Identifying the Impact of the Critical Success Factors on the Success of IT Projects in UAE

دراسة حول العوامل المؤثرة في تحقيق نجاح مشاريع تكنولوجيا المعلومات في الإمارات العربية المتحدة

by

SALEM NA'EL SALAMAH

A dissertation submitted in fulfilment

of the requirements for the degree of

MSc PROJECT MANAGEMENT

at

The British University in Dubai

Dr. Khalid Al Marri

January 2018

DECLARATION

I warrant that the content of this research is the direct result of my own work and that any use made in it of published or unpublished copyright material falls within the limits permitted by international copyright conventions.

I understand that a copy of my research will be deposited in the University Library for permanent retention.

I hereby agree that the material mentioned above for which I am author and copyright holder may be copied and distributed by The British University in Dubai for the purposes of research, private study or education and that The British University in Dubai may recover from purchasers the costs incurred in such copying and distribution, where appropriate.

I understand that The British University in Dubai may make a digital copy available in the institutional repository.

I understand that I may apply to the University to retain the right to withhold or to restrict access to my thesis for a period which shall not normally exceed four calendar years from the congregation at which the degree is conferred, the length of the period to be specified in the application, together with the precise reasons for making that application.

_____

Signature of the student

COPYRIGHT AND INFORMATION TO USERS

Abstract: understanding what can influence performance of information technology (IT) projects is vital to achieve success in these projects. This research study aims to identify the critical success factors (CSF's) that are required in implementing success information technology (IT) projects in UAE. We have collected factors that are candidate to be suitable for the UAE market by investigating IT project management literature in different countries and domains. The collected factors have been examined in order to measure their impact on the success of IT projects in UAE and find if they can be considered critical to the UAE market or not. This has been accomplished by collecting feedback from IT project managers in UAE using a questionnaire. Data collected from 41 participants who responded to the study questionnaire. Data analysis evidenced that collected candidate factors are critical to the success of IT projects in UAE. It also ranked factors impact on overall project success based on the strength of the relation between the factor and different success criteria elements "Scope, Cost, Time, & Quality". Factors sorted by their impact are: adequate team capabilities, selection of the right team, clear goals and objectives, effective communication, adequate requirements management, end user involvement, minimize project complexity, effective monitor & control, top management support, strong project leadership, effective risk management, and adequate planning. The study also showed that the effect of success criteria elements on how IT project managers in UAE perceive success is very near. These elements sorted by their influence are cost success, quality success, time success, and scope success.

Keywords*:* Critical Success Factors, Information Technology, UAE, Project Failure, Project Success.

الخلاصة: إن الفهم الدقيق للعوامل المؤثرة في أداء مشاريع تكنولوجيا المعلومات يعتبر ضرورياً لتحقيق النجاح في هذه المشاريع. تهدف هذه الدراسة البحثية إلى التعرف على العوامل المؤثرة في تنفيذ مشاريع تكنولوجيا المعلومات في دولة الإمارات العربية المتحدة والوصول بها الى النجاح المطلوب. لتحقيق هدف الدراسة فقد تم جمع العوامل المرشحة لتناسب سوق تكنولوجيا المعلومات في الإمارات وذلك بالرجوع للدراسات السابقة في مجال إدارة مشاريع تكنولوجيا المعلومات في مختلف البلدان والمجالات. بعد ذلك تم التحقق من العوامل التي تم جمعها لقياس تأثيرها على نجاح مشاريع تكنولوجيا المعلومات في الإمارات بهدف تحديد ما إن كان يمكن اعتبارها مؤثرة بالسوق الإماراتية أم لا. وقد تم إنجاز ذلك من خلال جمع ردود فعل عينة تتكون من 41 من مديري مشاريع تكنولوجيا المعلومات في الإمارات باستخدام استبيان تم ارساله لهم. بعد تحليل البيانات والردود على الاستبيان تبين أن العوامل المرشحة التي تم جمعها هي بالفعل مؤثرة في نجاح مشاريع تكنولوجيا المعلومات في الإمارات. بالإضافة لذلك فقد تم تصنيف العوامل المؤثرة على نجاح المشروع استنادا إلى قوة العلاقة بين كل منها ومعايير النجاح المختلفة "المتطلبات، التكلفة، الوقت، والجودة". العوامل مرتبة حسب تأثيرها هي: قدرات ومهارات فريق العمل، اختيار الفريق المناسب، وضوح أهداف المشروع، فعالية التواصل، إدارة متطلبات المشروع، إشراك المستخدم النهائي، التقليل من تعقيدات المشروع، مراقبه تنفيذ المشروع والسيطرة عليه، دعم الإدارة العليا، قوة قيادة المشروع، فعالية إدارة المخاطر، والتخطيط الكافي للمشروع. بالإضافة لما سبق فقد أظهرت الدراسة أيضا أن تأثير معايير النجاح على كيفية إدراك نجاح المشروع من قبل مدراء المشاريع في الإمارات متقارب جدا. هذه المعايير مرتبة حسب تأثيرها هي: النجاح المتعلق بالتكلفة، النجاح المتعلق بالجودة، النجاح المتعلق بالوقت، والنجاح المتعلق بالمتطلبات.

