	R	Yes, 95%	Confirmed	Med
19	Clear Risk Management Strategy	Always	R	Yes, 95%	Confirmed	High
20	Leadership and commitment of top management to the adoption of risk management strategy	Rare	R	Yes, 95%	Confirmed	Med
21	IT Risk is accessed and managed	Always	R	Yes, 95%	Confirmed	High
22	Business Risk is assessed and managed	Rare	R	Yes, 95%	Confirmed	Med
23	Effective Information Security Strategy	Always	R	R	Confirmed	High
24	IT manager is effective member	Always	R	R	New	High

	of top management/ board of directors					
25	A competitive advantage strategy is defined and followed	Always	R	R	New	High
26	Adequate IT Governance awareness and training	Often	R	R	New	High
27	Effective IT Management Standards/ Frameworks	Often	R	R	New	Med
28	Business and IT projects and investments are compliance with internal laws and regulations	Always	R	R	New	High
29	Effective ITG Standard/ Frameworks are adopted and followed	Always	R	R	New	High
30	Effective IT Outsourcing strategy is defined and followed	Always	R	R	New	High
31	Effective Quality Management strategy	Rare	R	R	New	Med
32	A clear definition of Regulatory requirements	Rare	R	R	New	Med

*** Yes**: Significantly related**, No:** Not significantly related**, R:** Recommended**, LR:** Literature Review, **GR**: Global Review, **CL**: Cultural Review, **Med**: Medium

As can be seen in Table 5-22, all the reviewed CSFs are either statistically significant factors, globally and culturally, with the agreement of over 95% of the participant experts or they are recommended by many global experts. As a result, all these CFSs are confirmed to be CSFs for ITG implementation in Saudi Arabia.

In addition, the rest of the proposed CSFs are always recommended in the literature and by both groups of experts. These CSFs will go through to a confirmation process at the beginning of the next stage.

5.3.4. Section 4: Proposed relationships between categories and CSFs

Here we discuss the proposed relationships between the different categories and CSFs. Each category will be discussed separately and the results are shown in the following tables. A confirmed status means that this factor is confirmed to belong to this category. A new or recommended status means that this factor is recommended to be included in this category and is confirmed as it has

been suggested by one or both groups of experts. A moved status indicates that the factor has been moved from one category to another category and that this move is confirmed.

Strategic alignment (SA) category

Table 5-23: SA Comparison

CSF no	CSFs	LR	GR	CR	Status
1	Adequate stakeholder involvement (ASI)	Rare	No, 71%	Yes, 96%	Confirmed
2	Adequate top management support and ownership	Always	Yes, 97%	Yes, 96%	Confirmed
3	Effective alignment between IT and business strategy	Always	Yes, 97%	Yes, 96%	Confirmed
4	Effective communication between IT and top management	Always	Yes, 97%	Yes, 96%	Confirmed
5	Clear Definition of IT Strategy in organization strategy	Always	R	Yes, 95%	Confirmed
6	IT manager is effective member of top management/ board of directors (ITMTM)	Always	R	R	New
7	Comprehensive responsibility of BODs of IT Decisions	Often	-	R	new

*** Yes:** Significantly related**, No:** Not significantly related**, R:** Recommended **LR:** Literature Review, **GR**: Global Review, **CL**: Cultural Review

Table 5-23 shows that, with the exception of ASI, all CSFs are always mentioned in the literature review in the SA category. The sample t test shows that they are statistically significant in relation to the SA category, with the agreement of more than 96% of the participants. As a result, these factors are confirmed as belonging under SA. In contrast, ASI is rarely mentioned in the literature as belonging to SA. It was not shown to have a statistically significant relationship with SA globally. However, the sample t test for the cultural review shows that ASI is statistically significant with regard to SA, with the agreement of 96% of participants. Accordingly, this factor is confirmed as part of the SA category as it has been shown to be important, based on the cultural experts' review. ITMTM is a new recommended factor. Since this factor influences IT and business at the same time, the factor will be placed in the SA category.

Environmental effect (external) (EE) category

Table 5-24: EEC Comparison

CSF no	CSF	LR	GR	CR	Status
1	Good Compliance with the Regulatory requirements	Always	Yes, 99%	Yes, 98%	Confirmed
2	A competitive advantage strategy is defined and followed	Often	R	R	New
3	A clear definition of Regulatory requirements	Rare	R	R	New

*** Yes:** Significantly related**, No:** Not significantly related**, R:** Recommended **LR:** Literature Review, **GR**: Global Review, **CL**: Cultural Review

As shown in Table 7–4, it is clear that the Regulatory environment & compliance requirement factor is always placed under EE. A sample t test shows that it has a statistically significant relationship with EE, both globally and culturally, with the agreement of more than 98% of the participants in both reviews. Accordingly, it is confirmed to be under EE. As discussed above, the competitive advantage will be found under EE as this category aims to give the competitive advantage over external competitors by being proactive in relation to the environment and new technologies.

Organizational effect (internal) (OE) category

Table 5-25: OEC Comparison

CSF no	CSFs	LR	GR	CR	Status
1	Clear ITG policies, principles & responsibilities	Often	Yes, 99%	Yes, 96%	Confirmed
2	Clear IT strategy, principles & policies	Rare	Yes, 99%	Yes, 96%	Confirmed
3	Appropriate organizational culture	Always	Yes, 99%	Yes, 96%	Confirmed
4	Adequate analysis, evaluation of the current and future use of IT (AAEITF)	Often	Yes, 78%	No, 69%	Moved

*** Yes:** Significantly related**, No:** Not significantly related**, R:** Recommended **LR:** Literature Review, **GR**: Global Review, **CL**: Cultural Review

Although there are differences as to whether the proposed CSFs belong in the OE category in terms of the literature review, as shown in Table 5-25, all CSFs are statistically significant with regard to OE, both globally and culturally, based on the sample t test, with the agreement of more than 96% of the participants in both reviews. Accordingly, these CFSs are confirmed to be under OE. AAEIT is a confirmed CSF but it is recommended that it be moved from the PM to the OE category as the adequate analysis and evaluation of IT should be done periodically and that cannot be achieved without proper organizational culture.

Resource management (RM) category

Table 5-26: RM Comparison

CSF no	CSFs	LR	GR	CR	Status
1	Sufficient financial support	Rare	Yes, 80%	Yes, 96%	Confirmed
2	Adequate IT skills & competencies	Always	Yes, 80%	Yes, 96%	Confirmed
3	Adequate IT Governance awareness and training	Rare	Yes‘ 80%	Yes, 96%	Confirmed
4	Adequate & relevant Technology and Infrastructure	Often	R	Yes, 96%	Confirmed

*** Yes:** Significantly related**, No:** Not significantly related**, R:** Recommended **LR:** Literature Review, **GR**: Global Review, **CL**: Cultural Review

Although there some differences in the literature review as to whether the proposed CSFs belong to the RM category, as shown in Table 5-26, all the proposed CSFs are statistically significant with regard to RM, both globally and culturally, based on the sample t test, with the agreement of more than 80% of the participants in both reviews. Accordingly, these factors are confirmed as belonging under RM.

Risk management (RKM) category

Table 5-27: RKMC Comparison

CSF No	CSFs	RV	GR	CR	Status
1	Clear Risk Management Strategy	Often	R	Yes, 96%	Confirmed
2	Responsibility of BoDs to the risk management strategy	Rare	R	Yes, 96%	Confirmed
3	IT Risk is accessed and managed	Always	R	Yes, 96%	Confirmed
4	Business Risk is assessed and managed	Often	R	Yes, 96%	Confirmed
5	Effective Information Security Strategy	Always	R	R	Confirmed

*** Yes:** Significantly related**, No:** Not significantly related**, R:** Recommended **LR:** Literature Review, **GR**: Global Review, **CL**: Cultural Review

Although there some differences as to whether the proposed CSFs belong to the RKM category in the literature review, as shown in Table 5-27, all factors are recommended by the global experts. In addition, a sample t test on the cultural review results shows that all factors are statistically significant with regard to RKM, with the agreement of 96% of participants. Accordingly, these factors are confirmed to be under RKM.

Framework/strategy adoption (FSA) category

Table 5-28: ***FSA Comparison***

CSF No	CSFs	LR	GR	CR	Status
1	The adoption of Effective Corporate Governance Standards/ Frameworks	Often	R	R	Moved
2	The adoption of Effective ITG Standard/ Frameworks	Always	R	R	New
3	The adoption of Effective IT Standards/ Frameworks	Always	R	R	New
4	The adoption of Good change management strategy	Often	R	R	Moved
5	The adoption of Effective performance management strategy	Often	R	R	Moved
6	The adoption of Effective project management methodology	Often	R	R	Moved
7	The adoption of Effective Quality	Often	R	R	New

	Management strategy				
8	The adoption of Effective IT Outsourcing strategy	Often	R	R	New
9	Effective integration between these frameworks and strategies	Often	-	R	New

*** R:** Recommended **LR:** Literature Review, **GR**: Global Review, **CL**: Cultural Review

This is a new recommended category and all related CSFs are either new or have been moved from other categories. Both groups of experts have recommended all the new CSFs, which was the trigger to create the new category. All the CSFs that have been moved from other categories to FSA are strategies, frameworks or standards that should be adopted during the implementation of ITG. All these CSFs are always or often mentioned in the literature in the FSA category. These factors are confirmed as belonging to FSA as this was suggested by both groups of experts.

5.4. The solution framework (SFITG) after the conformation process

After the in-depth analysis of the exploratory study that was conducted through the two expert review stages and the discussion of the implications of these results, the new CSFs for ITG implementation (SFITG) are published in Table 5-29.

It can be seen that all categories are confirmed categories and will go through to the next phase with no changes. In the same way, all CSFs are confirmed factors.

Table 5-29: The Confirmed SFITG Framework

Cat No	Categories items	CSF no	CSFs items	Stat
1	Strategic alignment (SA) ***Confirmed***	1	Clear Definition of IT Strategy in organization strategy	Conf
		2	Effective alignment between IT and business strategy	Conf
		3	Comprehensive responsibility of BoDs of IT Decisions	Conf
		4	Adequate top management support and ownership	Conf
		5	IT manager is effective member of BODs (ITMTM)	Conf
		6	Effective communication between IT and BODs	Conf
		7	Adequate stakeholder involvement (ASI)	Conf
2	Framework/strategy adoption (FSA) ***Confirmed***	1	Effective Corporate Governance Stands & Strategy	Conf
		2	Effective ITG Standard/ Frameworks	Conf
		3	Effective IT Management Standards/ Frameworks	Conf
		4	Good change management strategy	Conf
		5	Effective performance management strategy	Conf
		6	Effective project management methodology	Conf
		7	Effective Quality Management strategy	Conf
		8	Effective IT Outsourcing strategy	Conf
		9	Effective integration between these frameworks	Conf
3	Environmental effect (external) (EE) ***Confirmed***	1	A clear definition of Regulatory requirements	Conf
		2	Good Compliance with the Regulatory requirements	Conf
		3	competitive advantage strategy is defined & followed	Conf
4	Organizational effect (internal) (OE) ***Confirmed***	1	Clear ITG policies, principles & responsibilities	Conf
		2	Clear IT strategy, principles & policies	Conf
		3	Appropriate organizational culture	Conf
		4	Adequate analysis & evaluation of IT (AAEITF)	Conf
5	Resource management (RM) ***Confirmed***	1	Sufficient financial support	Conf
		2	Adequate IT skills & competencies	Conf
		3	Adequate IT Governance awareness and training	Conf
		4	Adequate & relevant Technology and Infrastructure	Conf
6	Risk management (RKM) ***Confirmed***	1	Clear Risk Management Strategy	Conf
		2	Leadership and commitment of top management to the adoption of risk management strategy	Conf
		3	IT Risk is accessed and managed	Conf
		4	Business Risk is assessed and managed	Conf
		5	Effective Information Security Strategy	Conf
	Total CSFs	**6 Confirmed & Categories 32 Critical Success Factors**		

***Stat**: Status, **Conf**: Confirmed, **BoDs**: Board of Directors

Chapter 6: The validation Phase

After receiving and analysing the results of the experts' reviews, the framework was refactored, analysed and adjusted. The entire study design was revised to reflect the changes and produce the confirmed SFITG. Then, the confirmed SFITG framework and related research data were ready for publication and submission for the validation phases. The validation process went through many phases, from developing the instrument and preparing the case studies to conducting the studies and receiving the participants' evaluation.

To ensure that SFITG is applicable in the public sector in Saudi Arabia, it should be examined in the same context. Although it combines groups of factors that are considered important on both a global and cultural level, specifically in terms of the successful implementation of ITG, SFITG requires developments to create a more practical form that can be tested in the involved organisations. The best and most direct option is to improve SFITG as an instrument by assessing the success of ITG implementation, based on SFITG in the public sector in Saudi Arabia.

Consequently, the SFITG instrument should be tested in different public organisations in Saudi Arabia. To evaluate the SFITG instrument and procure the most accurate feedback, comprehensive case studies were carried out on five large public organisations in Saudi Arabia that have applied the instrument. The participants of the case studies were asked to share their opinion on the usability and quality of the instrument, and to describe the extent to which the results reflected the reality of the organisation. In turn, quantitative and qualitative studies were carried out to validate the SFITG framework. The main goal was to ensure the confirmed SFITG framework successfully applied to the public sector in Saudi Arabia. These studies were undertaken in two stages via case studies and collecting feedback on the SFITG instrument. Online questionnaires, structured interviews and focus groups were used to collect the data. In addition, the web-based SurveyGizmo tool was used to design, publish and organise the questionnaires and responses. As requested by the university, the studies were built on the respondents' anonymity. The Ethics Form *ERGO/FOPSE/8771* was completed, and a copy of the instrument and questionnaire are included in **Appendix A**. In addition, all respondents were asked to read and agree to a consent form before participating in the study.

6.1. Developing the SFITG instrument

This is the first phase of the validation of the SFITG framework. To validate the SFITG framework and make sure it applies on a practical level, a research instrument was developed. The research instrument, which was based on the confirmed SFITG framework, measured the success of ITG

implementation in the public sector in Saudi Arabia. Success can be differentiated from status in a number of ways. For one, success has to do with final outcomes, while status has to do with progress. Status refers to how much has been implemented, while success, in this framework, is about how well the implementation has helped the company perform. We will call this the SFITG instrument.

Since COBIT is the most used framework for ITG, a COBIT 5 Process Assessment Model (PAM) and ISO/IEC 15504-5:2012 IT Process Assessment Standard were followed to develop the measurement metrics for all factors (See Figure 4-5). The metrics in this model are as follows:

0: Non-existent

1: Initial

2: Repeatable

3: Defined

4: Managed

5: Optimised

However, after conducting the pilot, the participants described that "Repeatable" was not very clear, and they deemed it unnecessary. Therefore, all factors related to SFITG were measured based on these metrics, both with and without the "Repeatable" measure. Then, to enhance the readability of the answers, each answer was given an equivalent percentage that indicates the success status of that factor. It's clear that "Non-existent" equals zero and "Optimised" represents 100%, which makes the parameters between 25%, 50% and 75% when 100% is divided by 4.

So, the metrics used in SFITG instrument are as follows:

0: Non-existent = 0%

1: Initial = 25%

2: Defined = 50%

3: Managed = 75%

4: Optimised = 100%

To make the results more informative, and to offer recommendations to the organisations, the indication of the results will be shown as follows:

0: Non-existent = The process is not adopted or implemented at all, which indicates that there are "Severe Weakness Areas, severe issues [and that] serious and urgent action is needed."

1: Initial = The process is not implemented properly and/or fails to achieve its purpose. The informal and uncoordinated process indicates the presence of "Below-Average Areas, [and that] major and urgent improvement is needed."

2: Defined = The process is simply implemented, documented, communicated and achieves its intended purpose, which indicates that those areas are "Average Areas, [and that] medium improvement is needed."

3: Managed = The defined/performed process is implemented in a managed fashion (planned, monitored, measured and adjusted), which indicates that those areas are "Solid Areas…and minor improvement may be needed."

4: Optimized = The managed process is continuously improved and best practices are followed to meet current and projected business goals, which indicates that those areas are "Perfect Areas…and no action is needed."

These indications of the results were discussed and agreed upon in the piloting phase. See section 6.2: Piloting for more information.

In addition, the factors were adjusted to be more measurable and match the equivalent answers' metrics. Participants were asked about the success status of each factor in their organization and to choose one measure as an answer. All questions began as follows: "What do you think is the status of...?"

The web-based SurveyGizmo tool was used to design the instrument and to distribute and collect the responses in the online questionnaire. The validity and reliability of this tool can be measured scientifically. The following table depicts the SFITG instrument:

Table 6-1: SFITG instrument

Cat No	Category items	CSF No	CSF items	Instrumental Questions
1	Strategic alignment (SA)	1	Clear Definition of IT Strategy in the organization strategy	Defining **IT strategy** in your organization's business strategy?
		2	Effective alignment between IT and business strategy	T**he alignment** between IT strategy and your organisation's business strategy?

		3	Comprehensive responsibility of BODs of IT projects and decisions	**The responsibility** of board of directors for IT projects and decisions?
		4	Adequate top management support and ownership	**The support** and ownership of board of directors to IT projects and investments?
		5	IT manager is effective member of top management/ board of directors (ITMTM)	**The position and role** of IT manager within the board of directors?
		6	Effective communication between IT and top management	**The communication** between IT management and the board of directors?
		7	Adequate stakeholder involvement (ASI)	**The identification** and **involvement** of Stakeholders of IT's investments and decisions in IT strategy?
2	Framework/ strategy adoption (FSA)	1	Effective Corporate Governance Standards/ Frameworks	the adopted **Corporate Governance** standard or framework?
		2	Effective ITG Standard/ Frameworks	the adopted **IT Governance** standard or framework?
		3	Effective IT Standards/ Frameworks	the adopted **IT Management** standard or framework?
		4	Good change management strategy	the adopted **Change Management** strategy for IT projects and investments?
		5	Effective performance management strategy	the adopted **Performance Management** strategy in IT departments?

		6	Effective project management methodology	the adopted **Project Management** Methodology in IT departments?
		7	Effective Quality Management strategy	the adopted **Quality Management** strategy in IT departments?
		8	Effective IT Outsourcing strategy	the adopted **IT Outsourcing** strategy?
		9	Effective **integration** between these frameworks and strategies	the **integration** between these frameworks and strategies?
3	Environmental effect (external) (EE)	1	A clear definition of Regulatory requirements in IT Strategy	**The Definition of Regulatory Requirements** in IT strategy?
		2	Good Compliance with the Regulatory Requirements	The **Compliance** with the Regulatory Requirements?
		3	A competitive advantage strategy is defined and followed	The adopted **Competitive Strategy** in IT strategy?
4	Organizational effect (internal) (OE)	1	Clear ITG policies, principles & responsibilities	**IT Governance** policies, principles & responsibilities in the organization?
		2	Clear IT strategy, principles & policies	**IT** policies, principles & responsibilities in the organization?
		3	Appropriate organizational culture	**The Proper Organisational Culture** in IT departments in the organization?
		4	Adequate Analysis for current and future se of IT	**The analysis of current and future use of IT?**
5	Resource Management (RM)	1	Adequate Financial Support	The allocated **budget** for IT projects and investments?
		2	Adequate IT skills & competencies	The required **IT skills & competencies?**

		3	Adequate IT Governance awareness and training	IT Governance **awareness and training** in the organization
		4	Adequate & relevant Technology and Infrastructure	The required **Relevant Technology and Infrastructure** of IT?
6	Risk management (RKM)	1	Clear Risk Management Strategy	**The Risk Management Strategy** of IT and Business**?**
		2	Leadership and commitment of top management to the adoption of risk management strategy	**The lead** of board of directors to the risk management strategy?
		3	IT Risk is accessed and managed	**IT risks** in the organization?
		4	Business Risk is assessed and managed	**Business risks** in the organization?
		5	Effective Information Security Strategy	**Information Security Strategy**?

6.2. Piloting

Pilot research was conducted to shape the instrument appropriately before carrying out the case studies. The research was piloted on a small sample, similar to the main sample of the primary case study. It was conducted in two places, the King Abdulaziz City for Science and Technology (KACST) and the Planning and Technology General Directorate (PTD) at the Ministry of Education (MOE). Since they are Saudi, in the public sector and have implemented ITG, they are similar to the main study sample. This pilot research combined two research methods, quantitative research (by way of questionnaires) and qualitative research (in the form of focus groups and interviews). The instrument was confirmed after the pilot research and before the main study.

The pilot was conducted at KACST with Enterprise Project Management Office, which is the responsibility of the KACST governance. Currently, KACST is adopting the COBIT 5 framework, and they are in the initial phases of the implementation process. First, permission was granted by email from the director of the office. Then, other interviews were conducted to explain the research and

the instrument itself. The instrument, subsequently, was sent as an online questionnaire to 7 ITG specialists. However, these specialists couldn't complete the questionnaire in its entirety, as they had just started implementing ITG, and the data required more experienced respondents. They did, however, recommend that the SFITG instrument be used in the public sector in Saudi Arabia. The overall lack of ITG expertise, however, indicated that extra care should be taken while collecting data for the main case studies.

Next, pilot research was conducted in PTD, which is the responsibility of the MOE governance. They were experts on the implementation of ITG, and they provided good recommendations. Although they were pleased with the instrument, they suggested minor modifications. First, they suggested removing "Repeatable" from the answer metric; they mentioned that this response was simultaneously redundant and unclear. Also, they suggested adding percentages equivalent to the metric numbers, as shown in section 6.1. Ultimately, the instrument was deemed ready to be used in the main case studies. Similar to the results' indication of the categories' final score (as shown in the previous section), and by following PAM and ISO/IEC 15504-5:2012 metric indications, all parties involved reached a consensus – ITG experts included – regarding the scoring process:
Any score from 0% to 12%: **Severe Governance –** serious, timely action is needed.
Any score from 12.50% to 37%: **Below-Average Governance –** Major, timely improvements are needed.
Any score from 37.50% to 62%: **Average Governance –** Medium improvements are needed.
Any score from 62.50% to 87%: **Solid Governance –** Minor improvements are needed.
Any score from 87.50% to 100%: **Optimized Governance –** No action is needed.

6.3. Case Studies

After obtaining and analysing the results of the pilot, qualitative and quantitative studies were conducted using the SFITG instrument. The instrument was examined in public Saudi organisations that have fully or partially implemented ITG and have a governance office. Comprehensive case studies of five organisations were carried out using the SFITG instrument, with the purpose of measuring the extent to which these organisations' implementation of ITG has proven successful. Permission was obtained from all five organisations in advance, at which point a substantial effort was made to prepare for the study with the participants. Subsequently, the instrument was prepared and developed as a questionnaire that could be accessed both online and manually. Then, the case studies were carried out. After obtaining and analysing the results of these case studies,

quantitative and qualitative studies were conducted to complete the validation of the SFITG instrument.

6.3.1. Getting permission

The instrument was examined in Saudi Arabia, in public organisations with governance office that have fully or partially implemented ITG. Consequently, a sound effort was made to identify public organisations that met those requirements, and that were willing to participate in the case study. This process began before and continued after the pilot took place. Some organisations expressed their willingness to participate in the case study, but after the first meeting, it was clear that they had insufficient ITG practices. Others combined ITG and eGovernment. Moreover, some organisations agreed to give the instrument a try at first, yet they were unwilling to cooperate after the study began. Ultimately, after addressing these struggles, five organisations participated in the case studies.

The following organisations participated in the case studies: the Ministry of Education, the Ministry of Trading and Manufacturing, the Ministry of Health, the Ministry of Civil Services and the King Abdulaziz Medical City. Correspondingly, before conducting the main study, permission was requested of these organisations, at which point the communication started with either their governance office, IT management or CIO. The bureaucracy system of public organisations in Saudi Arabia made gaining permission a difficult and a lengthy process. That said, by forging a connection with the key employees in each organisation, we were able to begin the five case studies in a timely manner. A substantial effort was made to reach executives in governance, IT and other departments in order to begin the study. Unofficial meetings, emails and phone calls were the main channels we used to contact these executives. In some cases, the permission was granted immediately after the first communication, while at times, the involvement of other executives was required. Because of the confidentiality agreement between the researcher and the organisation, the differences between the participating organisations and their response processes cannot be revealed.

6.3.2. Developing the case study tool

As explained in the methodology chapter, the only possible way of gathering the necessary data from the five organisations was to get one accurate assessment of ITG. This was undertaken by the focus group, which was the best option given the circumstances. The main target of the focus group was to provide a single completed questionnaire on behalf of the organisation in question.

To ensure a clear and accurate assessment of the targeted organisations' success rates, a structured questionnaire was used to gather their responses. Consequently, the SFITG instrument

was converted by the SurveyGizmo software tool and by using the COBIT Maturity Model to develop the questionnaire.

The questionnaire featured a general explanation of the rating scales, or the following five assessment levels:

- **Level 0 – Non-existent Process**: The process is not adopted or implemented.
  This means it's a ***Severe Factor*** and its score is **0%.**
- **Level 1 – Initial/Incomplete Process**: The process is not implemented properly and/or fails to achieve its purpose. Consequently, the process is informal and uncoordinated.
  This means it is a ***Below-Average Factor*** and its score is **25%.**
- **Level 2 – Defined/Performed Process**: The process is implemented, documented, and communicated simply; it achieves its process purpose.
  This means it is an ***Average Factor*** and its score is **50%.**
- **Level 3 – Managed Process**: The defined/performed process is now implemented in a managed fashion (planned, monitored, measured and adjusted).
  This means it is a ***Solid Factor*** and its score is **75%.**
- **Level 4 – Optimized Process**: The managed process is continuously improved, and best practices are followed to meet current and projected business goals.
  This means it is a ***Perfect Factor*** and its score is **100%.**

To clarify the meaning of the answers and to procure more precise responses, some questions had additional scale levels. For example, "Define IT strategy in your organization's business strategy" featured the following implications:

- **Non-Existent Process:** (0%; Not defined at all).
- **Initial/Incomplete Process** (25%; Partially complete).
- **Defined/Performed Process** (50%; Half complete).
- **Managed Process** (75%; Almost complete).
- **Optimized Process** (100%; Fully complete).

In turn, "the alignment between IT strategy and your organisation's business strategy" featured the following level implications:

- **Non-Existent Process** (0%; No alignment whatsoever).
- **Initial/Incomplete Process** (25%; Partial alignment).
- **Defined/Performed Process** (50%; Half alignment).
- **Managed Process** (75%; Almost full alignment).
- **Optimized Process** (100%; Full alignment).

These additional implications are shown in the questionnaire model in Appendix *F*: Case Study Questionnaire.
Next, the focus group participants were interviewed to provide a clear view of the study (and, more specifically, of their roles). The sample consisted of 4 to 12 participants from different levels and departments (executives, governance officers, IT managers, etc.).

Finally, the focus group interview was conducted in each organisation to record an accurate answer for all factors.
This method allowed participants to feel much more comfortable about the confidential nature of the study, and thus, they answered the questionnaire accurately.

Next, the weighting of the categories and factors took place, and scores were calculated for each factor, category and the full framework. The results will be shown in radar charts.

6.3.3. Case study installation

The SFITG instrument was applied in five case studies. Due to the confidentiality agreement, the results were assigned to the case study number rather than to the name of the organisation.
After conducting the focus group sessions and procuring the questionnaire results, the assessment of IT Governance (ITG) in the participating organizations took place (shown below).
As in the framework and the questionnaire, this study covered six main categories of ITG (Strategic Alignment, Frameworks and Strategies, Environmental Effect, Organisational Effect, Resource Management and Risk Management), and under each category were Critical Success Factors (CSFs) represented by the questions.
In this chapter, the assessment of the CSFs in each category will be presented first, followed by the assessment of the main categories.
Each organisation filled out one questionnaire and provided a single accurate answer for each question.
To enhance the readability of the assessment results, each part will be displayed in two charts – radar and bar charts – with the same data. The radar charts are presented in the main report, while the bar charts are in appendices G, H, I and J. Then, a brief translation of the charts and numbers will be presented, at which point feedback on each question will be presented as well. Finally, the participants' opinions of the whole instrument will be documented.

6.3.3.1. Calculating the final scores

Two calculations were completed after determining the scores of the factors (the category scores before weighting) and the whole ITG score. These will be explained in the following sections.

Calculating the Category Scores Before Weighting

After determining the score of each factor, the score of each category was calculated before weighting that category within the whole framework. This was done by collecting the scores of the factors (F) in each category and dividing the total by the number of factors in that category:

Strategic Alignment (SA) weight = (F1 score +…+ F7 score) / No. of factors in SA (7)

Frameworks & Strategies (FSA) weight: (F1 score + … + F9 score) / No. of factors (9)

Environmental Effect (EE) weight: (F1 score + F2 score + F2 score) / No. of factors (3)

Organizational Effect (OE) weight: (F1 score + … + F4 score) / No. of the factors (4)

Resource Management (RM) weight: (F1 score + … + F4 score) / No. of the factors (4)

Risk Management (RKM) weight: (F1 score + … + F5 score) / No. of the factors (5)

Any score from 0% to 12% is a ***Severe Category***.

Any score from 12.50% to 37% is a ***Below-Average Category***.

Any score from 37.50% to 62% is an ***Average Category***.

Any score from 62.50% to 87% is a ***Solid Category***.

Any score from 87.50% to 100% is a ***Severe Category***.

Calculating the Whole ITG Score

After determining the scores of the categories within each organisation, simple calculations were carried out to identify the final weight of ITG (again, for each organization). In doing so, the following steps were taken:

1- First, the weight of each factor was calculated. This was done by dividing 100 by the No. of factors in all categories:

The factor weight = 100/ (No. of the factors in all categories: 7+9+3+4+4+5) = 100/ 32 = **3.125**

2- Then, the full weight of each category was calculated:

Full Category weight = Factor weight (3.125) * No. of factors in each category.

Full Strategic Alignment (SA) weight = 3.125 * No. of factors (7) = **21.875%**

Full Frameworks & Strategies (FSA) weight: 3.125 * No. of factors (9) = **28.125%**

Full Environmental effect (EE) weight: 3.125 * No. of factors (3) = **9.375%**

Full Organizational effect (OE) weight: 3.125 * No. of factors (4) = **12.5%**

Full Resource Management (RM) weight: 3.125 * No. of factors (4) = **12.5%**

Full Risk Management (RKM) weight: 3.125 * No. of factors (5) = **15.625%**

3- After that, the weight of each category in the organisation was calculated. This consisted of multiplying the full category weight by the final score of that category, and then dividing that figure by 100:

SA weight in organization X= Category Weight (21.875) * SA final score in Organization X

4- Finally, the total score of the ITG in Organization X is the total of all categories' weight in the organisation:

ITG Final Score in Organisation X = SA weight in organisation X + FSA weight in organisation X + EE weight in organisation X + OE weight in organisation X + RM weight in organisation X + RKM weight in organisation X

6.3.3.2. Case Study Description & Structure

In the first stage of each case study, participants were asked to choose between 0-100% for each question.

Then, in the second stage, the results file was submitted and discussed with the main participants. The file contains radar and bar charts, and it shows the scores of the factors in each category. After each category, participants were asked, **"To what extent do you agree that these results reflect the actual status of 'Category X' in your organisation?"** In addition, another radar chart was presented, showing the scores of all categories. At the end of that file, the final score of ITG in the organisation was presented. Following the final score, the participants were asked two questions: **"To what extent do you agree that these results reflect the actual status of ITG in your organization?"** and **"To what extent do you agree that SFITG is a good instrument for measuring ITG in the public sectors in Saudi Arabia?"** The assessment results report, which was shown to the participants in the last case study, is located in Appendix K: A results report of the assessments of case stud's actual status, or on the extent to which participants believed the results reflected the current level of success of that category or ITG in their organisation. This was explained clearly to all participants.

In the case studies chapter, each case study covered the organisation, the results of the case study, the analysis and discussion of the study, and ultimately, a summary.

The results section presented a table summarising the results of all case study components, including the factor scores, category scores, whole ITG score and the participants' responses to all questions. This table refers to the SFITG instrument, adding the scores of the categories, CSFs and the whole ITG.

In the analysis section, the radar charts of the categories were depicted exactly as shown for the participants, with brief interpretations of the charts included. The feedback analysis of all questions was shown afterward.

The implications of the results and the analysis will be shown in the last section of the chapter, the discussion section.

The radar and bar charts of the factors, the participants' comments, the calculation of the categories and the ITG scores are located in appendices F to J, exactly as shown for the participants, with a brief interpretation of these charts.

6.4. The First Case study

It's has been applied in the largest public sector in Saudi Arabia with over 513,569 employees. The governance office was established 2 years ago, while ITG has just implemented 6 months before the start of the case study. The office is operated by IT and governance experts. The manager of this office is one of the VPs in this organization.

6.4.1. The results of the first case study

In this section, the results of the case studies are presented in SFITG instrument as in Table 6-2.

Table 6-2: The results of the first case study

Cat No	Categories items	CSF no	CSFs items	CSF Score
1	Strategic alignment (SA) Score: **82.14%** Response: ***Strongly Agree***	1	The Definition of IT strategy in the organization's business strategy?	75%
		2	The alignment between IT strategy and the organization's business strategy?	75%
		3	The support of board of directors to IT projects and investments?	75%
		4	The responsibility of board of directors for IT projects and decisions?	100%
		5	The position and role of IT manager within the board of directors?	100%
		6	The communication between IT management and the board of directors?	75%
		7	The identification and involvement of Stakeholders of IT's investments and decisions in IT strategy?	75%
2	Framework and Strategy adoption (FSA) Score: **41.6%** Response: ***Strongly Agree***	1	The Adopted Corporate Governance Standards or Frameworks?	25%
		2	The Adopted IT Governance Standard or Framework?	50%
		3	The Adopted IT Management standard or framework?	25%
		4	The Adopted Change Management Strategy?	50%
		5	The Adopted Performance Management Strategy?	50%
		6	The Adopted Project Management Methodology?	75%
		7	The Adopted Quality Management Strategy?	25%
		8	The Adopted IT Outsourcing Strategy?	25%

		9	The integration between these strategies and frameworks?	50%
3	Environmental effect (external) (EE) Score: **58.33%** Response: ***Strongly Agree***	1	The Definition of Regulatory Environment & Requirements in IT strategy?	75%
		2	The Compliance of Regulatory Environment & Requirements?	50%
		3	The adopted Competitive Strategy?	50%
4	Organizational effect (internal) (OE) Score: **62.5%** Response: ***Strongly Agree***	1	Proper Organizational Culture in IT Departments?	75%
		2	IT Governance policies, principles & responsibilities?	50%
		3	IT policies, principles and responsibilities?	75%
		4	The analysis and evaluation of the current and future use of IT?	50%
5	Resource management (RM) Score: **62.5%** Response: ***Agree***	1	The allocated budget for IT projects and investments?	75%
		2	The required IT skills and competencies?	50%
		3	The required Relevant Technology and Infrastructure of IT?	75%
		4	IT Governance awareness and training?	50%
6	Risk management (RKM) Score: **55%** Response: ***Agree***	1	Risk Management Strategy of IT and business?	50%
		2	The lead of board of directors to the risk management strategy?	50%
		3	Business risk management?	50%
		4	IT risk is management?	50%
		5	Information Security standards and policies?	75%
The Final Score			**59.37%** Response: **Agree**	

6.4.2. The analysis of the first case study

A. Factors analysis

Table 6-3: The factors analysis of the first case study

CSF status	CSF's Category	CSF No	CSF name
Perfect Factors (100%)	SA	1	The responsibility of BODs for IT projects and decisions
		2	The position and role of IT manager within the BODs
Solid Factors (75%)	SA	1	The definition of IT strategy in the organization's strategy
		2	The alignment between IT strategy & organization's strategy
		3	The support of board of directors to IT projects and investments.
		4	The communication between IT management and the board of directors
		5	The identification and involvement of Stakeholders
	FSA	6	The Adopted Project Management Methodology
	EE	7	The Definition of Regulatory Environment & Requirements in IT strategy
	OE	8	Proper Organizational Culture in IT Departments
		9	IT policies, principles and responsibilities
	RM	10	The allocated budget for IT projects and investments
		11	The required Relevant Technology and Infrastructure of IT
	RKM	12	Information Security standards and policies
Average Factors (50%)	FSA	1	The Adopted IT Governance Standard or Framework.
		2	The Adopted Performance Management Strategy.
		3	The integration between these strategies and frameworks
		4	The Adopted Change Management Strategy
	EE	5	The Compliance of Regulatory Environment & Requirements.
		6	The adopted Competitive Strategy
	OE	7	IT Governance policies, principles & responsibilities
		8	The analysis and evaluation of the current and future use of IT
	RM	9	The required IT skills and competencies
		10	IT Governance awareness and training
	RKM	11	Risk Management Strategy of IT and business
		12	The lead of board of directors to the risk management strategy
		13	Business risk management.
		14	IT risk is management
Below-Average Factors (25%)	FSA	1	The Adopted IT Management standard or framework
		2	The Adopted Corporate Governance
		3	The Adopted IT Outsourcing Strategy
		4	The Adopted Quality Management Strategy

B. Categories Analysis

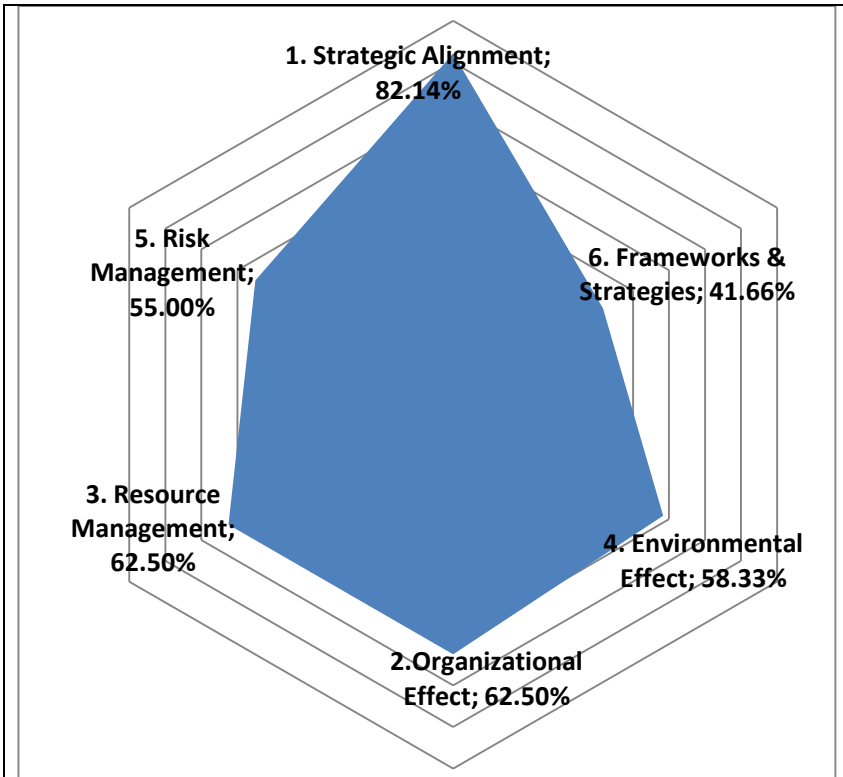


Figure 6-1: The categories analysis of the first case study

- **Solid Categories:**

1- Strategic Alignment, 82.14%
2- Resource Management, 62.50%
3- Organizational Effect, 62.50%

Action: be consistent and minor improvement may be needed.

- **Average categories**

4- Environmental Effect, 58.33%
5- Risk Management, 55.00%
6- Frameworks & strategies Adoption, 41.66

Action: medium improvement is needed.

A. Feedback analysis

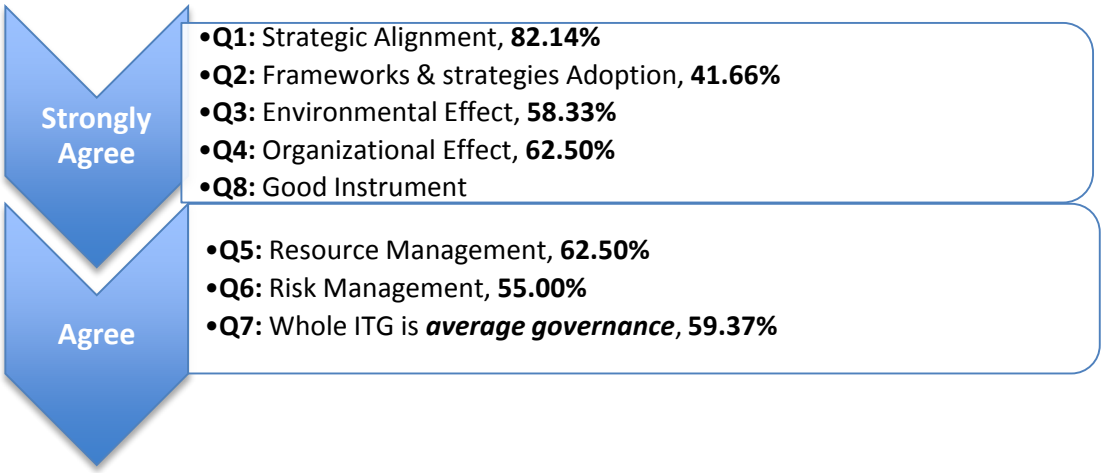


Figure 6-2: The feedback analysis of the first case study

6.4.1. The discussion of the first case study

It is clear from the results that the categories are solid and average, with some perfect and below-average factors as well. This means the number and the scores of the factors at each level will affect the final score of the category. For example, the Strategic Alignment category has two perfect factors, yet it's a solid category because it has an additional five solid factors.

Likewise, the entire IT governance study consists of average governance with solid categories. This means the number and the scores of categories at each level affect the overall score of the governance. In this case study, there are three solid categories and three average categories, and yet there is average governance. This is because there are two low solid scores (**62.50%**), in addition to two high average scores (**58.33%** & **55%**).