Table of Contents

1. CHAPTER ONE: INTRODUCTION

1.1 Background

Critical Success Factors (CSF's) of Information Technology projects are being studied by researchers since the 1970's, when technology started appearing in different business domains starting from banks to military, and universities. The importance of studying these factors recently increased because technology turned out to be an essential ingredient of all the other domains. While technology has almost invaded all of our lives, IT projects still suffer higher rates of failure compared to other areas. According to Nwakanma et al.(2013), rates of failure in IT projects are alarming to the industry and the economies. These failure rates have put IT CSF's, and understanding the impact of each of them, under the vital focus of IT professionals and researchers. This research intends to study CSF's of IT projects in UAE in order to assist professionals to achieve higher project success rates.

1.2 Aim and objectives

This study aims to serve as a guide to project managers and professionals in the field of Information Technology in UAE, on how to improve project success and decrease risks of failure. The study intends to achieve its aim by the following list of objectives:

I- Constructing a list of critical success factors perceived as affecting any of the IT project success criteria, such as time and cost, as a result affecting the overall success of the project.

II- Identify success criteria elements suitable to IT projects in UAE.

III- Measuring the collective effect of CSF's on each of the success criteria elements.

IV- Measuring the collective effect of CSF's on the overall success of IT projects in UAE.

V- Clarify the impact of the collected critical factors on IT project success negatively or positively.

VI- Ranking factors based on their level of effect on IT project success in UAE.

1.3 Define Success in IT Projects

The notion of project success is vast and perceived differently by different people based on their culture and background (Gomes & Romão, 2016). The criteria of success is not the same for all projects. Baker et al. (2008) clarified that it is not necessary for a project to achieve iron triangle criteria to be considered a success by targeted stakeholders. Moreover, many projects were delivered late and over the budget, but still perceived as successes. According to Tukel and Rom (1998), many of the gigantic projects have exceeded their delivery dates, however, those projects perceived success. For example; Burj Khalifa, which is considered as one of the success stories in Dubai, was estimated to cost 900 million US dollars, while the actual budget reached 1.5 billion. In addition, the project failed to meet the timeline, being 9 months late (UK Essays, 2013). Shepherd et al. (2009) explained that a project can be considered failed only if it was terminated before completion after recognizing that it is not performing properly if compared with the planned performance.

In the field of IT, scholars tried to define when a project could be considered success or failure. Early studies like the one done by Saur (1993) considered a project failed, in one of four cases – if it was entirely cancelled, failed to accomplish all project goals, lacked or had low levels of end-user willingness to use the outcome product, and failed to fulfil the requirements of all stakeholders. According to Lech (2013), iron triangle criteria is not enough to measure success of IT projects due to the fact that IT projects have a unique nature and should be treated differently. According to Lech (2013), success criteria of IT projects consist of two main parts: product success criteria and project management success criteria.

Product success is the successful delivery of the product that fulfils business and organizational needs. This is not questionable and must be accomplished for any project to succeed. While project management success is to measure the deviation from the planned budget, timeline and functionality; the realisation of deviation does not necessarily mean that the project has failed.

1.4 Uniqueness & Importance of IT projects

IT projects usually face many issues that are unique to the domain of IT, such as rapid changes in technology, high rates of jumper workers and continuous changes in the environment (Imtiaz et al., 2013). The intangible nature of the product that IT projects aim to deliver is another unique characteristic of IT projects. As a result, demands are higher to find and measure critical success factors in the domain of IT.

As IT came to be more integrated with all other parts of any company or organization, failed IT projects significantly affected success of the whole company. Some of the failed projects caused the whole company to fail, for instance, Kmart announced bankruptcy because of a failed IT project (Flyvbjerg & Budzier, 2011). The same happened with Auto Windscreen, which was the second biggest company manufacturing cars window and windscreen glass in United Kingdom; As a result, 1,100 employees lost their jobs.

1.5 High Failure Rates in IT Projects

Avoiding failure of IT projects is essential to the economy of the nations. Gingnell et al. (2014) clarified that governments allocate significant budgets every year to IT projects. However, many of these projects are considered entirely failed and cancelled, delivered late, over budget, or with less functionality than initially planned. According to PMI (2016), levels of money waste in projects is becoming higher because of inappropriate project management. They reported that 122 million dollars were wasted in 2016, for every investment of 1 billion

dollars, while the waste in 2015 was 109 million for every investment of 1 billion, which is 12% higher in 2016 than 2015.

Flyvbjerg & Budzier (2011) concluded that risks of failure in IT projects are much higher than expected. An outcome of analysing 1,471 IT projects reported an average cost overrun of 27% from initially estimated budget; moreover, a black swan was found in 1 out of each 6 IT projects, at double the budget and 70% extra time.

Failure rates in IT projects are always found higher than failures in other industries. Rubinstein (2007) found in their report that 50,000 projects were considered failed between the years 1992 and 2004, only in the software development sub-industry; and the number is higher for IT projects in general. The report indicated that 53 % of those IT projects finally delivered, but either exceeded the planned budget or timeline, or provided fewer functions, while 31% of them entirely cancelled during development phase. A recent study conducted by Stantdish Group concluded that achieving success results in Software Development projects still being challenging. The study examined 50,000 projects taking place during the period between 2011 and 2015. The study reported that only 29% of the studied projects found success without challenges, while 52% faced challenges, meaning that they were delivered with fewer functions, were over budget, or exceeding timeline, and the remaining 19% of those projects were fully terminated (Hastie & Wojewoda, 2015).

While both government and private companies increasing their investments in IT projects, failure rates are still high. Continuous improvement of technology and project management methodologies could not stop failures in IT projects (Ramaswamy, 2014). The reason behind this failure according to Arias et al, (2012) is the intangible nature of the product that an IT project aims to deliver. Another reason behind high failure rates of IT projects is project complexity. Dix (2010) claimed that IT projects are complex by nature; accordingly, complexity is the variable that certainly correlates with most of failures of IT projects.

Complexity increases when size and budget of the project increases, so as projects get bigger, they will get more complex and therefore more likely to fail. Murray (2000) described IT projects as too complex and complexity leads to higher threats of failure; accordingly, reducing threats of failure requires reducing project complexity.

Technology is involved almost in all industries, which makes it mandatory to achieve organisational success. Therefore, and because of the high exposure to failure in IT projects, studying CSF's of IT projects was found to be vital in order to enhance success opportunities of these projects, as well as success of the organisations. Accordingly, government and private sector companies working in the field of IT in UAE mandated to enhance the success rates of their projects. Organizations can accomplish this target by defining CSF's affecting IT project success and build their guidelines and procedures based on the impact of these factors.

1.6 IT Projects in UAE

UAE is considered the leading IT-based country in the Arab world. Elmasry (2016) stated that embracing of technology in UAE is the highest among governments in the Middle Eastern region, and matches the leading developed countries. UAE is at the top of the rank between Middle Eastern countries in terms of services accessibility, digital signature, and card functionalities (Elmasry, 2016).

The government of UAE has invested an enormous budget and implemented several initiatives in order build a solid IT economy. Presently, most of UAE government departments have transformed into electronic form of services in order to achieve e-government. Many of these services are also available to beneficiaries through smart channels using mobiles and tablets. The aspiring and brave initiatives adopted by decision makers in UAE yielded to turn the country into the hub of the IT industry in the region. This

is clear in the choosing of UAE by international giants in the field of technology such as Oracle & Microsoft to manage their business in the Middle East and Arab countries.

The concentration on technology is clear in the strategic plans of UAE. Digital technology is one of the primary divisions of the National Innovation Strategy in UAE, which is part of UAE Vision 2021. The strategy emphasises on promoting the rapid adoption of technology in all business domains in both public and private sectors (Elmasry, 2016). UAE Vision 2021 listed readiness of IT sector as a national key performance indicator, which acts as an enabler to achieve the vision (UAE Vision, 2017).

The appropriate and strategic use of technology positively affects innovation (Zafar, 2008). Innovation is seen by UAE leaders and decision makers as a key enabler to achieve future goals and strategic plans chosen for the country. This is another reason behind the need to achieve success in IT projects, henceforth, recognise what are the critical success factors affecting IT projects, and how to control these factors.

1.7 Research Structure

The remainder of this research proceeds as follows. In the following section, a literature review is presented to investigate CSF's discussed by earlier studies in both developed and developing countries, then build a conceptual framework that represents candidate success factors seen appropriate for UAE. Next, in methodology section, a questionnaire will be built, based on nominated factors and shared with IT project managers and professionals in UAE. Subsequently, the results and analysis section will present and analyse questionnaire's responses. After that, the discussion section will discuss analysed results. At last, the paper ends with the conclusion that would serve in setting guidelines towards achieving IT project success in UAE.

2. CHAPTER TWO: LITERATURE REVIEW

In this section, we will review literature discussing IT projects in order to explore CSF's affecting those projects and constructing a list of factors nominated to be suitable for IT projects in UAE. Then, we will use these factors to build a conceptual framework, which will facilitate assessment in the successive sections of the study.