It can be seen that in this organisation, the participants have strongly agreed on the assessment of most categories, and thus, SFITG is a good instrument when it comes to measuring ITG in the Saudi public sector. In addition, they agreed that the final ITG score reflects the true success (or lack thereof) of the ITG implementation in their organisation. They seem pleased with all components of SFITG and would complete the assessment again.

6.5. The Second Case Study

This organization is one of the largest organizations in the public sector in Saudi Arabia. There are over 203856 employees working under this organization. Its governance office was established a year ago, and they implemented IT Governance three months ago. The results of the study in this organization are shown below.

6.5.1. The results of the second case study

In this section, the results of the case studies are presented in SFITG instrument as follows.

Table 6-4: The results of the second case study

Cat No	Categories items	CSF no	CSFs items	CSF Score
1	Strategic alignment (SA) Score: **39.28%** Response: ***Strongly agree***	1	The Definition of IT strategy in the organization's business strategy	75%
		2	The alignment between IT strategy and the organization's business strategy	50%
		3	The support of board of directors to IT projects and investments	25%
		4	The responsibility of board of directors for IT projects and decisions	50%
		5	The position and role of IT manager within the board of directors	50%
		6	The communication between IT management and the board of directors	25%
		7	The identification and involvement of Stakeholders of IT's investments and decisions in IT strategy	25%
2	Framework and Strategy adoption (FSA) Score: **36.11%** Response: ***Strongly agree***	1	The Adopted Corporate Governance Standards or Frameworks	75%
		2	The Adopted IT Governance Standard or Framework	50%
		3	The Adopted IT Management standard or framework	25%
		4	The Adopted Change Management Strategy	25%
		5	The Adopted Performance Management Strategy	25%
		6	The Adopted Project Management Methodology	75%
		7	The Adopted Quality Management Strategy	25%
		8	The Adopted IT Outsourcing Strategy	0%
		9	The integration between these strategies and frameworks	25%
3		1	The Definition of Regulatory Environment & Requirements in IT strategy	50%

	Environmental effect (external) (EE) Score: **33.33%** Response: ***Strongly agree***	2	The Compliance of Regulatory Environment & Requirements	50%
		3	The adopted Competitive Strategy	0%
4	Organizational effect (internal) (OE) Score: **43.75%** Response: ***Agree***	1	Proper Organizational Culture in IT Departments	50%
		2	IT Governance policies, principles & responsibilities	50%
		3	IT policies, principles and responsibilities	25%
		4	The analysis and evaluation of the current and future use of IT	50%
5	Resource management (RM) Score: **37.5%** Response: ***Strongly agree***	1	The allocated budget for IT projects and investments	50%
		2	The required IT skills and competencies	25%
		3	The required Relevant Technology and Infrastructure of IT	50%
		4	IT Governance awareness and training	25%
6	Risk management (RKM) Score: **40%** Response: ***Strongly agree***	1	Risk Management Strategy of IT and business	50%
		2	The lead of board of directors to the risk management strategy	25%
		3	Business risk management	25%
		4	IT risk is management	50%
		5	Information Security standards and policies	50%
The Final Score			**38.28%**	Response: **Agree**

6.5.2. The analysis of the second Case study

A. Factors analysis

Table 6-5: The factors analysis of the second case study

CSF status	CSF's category	CSF No	CSF name
Solid Factors (75%)	SA	1	The definition of IT strategy in the organization's strategy
	FSA	2	The Adopted Corporate Governance Stands or Frameworks
		3	The Adopted Project Management Methodology
Average Factors (50%)	SA	1	The alignment between IT strategy & organization's strategy
		2	The responsibility of BODs for IT projects and decisions
		3	The position and role of IT manager within BODs
	FSA	4	The Adopted IT Governance Standard or Framework.
	EE	5	The Definition of Regulatory Requirements in IT strategy
		6	The Compliance of Regulatory Environment & Requirements
	OE	7	Proper Organizational Culture in IT Departments
		8	IT Governance policies, principles & responsibilities
		9	The analysis and evaluation of the current and future use of IT
	RM	10	The allocated budget for IT projects and investments
		11	The required Relevant Technology and Infrastructure of IT
	RKM	12	Risk Management Strategy of IT and business
		13	IT risk is management
		14	Information Security standards and policies
Below-Average Factors (25%)	SA	1	The support of board of directors to IT projects and investments
		2	The communication between IT management and the board of directors
		3	The identification and involvement of Stakeholders
	FSA	1	The Adopted IT Management standard or framework
		2	The Adopted Change Management Strategy
		3	The Adopted Performance Management Strategy
		4	The Adopted Quality Management Strategy
		5	The integration between these strategies and frameworks
	OE	6	IT policies, principles and responsibilities
	RM	7	The required IT skills and competencies
		8	IT Governance awareness and training
	RKM	9	The lead of board of directors to the risk management strategy
		10	Business risk management
Severe Factors (0%)	FSA	1	The Adopted IT Outsourcing Strategy
	EE	2	The adopted Competitive Strategy

B. Categories Analysis

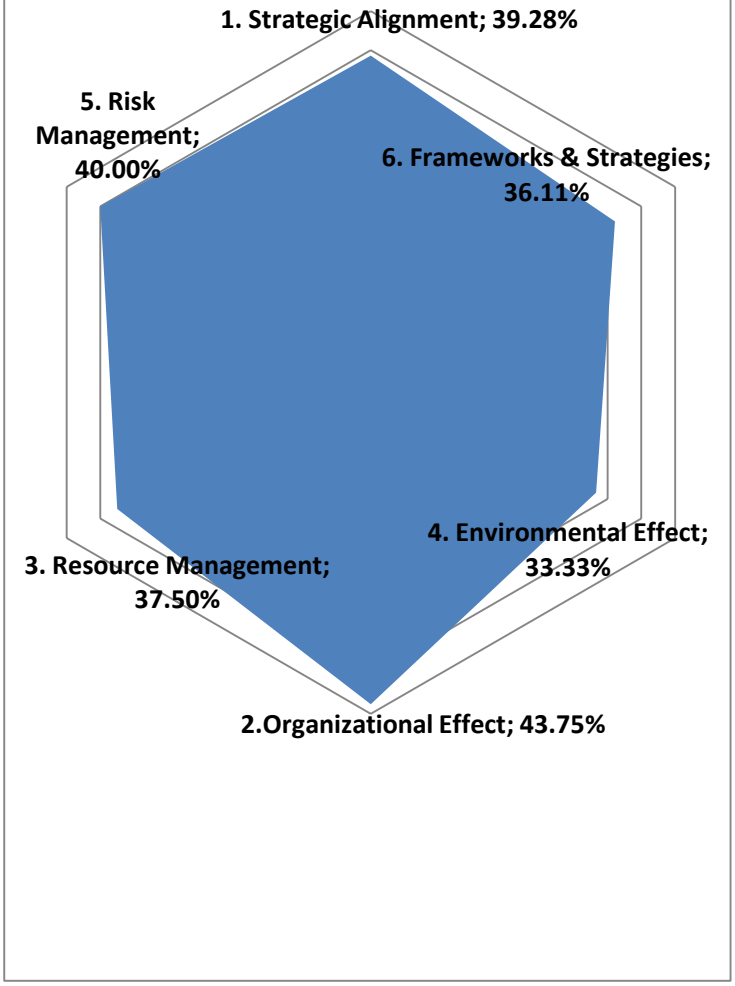


Figure 6-3: The categories analysis of the second case study

- **Average categories:**

1. **43.75%,** Organizational Effect (OE)

Action: medium improvement is needed.

- **Below-Average categories:**

2. **40%**, Risk Management (RKM)
3. **39.28%,** Strategic Alignment (SA)
4. **37.5%,** Resource Management (RM)
5. **36.11%,** Frameworks & Strategies Adoption (FSA)
6. **33.33%,** Environmental Effect (EE)

Action: major and urgent improvement is needed.

C. ***Feedback analysis***

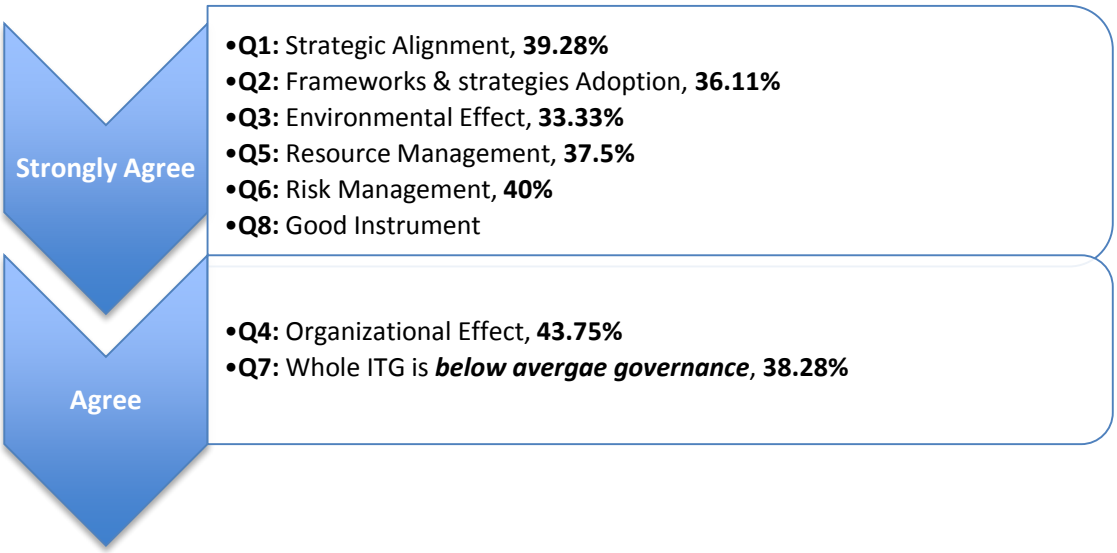


Figure 6-4: The feedback analysis of the second case study

6.5.3. The discussion of the second Case study

Based on the results, it is clear that the ITG is below-average governance, although there are solid categories and factors at play as well.

It can be seen that in this organisation, the case study participants strongly agreed on the assessment of most categories, and they concluded that SFITG was a good instrument to measure ITG in the Saudi public sector. However, the final ITG score of their organisation was below-average. In addition, they agreed that the final ITG score reflected the degree to which the ITG implementation was successful in their organisation. They said a large company conducted a similar assessment of ITG a few months ago, and that their results were similar to what we found in this study (considering the time difference).

6.6. The third Case study

Recently, this organization became one of the best organizations in Saudi Arabia in its performance and adoption of the electronic government. Many other public organizations have followed its processes and projects in E- government to achieve its success in this field. The governance practices are managed in E- government, which was established four years ago. However, the governance practices are still not fully executed, especially, IT Governance implementation in its early stages. The results of the study in this organization are shown below.

6.6.1. The results of the third Case study

In this section, the results of the case studies are presented in SFITG instrument as follows.

Table 6-6: The results of the third case study

Cat No	Categories items	CSF no	CSFs items	CSF Score
1	Strategic alignment (SA) Score: **50%** Response: ***Agree***	1	The Definition of IT strategy in the organization's business strategy	25%
		2	The alignment between IT strategy and the organization's business strategy	25%
		3	The support of board of directors to IT projects and investments	75%
		4	The responsibility of board of directors for IT projects and decisions	50%
		5	The position and role of IT manager within the board of directors	75%
		6	The communication between IT management and the board of directors	50%
		7	The identification and involvement of Stakeholders of IT's investments and decisions in IT strategy	50%
2	Framework and Strategy adoption (FSA) Score: **22.22%** Response: ***Strongly agree***	1	The Adopted Corporate Governance Standards or Frameworks	0%
		2	The Adopted IT Governance Standard or Framework	25%
		3	The Adopted IT Management standard or framework	25%
		4	The Adopted Change Management Strategy	25%
		5	The Adopted Performance Management Strategy	25%
		6	The Adopted Project Management Methodology	25%
		7	The Adopted Quality Management Strategy	25%
		8	The Adopted IT Outsourcing Strategy	25%
		9	The integration between these strategies and frameworks	25%

3	Environmental effect (external) (EE) Score: **50%** Response: ***Agree***	1	The Definition of Regulatory Environment & Requirements in IT strategy	50%
		2	The Compliance of Regulatory Environment & Requirements	50%
		3	The adopted Competitive Strategy	50%
4	Organizational effect (internal) (OE) Score: **43.75%** Response: ***Neutral***	1	Proper Organizational Culture in IT Departments	25%
		2	IT Governance policies, principles & responsibilities	50%
		3	IT policies, principles and responsibilities	50%
		4	The analysis and evaluation of the current and future use of IT	50%
5	Resource management (RM) Score: **62.50%** Response: ***Agree***	1	The allocated budget for IT projects and investments	75%
		2	The required IT skills and competencies	50%
		3	The required Relevant Technology and Infrastructure of IT	50%
		4	IT Governance awareness and training	75%
6	Risk management (RKM) Score: **30%** Response: ***Strongly agree***	1	Risk Management Strategy of IT and business	25%
		2	The lead of board of directors to the risk management strategy	25%
		3	Business risk management	25%
		4	IT risk is management	25%
		5	Information Security standards and policies	50%
The Final Score			**39.85%**	Response: ***Agree***

6.6.2. The analysis of the third Case study

Table 6-7: The factors analysis of third case study

CSF status	CSF's category	CSF No	CSF name
Solid Factors (75%)	SA	1	The support of board of directors to IT projects and investments
		2	The position and role of IT manager within the board of directors
	RM	3	The allocated budget for IT projects and investments
		4	IT Governance awareness and training
Average Factors (50%)	SA	1	The responsibility of board of directors for IT projects and decisions
		2	The communication between IT management and the board of directors
		3	The identification and involvement of Stakeholders
	EE	4	The Definition of Regulatory Environment & Requirements in IT strategy
		5	The Compliance of Regulatory Environment & Requirements
		6	The adopted Competitive Strategy
	OE	7	IT Governance policies, principles & responsibilities
		8	IT policies, principles and responsibilities
		9	The analysis and evaluation of the current and future use of IT
	RM	10	The required IT skills and competencies
		11	The required Relevant Technology and Infrastructure of IT
	RKM	12	Information Security standards and policies
Below-Average Factors (25%)	SA	1	The Definition of IT strategy in the organization's business strategy
		2	The alignment between IT strategy and the organization's business strategy
	FSA	3	The Adopted IT Governance Standard or Framework
		4	The Adopted IT Management standard or framework
		5	The Adopted Change Management Strategy
		6	The Adopted Performance Management Strategy
		7	The Adopted Project Management Methodology
		8	The Adopted Quality Management Strategy
		9	The Adopted IT Outsourcing Strategy
		10	The integration between these strategies and frameworks
	OE	11	Proper Organizational Culture in IT Departments
	RKM	12	Risk Management Strategy of IT and business
		13	The lead of board of directors to the risk management strategy
		14	Business risk management
		15	IT risk is management
Severe Factors (0%)	FSA	1	The Adopted Corporate Governance Standards or Frameworks

A. Categories Analysis

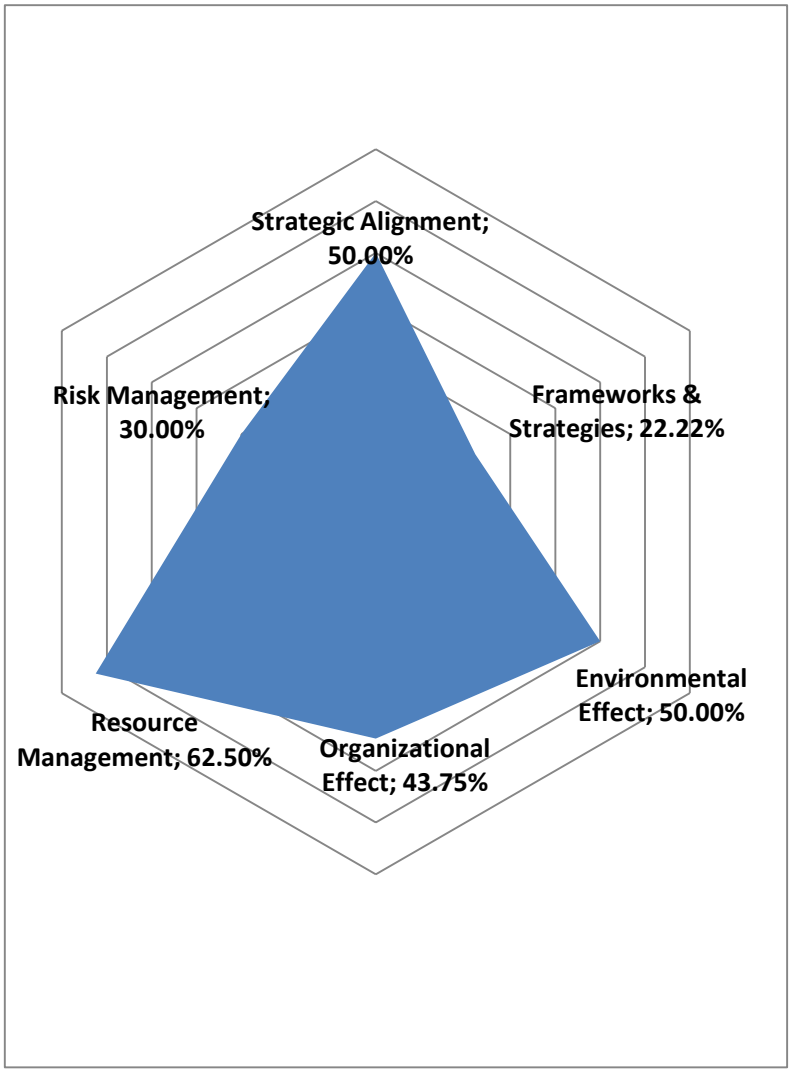


Figure 6-5: The categories analysis of the third case study

- **Solid Categories:**

1. **62.50%** Resource Management (RM)

Action: be consistent and minor improvement may be needed.

- **Average categories:**

2. **50%** Strategic Alignment (SA)
3. **50%** Environmental Effect (EE)
4. **43.75%** Organizational Effect (OE)

Action: medium improvement is needed.

- **Below-Average categories:**

5. **30%** Risk Management (RKM)
6. **22.22%** Frameworks & strategies **Adoption (FSA)**

Action: major and urgent improvement is needed.

B. Feedback analysis

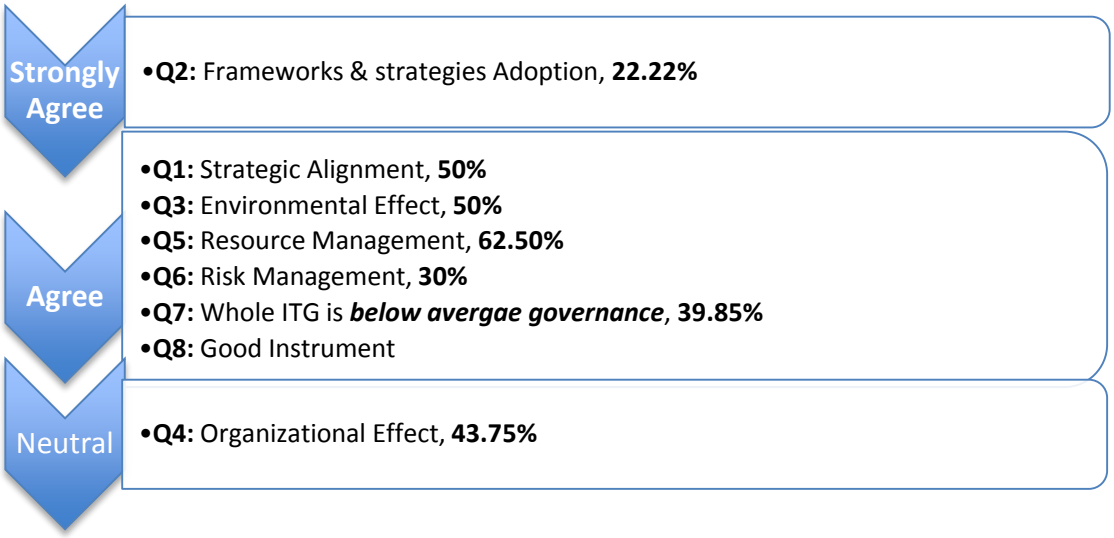


Figure 6-6: The feedback analysis of the third case study

6.6.3. The discussion of the third Case study

Based on the results, it is clear that ITG is a form of below-average governance, although there are solid factors and average categories.

Case study participants, for example, agreed on the assessment of most categories. Thus, the final ITG score reflected the level of success of the ITG implementation in the organisation. SFITG, therefore, is an effective instrument when it comes to measuring ITG in the Saudi public sector, although the final ITG score of the organisation was below average. As an indication of the reliability of the instrument, they were granted permission from the minister's office to provide feedback on the results, but they insisted that the results remain confidential.

6.7. The fourth Case study

This organization is a medium size public sector. The governance office in the main branch in Riyadh manages the governance's processes and projects. Although there are not many professionals in that office, they are very professional and well-trained.

The ITG was implemented in this organization almost one year ago. The results of the study in this organization are shown below.

6.7.1. The results of the fourth Case study

In this section, the results of the case studies are presented in SFITG instrument as follows.

Table 6-8: The results of the fourth case study

Cat No	Categories items	CSF no	CSFs items	CSF Score
1	Strategic alignment (SA) Score: **78.57%** Response: ***Agree***	1	The Definition of IT strategy in the organization's business strategy	75%
		2	The alignment between IT strategy and the organization's business strategy	75%
		3	The support of board of directors to IT projects and investments	100%
		4	The responsibility of board of directors for IT projects and decisions	75%
		5	The position and role of IT manager within the board of directors	75%
		6	The communication between IT management and the board of directors	75%
		7	The identification and involvement of Stakeholders of IT's investments and decisions in IT strategy	75%
2	Framework and Strategy adoption (FSA) Score: **63.88%** Response: ***Agree***	1	The Adopted Corporate Governance Standards or Frameworks	75%
		2	The Adopted IT Governance Standard or Framework	75%
		3	The Adopted IT Management standard or framework	75%
		4	The Adopted Change Management Strategy	75%
		5	The Adopted Performance Management Strategy	50%
		6	The Adopted Project Management Methodology	75%
		7	The Adopted Quality Management Strategy	50%
		8	The Adopted IT Outsourcing Strategy	25%
		9	The integration between these strategies and frameworks	75%
3		1	The Definition of Regulatory Environment & Requirements in IT strategy	75%

	Environmental effect (external) (EE) Score: **75%** Response: ***Strongly agree***	2	The Compliance of Regulatory Environment & Requirements	75%
		3	The adopted Competitive Strategy	75%
4	Organizational effect (internal) (OE) Score: **68.75%** Response: ***Agree***	1	Proper Organizational Culture in IT Departments	75%
		2	IT Governance policies, principles & responsibilities	75%
		3	IT policies, principles and responsibilities	75%
		4	The analysis and evaluation of the current and future use of IT	50%
5	Resource management (RM) Score: **81.25%** Response: ***Agree***	1	The allocated budget for IT projects and investments	75%
		2	The required IT skills and competencies	75%
		3	The required Relevant Technology and Infrastructure of IT	100 %
		4	IT Governance awareness and training	75%
6	Risk management (RKM) Score: **50%** Response: ***Strongly agree***	1	Risk Management Strategy of IT and business	50%
		2	The lead of board of directors to the risk management strategy	25%
		3	Business risk management	25%
		4	IT risk is management	75%
		5	Information Security standards and policies	75%
The Final Score			**64.75%**	Response: ***Strongly agree***

6.7.2. The analysis of the fourth case study

A. Factors analysis

Table 6-9: The factors analysis of the fourth case study

CSF status	CSF's category	CSF No	CSF name
Perfect Factors (100%)	SA	1	The support of BODs to IT projects and investments
	RM	2	The required Relevant Technology and Infrastructure of IT
Solid Factors (75%)	SA	1	The Definition of IT strategy in organization's strategy
		2	The alignment between IT strategy & organization's strategy
		3	The responsibility of BODs for IT projects and decisions
		4	The position and role of IT manager within the BODs
		5	The communication between IT management and the board of directors
		6	The identification and involvement of Stakeholders
	FSA	7	The Adopted Corporate Governance Standards or Frameworks
		8	The Adopted IT Governance Standard or Framework
		9	The Adopted IT Management standard or framework
		10	The Adopted Change Management Strategy
		11	The Adopted Project Management Methodology
		12	The integration between these strategies and frameworks
	EE	13	The Definition of Regulatory Environment & Requirements in IT strategy
		14	The Compliance of Regulatory Environment & Requirements
		15	The adopted Competitive Strategy
	OE	16	Proper Organizational Culture in IT Departments
		17	IT Governance policies, principles & responsibilities
		18	IT policies, principles and responsibilities
	RM	19	The allocated budget for IT projects and investments
		20	The required IT skills and competencies
		21	IT Governance awareness and training
	RKM	22	Information Security standards and policies
		23	IT risk is management
Average Factors (50%)	FSA	1	The Adopted Performance Management Strategy
		2	The Adopted Quality Management Strategy
	OE	3	The analysis and evaluation of the current and future use of IT
	RKM	4	Risk Management Strategy of IT and business
Below-Average Factors	FSA	1	The Adopted IT Outsourcing Strategy
	RKM	2	The lead of board of directors to the risk management strategy
		3	Business risk management

B. Categories Analysis

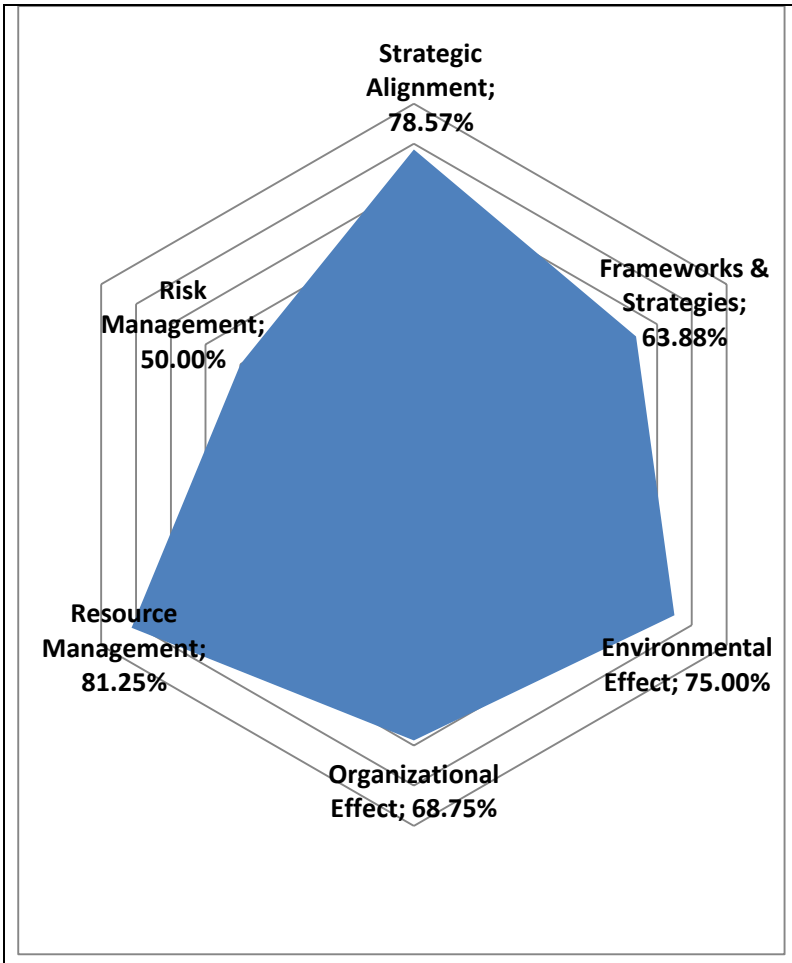


Figure 6-7: The categories analysis of the fourth case study

- **Solid Categories:**

1. **81.25%** Resource Management (RM)
2. **78.57%** Strategic Alignment (SA)
3. **75%** Environmental Effect (EE)
4. **68.75%** Organizational Effect (OE)
5. **63.88%** Frameworks & strategies Adoption (FSA)

Action: be consistent and minor improvement may be needed.

- **Average categories:**

6. **50%** Risk Management (RKM)

Action: medium improvement is needed.

C. Feedback analysis

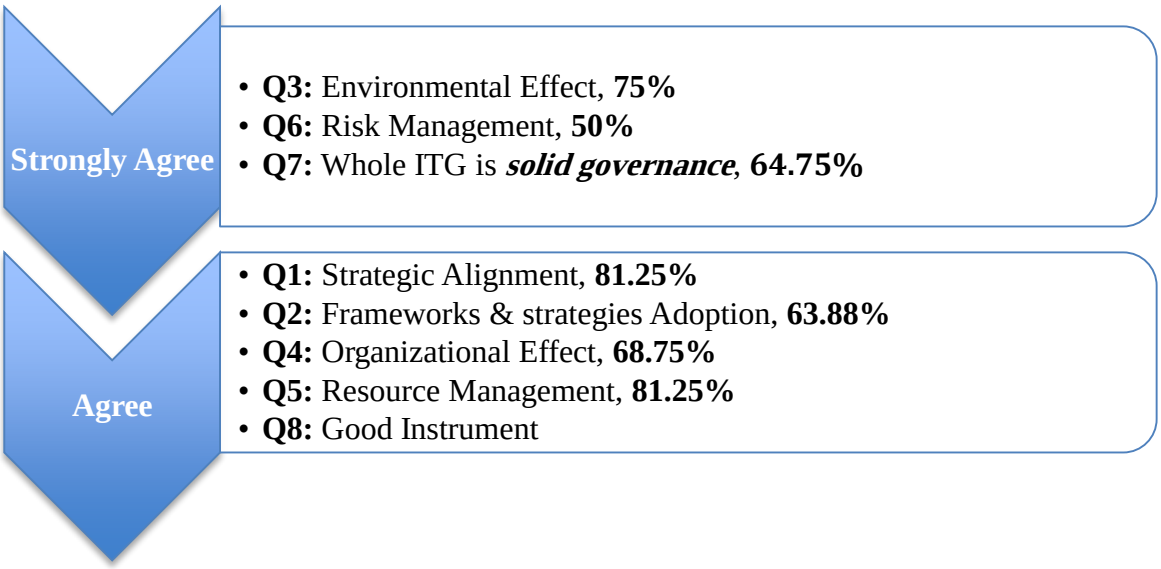


Figure 6-8: The feedback analysis of the fourth case study

6.7.3. The discussion of the fourth case study

Based on the results, it is clear that the existence of below-average and average factors, in addition to average categories, did not affect the final ITG score (solid governance).

It can be seen that in this organisation, the case study participants strongly agreed on the assessment of two categories. They were also in agreement that the final ITG score reflected the actual success of the ITG implementation in their organisation. In addition, they agreed that SFITG was effective at measuring ITG in the Saudi public sector and in the other four categories.

6.8. The fifth Case study

This organization was recently established with adopting the latest technologies and acquisition of professional staff in many fields and department. One of these departments is the Information and Communication Technology Directorate, responsible for IT Governance practices. They implemented COBIT5 a few months ago and adopted best practices models in many IT components.

The results of the study in this organization are shown below.

6.8.1. The results of the fifth Case study

In this section, the results of the case studies are presented in SFITG instrument as follows.

Table 6-10: The results of the fifth case study

Cat No	Categories items	CSF no	CSFs items	CSF Score
1	Strategic alignment (SA) Score: **92.86%** Response: ***Agree***	1	The Definition of IT strategy in the organization's business strategy	75%
		2	The alignment between IT strategy and the organization's business strategy	100%
		3	The support of board of directors to IT projects and investments	75%
		4	The responsibility of board of directors for IT projects and decisions	100%
		5	The position and role of IT manager within the board of directors	100%
		6	The communication between IT management and the board of directors	100%
		7	The identification and involvement of Stakeholders of IT's investments and decisions in IT strategy	100%
2	Framework and Strategy adoption (FSA) Score: **72.22%** Response: ***Agree***	1	The Adopted Corporate Governance Standards or Frameworks	50%
		2	The Adopted IT Governance Standard or Framework	75%
		3	The Adopted IT Management standard or framework	75%
		4	The Adopted Change Management Strategy	75%
		5	The Adopted Performance Management Strategy	75%
		6	The Adopted Project Management Methodology	75%
		7	The Adopted Quality Management Strategy	75%
		8	The Adopted IT Outsourcing Strategy	75%
		9	The integration between these strategies and frameworks	75%

3	Environmental effect (external) (EE) Score: **66.66%** Response: ***Strongly Agree***	1	The Definition of Regulatory Environment & Requirements in IT strategy	75%
		2	The Compliance of Regulatory Environment & Requirements	50%
		3	The adopted Competitive Strategy	75%
4	Organizational effect (internal) (OE) Score: **75%** Response: ***Agree***	1	Proper Organizational Culture in IT Departments	75%
		2	IT Governance policies, principles & responsibilities	75%
		3	IT policies, principles and responsibilities	75%
		4	The analysis and evaluation of the current and future use of IT	75%
5	Resource management (RM) Score: **62.5%** Response: ***Neutral***	1	The allocated budget for IT projects and investments	75%
		2	The required IT skills and competencies	50%
		3	The required Relevant Technology and Infrastructure of IT	75%
		4	IT Governance awareness and training	50%
6	Risk management (RKM) Score: **50%** Response: ***Agree***	1	Risk Management Strategy of IT and business	50%
		2	The lead of board of directors to the risk management strategy	50%
		3	Business risk management	50%
		4	IT risk is management	50%
		5	Information Security standards and policies	50%
The Final Score			**71.85%**	Response: ***Agree***

6.8.2. The analysis of the fifth case study

A. Factors analysis

Table 6-11: Fifth Case Study Factor Analysis

CSF status	CSF's category	CSF No	CSF name
Perfect Factors (100%)	SA	1	The alignment between IT strategy and the organization's business strategy
		2	The responsibility of BoDs for IT projects and decisions
		3	The position and role of IT manager within BoDs
		4	The communication between IT management and the board of directors
		5	The identification and involvement of Stakeholders of IT's investments and decisions in IT strategy
Solid Factors (75%)	SA	1	The Definition of IT strategy in the organization's business strategy
		2	The support of board of directors to IT projects and investments
	FSA	3	The Adopted IT Governance Standard or Framework
		4	The Adopted IT Management standard or framework
		5	The Adopted Change Management Strategy
		6	The Adopted Performance Management Strategy
		7	The Adopted Project Management Methodology
		8	The Adopted Quality Management Strategy
		9	The Adopted IT Outsourcing Strategy
		10	The integration between these strategies and frameworks
	EE	11	The Definition of Regulatory Environment & Requirements in IT strategy
		12	The adopted Competitive Strategy
	OE	13	Proper Organizational Culture in IT Departments
		14	IT Governance policies, principles & responsibilities
		15	IT policies, principles and responsibilities
		16	The analysis and evaluation of the current and future use of IT
	RM	17	The allocated budget for IT projects and investments
		18	The required Relevant Technology and Infrastructure of IT
Average Factors (50%)	FSA	1	The Adopted Corporate Governance Standards or Frameworks
	EE	2	The Compliance of Regulatory Environment & Requirements
	RM	3	The required IT skills and competencies
		4	IT Governance awareness and training
	RKM	5	Risk Management Strategy of IT and business
		6	The lead of board of directors to the risk management strategy
		7	Business risk management
		8	IT risk is management
		9	Information Security standards and policies

B. *Categories Analysis*

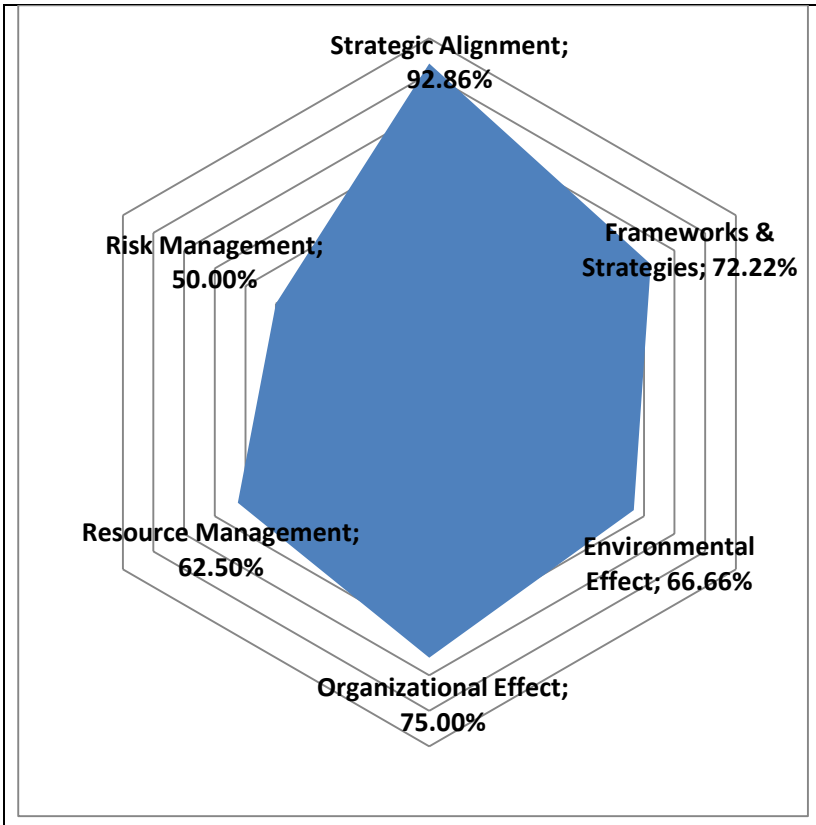


Figure 6-9: The categories analysis of the fifth case study

Action: medium improvement is needed.

- **Solid Categories:**

1. **92.86%** Strategic Alignment (SA)
2. **75%** Organizational Effect (OE)
3. **72.22%** Frameworks & strategies Adoption (FSA)
4. **66.66%** Environmental Effect (EE)
5. **62.5%** Resource Management (RM)

Action: be consistent and minor improvement may be needed.

- **Average categories:**

6. **50%** Risk Management (RKM)

C. *Feedback analysis*

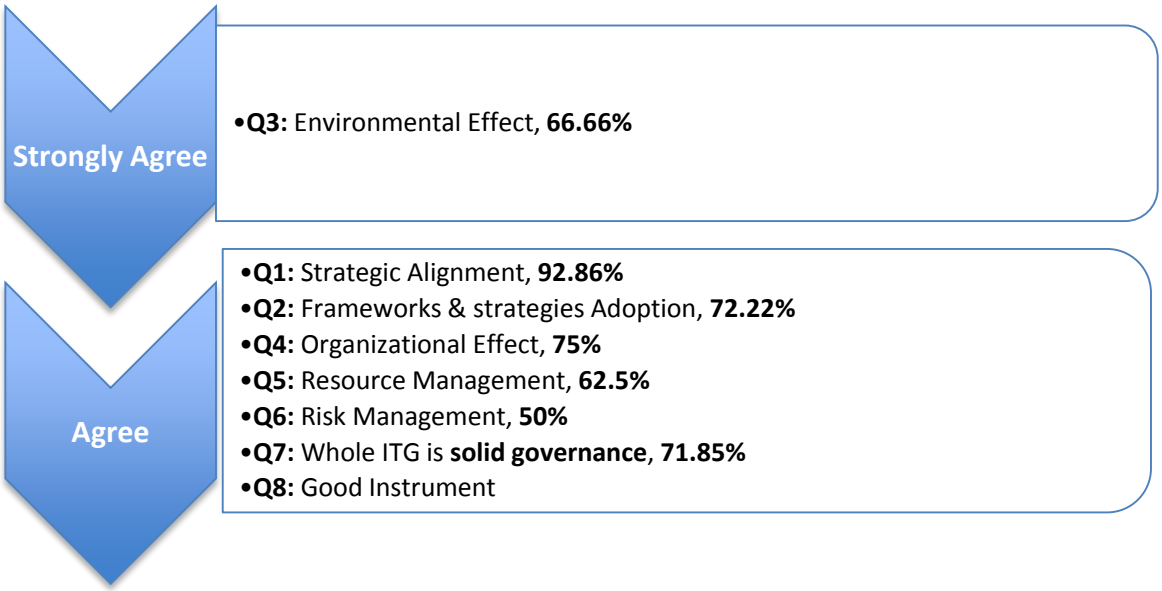


Figure 6-10: Fifth Case Study Feedback Analysis

6.8.3. The discussion of the fifth case study

In this case, the results revealed that solid governance was not affected by the average factors and category, as there were many perfect and solid factors – and solid categories – involved in the study. However, the final ITG score dropped from high-solid to average-solid governance because of the average risk management score.

It is clear that the case study participants in this organisation agreed on the assessment of most categories. The final ITG score mirrored the actual success of the ITG implementation in the organisation, and thus, participants agreed that SFITG was an effective instrument for measuring ITG in the Saudi public sector. This indicates that the organisation agreed on the results and questions, as they had the highest score of all five case studies, and therefore, they were the most advanced and experienced in IT Governance practices.

6.9. Case Studies Discussion

After analysing the results of these case studies, quantitative and qualitative studies were conducted to complete the validation of the SFITG instrument. These studies targeted the participants as they answered the third question: "Is the SFITG instrument appropriate for measuring the status of ITG implementation in a government organisation in Saudi Arabia?" Online surveys, paper questionnaires and interviews were used to complete the studies. Represented by the governance office, the main respondents were shown the case study results and then asked whether they agreed that the results reflected the actual status of ITG in their organisation (in terms of each factor, category and the whole framework). They were asked about the SFITG instrument's ability to measure the overall status of ITG in the Saudi public sector.

Participants' feedback is represented in Table 6-12. A comparison of the feedback from the five case studies will be depicted in the table, as the feedback for each question from all case study organisations is presented. In terms of a scoring system for the effectiveness of the instrument, the following system has been established: Strongly Agree (SA) is 4, Agree (A) is 3, Neutral (N) is 2, Disagree (D) is 1 and Strongly Disagree (SD) is 0.

Table 6-12: The summary of case studies feedback

Question	CS 1	CS 2	CS 3	CS 4	CS 5	R
Q1: Strategic alignment (SA)	SA	SA	A	A	A	**3.4**
Q2: Framework and Strategy adoption (FSA)	SA	SA	SA	A	A	**3.6**
Q3: Environmental effect (external) (EE)	SA	SA	A	SA	SA	**3.8**
Q4: Organizational effect (internal) (OE)	SA	A	N	A	A	**3**
Q5: Resource management (RM)	A	SA	A	A	N	**3**
Q6: Risk management (RKM)	A	SA	SA	SA	A	**3.6**
Q7: Whole ITG	A	A	A	SA	A	**3.2**
Q8: Good instrument	SA	SA	A	A	A	**3.4**

* ***CS:*** *Case Study****, R:*** *Results*

The above table shows all questions are either strongly agreed or agreed by the participants, except Q4 in CS3 & Q5 in CS5 are neutral. However, that didn't affect the final results, since all questions

are 3 and above. This means all SFITG instrument factors and categories reflect the accurate status of ITG in these organizations.

All participants consider SFITG instrument to be a good instrument to measure ITG in the public sector in Saudi Arabia.

Chapter 7: Conclusion and Future Work

From this research, it has been demonstrated that ITG can have a significant impact on IT practices, helping organizations to gain optimal benefits from IT projects and manage the associated risks. In this research, many sources and related studies have been explored and analysed in depth to build a framework that integrates all Critical Success Factors (CSFs) for the successful implementation of ITG. This chapter presents a conclusion of the research and outlines the next steps to be followed.

7.1. Conclusion

This study included a brief introduction to ITG and the associated factors. ITG is the set of policies, procedures, and processes accomplished by board of directors to optimize IT benefits and minimise their risks. In an era of rapidly-changing information technology, optimizing the benefits of IT applications and practices, while minimizing their risks, is critical. ITG offers solutions to this issue by providing guidelines, policies, and procedures to control IT practices and investment. Many frameworks and models have been published to help govern IT (Calder & Moir, 2009). COBIT and ISO/IEC 38500: 2012 have released guidelines and frameworks for most IT practices. Developing countries, such as Saudi Arabia, have the capabilities to implement successful ITG, but do so in a unique environment. For Saudi Arabia, although one of the richest countries in the world, some aspects of ITG still require investigation and specialized study. The CSFs for ITG is such an aspect that must be considered during and after implementing ITG. This aspect is important in the public sector, which needs guidance and tools to measure its ITG implementation success. The need to research CSFs for implementing ITG in the Saudi public sector has driven this study. To achieve this aim, an in-depth investigation of ITG and its implementation has been carried out, as shown in the literature review. Many related standards, frameworks, and models have been examined to identify the main success factors, enablers, obstacles, and barriers. These items have been extracted from the literature review, analysed, sorted, and categorized. The results were used to create the iSFITG1 framework. iSFITG1 was further refined by removing duplications to create the iSFITG2 framework. The framework has undergone a confirmation process through the survey method to become the confirmed SFITG. This confirmation process combined two consecutive reviews to incorporate expert views on ITG from across the globe and views pertaining to Saudi culture. After the global review, the recommendations of the global experts were analysed, and the questionnaire adjusted for the cultural review, based on the analysis. A new Risk management (RKM) category was added. Similarly, after the cultural survey was conducted, the results were collected and analysed. The final outcomes of these two reviews confirmed the proposed changes to the iSFITG2 framework. However, the Performance management (PM) category was removed,

as all related CSFs had been moved to other categories. In addition, a new Framework/strategy adoption (FSA) category was added, based on the experts' recommendations. This category became an incubator for new recommended CSFs, such as Effective Quality, Outsourcing management strategy, and Effective ITG Standard/Frameworks. In addition, existing CSFs, such as Effective Corporate Governance Standards, and Effective performance, and Change management strategy, were moved to the new FSA category.

After the expert reviews, all the proposed CSFs for the iSFITG2 framework were confirmed. The framework moved to the next phase. New CSFs were recommended by the groups of experts. These include factors, such as IT manager is member of top management/ board of directors and a Competitive advantage strategy is defined and followed. At the end of the confirmation stage, SFITG has been published and fully confirmed. It can, therefore, be stated that the first two research questions have been answered. These are: "What are the CSFs for the implementation of ITG? And what is the most appropriate framework that comprises these factors and is appropriate for the public sector in Saudi Arabia?" Finally, it can be seen that SFITG has passed many stages and phases to come to its final shape. By conducting five case studies in the public sector in Saudi Arabia and evaluating these case studies, it can be said SFITG is validated with no changes. Therefore, the validated framework is shown in Table 7-1. This framework is the answer of last research question, "Is the validated SFITG an appropriate instrument to measure the implementation success of ITG in government organizations in Saudi Arabia?"

Table 7-1: Validated SFITG

Cat No	Category items	CSF No	CSF items
1	Strategic alignment (SA)	1	Clear Definition of IT Strategy in the organization strategy
		2	Effective alignment between IT and business strategy
		3	Comprehensive responsibility of BODs of IT projects and decisions
		4	Adequate top management support and ownership
		5	IT manager is effective member of top management/ board of directors (ITMTM)
		6	Effective communication between IT and top management
		7	Adequate stakeholder involvement (ASI)
2	Framework/ strategy adoption (FSA)	1	Effective Corporate Governance Standards/ Frameworks
		2	Effective ITG Standard/ Frameworks
		3	Effective IT Standards/ Frameworks
		4	Good change management strategy
		5	Effective performance management strategy
		6	Effective project management methodology
		7	Effective Quality Management strategy
		8	Effective IT Outsourcing strategy
		9	Effective integration between these frameworks and strategies
3	Environmental effect (external) (EE)	1	A clear definition of Regulatory environment & requirements in IT Strategy
		2	Good Compliance with the Regulatory Environment & Requirements
		3	A competitive advantage strategy is defined and followed
4	Organizational effect (internal) (OE)	1	Clear ITG policies, principles & responsibilities
		2	Clear IT strategy, principles & policies
		3	Appropriate organizational culture
		4	Adequate Analysis for current and future se of IT
5	Resource Management (RM)	1	Adequate Financial Support
		2	Adequate IT skills & competencies
		3	Adequate IT Governance awareness and training
		4	Adequate & relevant Technology and Infrastructure
6	Risk management (RKM)	1	Clear Risk Management Strategy
		2	Leadership and commitment of top management to the adoption of risk management strategy
		3	IT Risk is accessed and managed
		4	Business Risk is assessed and managed
		5	Effective Information Security Strategy

7.2. Contribution Summary

This research has addressed the gaps in IT Governance both globally and culturally. Globally speaking, the SFITG framework has been confirmed by 17 ITG experts around the world. That said, this framework is one of the few studies that addresses the CSFs of ITG implementation. The solution framework has been confirmed globally with 22 CSFs (see Table 5-13). In short, these factors are the answer to the first research question: “What are the CSFs for the implementation of ITG?”

Culturally speaking, IT Governance is rarely addressed by studies in Saudi Arabia in general, and in the public sector in particular. Moreover, to the best of my knowledge, there are no studies on the CSFs of ITG in Saudi Arabia. Therefore, this study is one of the first of its kind, referring specifically to IT Governance in the Saudi public sector. In addition, it is the first one to address the factors that support the successful implementation of ITG in Saudi Arabia. The confirmed framework (SFITG) is the answer to the second research question: “What is the most appropriate framework that comprises these factors and applicable in the government sector in Saudi Arabia?” The framework is presented in Table 5-29.

Furthermore, an instrument was developed in this research based on the confirmed SFITG framework, in order to measure the success of the implementation of ITG in the Saudi public sector. This instrument has been validated and applied to five case studies of large organisations in the public sector in Saudi Arabia. This instrument is the answer to the third research question: “Is the validated SFITG an appropriate instrument to measure the implementation success of ITG in government organizations in Saudi Arabia?” The SFITG instrument can be viewed in Table 6-1, while the validated SFITG framework is depicted in Table 7-1.

Moreover, this research boasts a unique way of showing the assessment results to the participating organisations. The radar charts show the organisations’ ITG success status in simple terms, by way of a single diagram. These charts are presented in Chapter 6: The validation Phase and Appendices.

7.3. Future Work

As shown in previous chapters, SFITG 3 has been confirmed and validated as a result of the literature review, the reviews of global and cultural experts and case studies. In addition, experts have recommended new categories, factors and relationships among them. These changes were discussed in Chapter 4. Correspondingly, the updated SFITG framework has been developed based

on these changes (and on the evaluation of the case studies). Therefore, one can conclude that SFITG addresses the public sector in Saudi Arabia.

Many opportunities and improvements can be achieved from this SFITG framework.

7.3.1. Benchmarking Successful Governance

The first improvement that can be gained is to use the radar chart, which depicts the results of the assessments, to compare the results of one or more organisations to the most successful governance. In Figure 7-1, there are three assessments of three organisations, each represented by a different colour. The benchmarked organisation (Benchmark) is blue, while the others are all different colours. This method gives the organisations an indication of their position with regard to other organisations in the same industry.

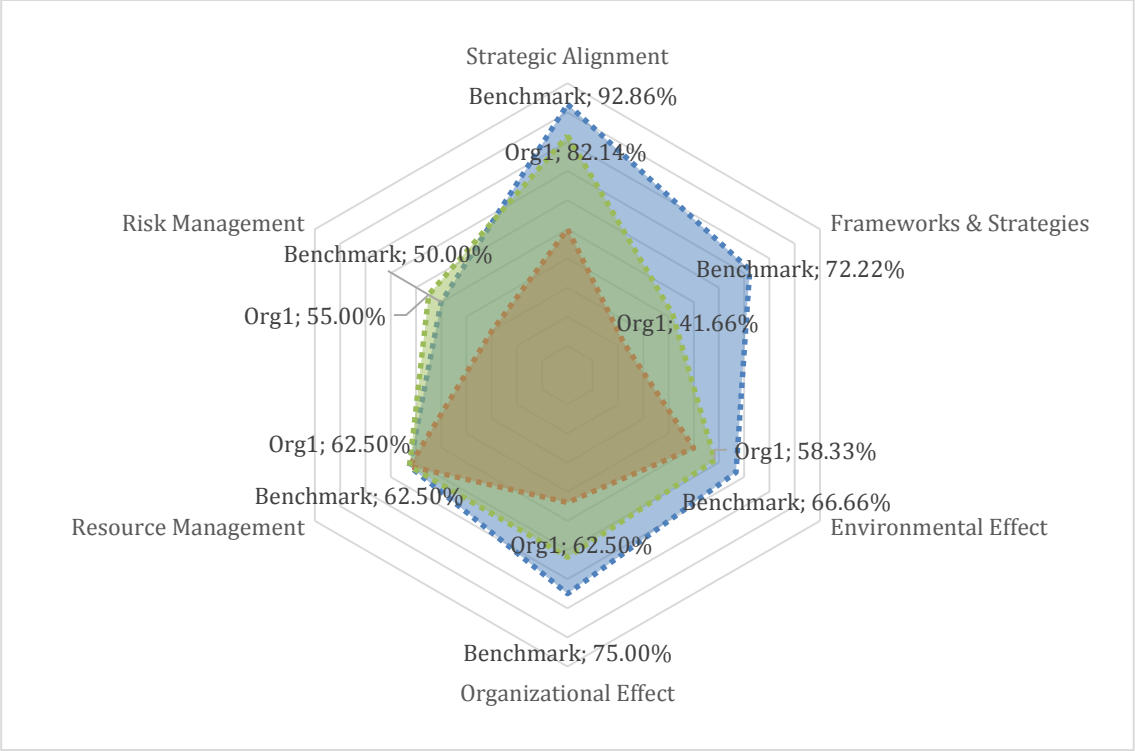


Figure 7-1: SFITG Benchmarking

7.3.2. SFITG Model and Factor analysis

Another recommendation is to improve the SFITG framework by weighting the various factors and establishing relationships among them. The weighting can be achieved by way of different methods, such as the weighted scoring model. This model uses different criteria to weight the factors – for example, the importance of the factor to the organisation and the impact of the factor. Similarly, in this research, the factor weighting can be achieved by calculating the following elements:

literature review frequency, the emphasis of global and cultural experts and the importance driven by the validation results to the organisations. An example of this is depicted in Table 7-2, with the scoring as follows: Always Mentioned; Significantly Important>95% & VI = 2; Often>80% & I = 1; Rare<80% & NI = 0. Then, Structural Equation Modelling (SEM) can be used to validate the model.

Table 7-2: Factor Weighting

CSFs	LR	GR	CR	VR	FW
Effective alignment bet IT and Business strategy	Always	95%	95%	VI	8
Sufficient financial support	Often	95%	95%	I	6
Appropriate organizational culture	Rare	95%	70%	NI	2

* LR: **Literature Review,** GR**: Global Review,** CL**: Cultural Review,** Med**: Medium, VI: Very Important, I: Important, NI: Not Important**

7.3.3. Other processes within IT governance

As defined in the Introduction Chapter, IT Governance consists of many processes and subcategories, such as Security Governance, Risk Management and IT Management (see Figure 2-1). The Critical Success Factors (CSFs) of the implementation of these areas are important and play a crucial role in their success. Therefore, the CSFs can be addressed by a similar methodology of this research in order to validate the results. Actually, some studies in these areas are currently underway, allowing researchers to use this study as a point of reference.

7.3.1. SFITG in a wider context

Since SFITG has been confirmed in the private and public sectors in Saudi Arabia, more case studies can be conducted in the private sector. Specifically, evaluation studies can take place to validate SFITG in the Saudi private sector. SFITG, consequently, can be a solution for all sectors in Saudi Arabia. In addition, as there are many similarities among Middle Eastern countries, SFITG can be confirmed and validated in the Middle East by applying the same methodologies that were utilised in this research. Moreover, as COBIT 5 is the most used ITG best practice, SFITG could very well be part of COBIT. Furthermore, SFITG is globally confirmed and accepted, which supports this opportunity. Figure 7-2 shows a flow chart of the future validation. The researcher has proven effective at communicating with the suggested countries, which will facilitate this plan.

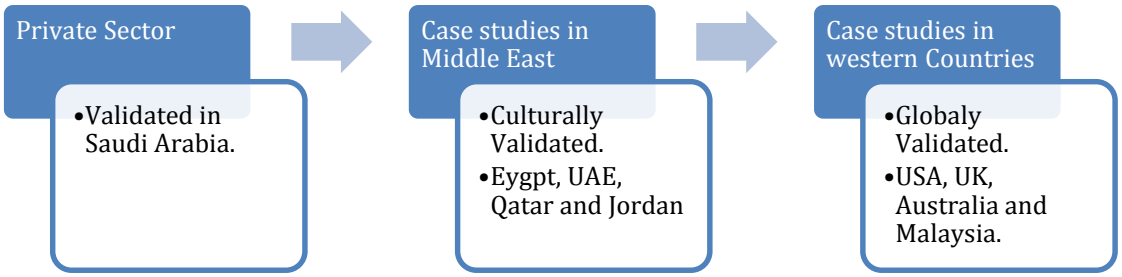


Figure 7-2: Future Validation of SFITG

7.3.2. SFITG automation

To make the solution easier and more popular, a software tool can be developed based on SFITG, in order to automate its application among organisations. The entry information to the software will be similar to the SFITG instrument questionnaire, and the results will be shown directly after filling out all the required information. This entry information – and the results – will be saved, and any update on them will automatically save the results as well. The user can then decide that the results be shown in different shapes and charts. To make the software more successful and powerful, it can also be connected to the main organisation infrastructure system, such as Oracle, SAP or SharePoint ERP (Enterprise Resource Planning). In addition, it can integrate the software with the Balanced Scorecard (BSC), the strategy performance management tool. The experience of the researcher as ERP project manager in KACST for the last two years will help experts develop this software. An example of how ITG Enterprise Goals are grouped into the BSC dimensions is shown in Figure 7-3.

BSC Dimension	Enterprise Goal	Relation to Governance Objectives		
		Benefits Realisation	Risk Optimisation	Resource Optimisation
Financial	1. Stakeholder value of business investments	P		S
	2. Portfolio of competitive products and services	P	P	S
	3. Managed business risk (safeguarding of assets)		P	S
	4. Compliance with external laws and regulations		P	
	5. Financial transparency	P	S	S
Customer	6. Customer-oriented service culture	P		S
	7. Business service continuity and availability		P	
	8. Agile responses to a changing business environment	P		S
	9. Information-based strategic decision making	P	P	P
	10. Optimisation of service delivery costs	P		P
Internal	11. Optimisation of business process functionality	P		P
	12. Optimisation of business process costs	P		P
	13. Managed business change programmes	P	P	S
	14. Operational and staff productivity	P		P
	15. Compliance with internal policies		P	
Learning and Growth	16. Skilled and motivated people	S	P	P
	17. Product and business innovation culture	P		

Figure 7-3: ITG with balanced Scorecard

Source: http://www.orbussoftware.com/blog/cobit-5-and-the-balanced-scorecard/

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Appendices

Appendix A: The global questionnaire

Critical Success Factors (CSFs) of IT Governance (ITG)

Section 2: Consent Form

Consent Form *

☐ I have read and understood the information (Section 1) and have had the opportunity to ask questions about the study. I also I agree to take part in this research project and agree for my data to be used for the purpose of this study. I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected. I therefore consent to the University retaining my personal details on a database, kept separately from the research data detailed above. The 'validity' of my consent is conditional upon the University complying with the Data Protection Act and I understand that I can request my details be removed from this database at any time.

Data Protection *

☐ I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be made anonymous.

Section 3: About You and Your Institution

1. In which country do you live? *

Abkhazia
Afghanistan
Akrotiri and Dhekelia
Åland
Albania
Algeria
American Samoa
Andorra
Angola
Anguilla
Antigua and Barbuda
Argentina
Armenia
Aruba
Ascension Island
Australia
Austria
Azerbaijan
Bahamas, The
Bahrain
Bangladesh
Barbados
Belarus
Belgium
Belize
Benin
Bermuda
Bhutan
Bolivia
Bosnia and Herzegovina
Botswana
Brazil
Brunei
Bulgaria
Burkina Faso
Burundi
Cambodia
Cameroon
Canada

2. Your IT Governance Experience (in years):*
(Either in IT Governance or any related fields)

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3. Your position

- Top Level Executive
- Senior Vice President
- Vice President
- Director
- Manager
- Professional
- Administrative/Support personnel
- N/A - Unemployed/Retired/Homemaker

4. I can accurately describe IT governance at my organisation

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

5. I am personally very involved in IT governance at my institution

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

6. Which of the following best characterizes IT governance at your institution?

- Non-existent: IT governance processes are not applied, and the institution has not recognized the need for them.
- Initial: IT governance processes are informal and uncoordinated.
- Repeatable: IT governance processes follow a regular pattern.
- Defined: IT governance processes are documented and communicated.
- Managed: IT governance processes are monitored and measured.
- Optimized: IT governance best practices are followed, and there are provisions for amending processes.

Section 4: Proposed Categories of CSFs of IT Governance

7. To what extent do you agree that each of the following is an appropriate category of CSFs of IT Governance? *

	Strongly disagree	Disagree	Agree	Strongly agree
Strategic alignment *				
Environmental effect (external) *				
Organisational effect (internal) *				
Performance management *				
Resource Management *				

8. Do you think there are other important categories have not mentioned here? If yes, what are they please?

Section 5: Proposed CSFs of IT Governance

9. Do you agree that each of the following is a Critical Success Factor (CSF) of IT Governance? *

	Strongly disagree	Disagree	Agree	Strongly agree
Adequate stockholders involvement *				
Adequate management support and ownership *				
Effective alignment and communication between IT and business strategy *				
Effective communication between IT and business *				
Regulatory environment & compliance requirements *				
Clear ITG policies, principles & responsibilities *				
Effective current Enterprise Governance *				
Appropriate organizational culture *				
Clear IT strategy, principles & policies *				
Good organization change strategy *				
Adequate analysis, evaluation of the current and future use of IT *				
Good project management methodology *				
Effective performance management strategy *				
Sufficient financial support *				
Adequate IT skills & staff *				

10. Do you think there are other important factors have not mentioned here? If yes, what are they please?

Section 6: The Proposed framework of CSFs & Categories of IT Governance

11. Do you agree that each of the following CSFs belongs to "Strategic Alignment" Category?

	Strongly disagree	Disagree	Agree	Strongly agree
Adequate stockholders involvement *	○	○	○	○
Adequate management support and ownership *	○	○	○	○
Effective alignment and communication between IT and business strategy *	○	○	○	○
Effective communication between IT and business management *	○	○	○	○

12. Do you agree that the following CSF belongs to "Environmental Effect (External)" Category?

	Strongly disagree	Disagree	Agree	Strongly agree
Regulatory environment & compliance requirements *	○	○	○	○

13. Do you agree that each of the following CSFs belongs to "Organisational Effect (Internal)" Category?

	Strongly disagree	Disagree	Agree	Strongly agree
Effective current Corporate Governance *	○	○	○	○
Clear ITG policies, principles & responsibilities *	○	○	○	○
Clear IT strategy, principles & policies *	○	○	○	○
Appropriate organisational culture through *	○	○	○	○
Good change management strategy *	○	○	○	○

14. Do you agree that each of the following CSFs belongs to "Performance Management" Category?

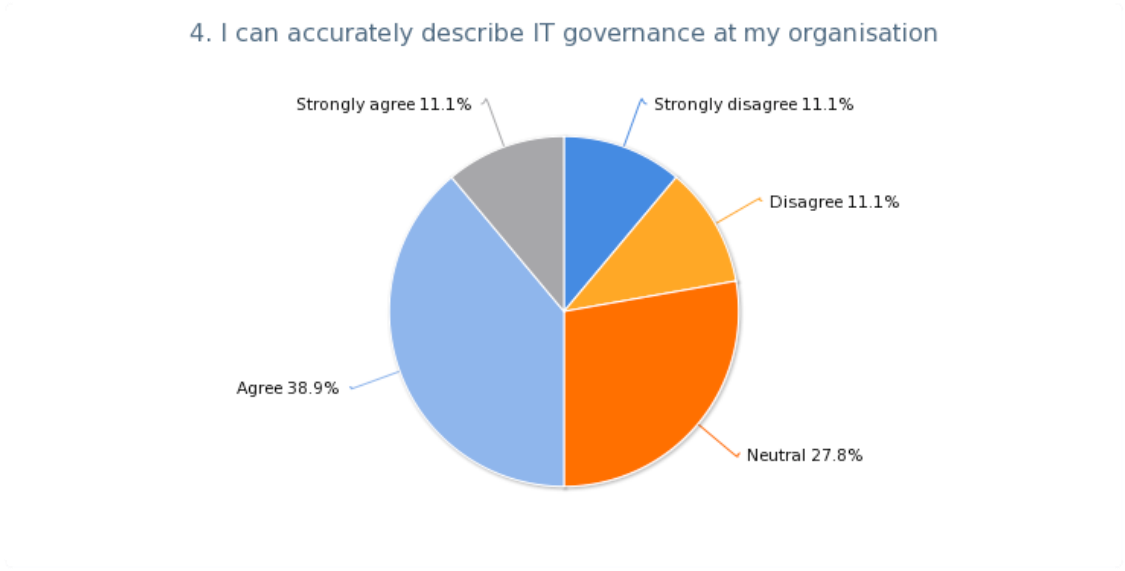
	Strongly disagree	Disagree	Agree	Strongly agree
Adequate analysis, evaluation of the current and future use of IT	○	○	○	○
Good project management methodology	○	○	○	○
Effective performance management strategy	○	○	○	○

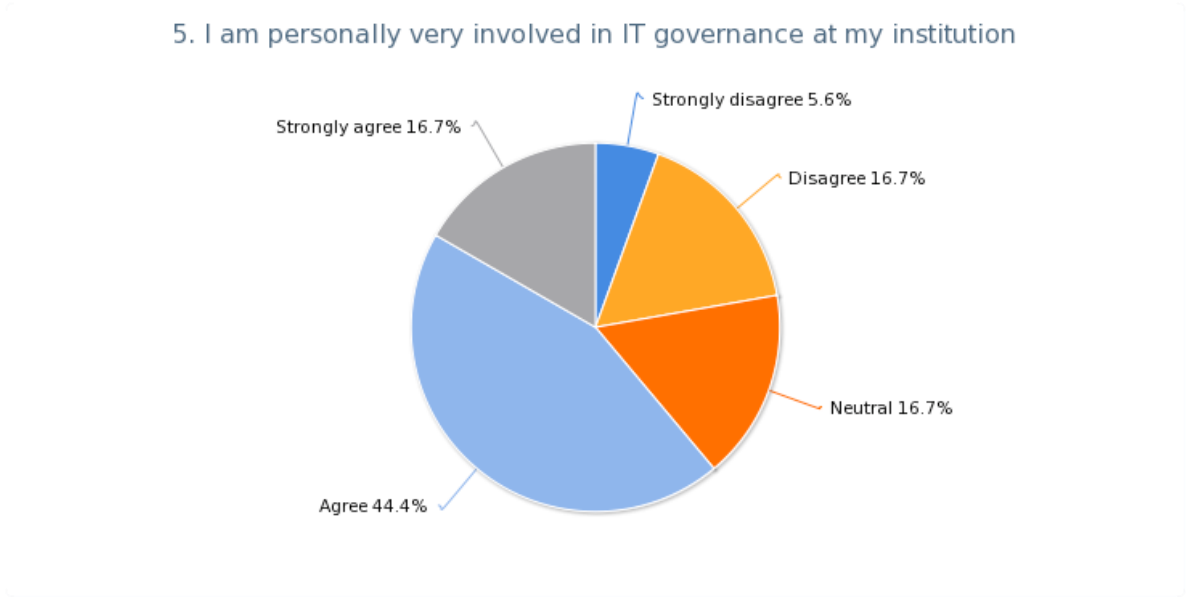
15. Do you agree that each of the following CSFs belongs to "Resource Management" Category?

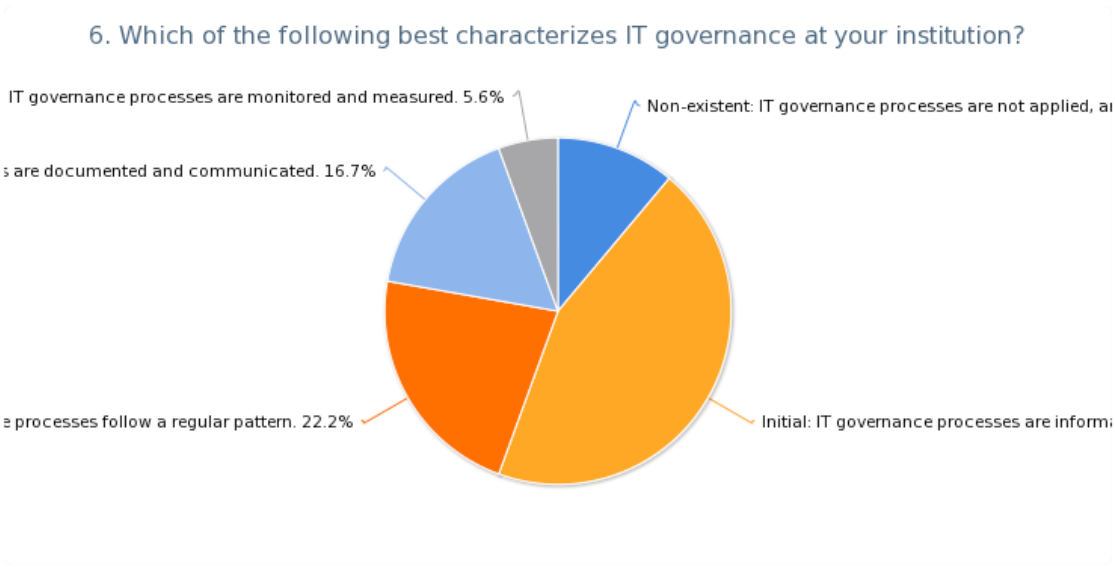
	Strongly disagree	Disagree	Agree	Strongly agree
Sufficient financial support	○	○	○	○
Adequate IT skills & staff	○	○	○	○
Adequate IT Governance awareness and training	○	○	○	○

16. Do you suggest any modifications in these relationships between categories and factors?

Appendix B: The other demographic information in global review







Appendix C: More details about the global review's results

Categories	Strongly disagree	Disagree	Agree	Strongly agree	Responses
Strategic alignment	0.0% 0	5.9% 1	23.5% 4	70.6% 12	17
Environmental effect (external)	5.9% 1	0.0% 0	47.1% 8	47.1% 8	17
Organizational effect (internal)	0.0% 0	5.9% 1	41.2% 7	52.9% 9	17
Performance management	0.0% 0	0.0% 0	41.2% 7	58.8% 10	17
Resource Management	0.0% 0	0.0% 0	41.2% 7	58.8% 10	17

CSFs	Strongly disagree	Disagree	Agree	Strongly agree	Responses
Adequate stakeholders involvement	13.3% 2	0.0% 0	60.0% 9	26.7% 4	15
Adequate management support and ownership	6.7% 1	0.0% 0	40.0% 6	53.3% 8	15

Effective alignment and communication between IT and business strategy	6.7% 1	0.0% 0	33.3% 5	60.0% 9	15
Effective communication between IT and business	6.7% 1	0.0% 0	33.3% 5	60.0% 9	15
Regulatory environment & compliance requirements	6.7% 1	6.7% 1	26.7% 4	60.0% 9	15
Clear ITG policies, principles & responsibilities	6.7% 1	0.0% 0	26.7% 4	66.7% 10	15
Effective current Enterprise Governance	6.7% 1	0.0% 0	33.3% 5	60.0% 9	15
Appropriate organizational culture	6.7% 1	0.0% 0	60.0% 9	33.3% 5	15
Clear IT strategy, principles & policies	6.7% 1	0.0% 0	33.3% 5	60.0% 9	15
Good organization change strategy	6.7% 1	0.0% 0	60.0% 9	33.3% 5	15
Adequate analysis, evaluation of the current and future use of IT	6.7% 1	0.0% 0	46.7% 7	46.7% 7	15
Good project management methodology	6.7% 1	0.0% 0	80.0% 12	13.3% 2	15
Effective performance management strategy	6.7% 1	0.0% 0	53.3% 8	40.0% 6	15
Sufficient financial support	6.7% 1	6.7% 1	46.7% 7	40.0% 6	15
Adequate IT skills & staff	6.7% 1	6.7% 1	53.3% 8	33.3% 5	15

Strategic Alignment Category	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**	**Responses**
Adequate stakeholders involvement	14.3% 2	14.3% 2	35.7% 5	35.7% 5	14
Adequate management support and ownership	0.0% 0	0.0% 0	64.3% 9	35.7% 5	14

Effective alignment and communication between IT and business strategy	0.0% 0	0.0% 0	35.7% 5	64.3% 9	14
Effective communication between IT and business management	0.0% 0	14.3% 2	28.6% 4	57.1% 8	14

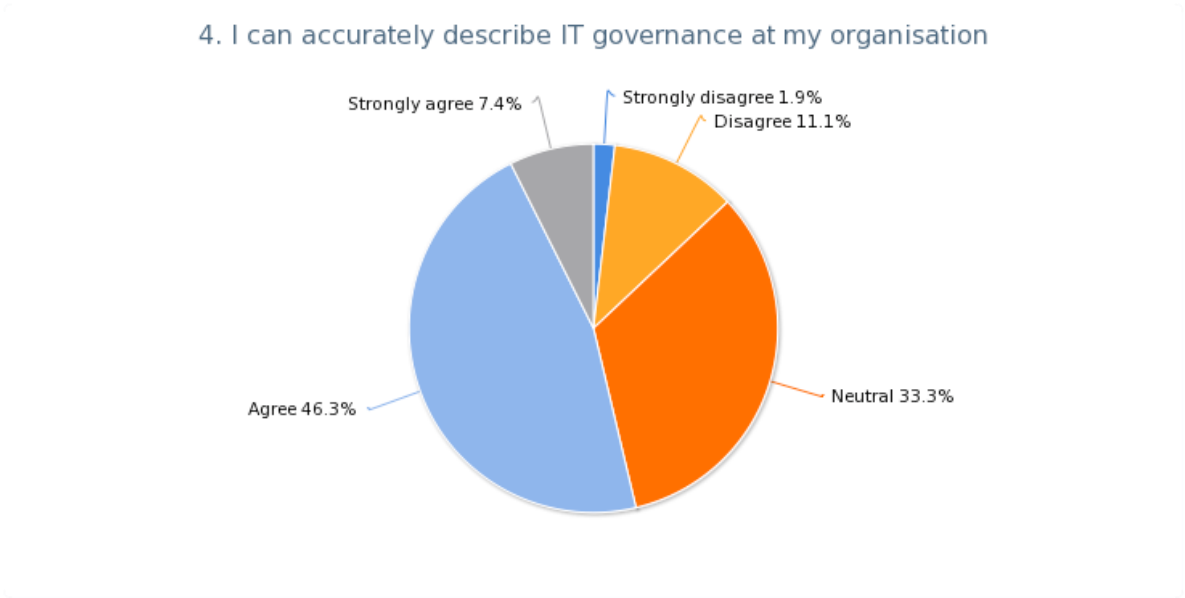
Environmental Effect (External) Category	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**	**Responses**
Regulatory environment & compliance requirements	0.0% 0	0.0% 0	61.5% 8	38.5% 5	13

Culture Effect (internal)	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**	**Responses**
Effective current Corporate Governance	0.0% 0	0.0% 0	46.2% 6	53.8% 7	13
Clear ITG policies, principles & responsibilities	0.0% 0	0.0% 0	53.8% 7	46.2% 6	13
Clear IT strategy, principles & policies	0.0% 0	0.0% 0	57.1% 8	42.9% 6	14
Appropriate organizational culture through	0.0% 0	0.0% 0	64.3% 9	35.7% 5	14
Good change management strategy	0.0% 0	0.0% 0	58.3% 7	41.7% 5	12

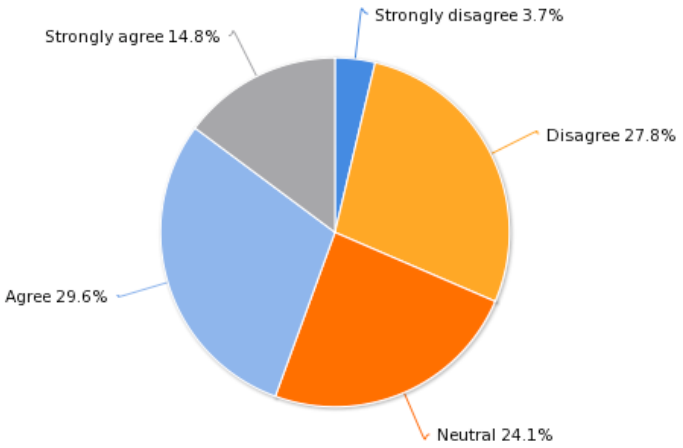
Performance Management	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**	**Responses**
Adequate analysis, evaluation of the current and future use of IT	0.0% 0	21.4% 3	42.9% 6	35.7% 5	14
Good project management methodology	0.0% 0	30.8% 4	53.8% 7	15.4% 2	13
Effective performance management strategy	0.0% 0	21.4% 3	42.9% 6	35.7% 5	14

Resource Management	Strongly disagree	Disagree	Agree	Strongly agree	Responses
Sufficient financial support	0.0% 0	14.3% 2	64.3% 9	21.4% 3	14
Adequate IT skills & staff	0.0% 0	7.1% 1	64.3% 9	28.6% 4	14
Adequate IT Governance awareness and training	0.0% 0	21.4% 3	42.9% 6	35.7% 5	14

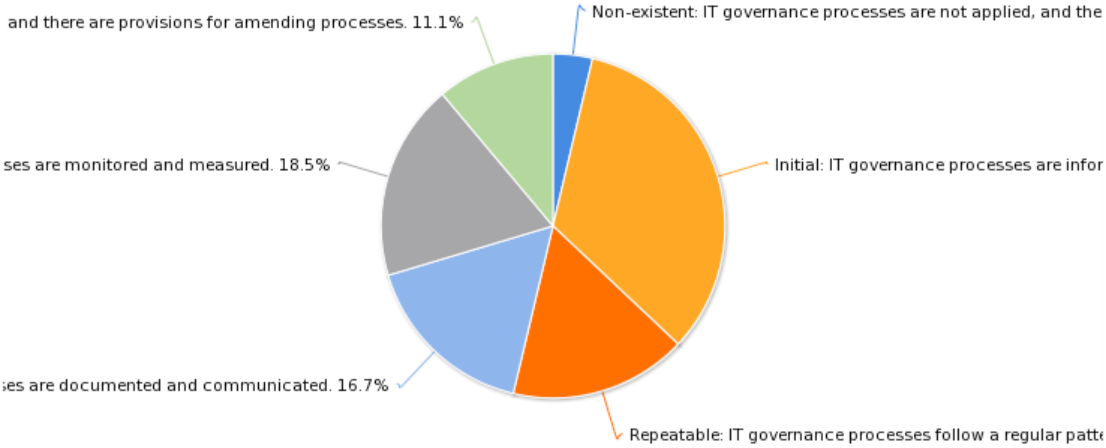
Appendix D: The other demographic information in Cultural review



5. I am personally very involved in IT governance at my institution



6. Which of the following best characterizes IT governance at your institution?



Appendix E: More details about the cultural review's results

Categories	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Responses
Strategic alignment	8.2% 4	2.0% 1	18.4% 9	34.7% 17	36.7% 18	49
Environmental effect (external)	8.3% 4	2.1% 1	31.3% 15	39.6% 19	18.8% EEE9	48
Organizational effect (internal)	8.2% 4	4.1% 2	12.2% 6	34.7% 17	40.8% 20	49
Performance management	8.2% 4	6.1% 3	28.6% 14	26.5% 13	30.6% 15	49
Resource Management	4.2% 2	12.5% 6	20.8% 10	31.3% 15	31.3% 15	48
Risk Management	8.2% 4	10.2% 5	22.4% 11	30.6% 15	28.6% 14	49

CSFs	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Responses
Adequate stakeholders involvement	7.5% 3	2.5% 1	10.0% 4	35.0% 14	45.0% 18	40
Adequate top management support and ownership	5.0% 2	0.0% 0	7.5% 3	27.5% 11	60.0% 24	40
Effective alignment between IT and business strategy	7.5% 3	0.0% 0	12.5% 5	35.0% 14	45.0% 18	40
Effective communication between IT and top management	5.0% 2	10.0% 4	7.5% 3	22.5% 9	55.0% 22	40
Regulatory environment & compliance requirements	5.0% 2	2.5% 1	17.5% 7	42.5% 17	32.5% 13	40
Clear Definition of IT Strategy in business strategy	2.5% 1	2.5% 1	10.0% 4	25.0% 10	60.0% 25	40
Comprehensive responsibility of BODs of IT Decisions	7.5% 3	2.5% 1	10.0% 4	30.0% 12	50.0% 20	40

Clear ITG policies, principles & responsibilities	2.5% 1	7.5% 3	7.5% 3	37.5% 15	45.0% 18	40
Effective current Enterprise Governance	5.0% 2	7.5% 3	10.0% 4	50.0% 20	27.5% 11	40
Appropriate organizational culture	5.0% 2	2.5% 1	27.5% 11	37.5% 15	27.5% 11	40
Clear IT strategy, principles & policies	7.5% 3	5.0% 2	10.0% 4	25.0% 10	52.5% 21	40
Good organization change strategy	5.0% 2	7.5% 3	25.0% 10	32.5% 13	30.0% 12	40
Adequate analysis, evaluation of the current and future use of IT	5.0% 2	2.5% 1	17.5% 7	32.5% 13	42.5% 17	40
Good project management methodology	5.0% 2	10.0% 4	12.5% 5	40.0% 16	32.5% 13	40
Effective performance management strategy	5.0% 2	2.5% 1	17.5% 7	42.5% 17	32.5% 13	40
Sufficient financial support	5.0% 2	7.5% 3	12.5% 5	25.0% 10	50.0% 20	40
Adequate IT Governance skills & Competencies	5.0% 2	2.5% 1	12.5% 5	25.0% 10	55.0% 22	40
Adequate and relevant Technology & Infrastructure	5.0% 2	5.0% 2	22.5% 9	22.5% 9	45.0% 18	40
Clear Risk Management Strategy	5.0% 2	2.5% 1	20.0% 8	37.5% 15	35.0% 14	40
Leadership and commitment of top management to the adoption of risk management strategy	5.0% 2	2.5% 1	20.0% 8	32.5% 13	40.0% 16	40
IT Risk is accessed and managed	5.0% 2	2.5% 1	25.0% 10	35.0% 14	32.5% 13	40
Business Risk is assessed and managed	5.0% 2	0.0% 0	27.5% 11	37.5% 15	30.0% 12	40

Strategic Alignment	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Responses**
Adequate stakeholders involvement	3.2% 1	3.2% 1	12.9% 4	38.7% 12	41.9% 13	31

Adequate top management support and ownership	3.2% 1	0.0% 0	12.9% 4	32.3% 10	51.6% 16	31
Effective alignment between IT and business strategy	0.0% 0	6.5% 2	9.7% 3	32.3% 10	51.6% 16	31
Clear Definition of IT Strategy in business strategy	0.0% 0	3.2% 1	12.9% 4	32.3% 10	51.6% 16	31
Comprehensive responsibility of BODs of IT Decisions	3.2% 1	3.2% 1	19.4% 6	32.3% 10	48.4% 15	31
Effective communication between IT and top management	3.2% 1	0.0% 0	19.4% 6	29.0% 9	48.4% 15	31

Environmental Effect (External) Category	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Responses**
Regulatory environment & compliance requirements	0.0% 0	3.2% 1	29.0% 9	32.3% 10	35.5% 11	31

Organizational Effect (Internal) Category	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Responses**
Effective current Corporate Governance	0.0% 0	3.2% 1	16.1% 5	48.4% 15	32.3% 10	31
Clear ITG policies, principles & responsibilities	0.0% 0	0.0% 0	9.7% 3	54.8% 17	35.5% 11	31
Clear IT strategy, principles & policies	0.0% 0	3.3% 1	16.7% 5	33.3% 10	46.7% 14	30
Appropriate organizational culture through	0.0% 0	0.0% 0	29.0% 9	48.4% 15	22.6% 7	31
Good change management strategy	0.0% 0	6.5% 2	25.8% 8	38.7% 12	29.0% 9	31

Performance Management Category	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Responses**
Adequate analysis, evaluation of the current and future use of IT	0.0% 0	9.4% 3	15.6% 5	50.0% 16	25.0% 8	32

Good project management methodology	0.0% 0	3.1% 1	25.0% 8	34.4% 11	37.5% 12	32
Effective performance management strategy	0.0% 0	0.0% 0	19.4% 6	38.7% 12	41.9% 13	31

Resource Management Category	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Responses**
Sufficient financial support	0.0% 0	3.1% 1	18.8% 6	43.8% 14	34.4% 11	32
Adequate IT skills & competencies	0.0% 0	0.0% 0	19.4% 6	48.4% 15	32.3% 10	31
Adequate IT Governance awareness and training	0.0% 0	0.0% 0	9.4% 3	53.1% 17	37.5% 12	32
Adequate & relevant Technology and Infrastructure	0.0% 0	0.0% 0	22.6% 7	41.9% 13	35.5% 11	31

Risk Management Category	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Responses**
Clear Risk Management Strategy	0.0% 0	0.0% 0	12.5% 4	40.6% 13	46.9% 15	32
Leadership and commitment of top management to the adoption of risk management strategy	0.0% 0	0.0% 0	12.5% 4	43.8% 14	43.8% 14	32
IT Risk is accessed and managed	0.0% 0	0.0% 0	12.5% 4	50.0% 16	37.5% 12	32
Business Risk is assessed and managed	0.0% 0	0.0% 0	18.8% 6	43.8% 14	37.5% 12	32

Appendix **F***: Case Study Questionnaire*

SFITG instrument- SAMA- v2

Section 1: Introduction

Page description:
Important Information for the participant and brief description of the study.

I am currently pursuing my PhD degree at the University of Southampton, United Kingdom. A key aim of my research is to develop an instrument that measures the status of IT Governance (ITG) in Public Organizations in Saudi Arabia based on the Critical Success Factors (CSFs) of ITG. These CSFs are structured and developed in a framework which is confirmed by global and cultural ITG experts.

These factors are divided to 6 Categories. Via this questionnaire, you will be asked some questions that measure specific fields in your organization. Besides, you can suggest adding more measures. Eventually, this would confirm the whole status of ITG in your organization.

I would like your kind contribution in the research process by completing the questionnaire. I would also like to stress that you have the right to withdraw up until the final submission of your response. All respondents will be anonymous during the collection, storage and publication of research material. Responses are collected online or by hand, and they will be treated confidentially and stored in a secure database.

Should you have any questions about the study or you wish to receive a copy of the results, please contact the researcher.

Zyad Alreemy
Electronics and Computer Science (ECS)
University of Southampton
Southampton, United Kingdom
Email: zsa1g12@soton.ac.uk
Mobile: 00966555558783

Section 2: Consent Form

Page description:
Important statements to be read and agreed to save the participant rights. You can contact me at any time for more explanation on my: Email: zsa1g12@soton.ac.uk, or Mobile: 00966555558783

Consent 1 *

☐ I have read and understood the introduction section and have had the opportunity to ask questions about the study.

Consent 2 *

☐ I agree to take part in this research project and agree for my data to be used for the purpose of this study.

Consent 3 *

☐ I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected.

Data Protection *

☐ I understand that all data is anonymous and no personal information will be stored or linked to the participant.

Section 3: About You and Your Organization

Page description:
Important Information about your organization to have an indication about your experience about IT Governance in general. You can contact me at any time for more explanation on my: Email: zsa1g12@soton.ac.uk, or Mobile: 00966555558783

Thank you for taking our survey! We're gathering this information for statistical purposes only. The data will not be used to identify you personally in any way.

1. Your IT Experience, ether in IT Governance or any related fields (in years): *

1-5
6-10
11-20
>20

2. Your position

- Top Level Executive
- Senior Vice President
- Vice President
- Director
- Manager
- Professional
- Administrative/Support personnel
- N/A - Unemployed/Retired/Homemaker

3. I can accurately describe IT governance at my organisation

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

4. I am personally very involved in IT governance at my institution

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

5. Which of the following best characterizes IT governance at your institution?

- Non-existent: IT governance processes are not applied, and the institution has not recognized the need for them.
- Initial: IT governance processes are informal and uncoordinated.
- Repeatable: IT governance processes follow a regular pattern.
- Defined: IT governance processes are documented and communicated.
- Managed: IT governance processes are monitored and measured.
- Optimized: IT governance best practices are followed, and there are provisions for amending processes.

Section 4: Strategic Alignment

Page description:
The following questions pertain to the Strategic Alignment between Business and IT in your organisation only.

The rating scale involves five assessment levels of the process as follows:

• Level 0 Non-existent process—The process is not adopted or implemented at all.

• Level 1 initial/ Incomplete process—The process is not implemented properly or fails to achieve its process purpose. Informal and uncoordinated process.

• Level 2 Defined/ Performed process—The process is simply implemented, documented, communicated and achieves its process purpose.

• Level 3 Managed process—The defined/ performed process is now implemented in a managed fashion (planned, monitored, measured and adjusted).

• Level 4 Optimized process—The managed process is continuously improved and best practices are followed to meet relevant current and projected business goals.

*The above are general definitions of the levels, and there are some specific definitions for some questions.

Your comments and suggestion are very appreciated and they will be taken seriously to enhance the study.
You can suggest modifying the question/ answer contents, format or any other modification. You can add your comments in the comments' textbox under each question or/and at the end of each section.

You can contact me at any time for more explanation on my: Email: zsa1g12@soton.ac.uk, or Mobile: 00966555558783

6. What do you think is the status of "Defining IT strategy in your organisation's business strategy"? *

Non-existent Process: (0% Not defined at all)
Initial/incomplete Process (25% Partially Complete)
Defined/performed Process (50% Half Complete)
Managed Process (75% Almost Complete)
Optimised Process (100% Fully Complete)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

7. What do you think is the status of "The alignment between IT strategy and your organisation's business strategy"? *

Non-existent Process: (0% No alignment at all)
Initial/incomplete Process (25% Partially alignment)
Defined/performed Process (50% Half alignment)
Managed Process (75% Almost Fully alignment)
Optimised Process (100% Fully alignment)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

8. What do you think is the status of "The support of board of directors to IT projects and investments in your organisation"? *

Non-existent Process: (0% No support at all)
Initial/incomplete Process (25% Partially support)
Defined/performed Process (50% Half support)
Managed Process (75% Almost Fully support)
Optimised Process (100% Fully support)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

9. What do you think is the status of "The responsibility of board of directors for IT projects and decisions in your organisation"? *

Non-existent Process: (0% No responsibility at all)
Initial/incomplete Process (25% Partially responsible)
Defined/performed Process (50% Half responsible)
Managed Process (75% Almost Fully responsible)
Optimised Process (100% Fully responsible)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

10. What do you think is the status of "The position and role of IT manager within the board of directors in your organisation"? *

Non-existent Process: (0% not active at all)
Initial/incomplete Process (25% Partially active)
Defined/performed Process (50% Half active)
Managed Process (75% Almost Fully active)
Optimised Process (100% Fully active)

***Active means he is as the same level of other members of the board of directors and involves in setting the policies and strategies of your organisation.**

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

11. What do you think is the status of "The communication between IT management and the board of directors in your organisation"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

12. What do you think is the status of "The identification and involvement of Stakeholders of IT's investments and decisions in IT strategy"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

13. Do you suggest adding more questions to measure the "Strategic Alignment" in your organisation or any other comments? if yes, what are they? You can also suggest modifying any question or answer options..

Section 5: Frameworks and Strategies Adoption

Page description:
The following questions pertain to the adoption of any frameworks, standards or strategies in your organisation only.

The rating scale involves five assessment levels of the process as follows:

• Level 0 Non-existent process—The process is not adopted or implemented at all.

• Level 1 initial/ Incomplete process—The process is not implemented properly or fails to achieve its process purpose. Informal and uncoordinated process.

• Level 2 Defined/ Performed process—The process is simply implemented, documented, communicated and achieves its process purpose.

• Level 3 Managed process—The defined/ performed process is now implemented in a managed fashion (planned, monitored, measured and adjusted).

• Level 4 Optimized process—The managed process is continuously improved and best practices are followed to meet relevant current and projected business goals.

*The above are general definitions of the levels, and there are some specific definitions for some questions.

Your comments and suggestion are very appreciated and they will be taken seriously to enhance the study.
You can suggest modifying the question/ answer contents, format or any other modification. You can add your comments in the comments' textbox under each question or/and at the end of each section.

You can contact me at any time for more explanation on my: Email: zsa1g12@soton.ac.uk, or Mobile: 00966555558783

14. What do you think is the status of "the adopted Corporate Governance standard or framework in your organisation"? *

Examples of Corporate Governance Frameworks are "TOGAF" and "The Zachman"

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

15. What do you think is the status of "the adopted IT Governance standard or framework in your organisation"? *

Examples of IT Governance standards and framework are "COBIT" and "ISO/IEC 38500"

Non-existent Process	Initial Process	Defind Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

16. What do you think is the status of "the adopted IT Management standard or framework in your organisation"? *

Examples of IT Management frameworks and standards are "ITIL" and "ISO/IEC 20000"

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

17. What do you think is the status of "the adopted Change Management strategy for IT projects and investments in your organisation"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

18. What do you think is the status of "the adopted Performance Management strategy in IT departments in your organisation"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

19. What do you think is the status of "the adopted Project Management Methodology in IT departments in your organisation"? *
Examples of Project Management Methodology are "PMBoK" and "PRINCE2"

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

20. What do you think is the status of "the adopted Quality Management strategy in IT departments in your organisation"? *
Quality Management comprises of Quality Control and Quality Assurance.

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

21. What do you think is the status of "the adopted IT Outsourcing strategy in your organisation"? *

Non-existent Process	initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

22. What do you think is the status of "the integration between these frameworks and strategies in your organisation"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

23. Do you suggest adding more questions to measure the "Frameworks and Strategies Adoption" in your organisation or any other comments? if yes, what are they? You can also suggest modifying any question or answer options..

Section 6: Environmental effect (external)

Page description:
The following questions pertain to the external environment effects on your organisation only.

The rating scale involves five assessment levels of the process as follows:

• Level 0 Non-existent process—The process is not adopted or implemented at all.

• Level 1 initial/ Incomplete process—The process is not implemented properly or fails to achieve its process purpose. Informal and uncoordinated process.

• Level 2 Defined/ Performed process—The process is simply implemented, documented, communicated and achieves its process purpose.

• Level 3 Managed process—The defined/ performed process is now implemented in a managed fashion (planned, monitored, measured and adjusted).

• Level 4 Optimized process—The managed process is continuously improved and best practices are followed to meet relevant current and projected business goals.

*The above are general definitions of the levels, and there are some specific definitions for some questions.

Your comments and suggestion are very appreciated and they will be taken seriously to enhance the study.
You can suggest modifying the question/ answer contents, format or any other modification. You can add your comments in the comments' textbox under each question or/and at the end of each section.

You can contact me at any time for more explanation on my: Email: zsa1g12@soton.ac.uk, or Mobile: 00966555558783

24. What do you think is the status of "The Definition of Regulatory Requirements in IT strategy"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

25. What do you think is the status of "The Compliance with the Regulatory Requirements in your organisation"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

26. What do you think is the status of "The adopted Competitive Strategy in IT strategy"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

Page description:
The following questions pertain to the internal effects on your organisation only.

The rating scale involves five assessment levels of the process as follows:

• Level 0 Non-existent process—The process is not adopted or implemented at all.

• Level 1 initial/ Incomplete process—The process is not implemented properly or fails to achieve its process purpose. Informal and uncoordinated process.

• Level 2 Defined/ Performed process—The process is simply implemented, documented, communicated and achieves its process purpose.

• Level 3 Managed process—The defined/ performed process is now implemented in a managed fashion (planned, monitored, measured and adjusted).

• Level 4 Optimized process—The managed process is continuously improved and best practices are followed to meet relevant current and projected business goals.

*The above are general definitions of the levels, and there are some specific definitions for some questions.

Your comments and suggestion are very appreciated and they will be taken seriously to enhance the study. You can suggest modifying the question/ answer contents, format or any other modification. You can add your comments in the comments' textbox under each question or/and at the end of each section. You can contact me at any time for more explanation on my: Email: zsa1g12@soton.ac.uk, or Mobile: 00966555558783

27. What do you think is the status of "The Proper Organisational Culture in IT departments in your organization"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

28. What do you think is the status of "IT Governance policies, principles & responsibilities in your organization"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

29. What do you think is the status of "IT policies, principles & responsibilities in your organization"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

30. What do you think is the status of "The analysis and evaluation of the current and future use of IT in your organization"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

31. Do you suggest adding more questions to measure the "Internal Organisational Effects" in your organisation or any other comments? if yes, what are they? You can also suggest modifying any question or answer options..

Section 8: Resource Management

Page description:
The following questions pertain to the Resource Management of IT Governance in your organisation only.

The rating scale involves five assessment levels of the process as follows:

• Level 0 Non-existent process—The process is not adopted or implemented at all.

• Level 1 initial/ Incomplete process—The process is not implemented properly or fails to achieve its process purpose. Informal and uncoordinated process.

• Level 2 Defined/ Performed process—The process is simply implemented, documented, communicated and achieves its process purpose.

• Level 3 Managed process—The defined/ performed process is now implemented in a managed fashion (planned, monitored, measured and adjusted).

• Level 4 Optimized process—The managed process is continuously improved and best practices are followed to meet relevant current and projected business goals.

*The above are general definitions of the levels, and there are some specific definitions for some questions.

Your comments and suggestion are very appreciated and they will be taken seriously to enhance the study.
You can suggest modifying the question/ answer contents, format or any other modification. You can add your comments in the comments' textbox under each question or/and at the end of each section.

You can contact me at any time for more explanation on my: Email: zsa1g12@soton.ac.uk, or Mobile: 00966555558783

32. What do you think is the status of "The allocated budget for IT projects and investments"? *

Non-existent Process: (0% Not sufficient at all)
Initial/incomplete Process (25% Partially sufficient and accessible)
Defined/performed Process (50% Half sufficient and accessible)
Managed Process (75% Almost Fully sufficient and accessible)
Optimised Process (100% Fully sufficient and accessible)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

33. What do you think is the status of "The required IT skills & competencies"? *

Non-existent Process: (0% Not sufficient at all)
Initial/incomplete Process (25% Partially sufficient)
Defined/performed Process (50% Half sufficient)
Managed Process (75% Almost Fully sufficient)
Optimised Process (100% Fully sufficient)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

34. What do you think is the status of "The required Relevant Technology and Infrastructure of IT"? *

Non-existent Process: (0% Not sufficient at all)
Initial/incomplete Process (25% Partially sufficient)
Defined/performed Process (50% Half sufficient)
Managed Process (75% Almost Fully sufficient)
Optimised Process (100% Fully sufficient)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

35. What do you think is the status of "IT Governance awareness and training in your organization"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

36. Do you suggest adding more questions to measure the "Resource Management" in your organisation or any other comments? if yes, what are they? You can also suggest modifying any question or answer options..

Section 9: Risk Management

Page description:
The following questions pertain to the Risk Management of IT and Business in your organisation only.

The rating scale involves five assessment levels of the process as follows:

• Level 0 Non-existent process—The process is not adopted or implemented at all.

• Level 1 initial/ Incomplete process—The process is not implemented properly or fails to achieve its process purpose. Informal and uncoordinated process.

• Level 2 Defined/ Performed process—The process is simply implemented, documented, communicated and achieves its process purpose.

• Level 3 Managed process—The defined/ performed process is now implemented in a managed fashion (planned, monitored, measured and adjusted).

• Level 4 Optimized process—The managed process is continuously improved and best practices are followed to meet relevant current and projected business goals.

*The above are general definitions of the levels, and there are some specific definitions for some questions.

Your comments and suggestion are very appreciated and they will be taken seriously to enhance the study.
You can suggest modifying the question/ answer contents, format or any other modification. You can add your comments in the comments' textbox under each question or/and at the end of each section.

You can contact me at any time for more explanation on my: Email: zsa1g12@soton.ac.uk, or Mobile: 00966555558783

37. What do you think is the status of "The Risk Management Strategy of IT and Business in your organization"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

38. What do you think is the status of "The lead of board of directors to the risk management strategy in your organization"? *

Non-existent Process: (0% No lead at all)
Initial/incomplete Process (25% Partially lead)
Defined/performed Process (50% Half lead)
Managed Process (75% Almost Fully lead)
Optimised Process (100% Fully lead)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

39. What do you think is the status of "Business risks in your organization"? *

Non-existent Process: (0% Not managed at all)
Initial/incomplete Process (25% Partially managed)
Defined/performed Process (50% Half managed)
Managed Process (75% Almost Fully managed)
Optimised Process (100% Fully managed)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

40. What do you think is the status of "IT risks in your organization"? *

Non-existent Process: (0% Not managed at all)
Initial/incomplete Process (25% Partially managed)
Defined/performed Process (50% Half managed)
Managed Process (75% Almost Fully managed)
Optimised Process (100% Fully managed)

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

41. What do you think is the status of "Information Security Strategy in your organization"? *

Non-existent Process	Initial Process	Defined Process	Managed Process	Optimised Process
○	○	○	○	○

Comments

42. Do you suggest adding more questions to measure the "Risk Management" in your organisation or any other comments? if yes, what are they? You can also suggest modifying any question or answer options..

Thank you for Completing our survey.

Page description:
We're gathering this information for statistical purposes only. The data will not be used to identify you personally in any way.

Thank you for taking our survey. Your response is very important to us. To get the results of the questionnaire, you can contact me in April 2015 at zsa1g12@soton.ac.uk.

Appendix G: Case Study 1

Section 1: The radar charts of the factors and the participants' comments

In this case study, only the radar charts of the factors assessments are shown while in the other case studies both radar and bar charts are presented.

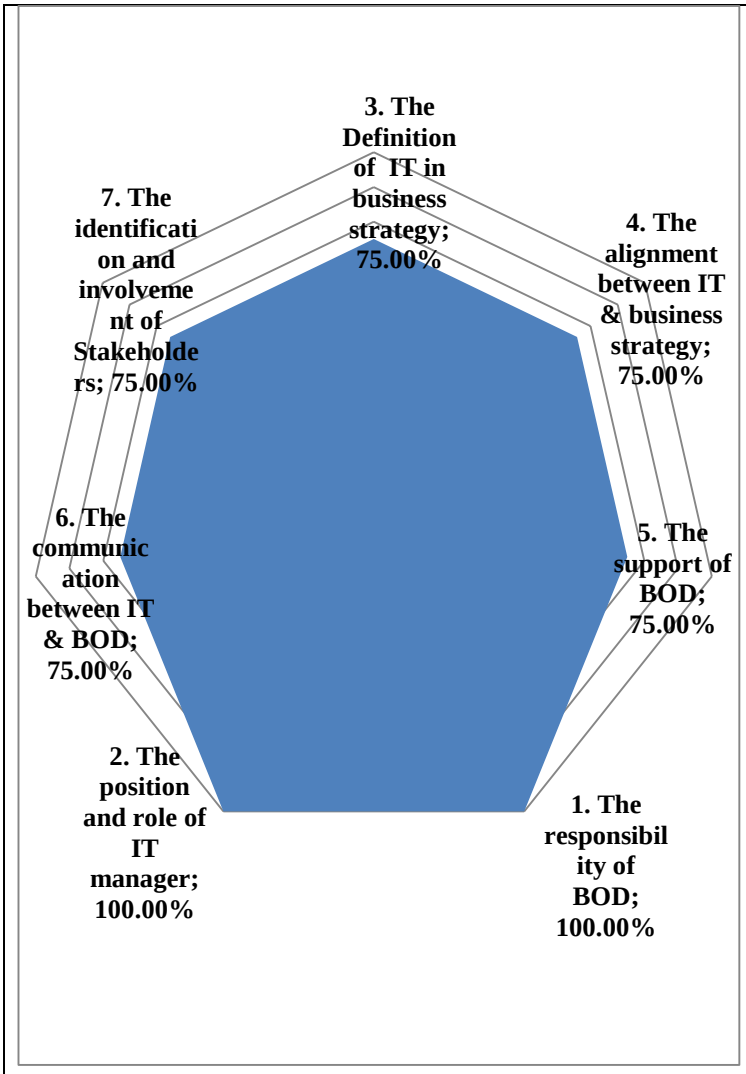


Figure 7-4: Strategic Alignment (SA)

The participants ***strongly agreed*** that these results reflect the actual status of **SA** in their Organization.

Action: be consistent and minor improvement may be needed.

- **100% - Optimized Processes:**

1. The board of directors is fully responsible for IT projects and decisions.
2. The position and role of IT manager is very active within the board of directors.

Action: be consistent and no action is needed

- **75% - Managed Processes:**

3. The Definition of IT strategy in the organization's business strategy is almost complete.
4. IT strategy is almost fully aligned with organization's business strategy.
5. The board of directors is almost fully support IT projects and investments.
6. The communication between IT management and the board of directors.
7. The identification and involvement of Stakeholders of IT's investments and decisions in IT strategy.

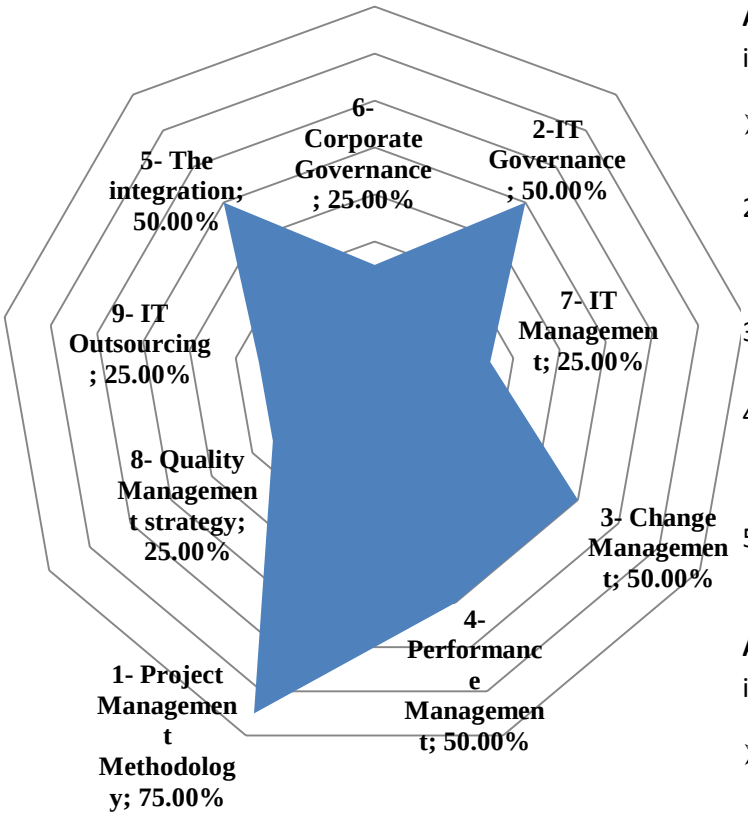


Figure 7-5: Frameworks and Strategies (FSA)

The participants ***strongly agreed*** that these results reflect the actual status of **FSA** in their Organization.

- **75% - Managed Processes:**

1. The Adopted Project Management Methodology.

Action: be consistent and minor improvement may be needed.

- **50% - Defined/ Performed Processes:**

2. The Adopted IT Governance Standard or Framework.
3. The Adopted Performance Management Strategy.
4. The integration between these strategies and frameworks.
5. The Adopted Change Management Strategy.

Action: medium improvement is needed.

- **25% - Initial/incomplete Process:**

6. The Adopted Corporate Governance.
7. The Adopted IT Management standard or framework.
8. The Adopted Quality Management Strategy.
9. The Adopted IT Outsourcing Strategy.

Action: major and urgent improvement is needed.

Participants Comments

- The top management emphasizes to not outsource any IT processes; this is why our IT outsourcing strategy is not complete.

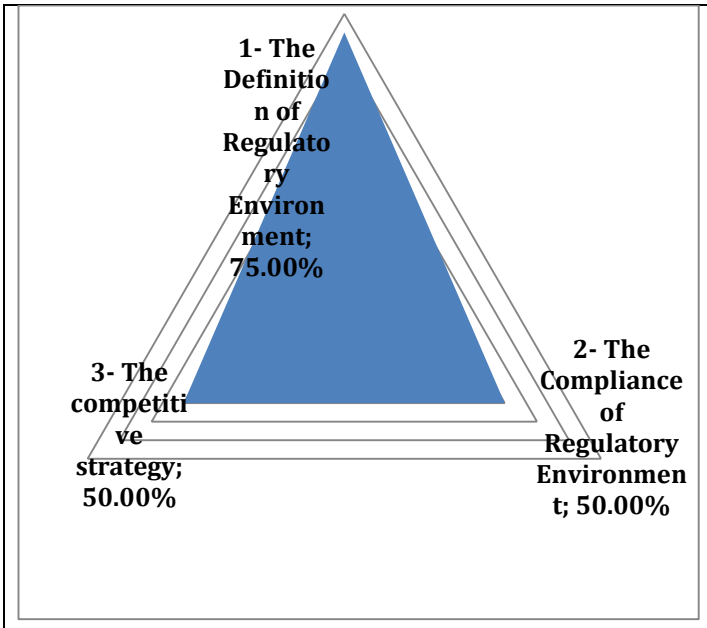


Figure 7-6: Environmental Effect (EE)

The participants ***strongly agreed*** that these results reflect the actual status of **EE** in their Organization.

- **75% - Managed Processes:**

1- The Definition of Regulatory Environment & Requirements in IT strategy.

Action: be consistent and minor improvement may be needed.

- **50% - Defined/ Performed Processes:**

2- The Compliance of Regulatory Environment & Requirements.
3- The adopted Competitive Strategy.

Action: medium improvement is needed.

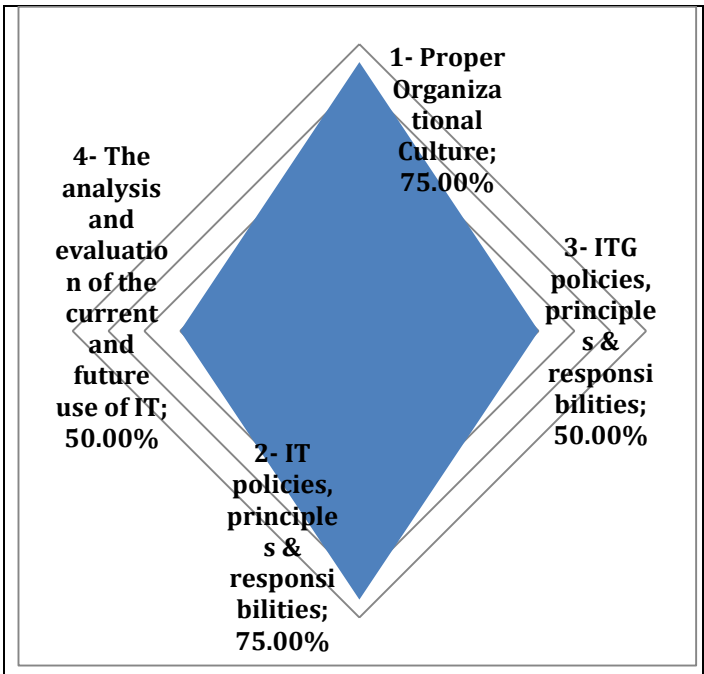


Figure 7-7: Organisational Effect (OE)

After showing these results to the participants, they ***agreed*** these results reflect the actual status of **OE** in their Organization.

- **75% - Managed Processes:**

1. Proper Organizational Culture in IT Departments.
2. IT policies, principles and responsibilities.

Action: be consistent and minor improvement may be needed.

- **50% - Defined/ Performed Processes:**

3. IT Governance policies, principles & responsibilities.
4. The analysis and evaluation of the current and future use of IT.

Action: medium improvement is needed.

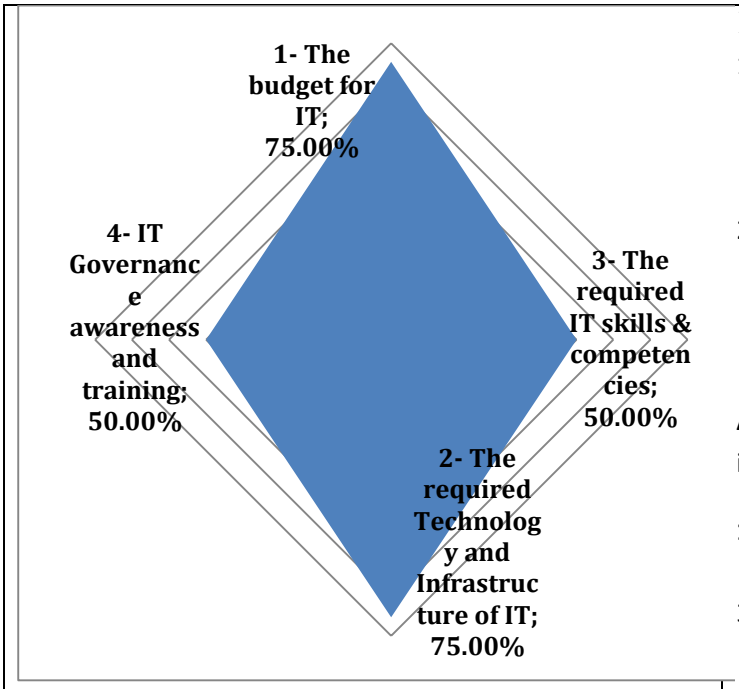


Figure 7-8: Resource Management (RM)

The participants ***strongly agreed*** that these results reflect the actual status of **RM** in their Organization.

Action: medium improvement is needed.

- **75% - Managed Processes:**

1. The allocated budget for IT projects and investments is almost fully sufficient and accessible.
2. The required Relevant Technology and Infrastructure of IT is almost fully sufficient.

Action: be consistent and minor improvement may be needed.

1. **50% - Defined/ Performed Processes:**
3. The required IT skills and competencies are half sufficient.
4. IT Governance awareness and training.

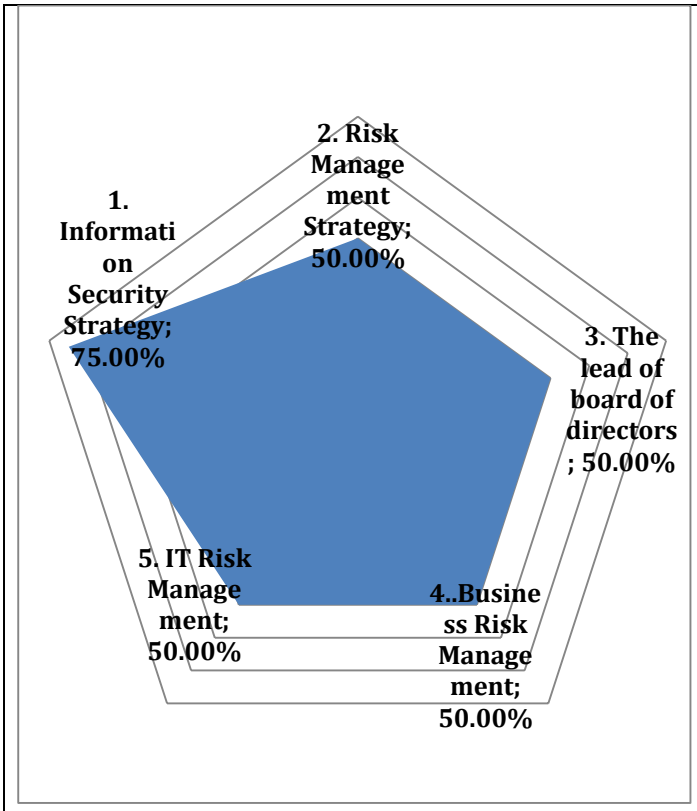


Figure 7-9: Risk Management (RKM)

- **75% - Managed Processes:**

1. Information Security standards and policies.

Action: be consistent and minor improvement may be needed.

2. **50% - Defined/ Performed Processes:**
2. Risk Management Strategy of IT and business.
3. The board of directors is half leading the risk management strategy.
4. Business risk is half managed.
5. IT risk is half managed.

Action: medium improvement is needed.

The participants ***agreed*** that these results reflect the actual status of **RKM** in their Organization.

Section 2: The main categories scores before weighting

After showing the results of all CSFs in this case study, the score of each category will be calculated – as explained above:

1- **Strategic Alignment (SA) weight** = (factor1 score + … + factor 7 score) / No of the factors in SA (7)

   SA weight = (75 + 75 + 75 + 100 + 100 + 75 + 75) / 7 = **82.14%**

2- **Frameworks & Strategies (FSA) weight**: (factor1 score + … + factor 9 score) / No of the factors (9)

   FSA weight: (25 + 50 + 25 + 50 + 50 +75 + 25 + 25 + 50) / 9 = **41.66%**

3- **Environmental effect (EE) weight**: (factor1 score + factor 2 score + factor 3 score) / No of the factors (3)

   EE weight: (75 + 50 + 50) / 3

4- **Organizational effect (OE) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)

   OE weight: (75 + 50 + 75 + 50) / 4 = **58.33%**

5- **Resource Management (RM) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)

   RM weight: (75 + 50 + 75 + 50) / 4 = **62.5%**

6- **Risk Management (RKM) weight**: (factor1 score + … + factor 5 score) / No of the factors (5)

   RKM weight: (50 + 50 + 50 + 50 + 75) / 5 = **55%**

Section 3: Whole ITG Score

This section pertains to find the final score of ITG in this case study. The steps are illustrated above.

1- The factor weight is **3.125**

2- Strategic Alignment (SA) weight =3.125 * 7= **21.875%**

Frameworks & Strategies (FSA) weight = 3.125 *9 = **28.125%**

Environmental effect (EE) weight = 3.125 *3 = **9.375%**

Organizational effect (OE) weigh t= 3.125 *4 = **12.5%**

Resource Management (RM) weigh t= 3.125 *4 = **12.5%**

Risk Management (RKM) weight = 3.125 *5 = **15.625%**

3- SA weight **=**

(Category Weight (21.875) * SA final score in this case study (82.14))/100= **17.97%**

FSA weight **=**

28.125 * FSA final score (41.66) = **11.72%**

EE weight **=**

9.375 * EE final score (58.33) = **5.47%**

OE weight **=**

12.5* OE final score (62.50) = **7.81%**

RM weight **=**

12.5 * RM final score (62.50) = **7.81%**

RKM weight **=**

15.625 * RKM final score (55.00) = **8.59%**

4- **The total weights of all categories in this case study =** 17.97%+ 11.72%+ 5.47% + 7.81% + 7.81% + 8.59%= **59.37%**

Based on the assessments of the categories and CSFs, the final score of whole ITG in this case study is **59.37%,** ***"Average Governance, medium improvement is needed"***

Participants Comments:

1. This is good instrument at the time of collecting the data.
2. We will use this instrument as support guide during our ITG development.
3. We are happy to work again if there is any update on the study.

Appendix H: Case Study 2

Section 1: The charts of the factors and the participants' comments

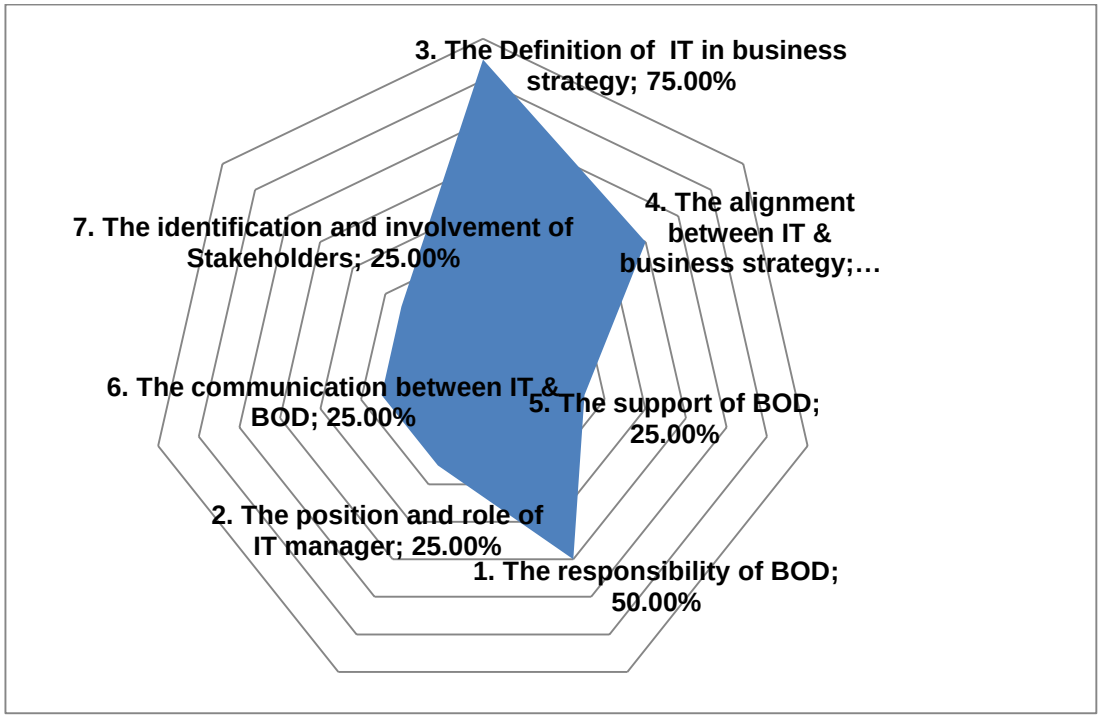


Figure 7-10: Strategic Alignment (SA)

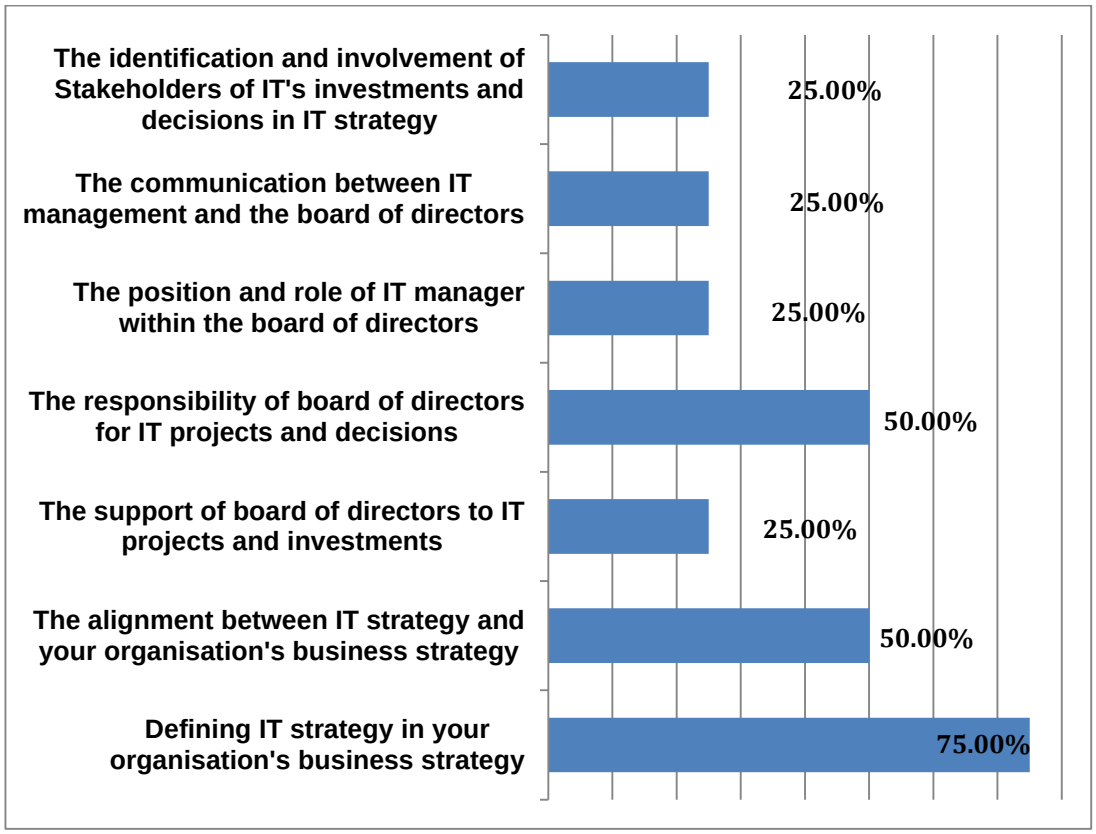


Figure 7-11: Case Study2: Strategic Alignment- Bar Chart

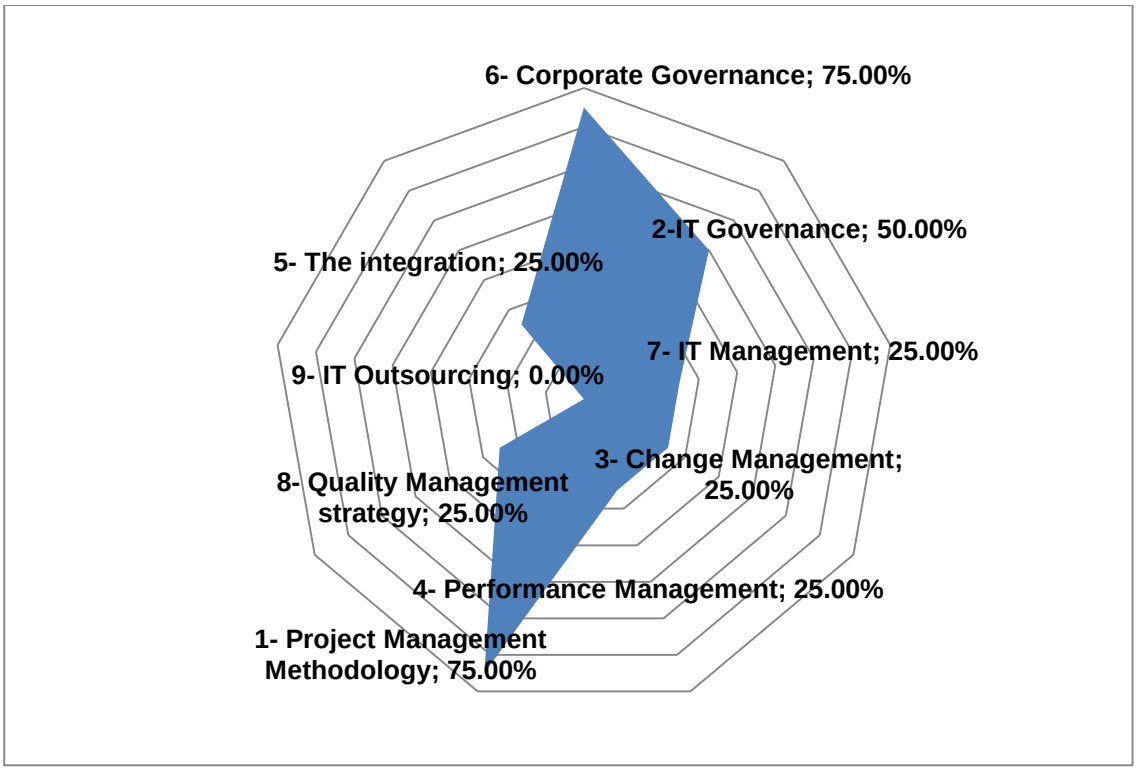


Figure 7-12: Frameworks and Strategies Adoption (FSA)

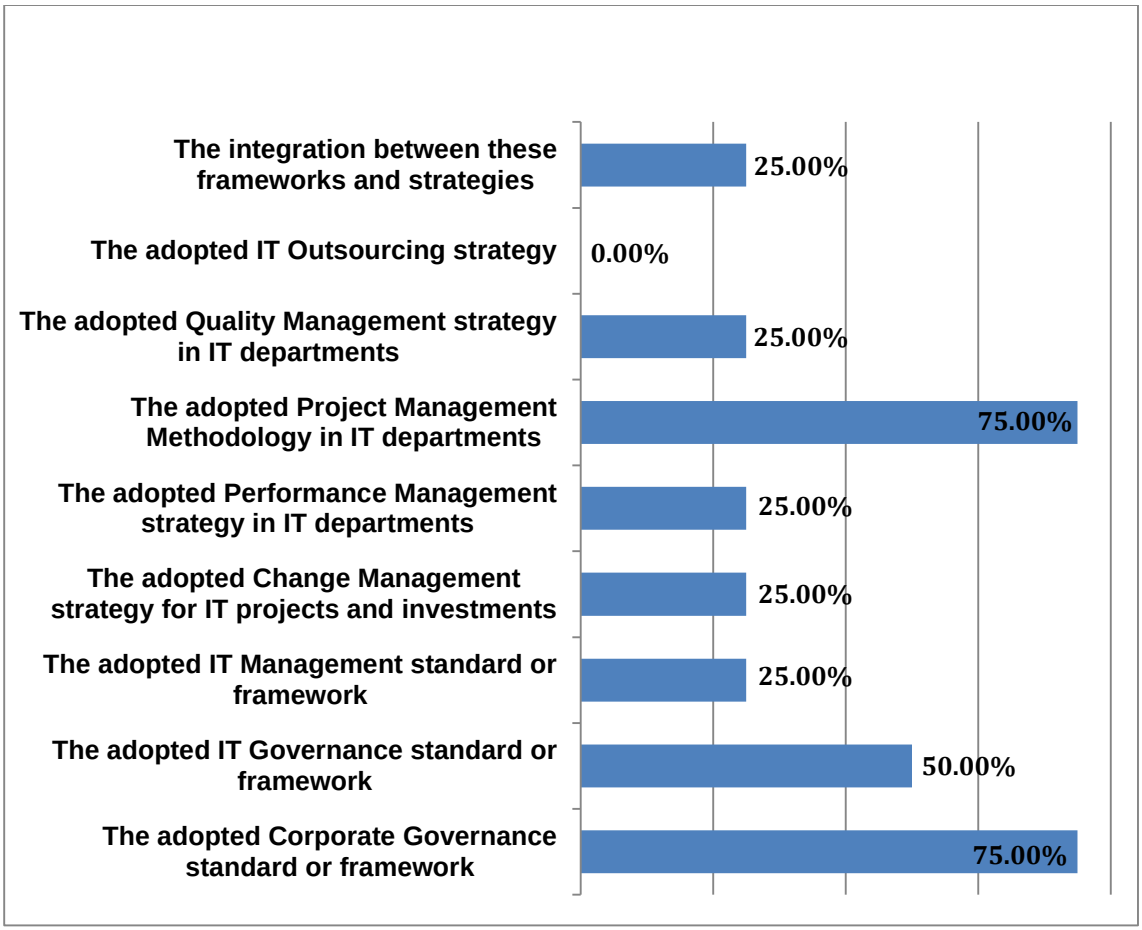


Figure 7-13: Case Study2: Frameworks and Strategies- Bar Chart

Participants Comments:

1- (Corporate Governance) The organization follows the rules and regulations of the government in Saudi Arabia with respect to corporate governance. These are very well defined and applied to all government agencies.

2- (IT Governance) We are primarily using COBIT 5 framework to define our IT Governance framework, with augmentation by other frameworks in their respective areas of strength (such as TOGAF, ITIL, PMI...etc.)

3- (IT Management) A project is underway to define the ITSM processes based on ITIL. The key service management processes (incident management and problem management) are only active for the time being.

4- (Change Management) This is partially defined based on PROSCI framework. They are being improved to address our organization's demands.

5- (Project Management) The PMO at our organization has been established more than 3 years ago based on PMBoK. The processes are highly detailed and applied.

6- (Quality Management) This is primarily based on Microsoft Application Life-cycle Management (ALM). Still more work to be done to cover the entire life cycle.

7- (The integration) COBIT 5 has been leveraged to cover for this area. Process definition is complete, but the execution is still at the very early stages.

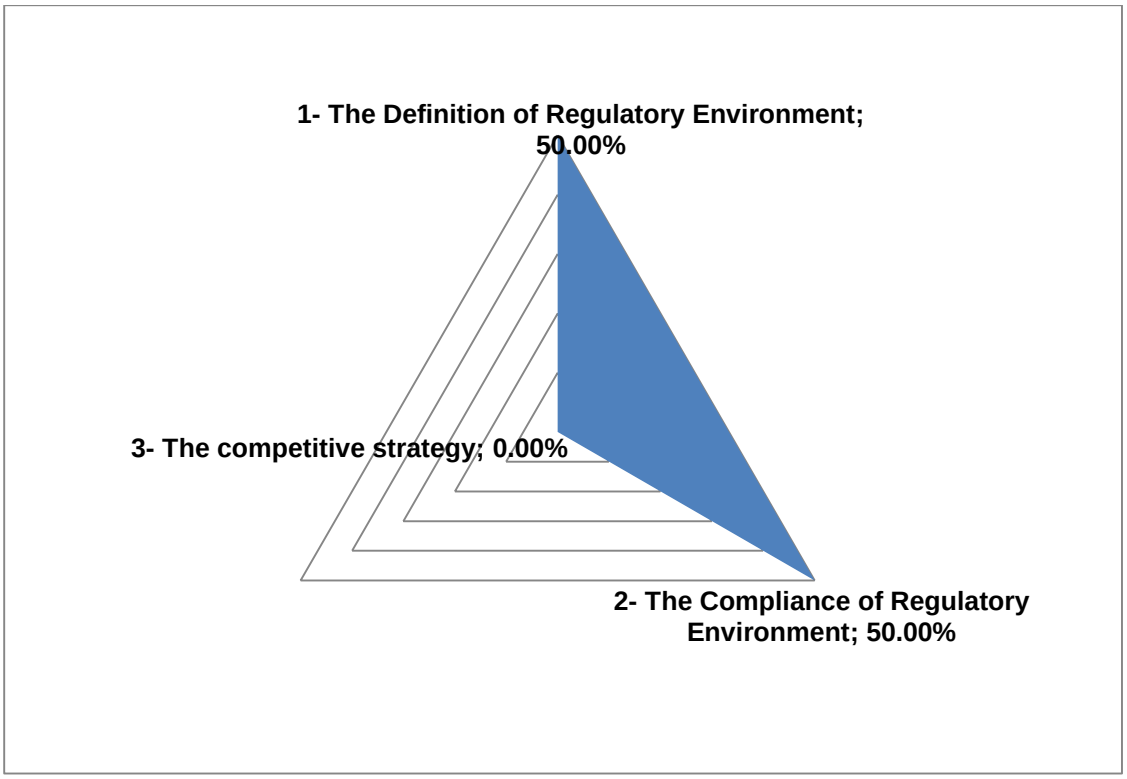


Figure 7-14: Environmental Effect (EE)

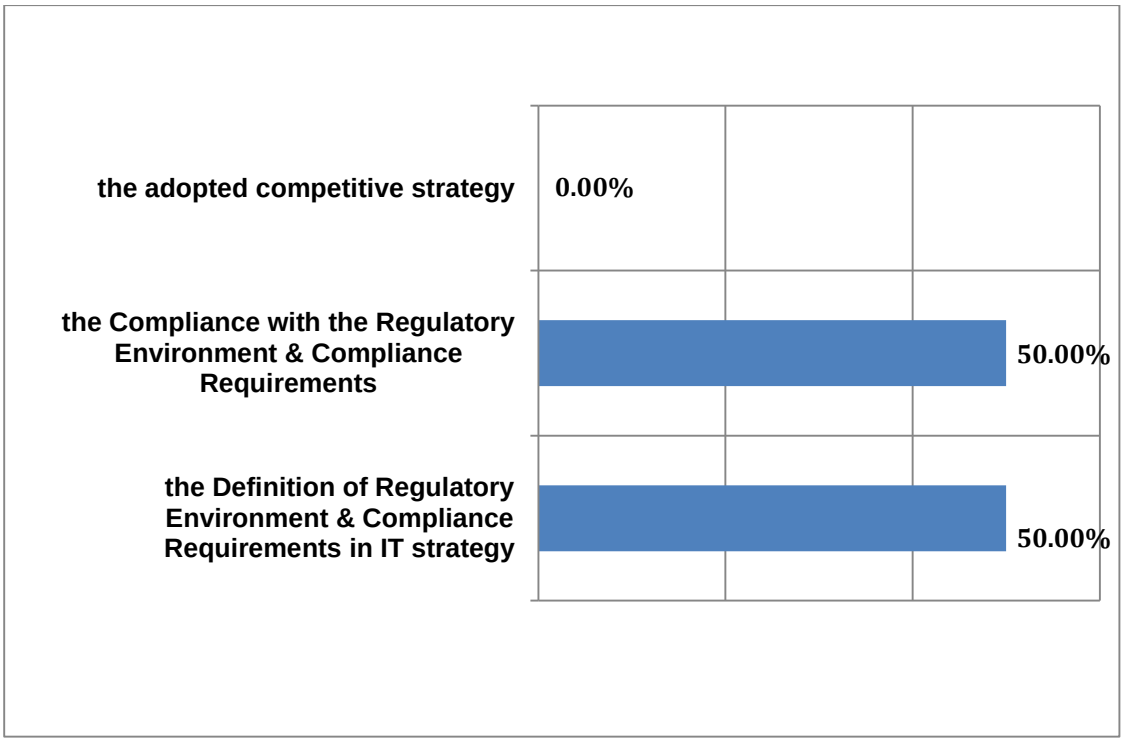


Figure 7-15: Case Study2: Environmental Effect- Bar Chart

Participants Comments: Based on the government rules for this domain. Not aware of any specific framework for this domain. Because we are public sector, there is no need for the competitive strategy.

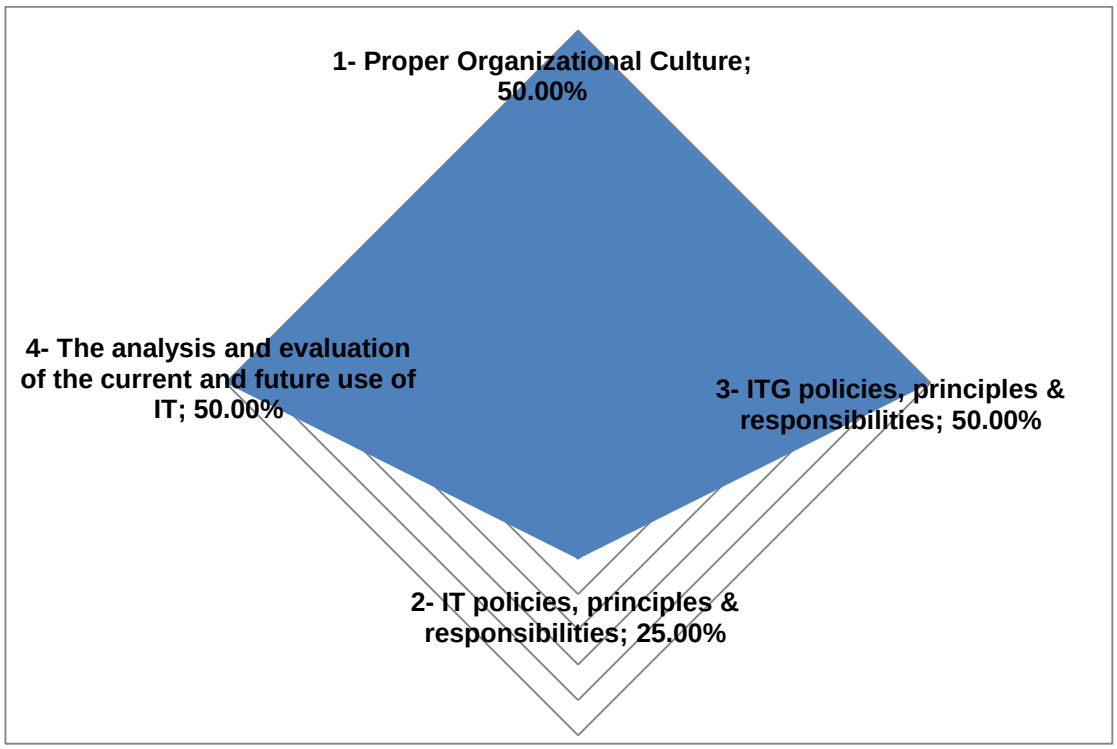


Figure 7-16: Organizational Effect (OE)

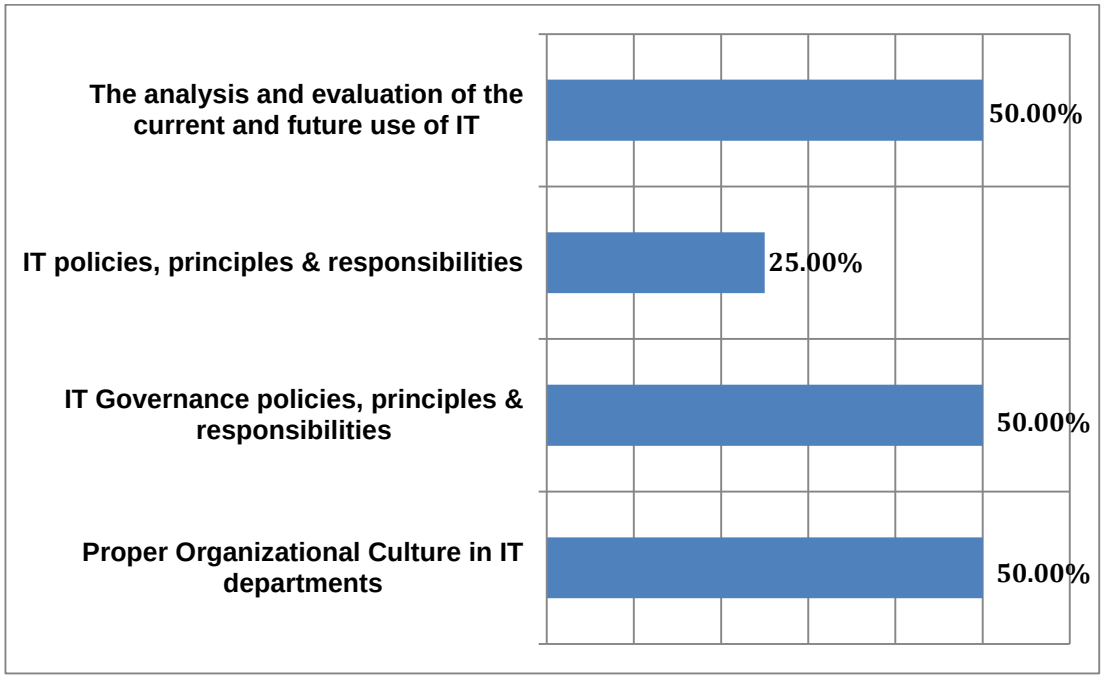


Figure 7-17: Case Study2: Organizational Effect- Bar Chart

Participants Comments:

1- (IT Policies) Some policies are already defined, but not all of them are applied.

2- (The analysis) This is partly delivered by the Strategy Management Office operational activities.

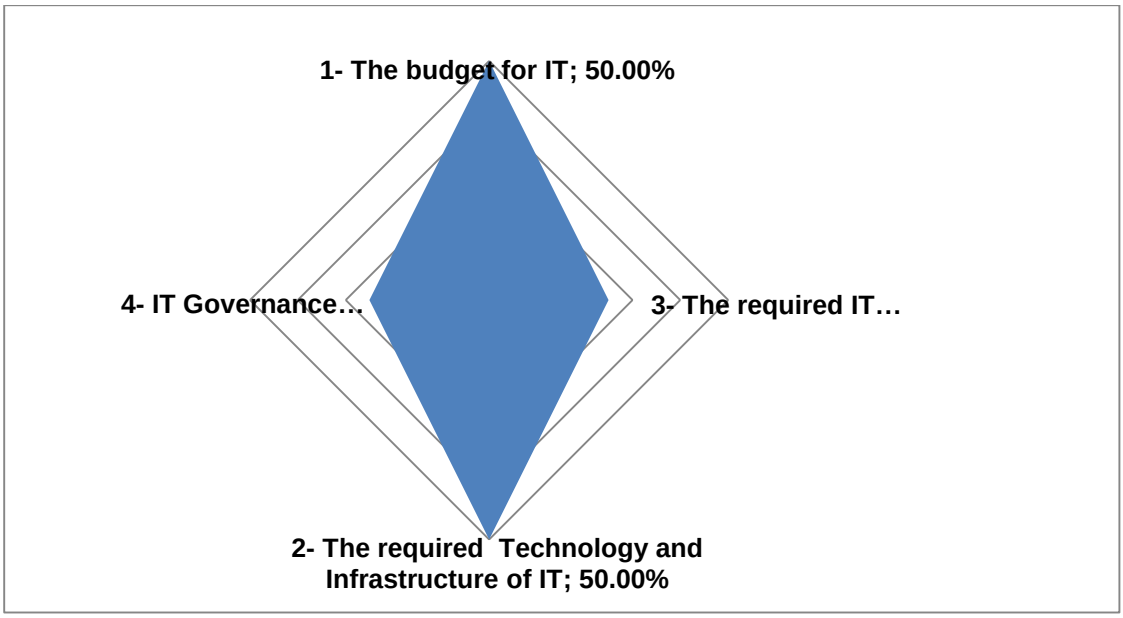


Figure 7-18: Resource Management- Radar Chart

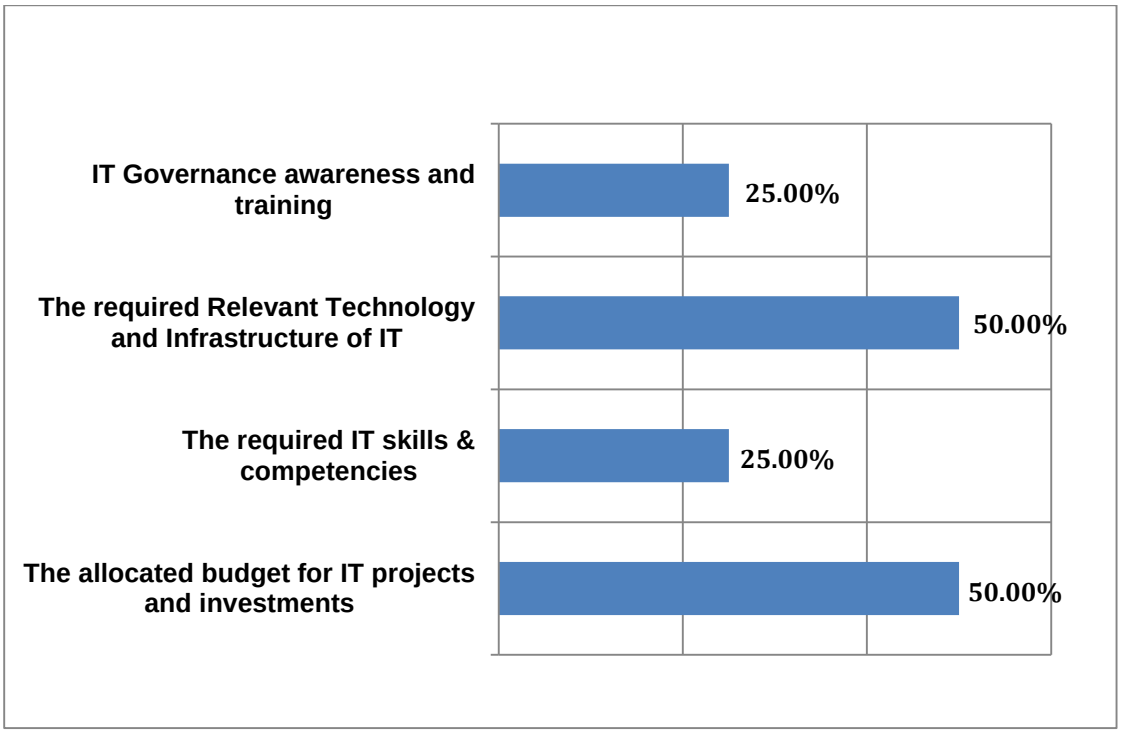


Figure 7-19: Case Study2: Resource Management- Bar Chart

Participants Comments:

1- (Technology) A major challenge being faced is the infrastructure connectivity by the service providers.

2- (Training) A COBIT 5 training course was delivered to key IT staff. Still more to come to keep all IT staff abreast of the customized IT Governance framework.

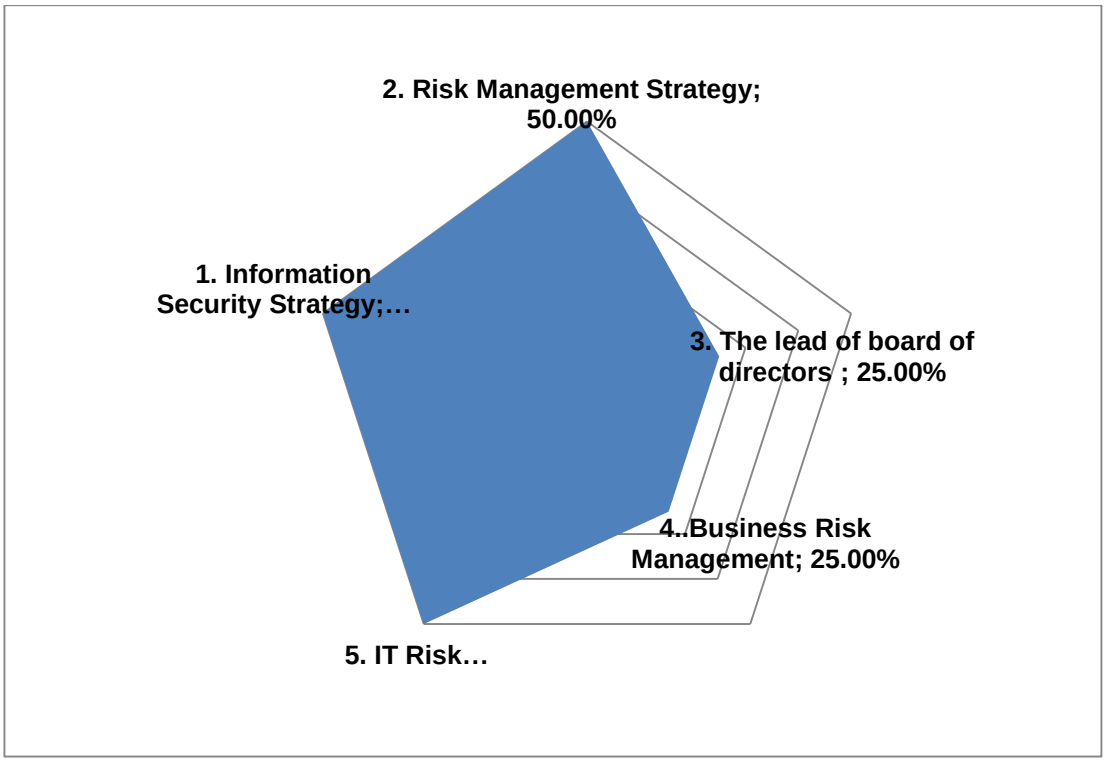


Figure 7-20: Risk Management- Radar Chat

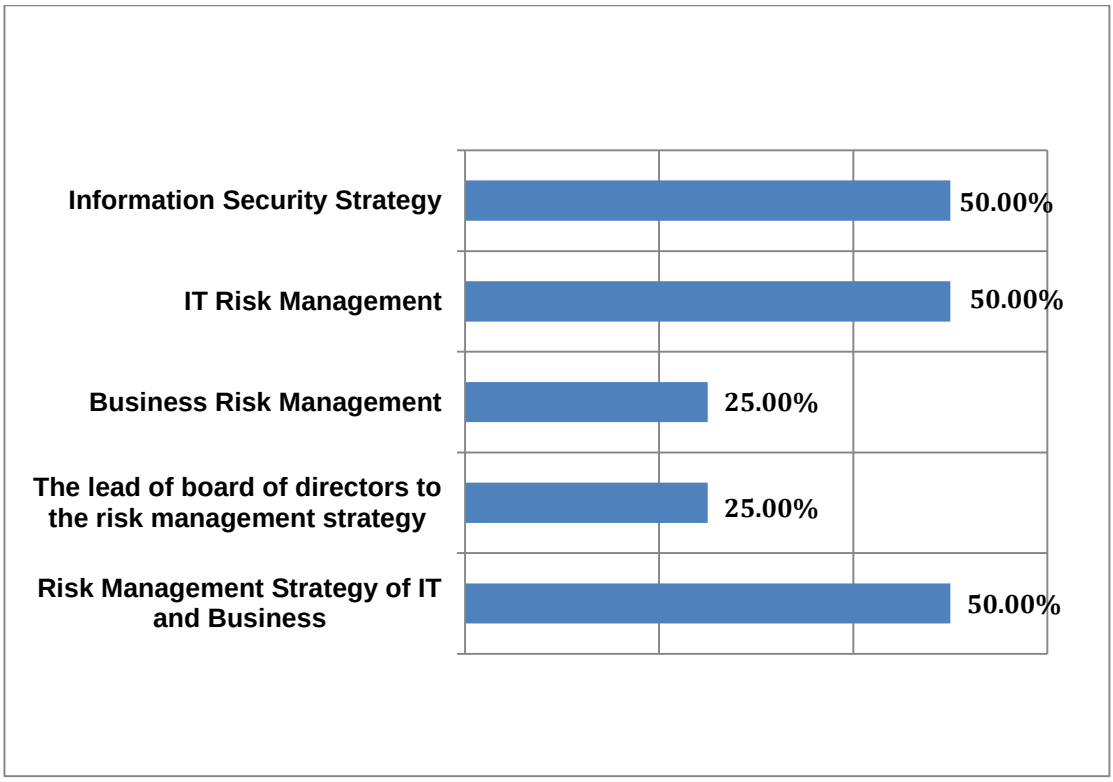


Figure 7-21: Case Study2: Risk Management- Bar Chat

Section 2: The main categories scores before weighting

After showing the results of all CSFs, the score of each category will be calculated – as explained above:

1- **Strategic Alignment (SA) weight** = (factor1 score + … + factor 7 score) / No of the factors in SA (7)
   SA weight = (75 + 50 + 25 + 50 + 50 + 25 + 25) / 7 = **39.28%**

2- **Frameworks & Strategies (FSA) weight**: (factor1 score + … + factor 9 score) / No of the factors (9)
   FSA weight: (75 + 50 + 25 + 25 + 25 +75 + 25 + 0 + 25) / 9 = **36.11%**

3- **Environmental effect (EE) weight**: (factor1 score + factor 2 score + factor 3 score) / No of the factors (3)
   EE weight: (50 + 50 + 0) / 3 = **33.33%**

4- **Organizational effect (OE) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)
   OE weight: (50 + 50 + 25 + 50) / 4 = **43.75%**

5- **Resource Management (RM) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)
   RM weight: (50 + 25 + 50 + 25) / 4 = **37.5%**

6- **Risk Management (RKM) weight**: (factor1 score + … + factor 5 score) / No of the factors (5)
   RKM weight: (50 + 25 + 25 + 50 + 50) / 5 = **40%**

Section 3: Whole ITG Score

This section pertains to find the final score of ITG in this case study. The steps are illustrated above.

1- The factor weight is **3.125**

2- Strategic Alignment (SA) weight =3.125 * 7= **21.875%**

Frameworks & Strategies (FSA) weight = 3.125 *9 = **28.125%**

Environmental effect (EE) weight = 3.125 *3 = **9.375%**

Organizational effect (OE) weigh t= 3.125 *4 = **12.5%**

Resource Management (RM) weigh t= 3.125 *4 = **12.5%**

Risk Management (RKM) weight = 3.125 *5 = **15.625%**

3- SA weight**=** (Category Weight (21.875) * SA final score in this case study (39.28))/100= **8.59%**

FSA weight **=**

28.125 * FSA final score (36.11) = **10.16%**

EE weight **=**

9.375 * EE final score (33.33) = **3.12%**

OE weight **=**

12.5* OE final score (43.75) = **5.47%**

RM weight **=**

12.5 * RM final score (37.5) = **4.69%**

RKM weight **=**

15.625 * RKM final score (40) = **6.25%**

4- **The total weights of all categories in this case study =** 8.59% + 10.16% + 3.12% + 5.47% + 4.69% + 6.25% = **38.28%**

Based on the assessments of the categories and CSFs, the final score of whole ITG in this case study is **38.28%,** ***"Below-Average Governance, major and urgent improvement is needed"***

Comments: There is big company has conducted similar assessment on ITG few months ago and their results shows very similar results to this study's results with considering the time difference.

Appendix I: Case Study 3

Section 1: The charts of the factors and the participants' comments

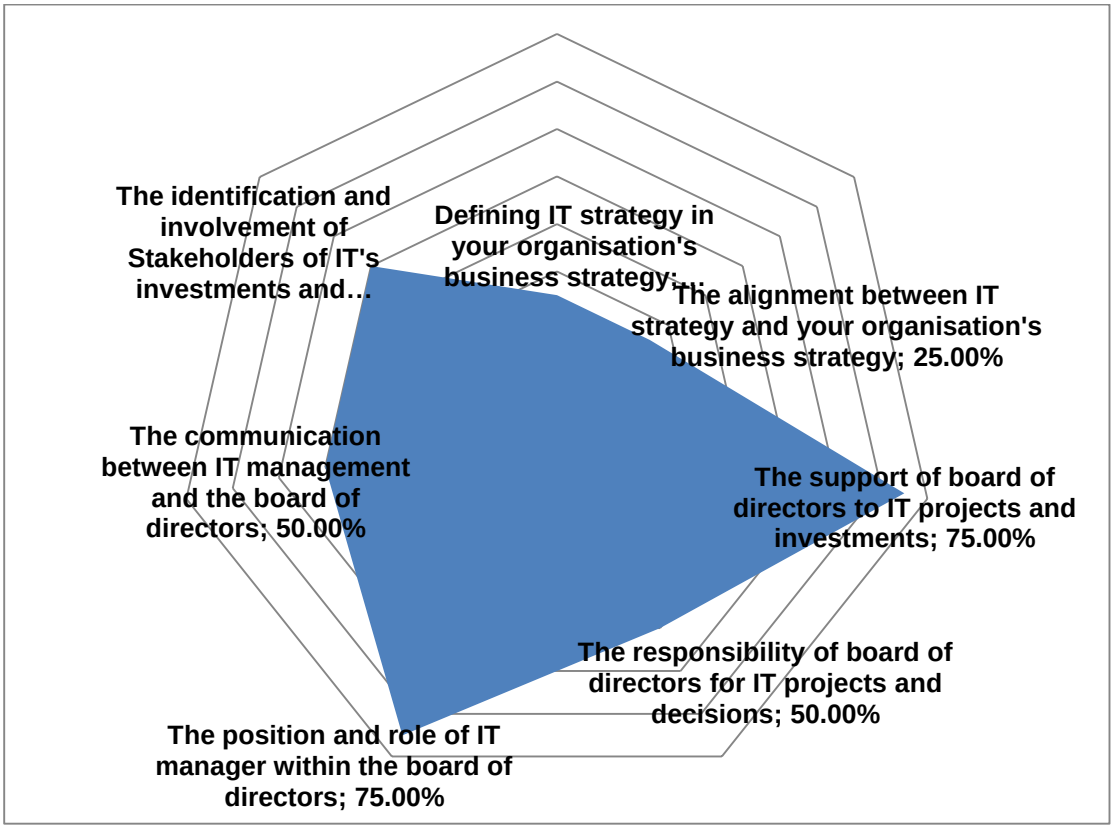


Figure 7-22: Strategic Alignment- Radar Chart

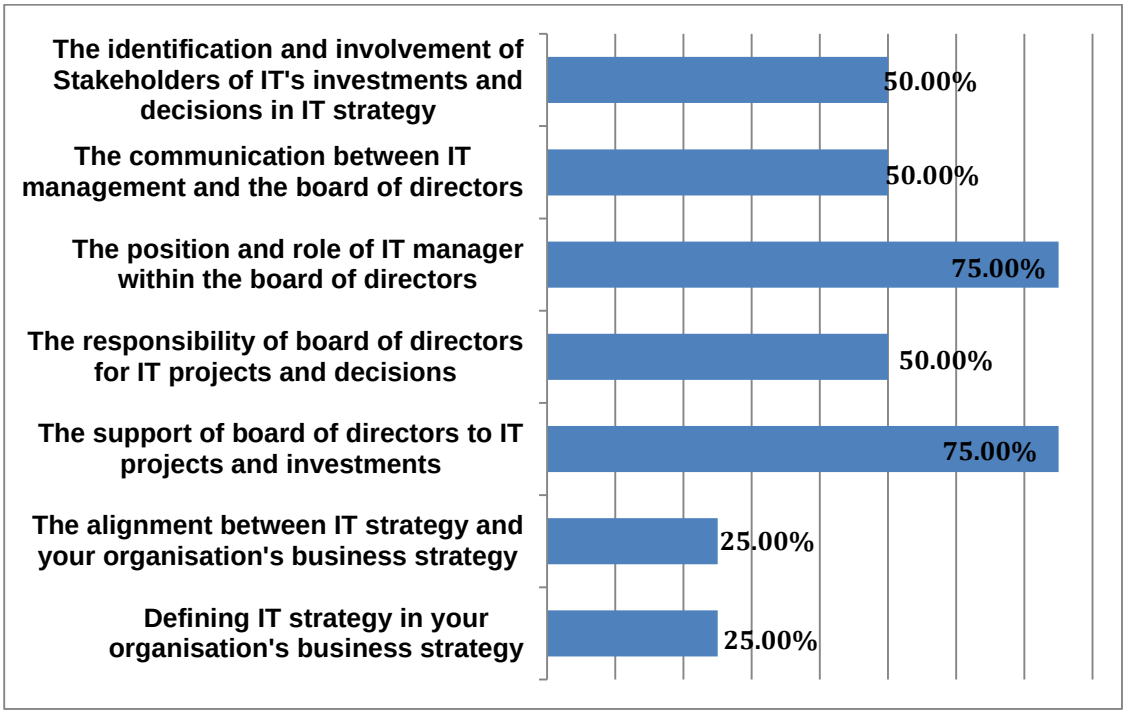


Figure 7-23: Case Study3: Strategic Alignment- Bar Chart

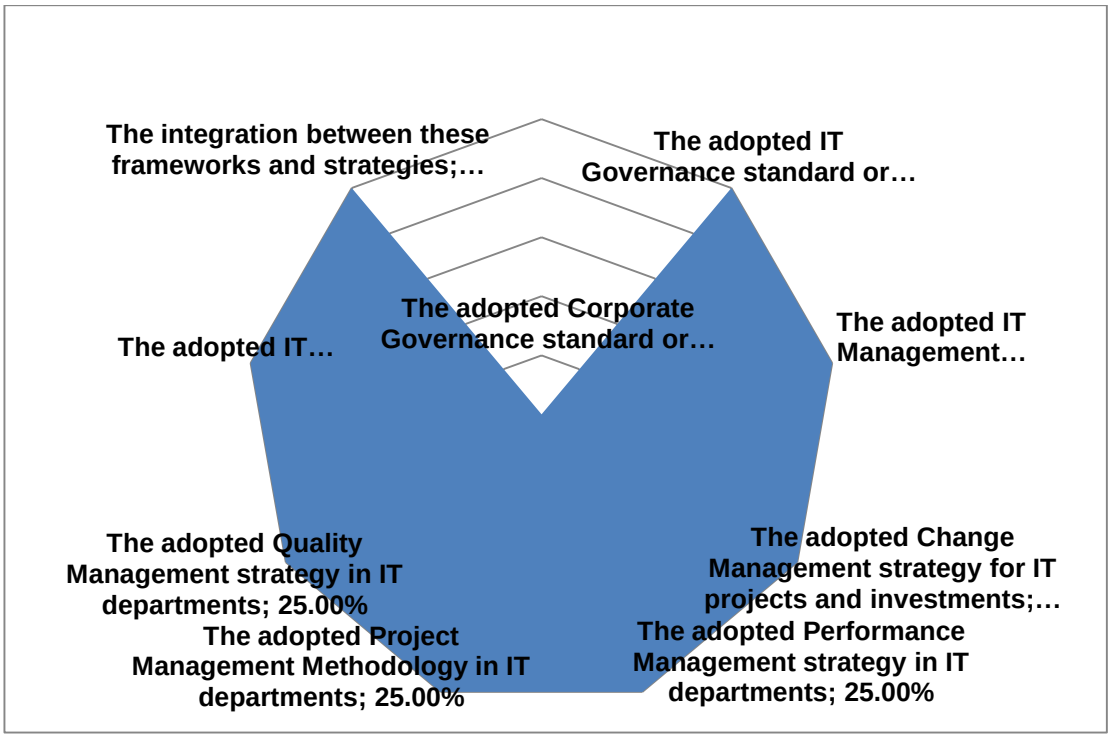


Figure 7-24: Frameworks and Strategies- Radar Chart

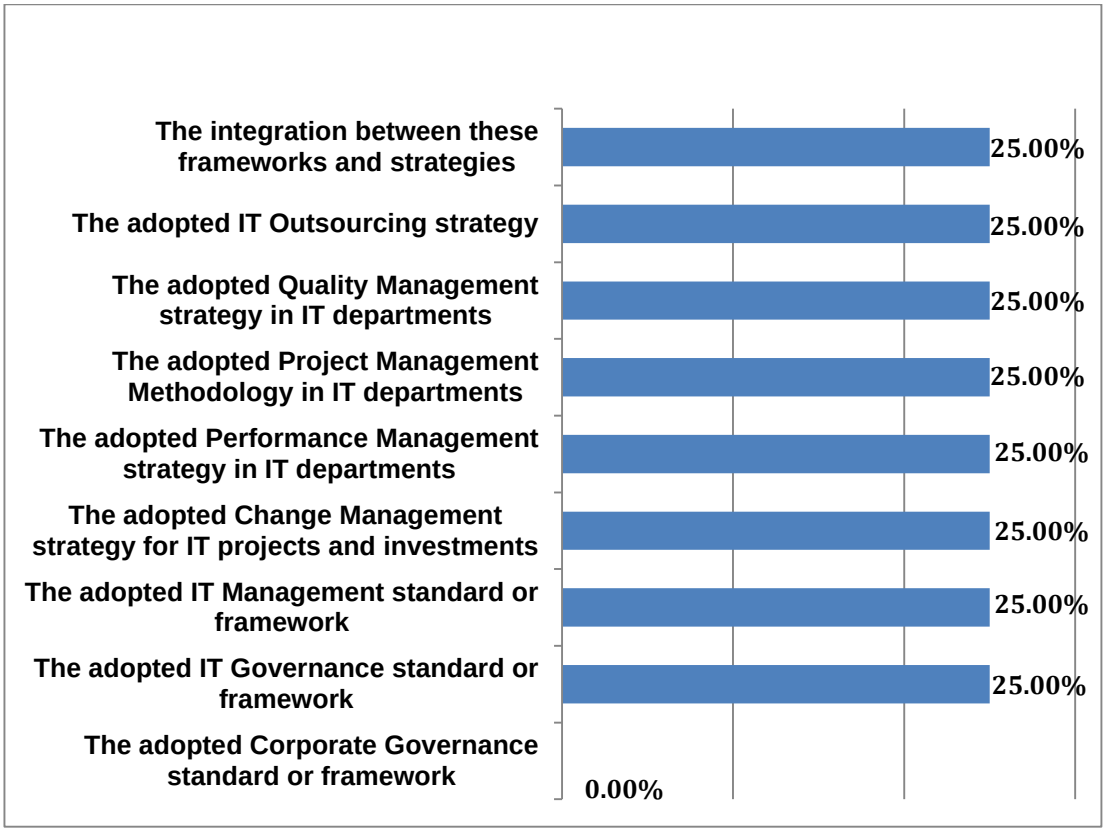


Figure 7-25: Case Study3: Frameworks and Strategies- Bar Chart

Participants Comments:

We are focusing now in IT Governance before Corporate Governance since they are more experts in.

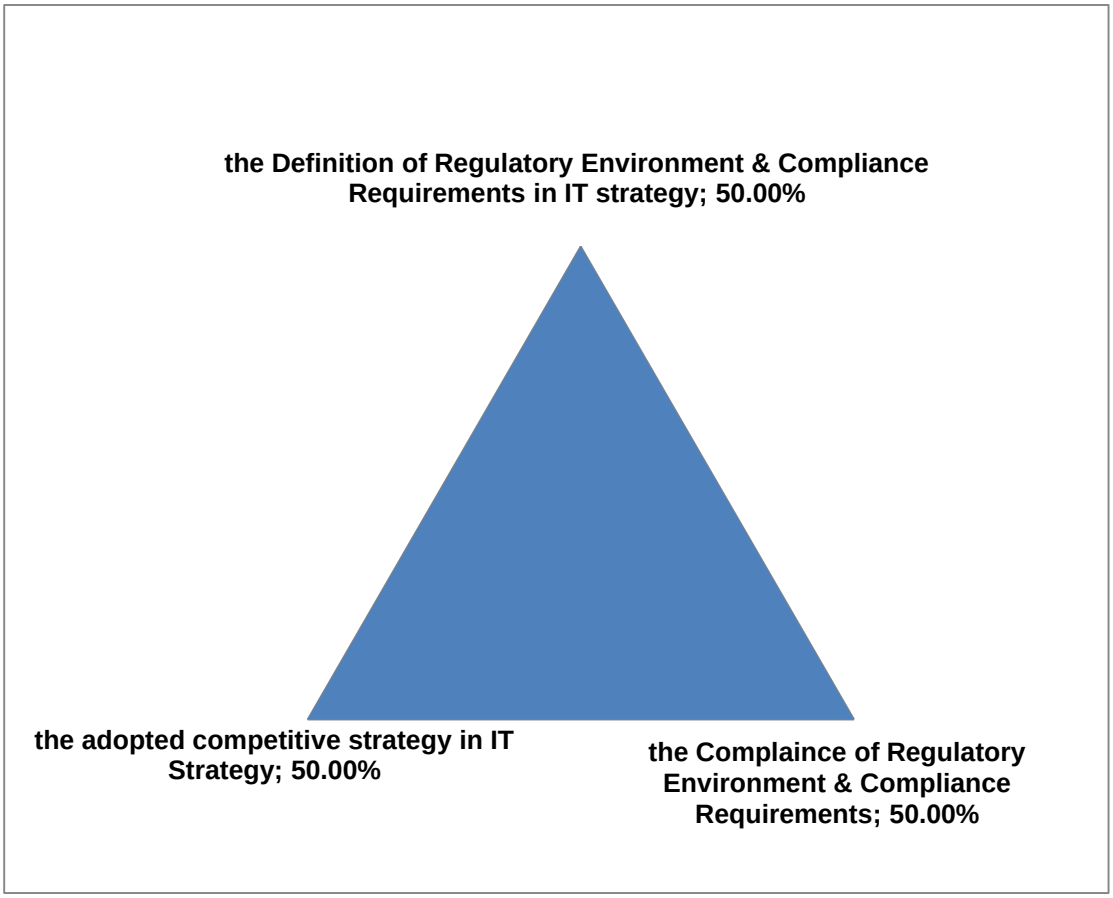


Figure 7-26: Environmental Effect- Radar Chart

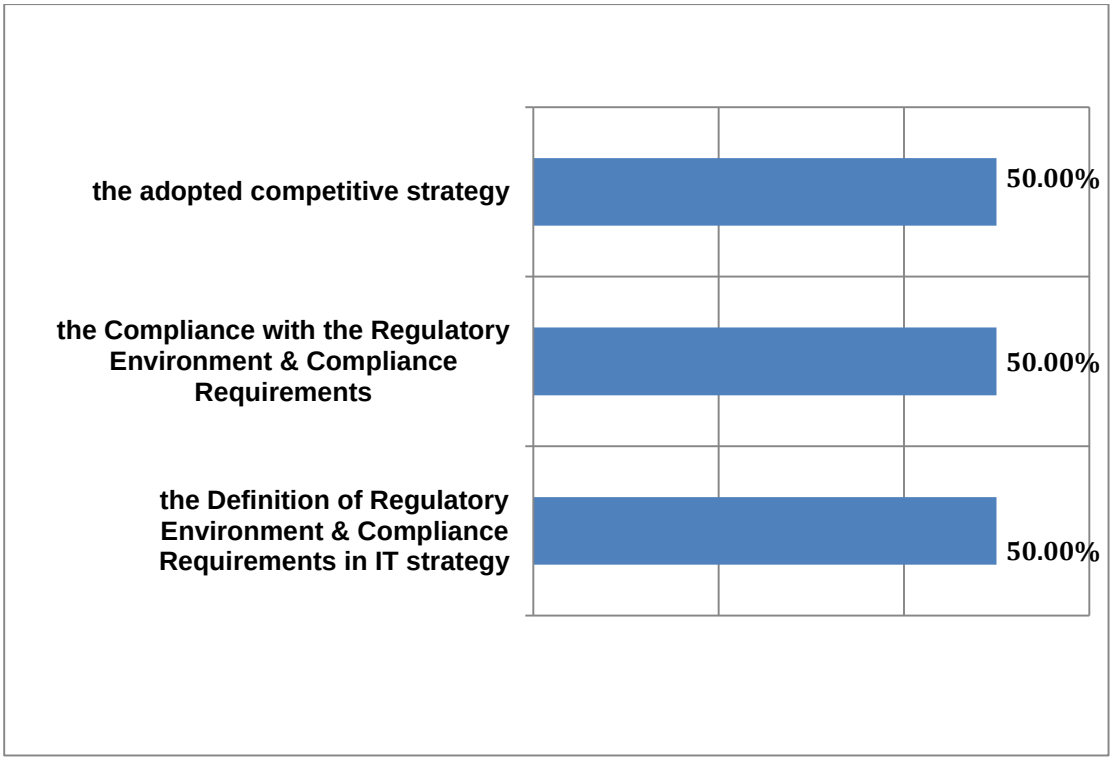


Figure 7-27: Case Study3: Environmental Effect- Bar Chart

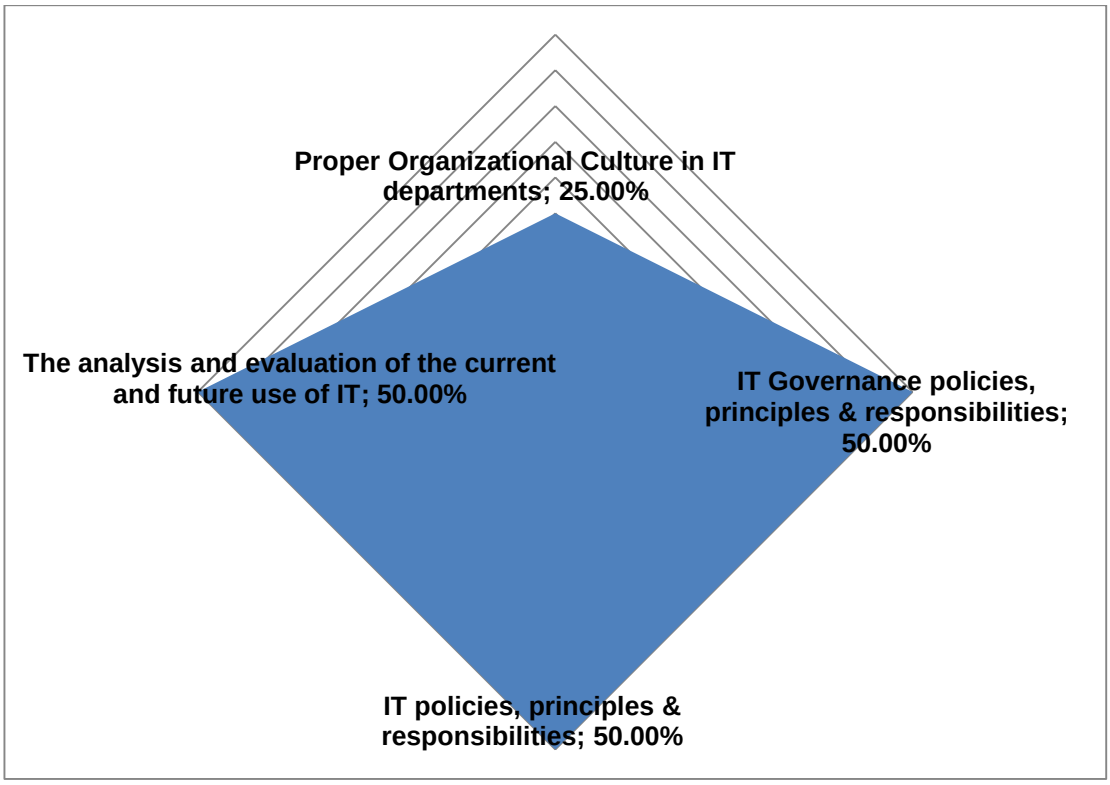


Figure 7-28: Organizational Effect- Radar Chart

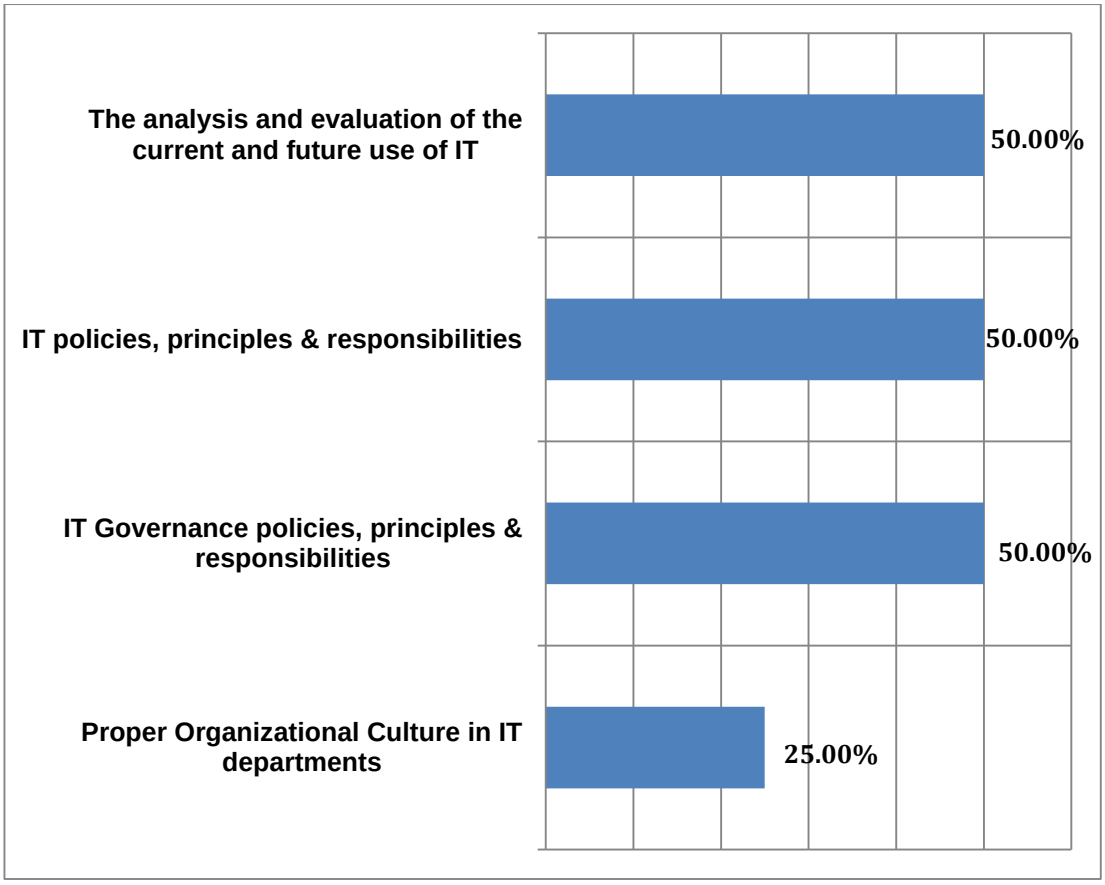


Figure 7-29: Case Study3: Organizational Effect- Bar Chart

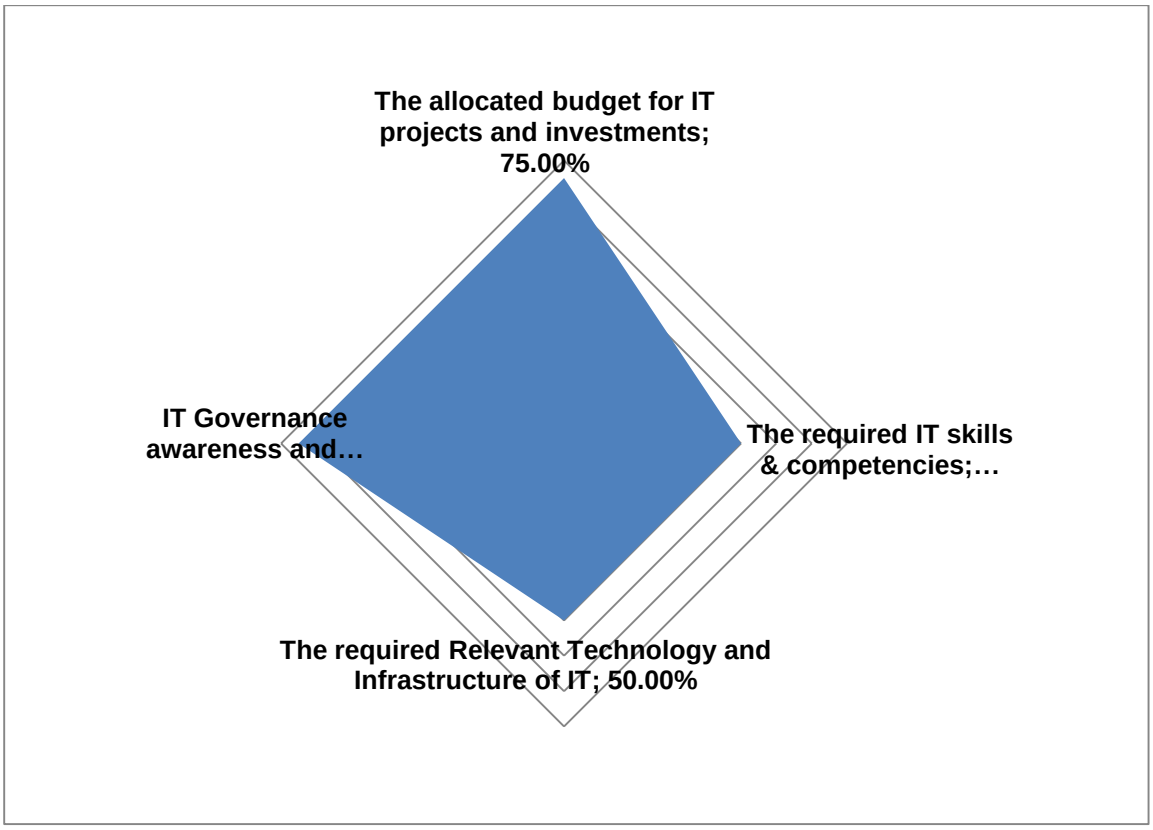


Figure 7-30: Resource Management- Radar Chart

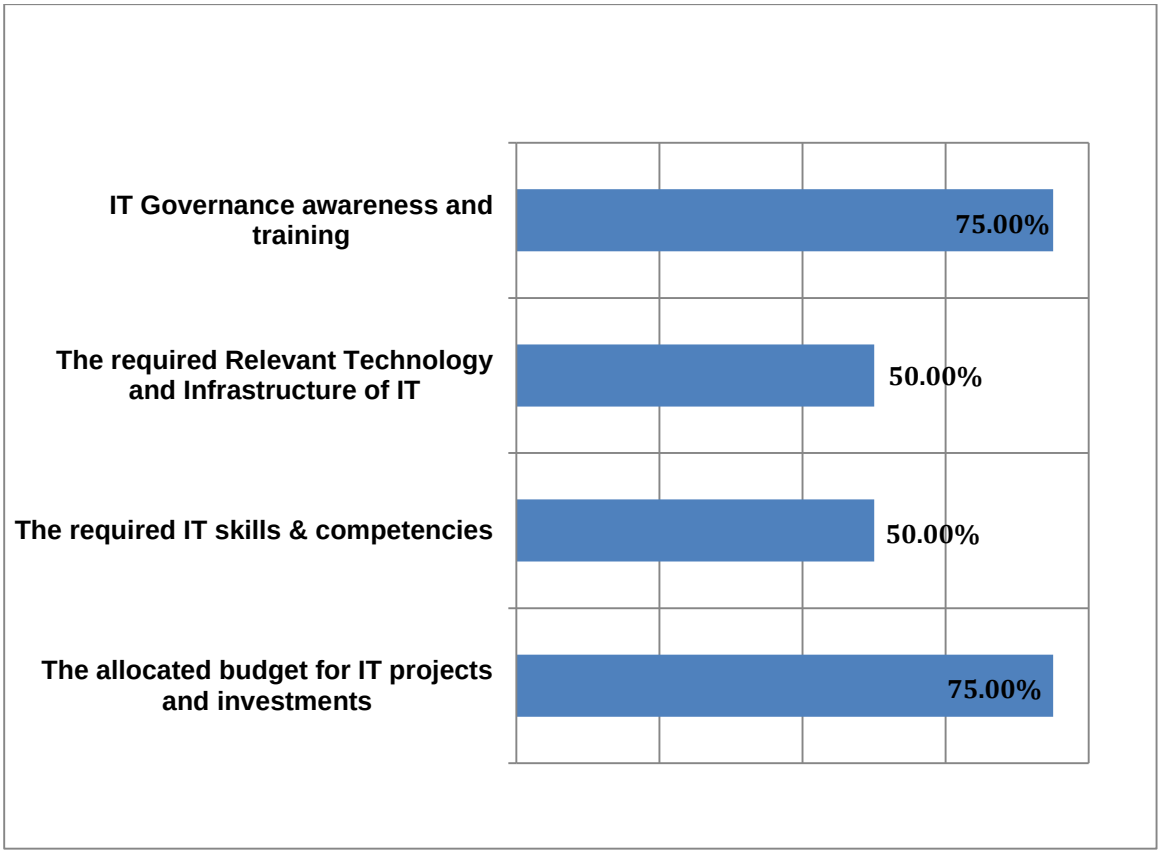


Figure 7-31: Case Study3: Resource Management- Bar Chart

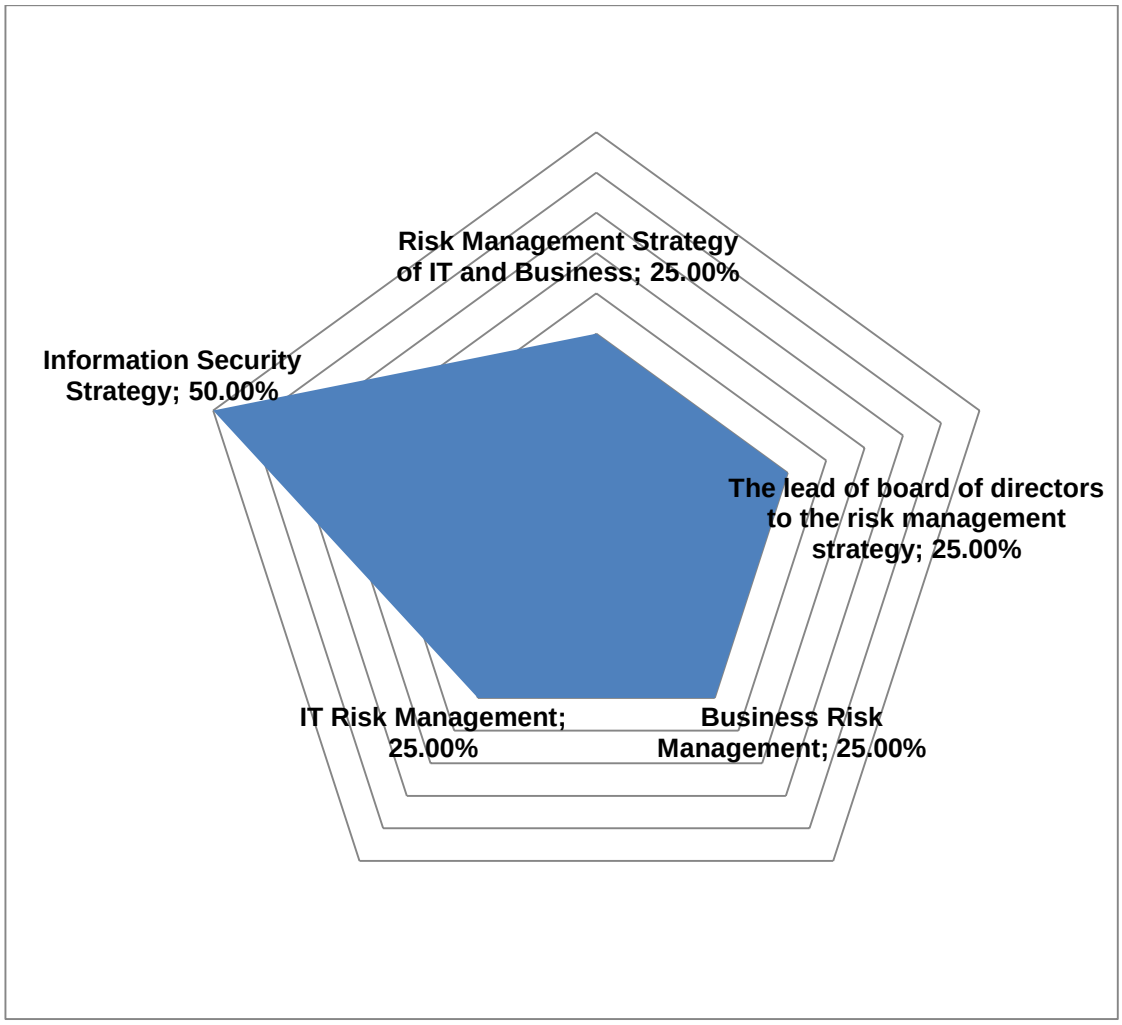


Figure 7-32: Risk Management- Radar Chat

Figure 7-33: Case Study3: Risk Management- Bar Chat

Section 2: The main categories scores before weighting

After showing the results of all CSFs in this case study, the score of each category will be calculated – as explained above:

1- **Strategic Alignment (SA) weight** = (factor1 score + … + factor 7 score) / No of the factors in SA (7)
   SA weight = (25 + 25 + 75 + 50 + 75 + 50 + 50) / 7 = **50%**

2- **Frameworks & Strategies (FSA) weight**: (factor1 score + … + factor 9 score) / No of the factors (9)
   FSA weight: (0 + 25 + 25 + 25 + 25 +25 + 25 + 25 + 25) / 9 = **22.22%**

3- **Environmental effect (EE) weight**: (factor1 score + factor 2 score + factor 3 score) / No of the factors (3)
   EE weight: (50 + 50 + 50) / 3 = **50%**

4- **Organizational effect (OE) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)
   OE weight: (25 + 50 + 50 + 50) / 4 = **43.75%**

5- **Resource Management (RM) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)
   RM weight: (75 + 50 + 50 + 75) / 4 = **62.50%**

6- **Risk Management (RKM) weight**: (factor1 score + … + factor 5 score) / No of the factors (5)
   RKM weight: (25 + 25 + 25 + 25 + 50) / 5 = **30%**

Section 3: Whole ITG Score

This section pertains to find the final score of ITG. The steps are illustrated above.

1- The factor weight is **3.125**

2- Strategic Alignment (SA) weight =3.125 * 7= **21.875%**

Frameworks & Strategies (FSA) weight = 3.125 *9 = **28.125%**

Environmental effect (EE) weight = 3.125 *3 = **9.375%**

Organizational effect (OE) weigh t= 3.125 *4 = **12.5%**

Resource Management (RM) weigh t= 3.125 *4 = **12.5%**

Risk Management (RKM) weight = 3.125 *5 = **15.625%**

3- SA weight in MCI**=**

(Category Weight (21.875) * SA final score in this case study (50))/100= **10.94%**

FSA weight in MCI **=**

28.125 * FSA final score (22.22) = **6.25%**

EE weight in MCI **=**

9.375 * EE final score (50) = **4.69%**

OE weight in MCI **=**

12.5* OE final score (43.75) = **5.47%**

RM weight in MCI **=**

12.5 * RM final score (62.50) = **7.81%**

RKM weight in MCI **=**

15.625 * RKM final score (30) = **4.69%**

4- **The total weights of all categories in this case study =** 10.94%+ 6.25%+ 4.69%+ 5.47%+ 7.81%+ 4.69% = **39.85%**

Based on the assessments of the categories and CSFs, the rate of whole ITG in this case study is **39.85%*, "Below-Average, major and urgent improvement is needed"***

Appendix J: Case Study 4

Section 1: The charts of the factors and the participants' comments

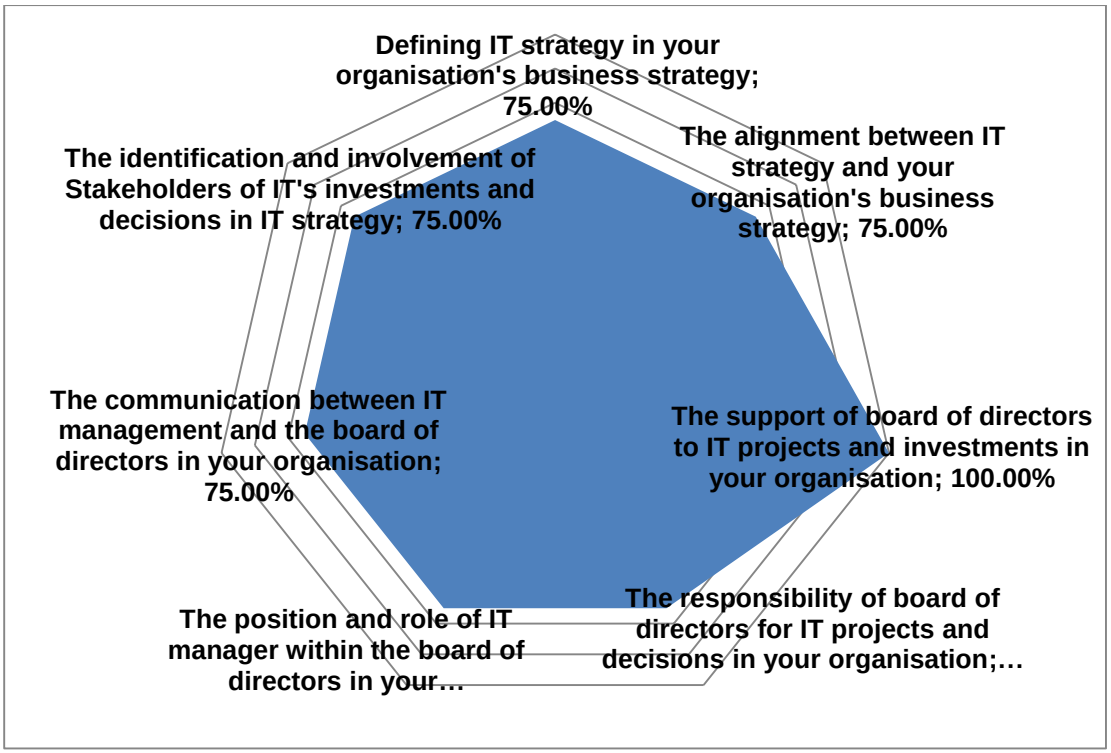


Figure 7-34: Strategic Alignment- Radar Chart

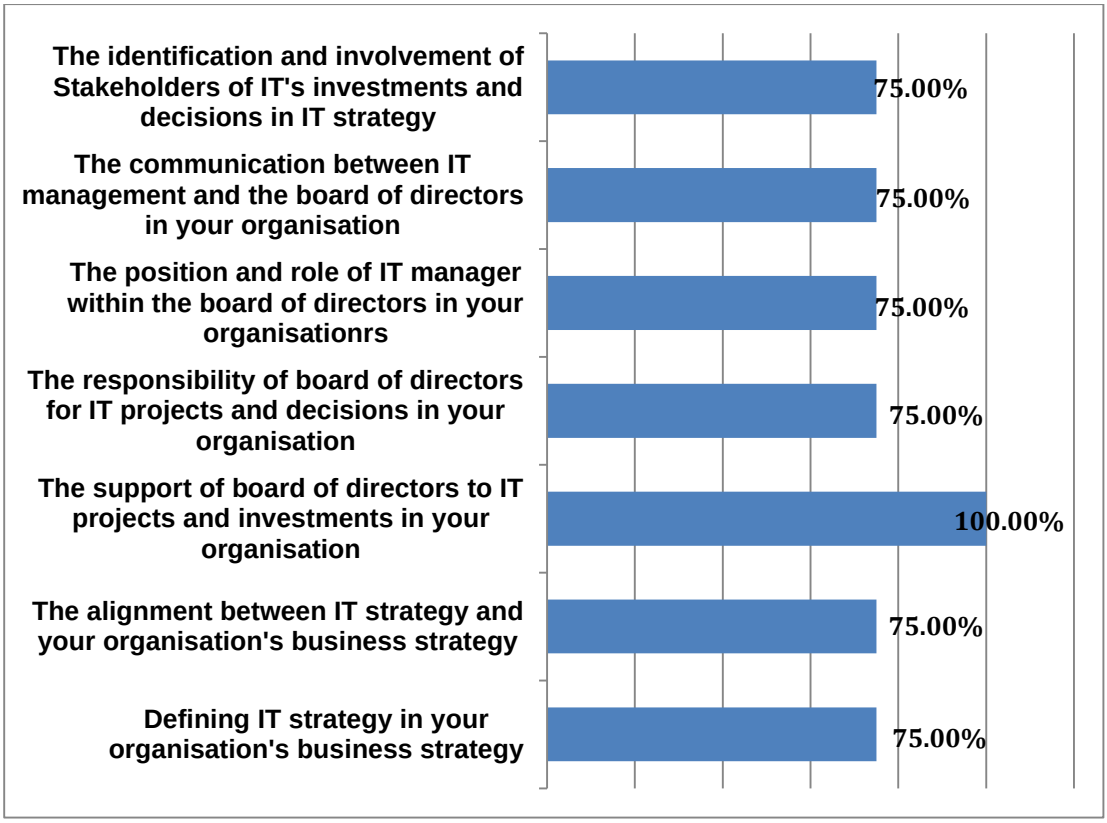


Figure 7-35: Case Study4: Strategic Alignment- Bar Chart

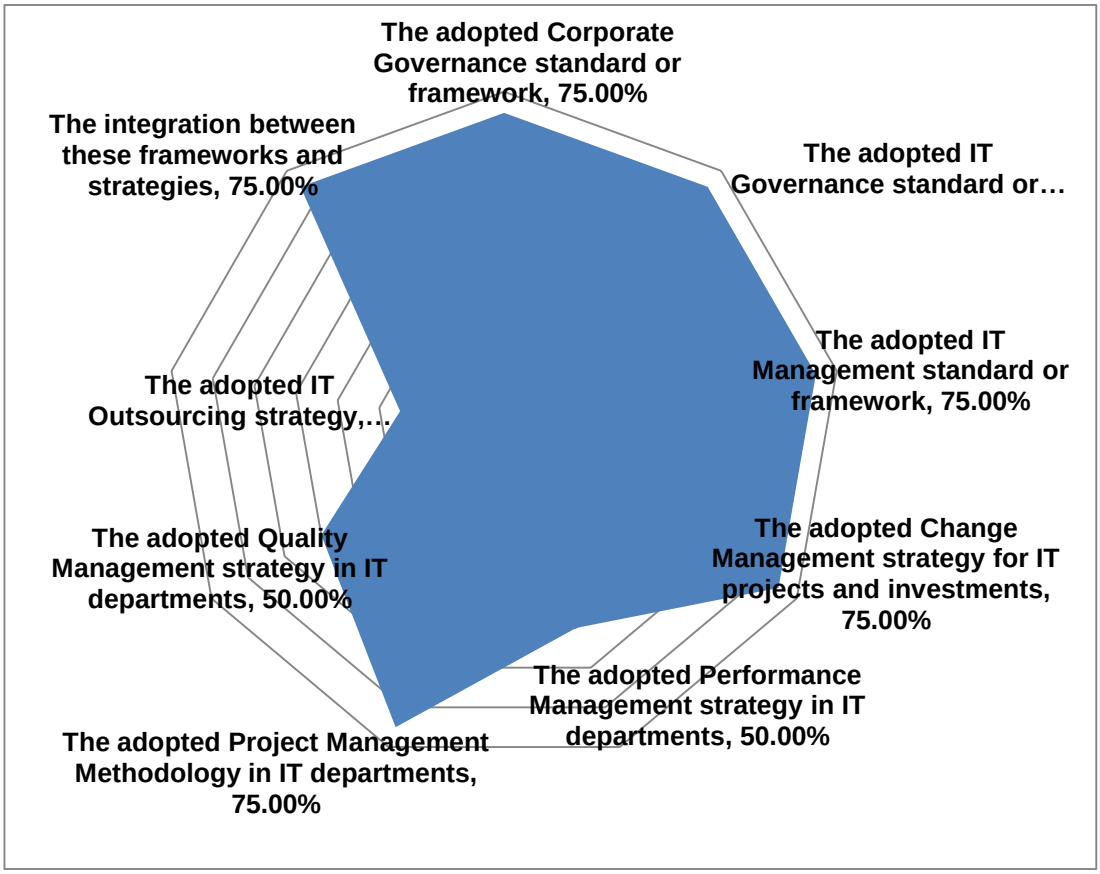


Figure 7-36: Frameworks and Strategies- Radar Chart

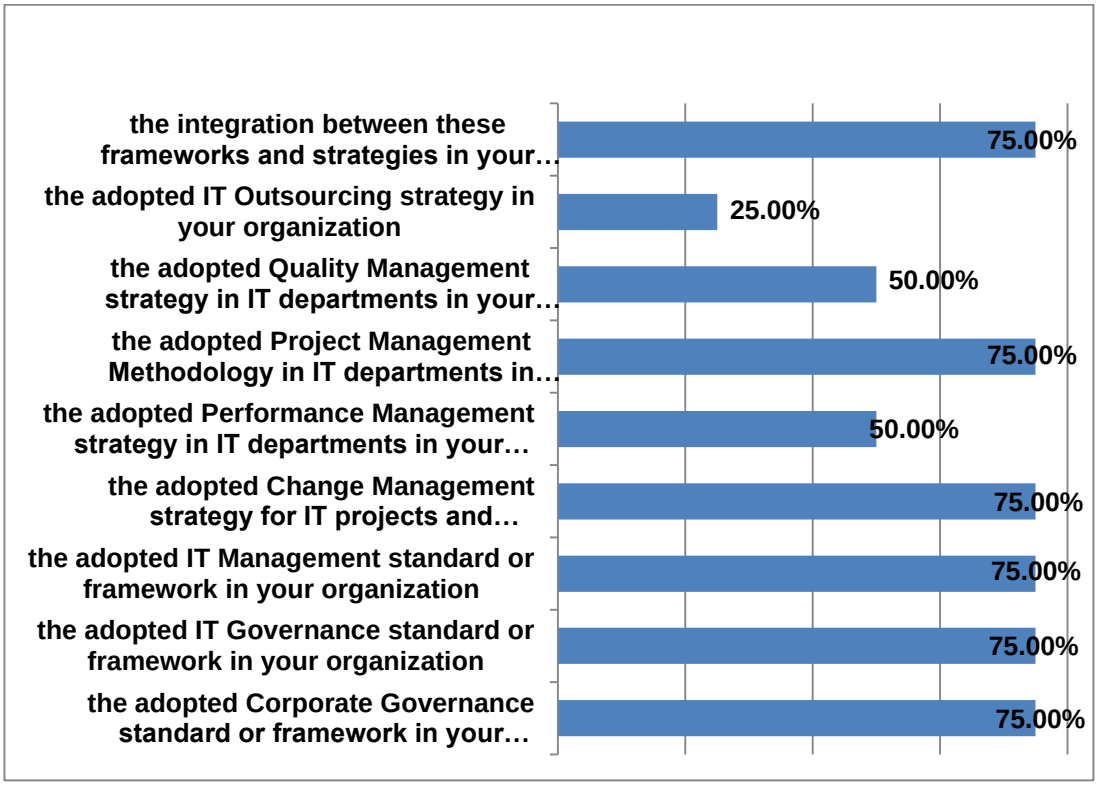


Figure 7-37: Case Study4: Frameworks and Strategies- Bar Chart

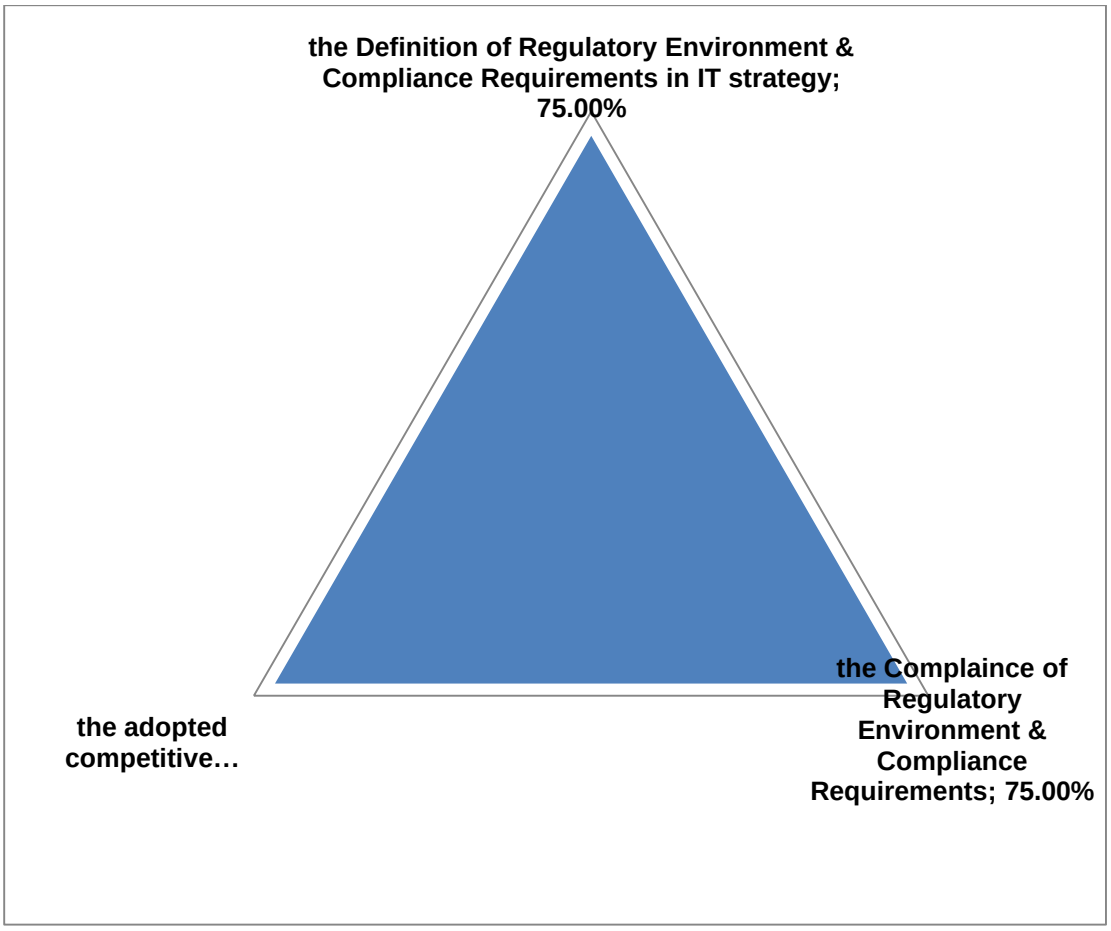


Figure 7-38: Environmental Effect- Radar Chart

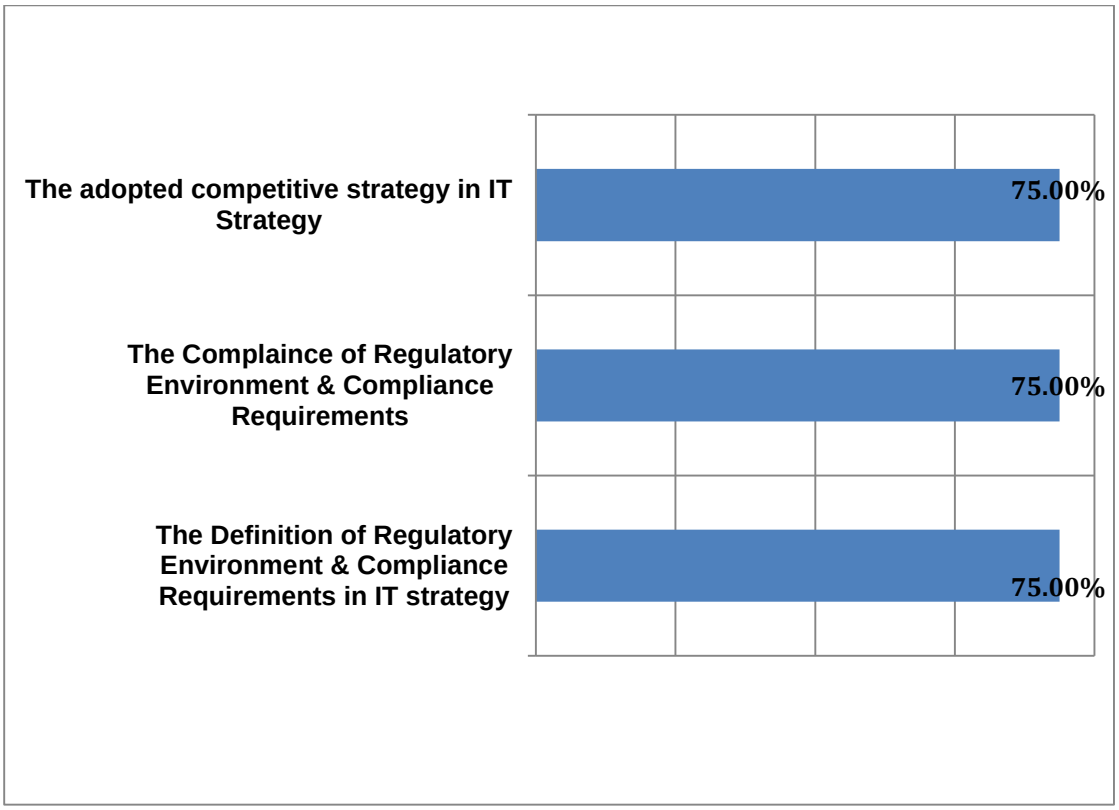


Figure 7-39: Case Study4: Environmental Effect- Bar Chart

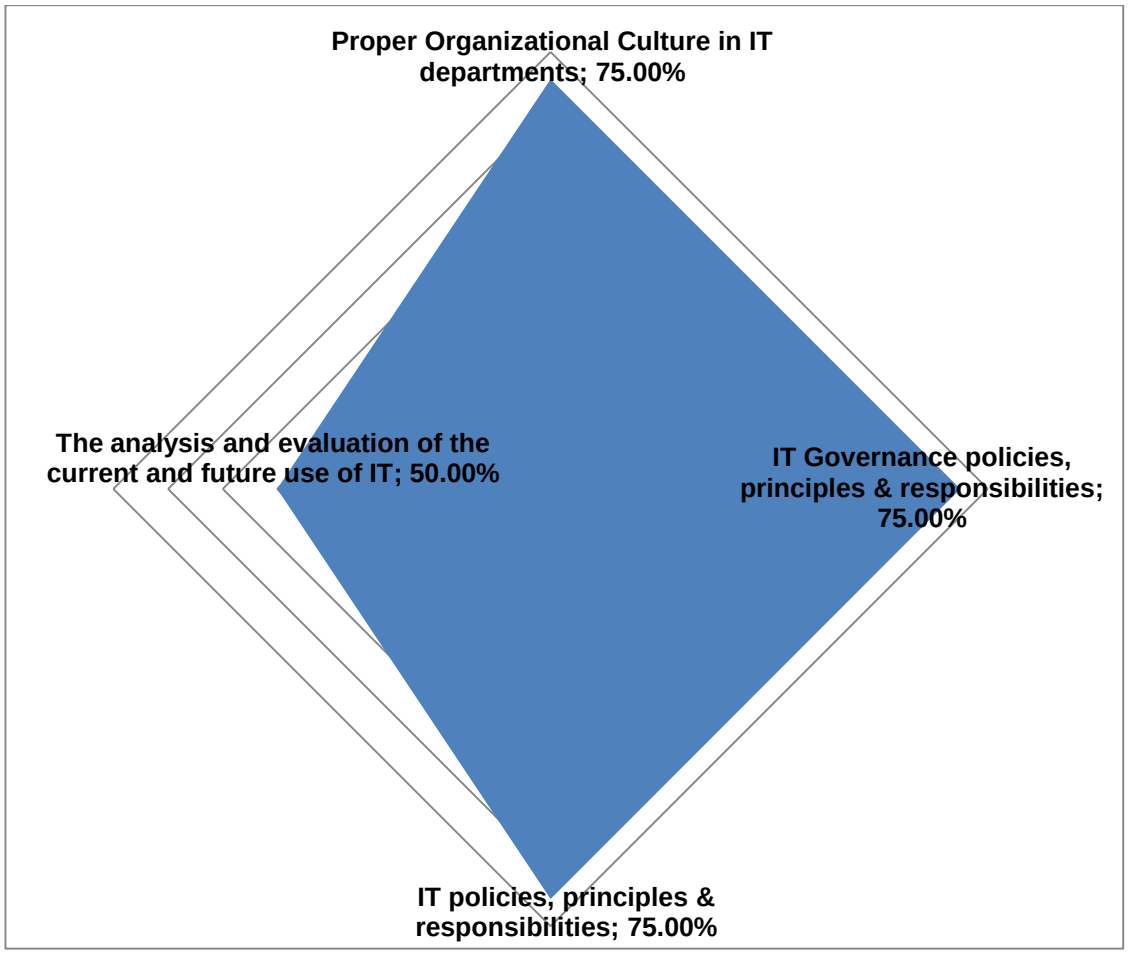


Figure 7-40: Organisational Effect- Radar Chart

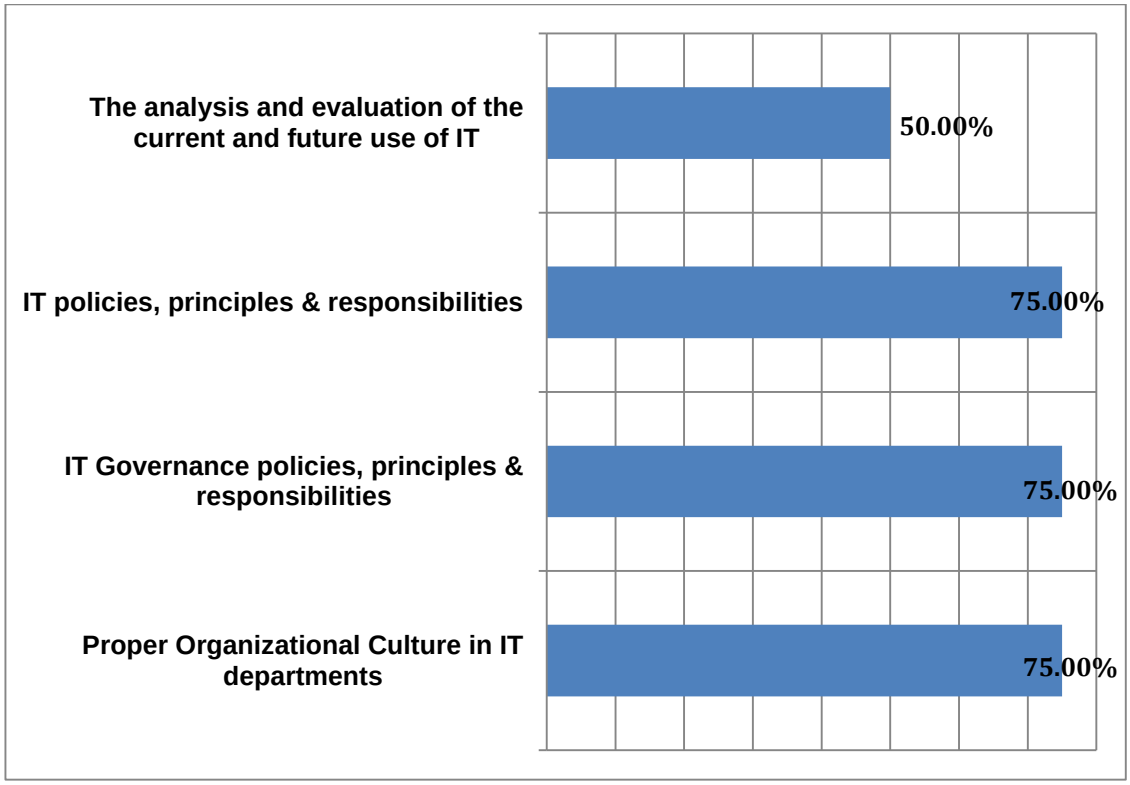


Figure 7-41: Case Study4: Organisational Effect- Bar Chart

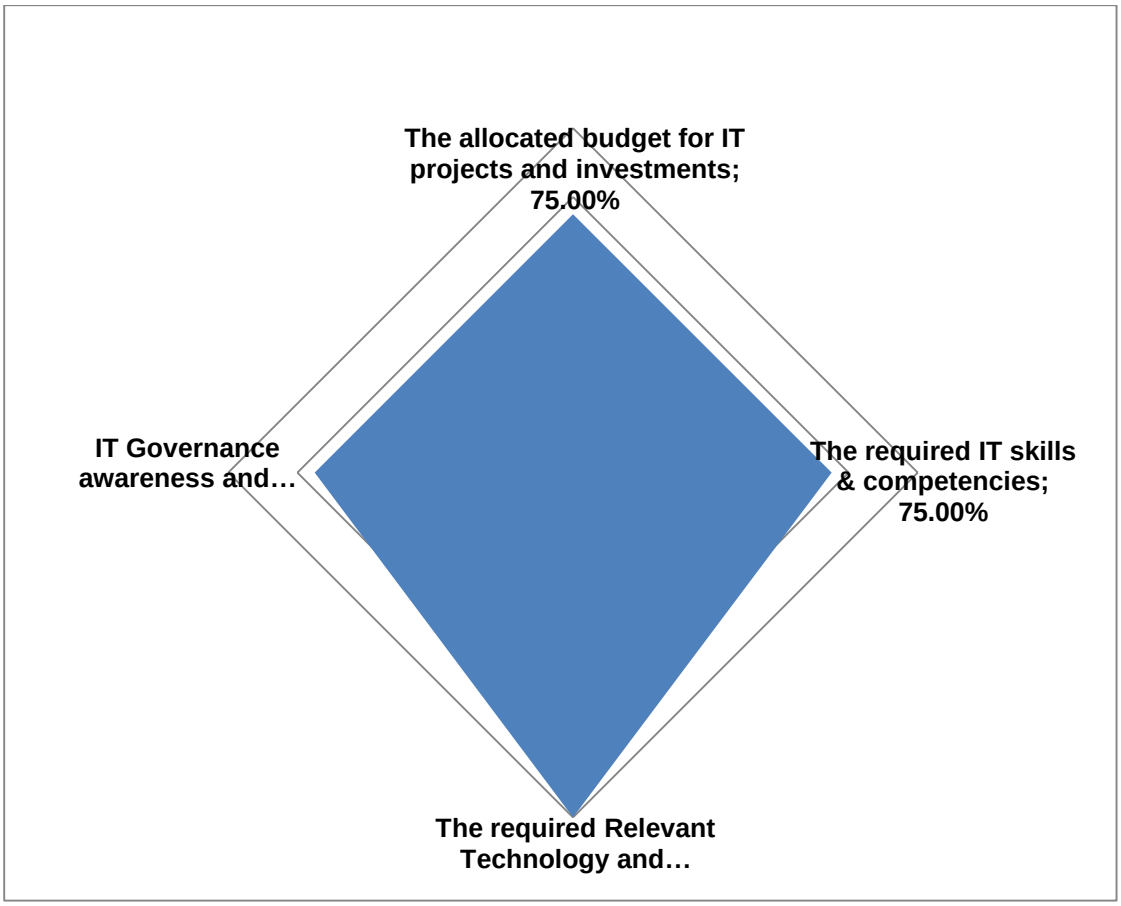


Figure 7-42: Resource Management- Radar Chart

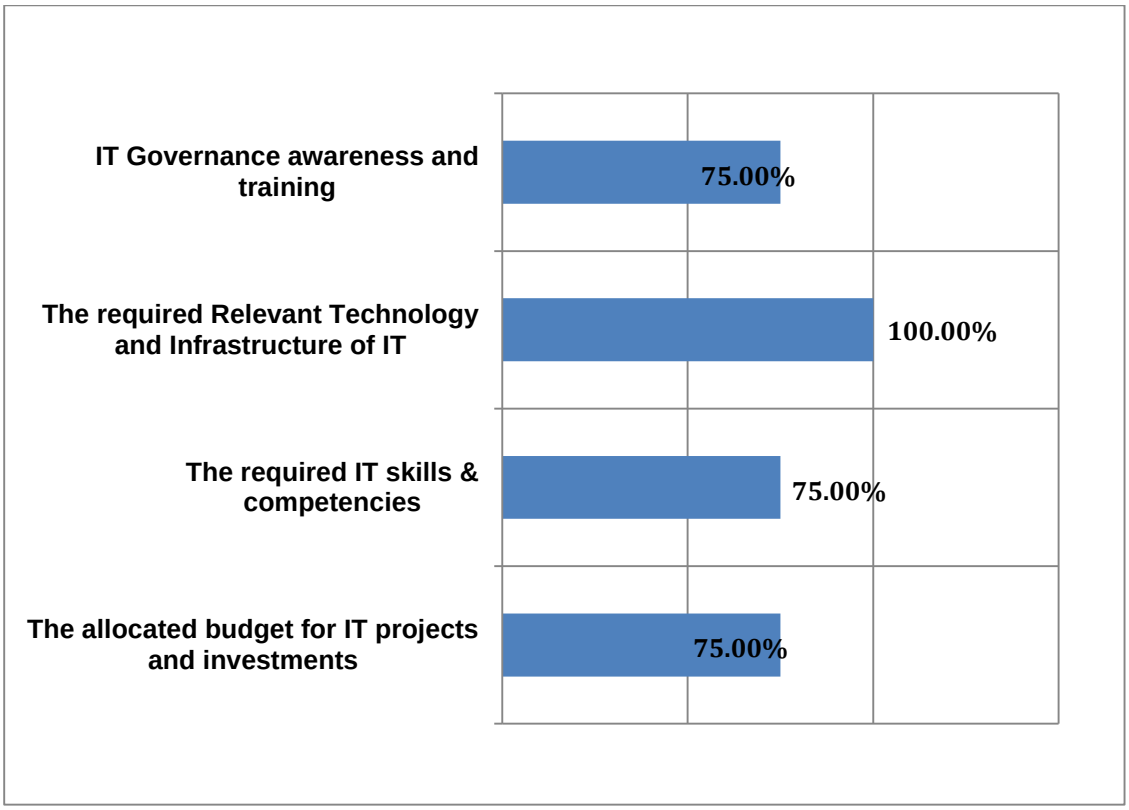


Figure 7-43: Case Study4: Resource Management- Bar Chart

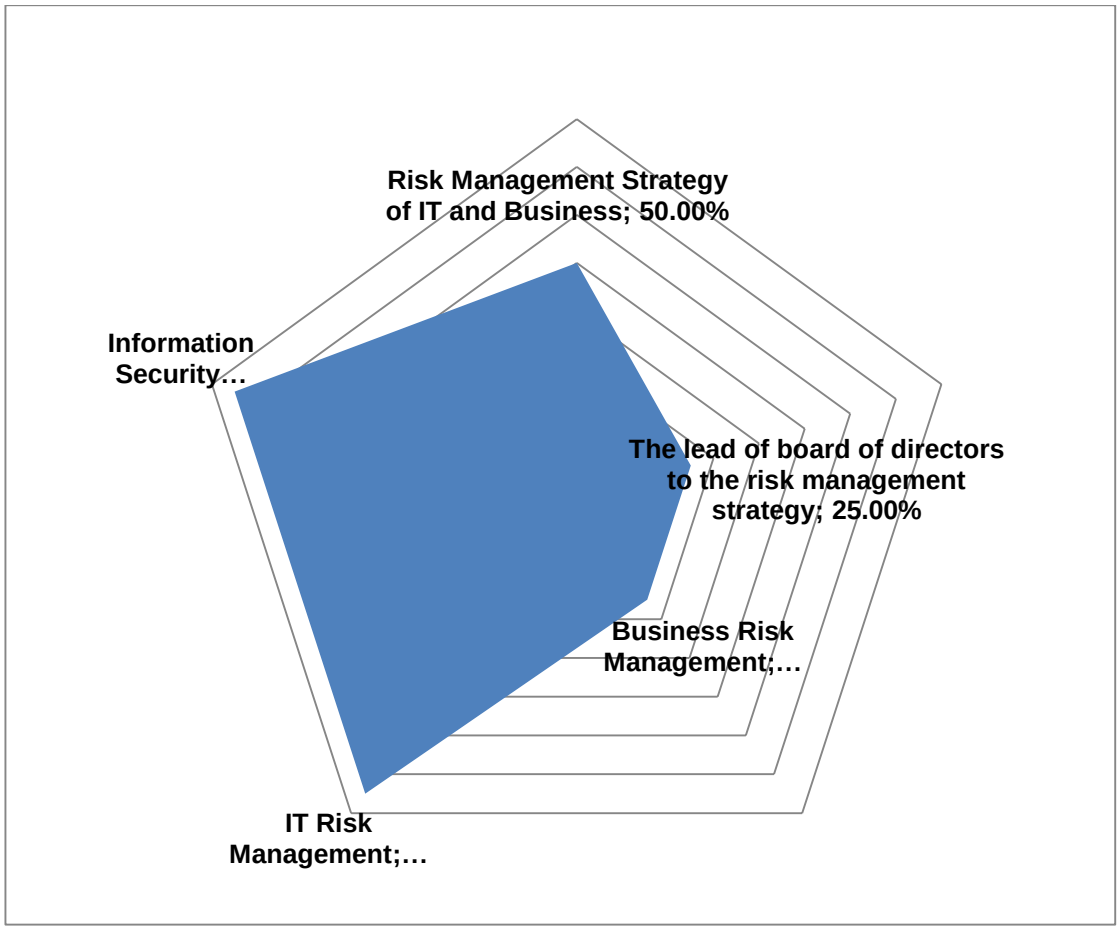


Figure 7-44: Risk Management- Radar Chat

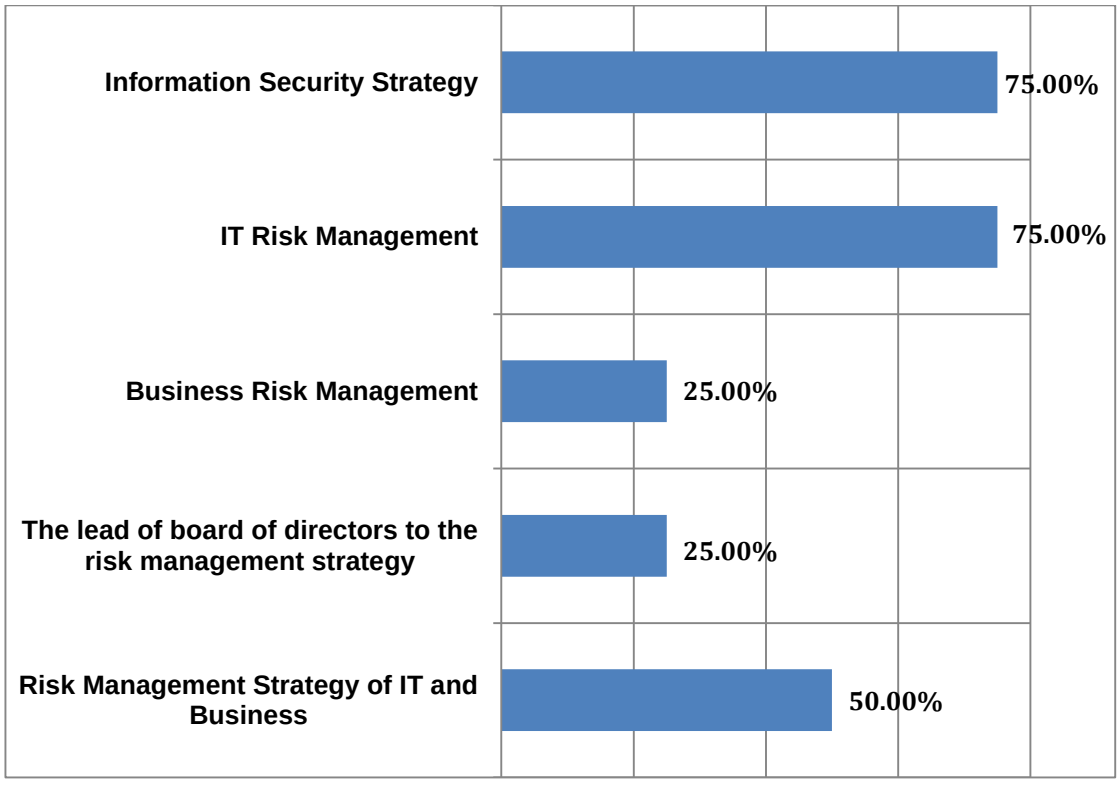


Figure 7-45: Case Study4: Risk Management- Bar Chat

Section 2: The main categories scores before weighting

After showing the results of all CSFs in this case study, the score of each category will be calculated – as explained above:

1- **Strategic Alignment (SA) weight** = (factor1 score + … + factor 7 score) / No of the factors in SA (7)
   SA weight = (75 + 75 + 100 + 75 + 75 + 75 + 75) / 7 = **78.57%**

2- **Frameworks & Strategies (FSA) weight**: (factor1 score + … + factor 9 score) / No of the factors (9)
   FSA weight: (75 + 75 + 75 + 75 + 50 +75 + 50 + 25 + 75) / 9 = **63.88%**

3- **Environmental effect (EE) weight**: (factor1 score + factor 2 score + factor 3 score) / No of the factors (3)
   EE weight: (75 + 75 + 75) / 3 = **75%**

4- **Organizational effect (OE) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)
   OE weight: (75 + 75 + 75 + 50) / 4 = **68.75%**

5- **Resource Management (RM) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)
   RM weight: (75 + 75 + 100 + 75) / 4 = **81.25%**

6- **Risk Management (RKM) weight**: (factor1 score + … + factor 5 score) / No of the factors (5)
   RKM weight: (50 + 25 + 25 + 75 + 75) / 5 = **50%**

Section 3: Whole ITG Score

This section pertains to find the final score of ITG. The steps are illustrated above.

1- The factor weight is **3.125**

2- Strategic Alignment (SA) weight =3.125 * 7= **21.875%**
Frameworks & Strategies (FSA) weight = 3.125 *9 = **28.125%**
Environmental effect (EE) weight = 3.125 *3 = **9.375%**
Organizational effect (OE) weigh t= 3.125 *4 = **12.5%**
Resource Management (RM) weigh t= 3.125 *4 = **12.5%**
Risk Management (RKM) weight = 3.125 *5 = **15.625%**

3- SA weight**=**
(Category Weight (21.875) * SA final score in this case study (**78.57**))/100= **17.19%**
FSA weight in this case study **=**
28.125 * FSA final score (63.88) = **13.97%**
EE weight**=**
9.375 * EE final score (75) = **7.03%**
OE weight**=**
12.5* OE final score (68.75) = **8.59%**
RM weight**=**
12.5 * RM final score (81.25) = **10.16%**
RKM weight**=**
15.625 * RKM final score (50) = **7.8125%**

4- **The total weights of all categories=** 17.19% + 13.97% + 7.03% + 8.59% + 10.16% + 7.8125% = **64.75%**

Based on the assessments of the categories and CSFs, the rate of whole ITG in this case study is **64.75%** ***"Solid Governance, be consistent and minor improvement may be needed"***

Participants Comments:

I think yes it can be utilized as assessment tool also I'd encourage using TOGAF5 maturity model to enhance the tool and to check the governance program effort in this field also it will help to enhance this tool.

Appendix G: Case Study 5

Section 1: The charts of the factors and the participants' comments

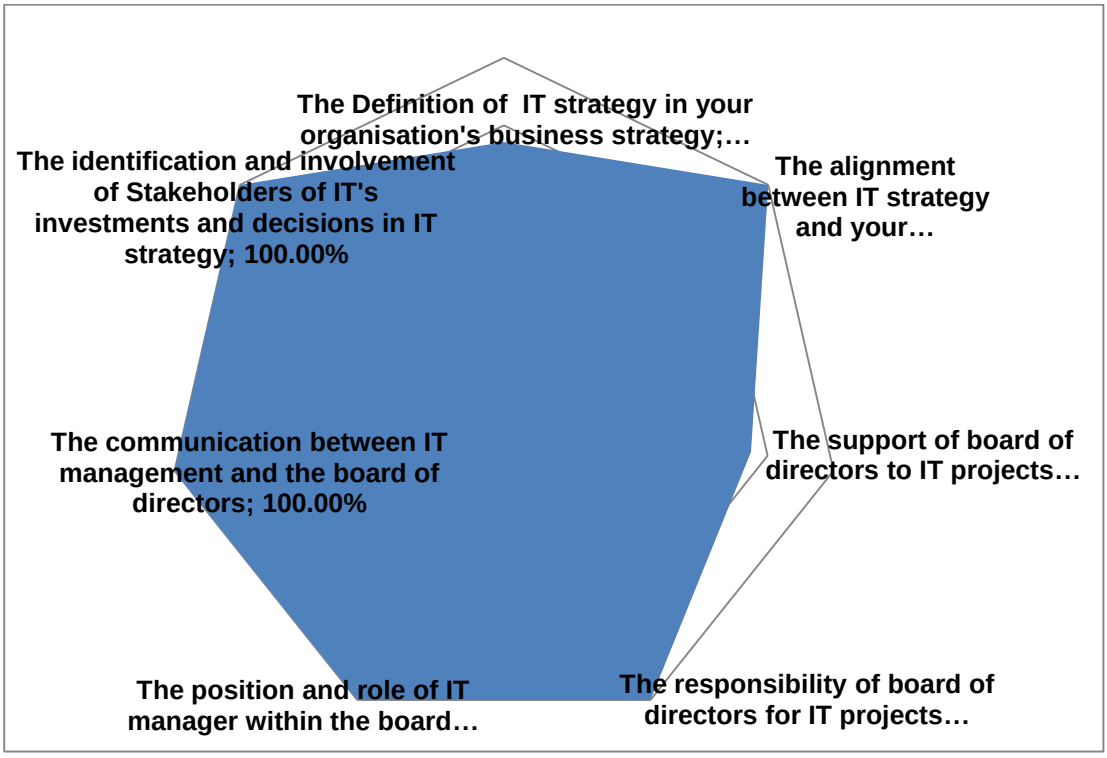


Figure 7-46: Strategic Alignment- Radar Chart

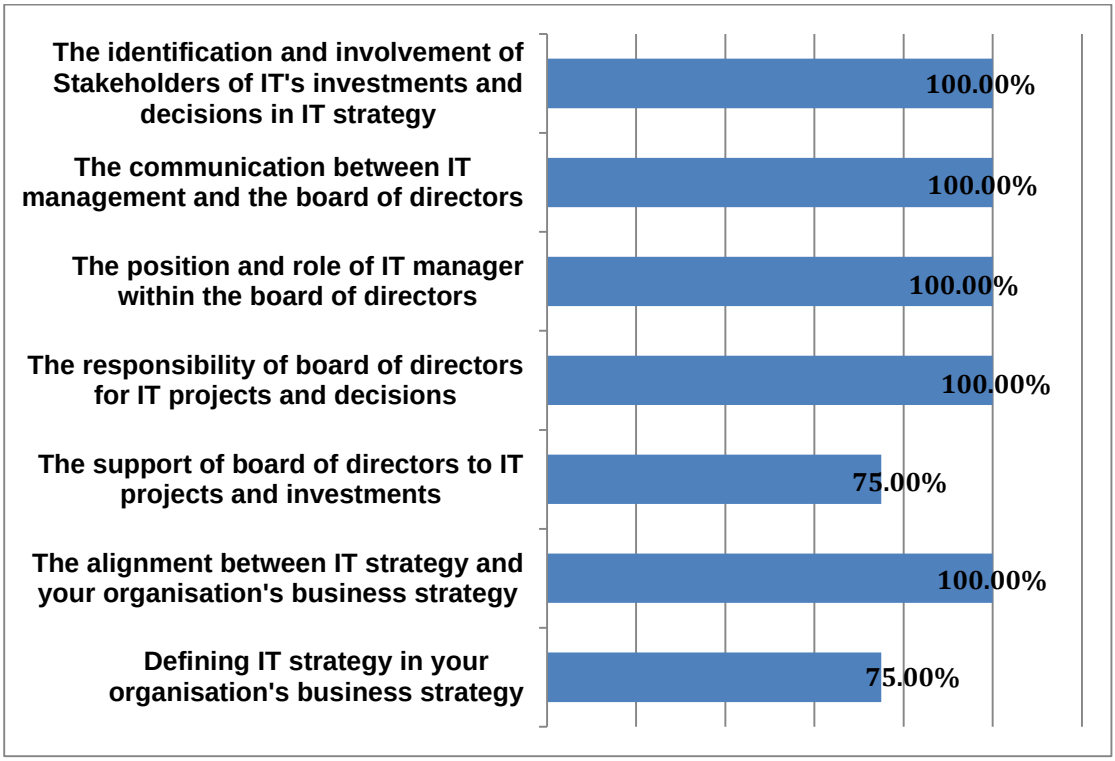


Figure 7-47: Case Study5: Strategic Alignment- Bar Char

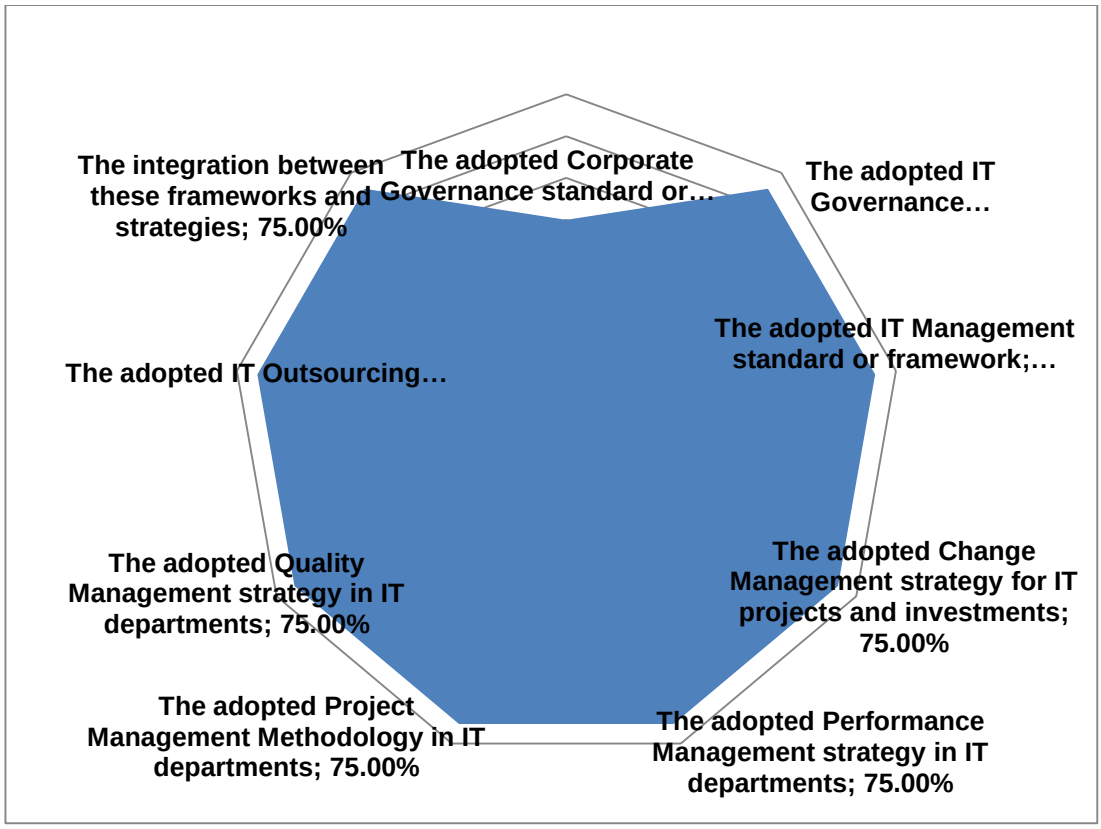


Figure 7-48: Frameworks and Strategies- Radar Chart

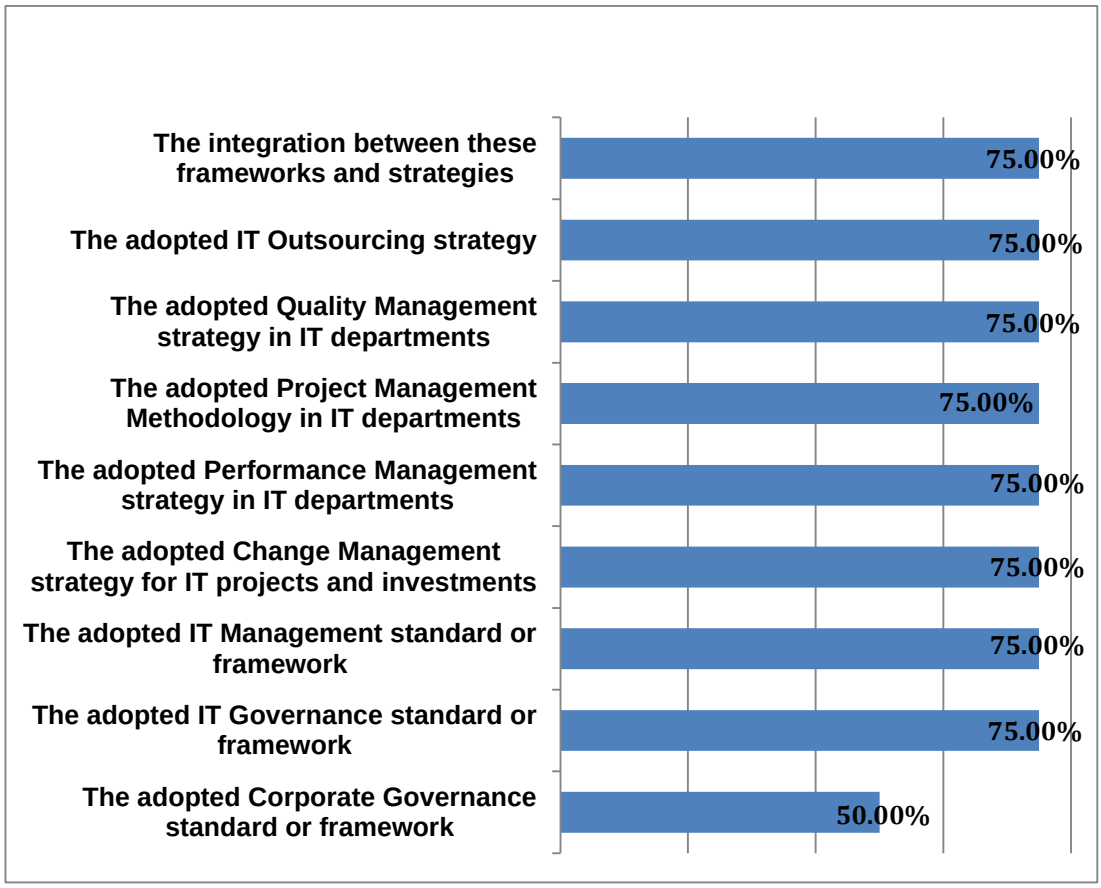


Figure 7-49: Case Stu

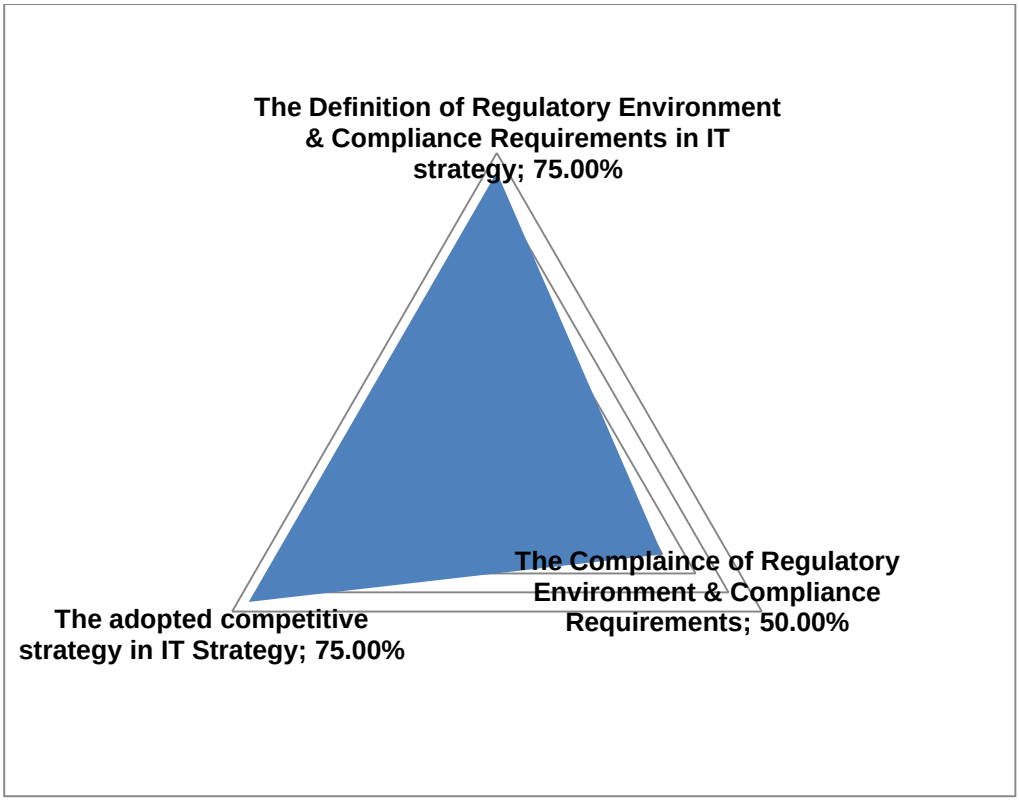


Figure 7-50: Environmental Effect- Radar Chart

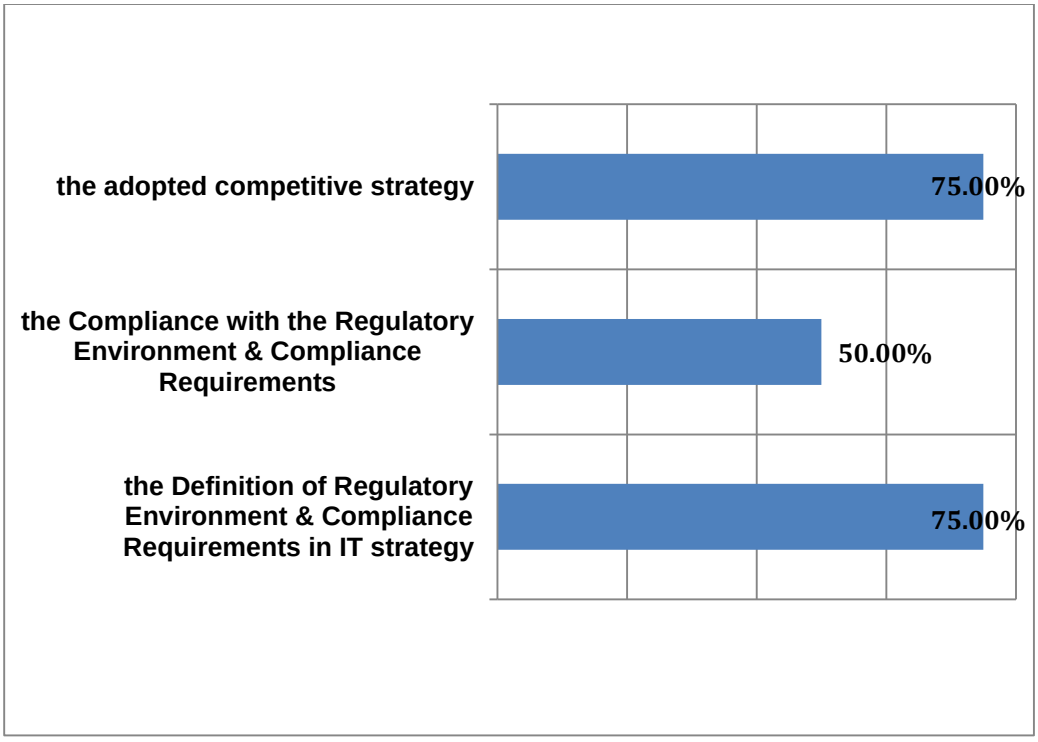


Figure 7-51: Case Study5: Environmental Effect- Bar Chart

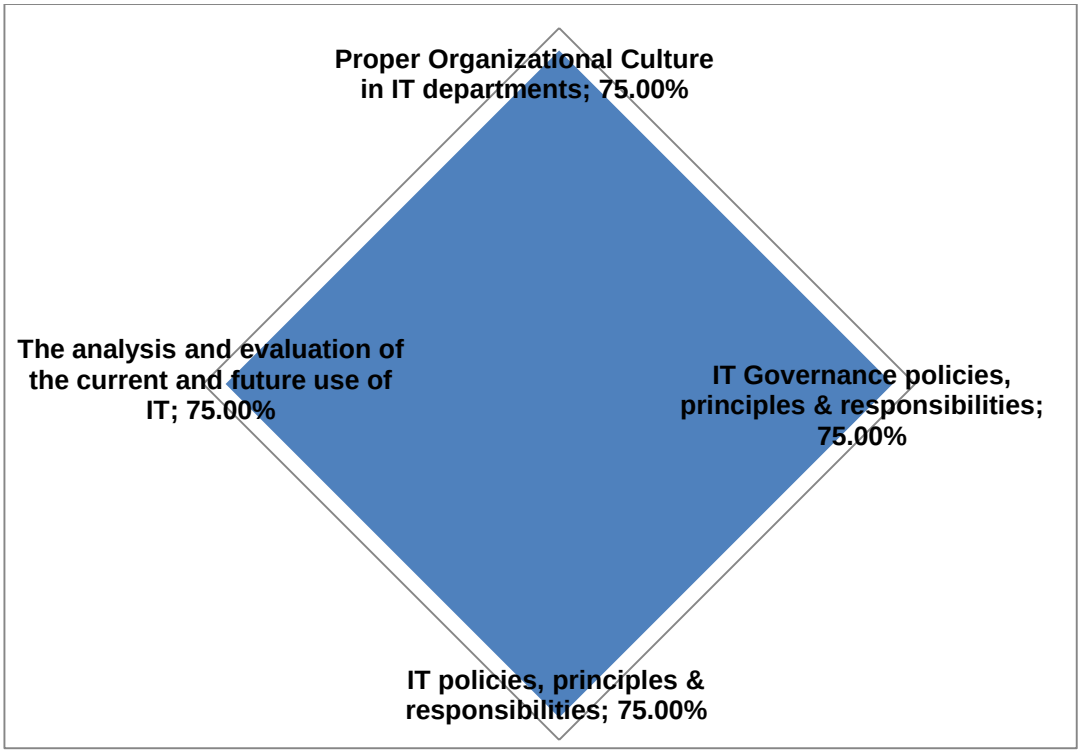


Figure 7-52: Organizational Effect- Radar Chart

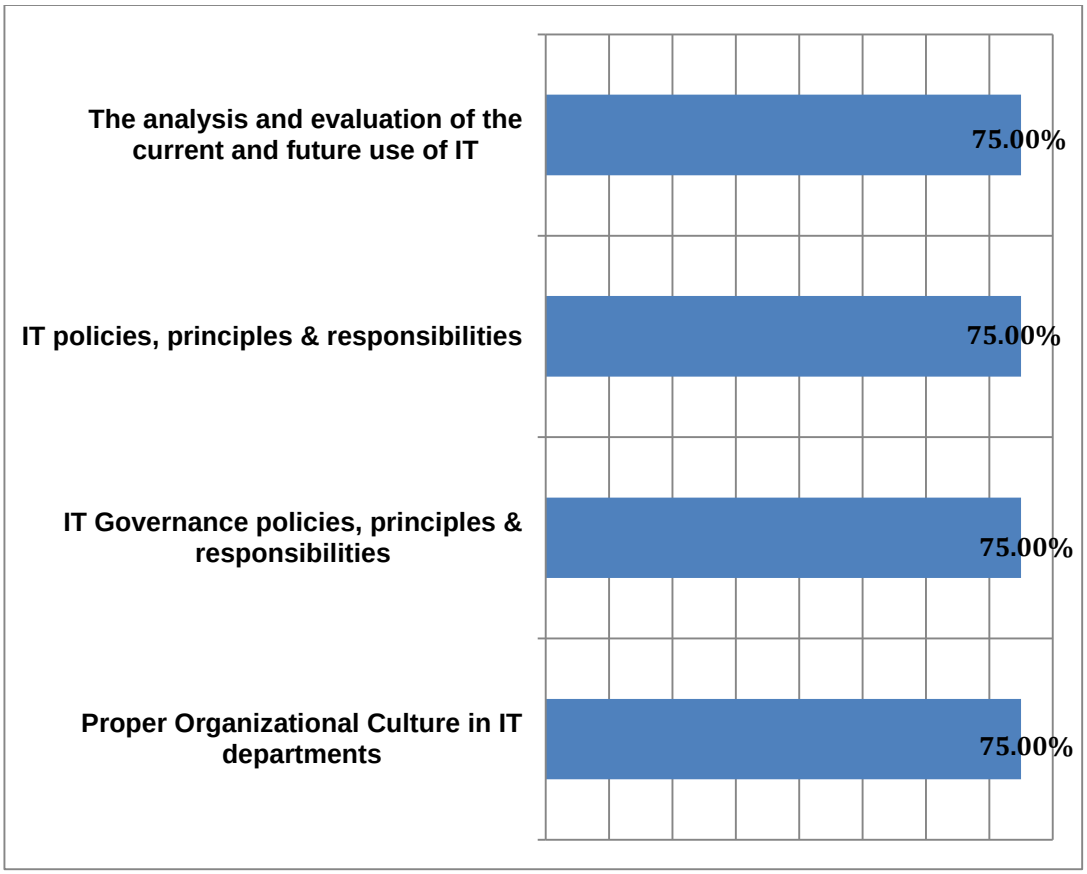


Figure 7-53: Case Study5: Organizational Effect- Bar Chart

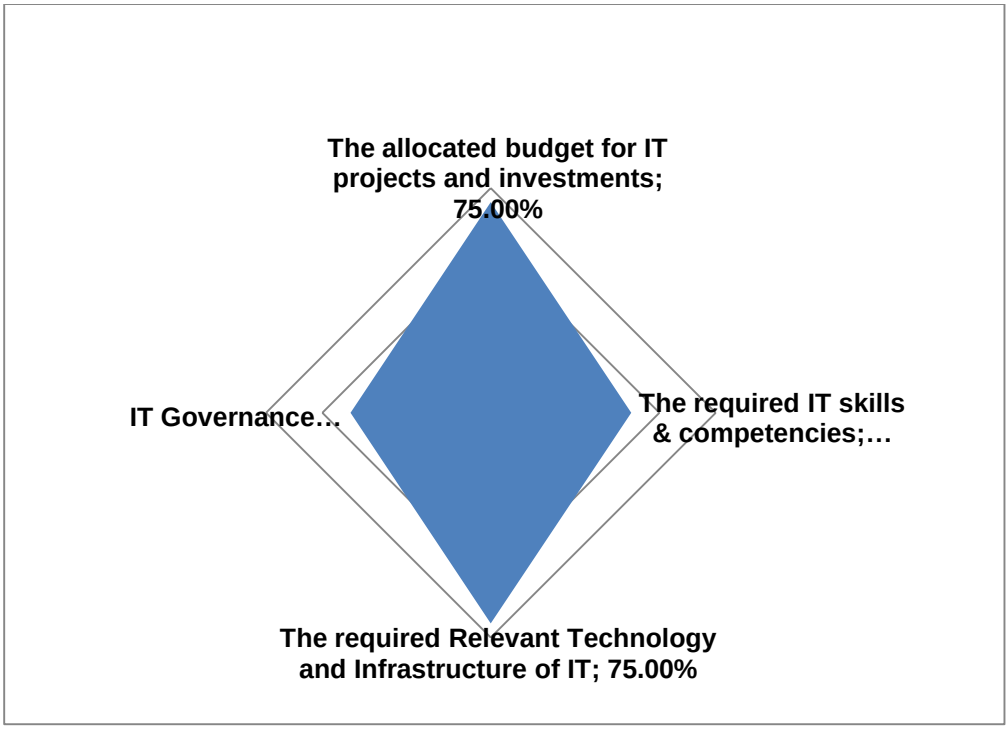


Figure 7-54: Resource Management- Radar Chart

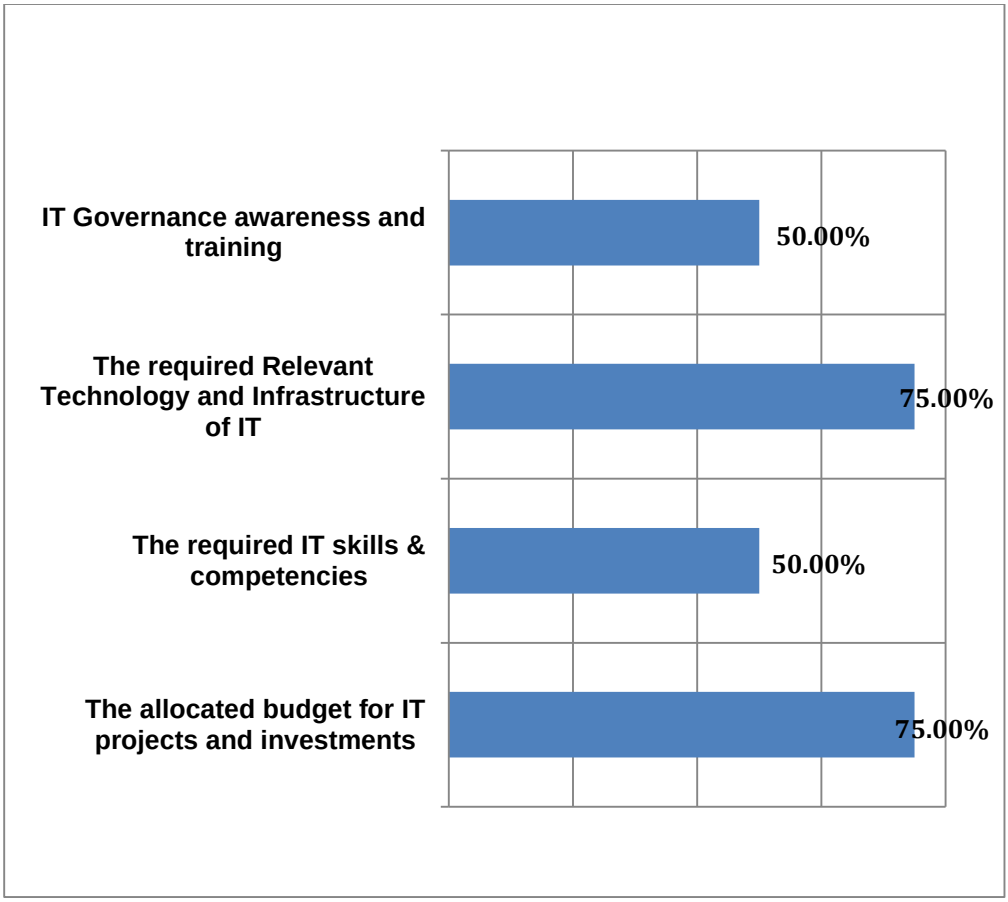


Figure 7-55: Case Study5: Resource Management- Bar Chart

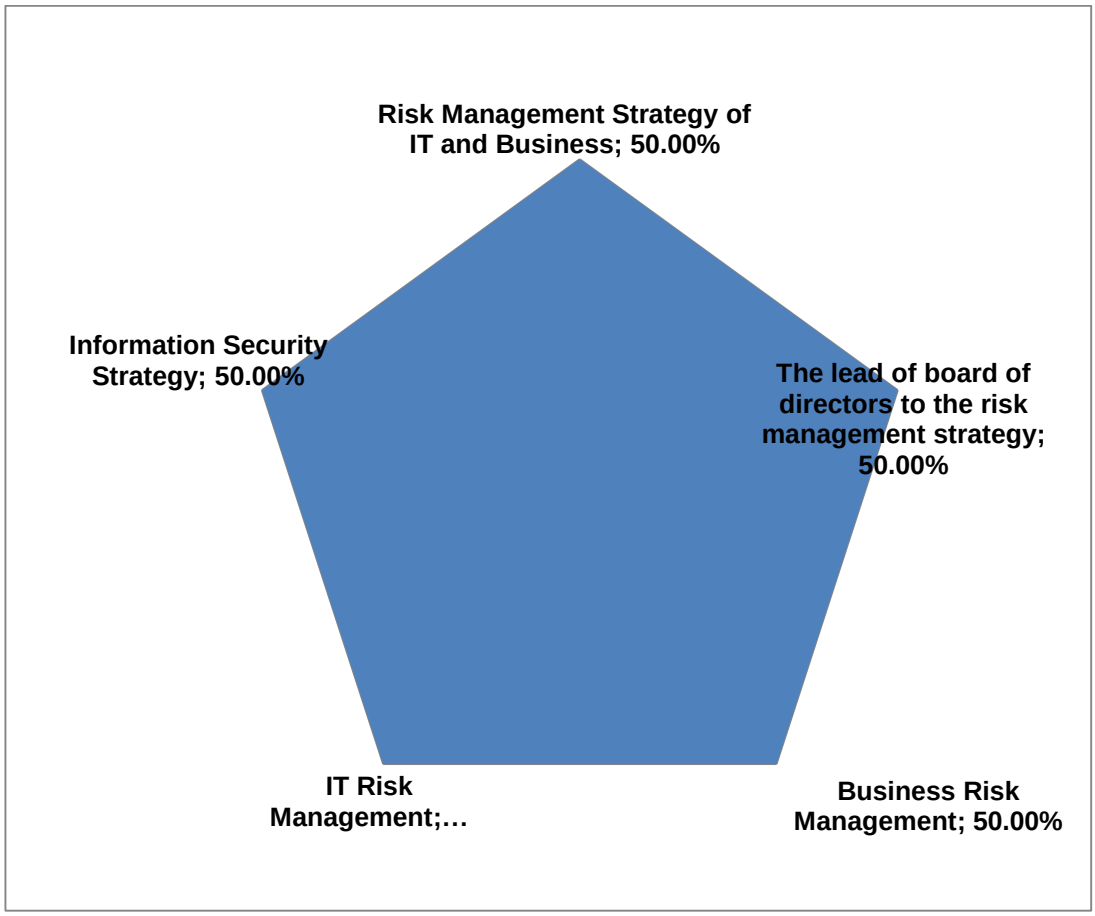


Figure 7-56: Risk Management- Radar Chat

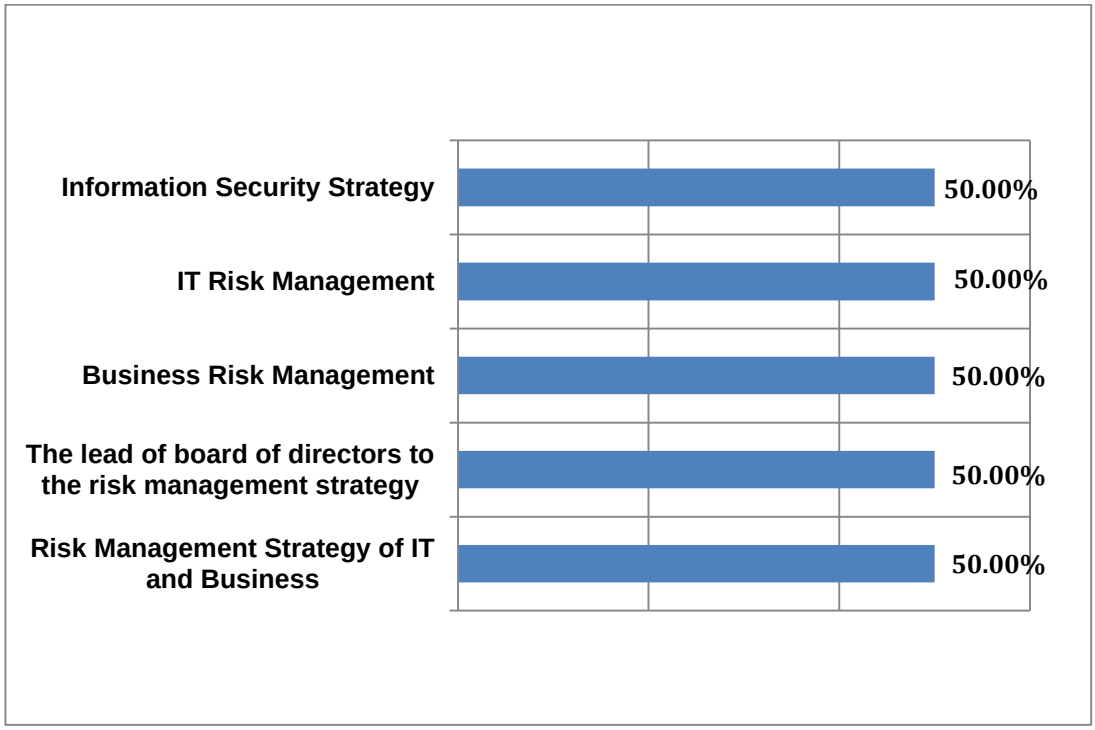


Figure 7-57: Case Study5: Risk Management- Bar Chart

Section 2: The main categories scores before weighting

After showing the results of all CSFs in this case study, the score of each category will be calculated – as explained above:

1- **Strategic Alignment (SA) weight** = (factor1 score + … + factor 7 score) / No of the factors in SA (7)

SA weight = (75 + 100 + 75 + 100 + 100 + 100 + 100) / 7 = **92.86%**

2- **Frameworks & Strategies (FSA) weight**: (factor1 score + … + factor 9 score) / No of the factors (9)

FSA weight: (50 + 75 + 75 + 75 + 75 +75 + 75 + 75 + 75) / 9 = **72.22%**

3- **Environmental effect (EE) weight**: (factor1 score + factor 2 score + factor 3 score) / No of the factors (3)

EE weight: (75 + 50 + 75) / 3 = **66.66%**

4- **Organizational effect (OE) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)

OE weight: (75 + 75 + 75 + 75) / 4 = **75%**

5- **Resource Management (RM) weight**: (factor1 score + … + factor 4 score) / No of the factors (4)

RM weight: (75 + 50 + 75 + 50) / 4 = **62.5%**

6- **Risk Management (RKM) weight**: (factor1 score + … + factor 5 score) / No of the factors (5)

RKM weight: (50 + 50 + 50 + 50 + 50) / 5 = **50%**

Section 3: Whole ITG Score

This section pertains to find the final score of ITG in this case study. The steps are illustrated above.

1- The factor weight is **3.125**

2- Strategic Alignment (SA) weight =3.125 * 7= **21.875%**

Frameworks & Strategies (FSA) weight = 3.125 *9 = **28.125%**

Environmental effect (EE) weight = 3.125 *3 = **9.375%**

Organizational effect (OE) weigh t= 3.125 *4 = **12.5%**

Resource Management (RM) weigh t= 3.125 *4 = **12.5%**

Risk Management (RKM) weight = 3.125 *5 = **15.625%**

3- SA weight **=**

(Category Weight (21.875) * SA final score in this case study (92.86))/100= **20.31%**

FSA weight **=**

28.125 * FSA final score (72.22) = **20.31%**

EE weight **=**

9.375 * EE final score (66.66) = **6.24%**

OE weight **=**

12.5* OE final score (75) = **9.37%**

RM weight **=**

12.5 * RM final score (62.50) = **7.81%**

RKM weight**=**

15.625 * RKM final score (50) = **7.81%**

4- The total weights of all categories= 20.31% + 20.31% + 6.24% + 9.37% + 7.81%+ 7.81%= **71.85%**

Based on the assessments of the categories and CSFs, the rate of whole ITG in this case study is **71.85%,** ***"Solid Governance, be consistent and minor improvement may be needed"***

Appendix K: A results report of the assessments of case study 5

ITG Assessment in KAMC

After getting the questionnaire results, the assessment of IT Governance (ITG) in KAMC is ready to expose in this report.

As shown in the questionnaire, there are 6 main categories of ITG are covered in this study (Strategic Alignment, Frameworks and Strategies, Environmental Effect, Organizational Effect, Resource Management and Risk Management), and under each category there are Critical Success factors (CSFs) that represented by the questions.

In this report, the assessment of the CSFs under each category will be presented first, then the assessment of the main categories will follow.

To make the assessment results easier and more readable, each part will be displayed in two different charts with the same data. Then, a brief translation of the charts and numbers will be presented.

1

Section 1: Strategic Alignment Category

This section pertains to the factors that affect the Strategic Alignment between Business and IT in KAMC. There are 7 CSFs under this category as shown in the following charts.

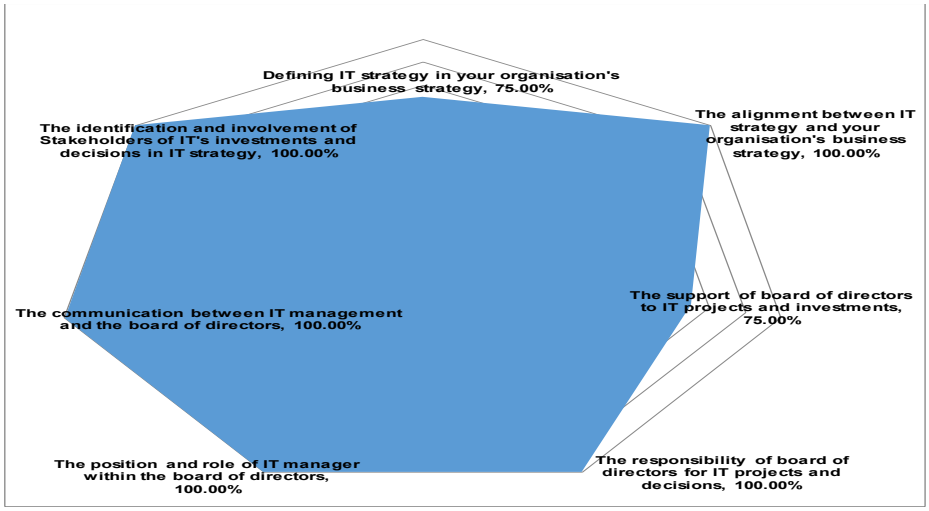


Figure 1: Strategic Alignment- Radar Chart

2

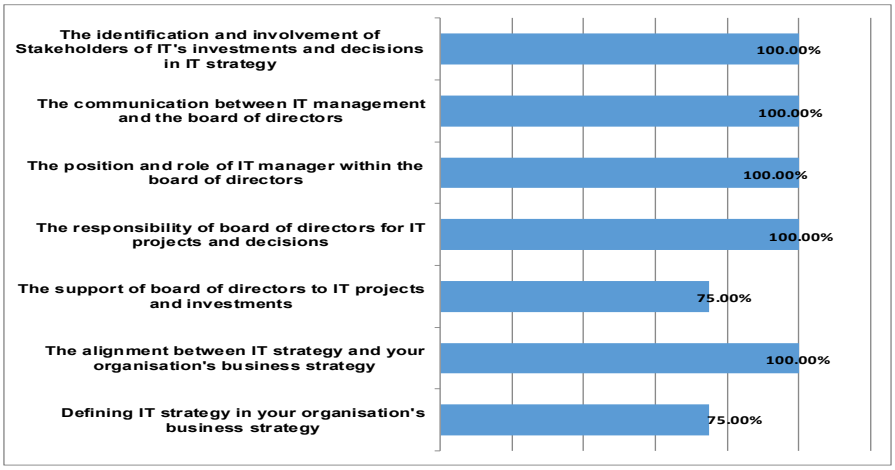


Figure 2: Strategic Alignment- Bar Chart

- Perfect Areas (100%), be consistent and no action is needed:
  1- **The alignment between IT strategy and your organisation's business strategy**
  2- **The responsibility of board of directors for IT projects and decisions.**
  3- **The position and role of IT manager within the board of directors.**
  4- **The communication between IT management and the board of directors.**
  5- **The identification and involvement of Stakeholders of IT's investments and decisions in IT strategy.**

- Solid Areas (75%), be consistent and minor improvement may be needed:
  1- **Defining IT strategy in your organisation's business strategy.**
  2- **The support of board of directors to IT projects and investments.**

3

Q1: To what extend do you agree that these results reflect the actual status of "Strategic Alignment" in KAMC?

Strongly disagree
Disagree
Neutral
Agree
Strongly agree

4

Section 2: Frameworks and Strategies Category

This section pertains to the factors that concern about the adoption of the important framework and strategies in KAMC. There are 9 CSFs under this category as shown in the following charts.

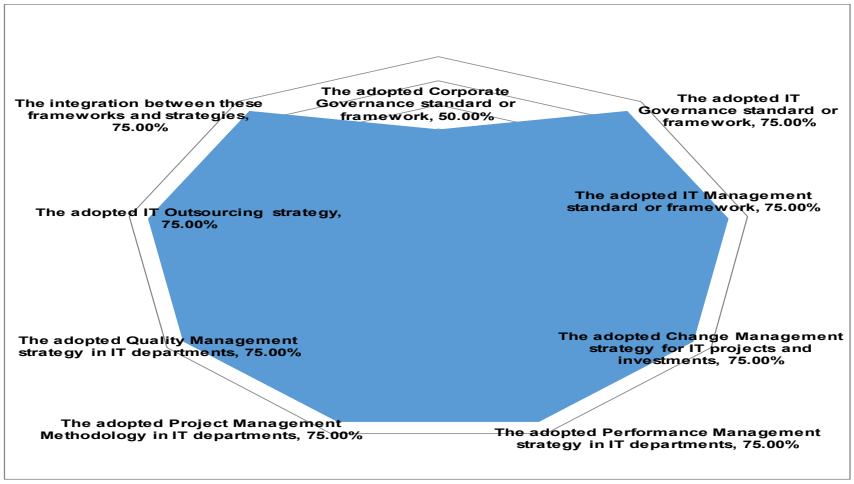


Figure 3: Frameworks and Strategies- Radar Chart

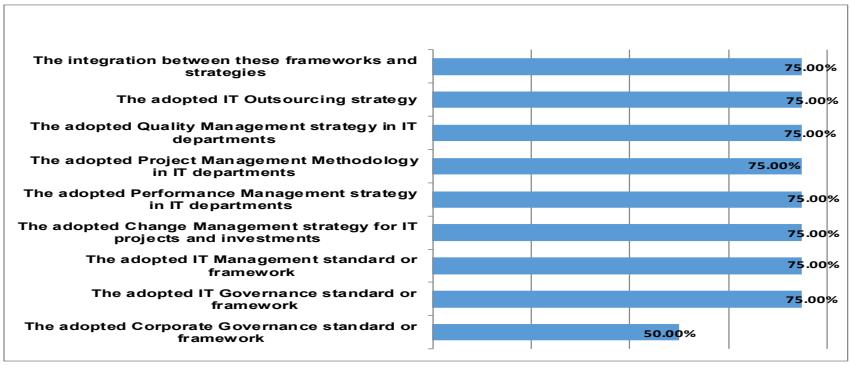


Figure 4: Frameworks and Strategies- Bar Chart

- Solid Areas (75%), be consistent and minor improvement may be needed:
  1- **The Adopted Performance Management Strategy.**
  2- **The Adopted Quality Management Strategy**
  3- **The Adopted IT Governance Standard or Framework.**
  4- **The Adopted IT Management standard or framework.**
  5- **The Adopted Change Management Strategy.**
  6- **The Adopted Project Management Methodology.**
  7- **The integration between these strategies and frameworks.**
  8- **The Adopted IT Outsourcing Strategy.**

- Average Areas (50%), medium improvement is needed:
  1. **The Adopted Corporate Governance Standard or Framework**.

Q2: To what extend do you agree that these results reflect the actual status of "Frameworks and strategies adoption" in KAMC?

Strongly disagree
Disagree
Neutral
Agree
Strongly agree

Section 3: Environmental Effect

This section pertains to the external and environmental factors of KAMC. There are 3 CSFs under this category as shown in the following charts.

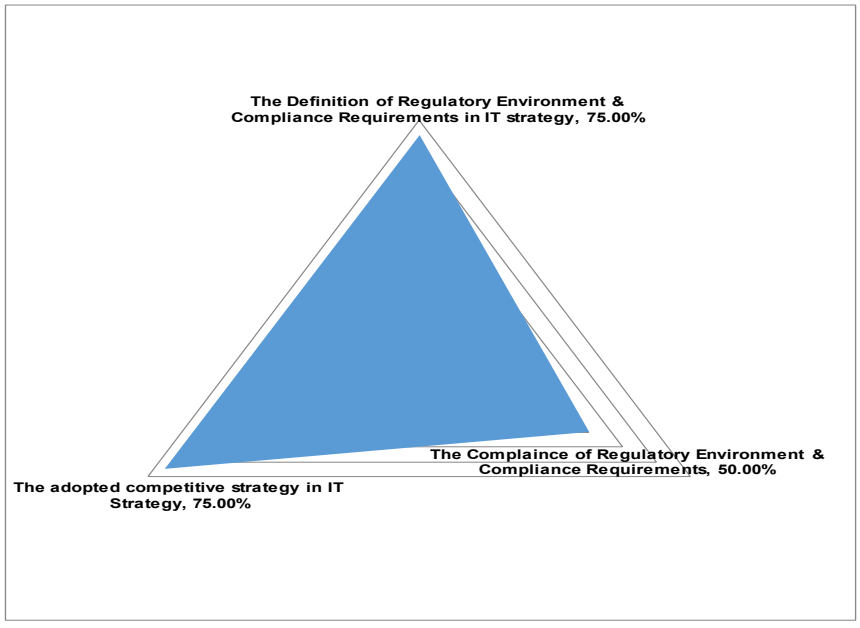


Figure 5: Environmental Effect- Radar Chart

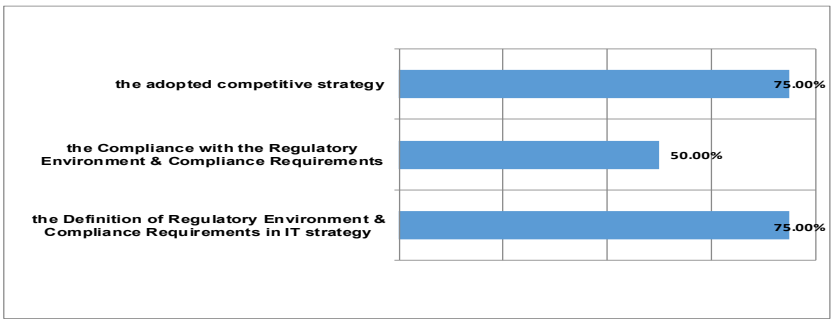


Figure 6: Environmental Effect- Bar Chart

- Solid Areas (75%), be consistent and minor improvement may be needed:
  1. **The Definition of Regulatory Environment & Compliance Requirements in IT Strategy.**
  2. **The Adopted Competitive Strategy.**

- Average Areas (50%), medium improvement is needed:
  1- **The Compliance with the Regulatory Environment & Compliance Requirements.**

Q3: To what extend do you agree that these results reflect the actual status of "Environmental Effect" in KAMC?

Strongly disagree
Disagree
Neutral
Agree
Strongly agree

Section 4: Organisational Effect

This section pertains to the internal and organizational factors of KAMC. There are 4 CSFs under this category as shown in the following charts.

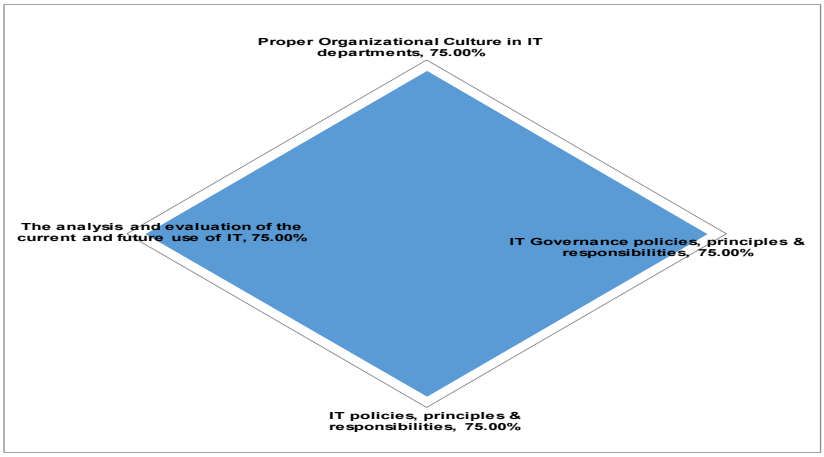


Figure 7: Organizational Effect- Radar Chart

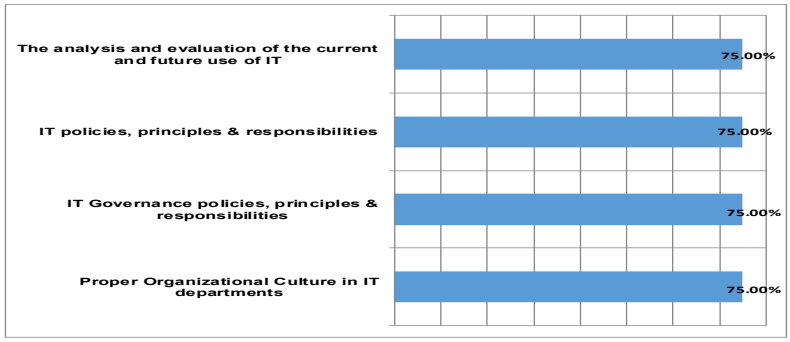


Figure 8: Organizational Effect- Bar Chart

- Solid Areas (75%), be consistent and minor improvement may be needed:
  1- **Proper Organizational Culture in IT departments in your Organisation.**
  2- **IT Governance policies, principles & responsibilities in your Organisation.**
  3- **The analysis and evaluation of the current and future use of IT in your Organisation.**
  4- **IT policies, principles & responsibilities in your organisation.**

Q4: To what extend do you agree that these results reflect the actual status of "Organisational Effect" in KAMC?

Strongly disagree
Disagree
Neutral
Agree
Strongly agree

Section 5: Resource Management

This section pertains to resource management factors in KAMC. There are 4 CSFs under this category as shown in the following charts.

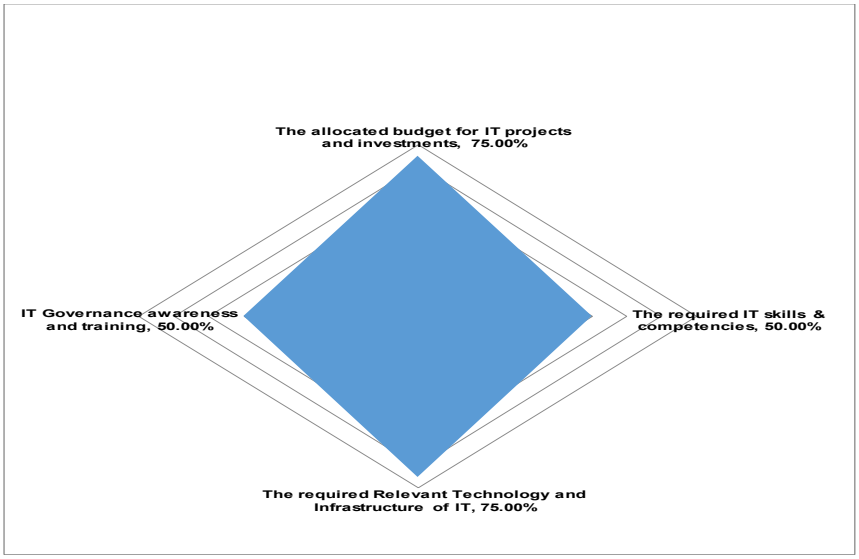


Figure 9: Resource Management- Radar Chart

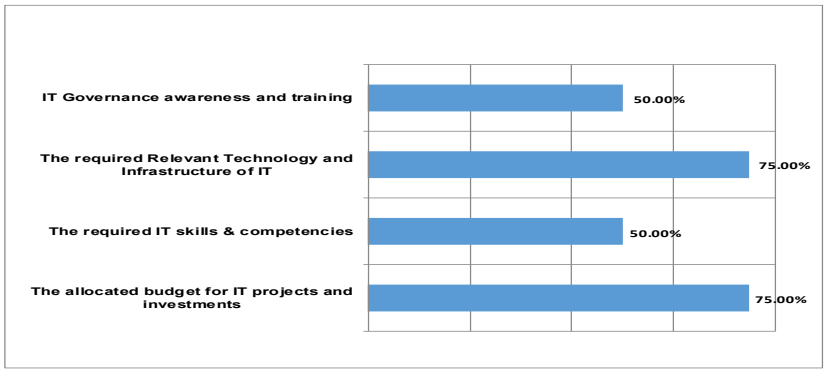


Figure 10: Resource Management- Bar Chart

- Solid Areas (75%), be consistent and minor improvement may be needed:
  1. **The allocated budget for IT projects and investments.**
  2. **The required Relevant Technology and Infrastructure of IT.**

- Average Areas (50%), medium improvement is needed:
  1- **The required IT skills & competencies.**
  2- **IT Governance awareness and training.**

Q5: To what extend do you agree that these results reflect the actual status of "Resource Management" in KAMC?

Strongly disagree
Disagree
Neutral
Agree
Strongly agree

Section 6: Risk Management

This section pertains to risk management factors in KAMC. There are 5 CSFs under this category as shown in the following charts.

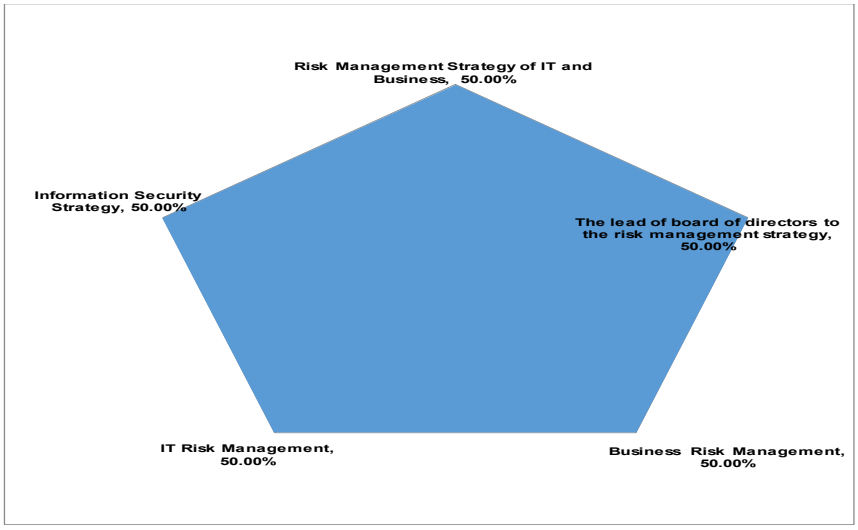


Figure 11: Risk Management- Radar Chat

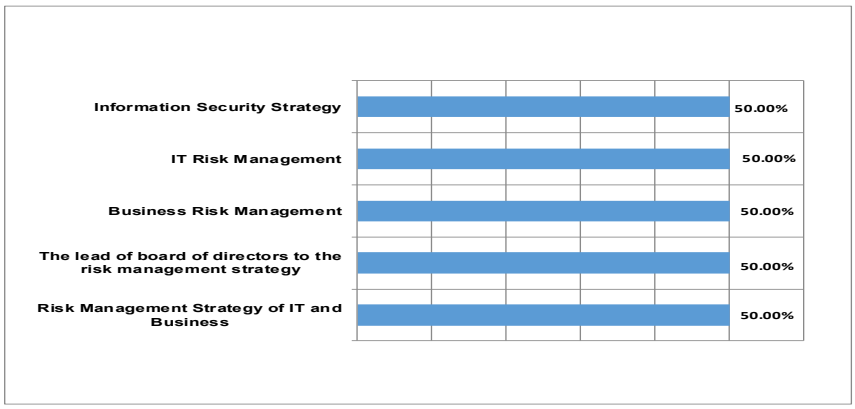


Figure 12: Risk Management- Bar Chat

- Average Areas (50%), medium improvement is needed:
  1- **The Risk Management Strategy of IT and Business in your organization.**
  2- **IT risks in your Organisation.**
  3- **Information Security Strategy in your organization.**
  4- **The lead of board of directors to the risk management strategy in your organization.**
  5- **Business risks in your Organisation.**

Q6: To what extend do you agree that these results reflect the actual status of "Risk Management" in KAMC?

Strongly disagree
Disagree
Neutral
Agree
Strongly agree

Section 7: The main categories

After showing the assessment of all CSFs in KAMC, now the assessment of the main 6 categories is presented in the next charts.

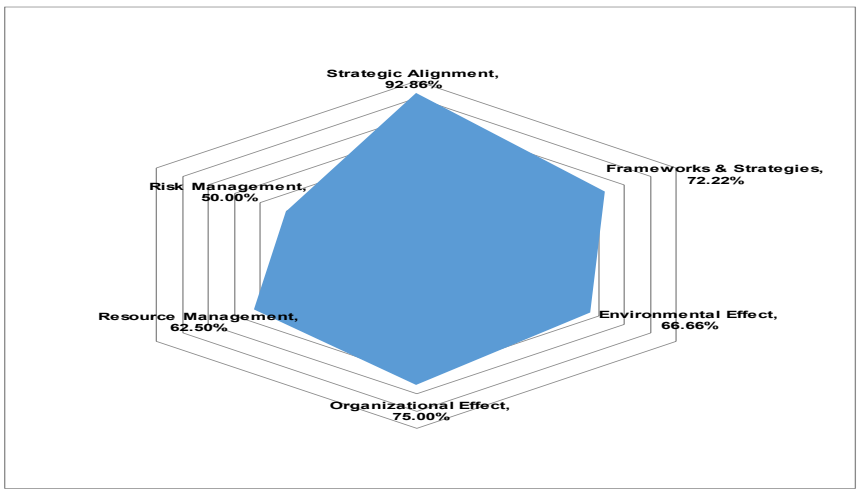


Figure 13: Categories- Radar Chart

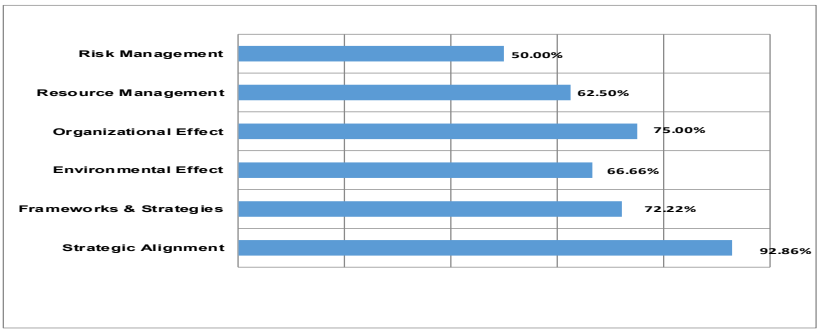


Figure 14: Categories- Bar Chart

- Perfect Areas (100%), be consistent and no action is needed:
  1. **Strategic Alignment, 92.86%**

- Solid Areas (75%), be consistent and minor improvement may be needed:
  1. **Organizational Effect, 75%**
  2. **Frameworks & Strategies Adoption, 72.22%**
  3. **Environmental Effect, 66.66%**
  4. **Resource Management, 62.50%**

- Average Areas, medium improvement is needed:
  1. **Risk Management, 50%**

Based on the assessments of the categories and CSFs,

the rate of whole ITG in KAMC is

71.85%

"Solid Governance, be consistent and minor improvement may be needed"

Q7: To what extend do you agree that these results reflect the actual status of" ITG" in KAMC?

Strongly disagree
Disagree
Neutral
Agree
Strongly agree

Question8: To what extend do you agree that "SFITG3 is good instrument in measuring ITG in the public sectors in Saudi Arabia"?

Strongly disagree
Disagree
Neutral
Agree
Strongly agree