This chapter start with exploring literature in order to build solid definition of success criteria elements that are suitable to measure success of IT projects, criteria will be utilized in a later stage to evaluate the influence of candidate success factors in order to find their influence on overall project success. Then critical success factors will be defined based on literature in order to explain the difference between success criteria and success factors. The next section is the core of this chapter where literature reviewed seeking for the success factors that can be considered critical to IT projects in UAE, support of these factors by earlier researchers will be also highlighted in this section. After that, conceptual framework will be constructed based on the information gathered from prior section of the literature review. This framework will propose the relation between CSF's, success criteria elements, and project success. In the last section, Hypothesis will be constructed based on the conceptual framework in order to test candidate success factors by finding their impact on the success criteria elements and overall success of IT projects in UAE.

2.1 Project Success Criteria

Success in managing projects is different from achieving successful projects; moreover, success criteria and success factors are not equal. It is mandatory to clarify project success factors and distinguish them from project success criteria in order to shape the main dimensions of conceptual framework that will be utilized in this study. According to Prabhakar (2008), success criteria in project management are utilized as the indicators to

verify if the project achieved planned targets or not, and to which level. While project success encapsulates success of both project management as well as product that the project intends to deliver (Baccarini, 1999).

Reviewing literature illustrates that the success criteria of projects should include achieving sit of targets such as delivering full scope; within planned budget; within planned timeline; and without affecting quality. According to Belout & Gauverea (2004), IT projects are considered success only if they were completed within timeline; without extra expenditure; covering all requirements collected during planning phase; and if they delivered a usable product that satisfied end users. Chow & Cao (2008) also supported this proposition. They concluded that level of IT project success can be measured by a criteria of four dimensions: delivering a good quality product (quality); meeting all required objectives and functionalities (scope); delivering the product within timeline (time) and within planned budget (cost). Shenhar et al. (1996) conducted a study on 127 projects and found that completing projects within planned budget should be part of the success criteria of any project. Meeting budget was also highlighted by White and Fortune (2002). They concluded as a result of studying 620 projects in United Kingdom, that meeting budget is essential when judging success of projects. They also reported another vital dimension of success criteria, which is meeting the timeline. This dimension was also seen crucial by other researchers including Marshall's (2007) and Shenhar et al. (1996). Recently; researchers such as Montequin et al. (2014) pointed out that the criteria which works fine with a specific project is not necessarily significant with another. They claimed that measuring project success has turned to be much more complex than before. Perception of success is a subjective matter, success perceived in a different way by different people; and project type and domain also affect our judgement about project success.

2.2 Definition of Critical Success Factors (CSF)

Critical success factors (CSF) defined in a different way and context by different researchers based on their experiences and domain of research. Reviewing literature indicated that there is a continuous dispute about what are the critical success factors affecting project success. We perceived that researchers could be divided into three main groups based on their opinion about this argument. The first group of researchers introduced a list of factors and claimed that those factors are suitable for all kinds of projects in all areas. The second group argued that success factors need to be specific to the type and domain of the project. The last group claimed that each project should have its own success factors, as each project is unique and different from other projects. Selim (2007) had defined CSF's as the main factors decision makers need to consider in order to prevent project failure and increase success opportunities. For Kerzner and Saladis (2009) CSF's are those that can lead the project to reach successful delivery. Moreover, they assist companies to build the best technology product. According to Sudhakar (2012), it is critical for project managers to understand what the CSF's are that can prevent project failure and enhance success possibilities. Defining CSF's of IT projects must consider stakeholders' roles and observations, CSF's of a specific project might not be appropriate to another. Besides, different companies comprise of different cultures and preferences, which also support this argument (Peterson et al., 2002).

2.3 Critical Success Factors of IT Projects

In this section, we will explore earlier researches with the intention to identify CSF's of IT projects, then use them to construct conceptual framework that will be analysed later. The bottom-up approach is followed to identify critical factors, which means to start with identifying and gathering CSF's of IT projects through studying other researches then categorizing them and finally listing dimensions with corresponding critical factors.

Referring to the earlier research in the field of IT projects, the following list of twelve candidate critical success factors has been constructed.

2.3.1 Top management support

This factor got attention by many scholars such as Fortune &White (2006) and Biehl (2007) and Xia & Lee (2004), who concluded that projects would struggle and fail if they did not get adequate support from top management. In addition and according to Arias et al. (2012), if projects did not get enough support from top management, then they will not be in line with company objectives; which means project failure. Lam et al. (2013) explained that higher commitment from top management towards IT project enhances success rates of the project. Project sponsor is an example of top management positions in the projects. According to Mulcahy (2011), sponsors hold the power needed to support the project, which is mandatory to moderate threats of failure and amplify opportunities to succeed. Sponsors should protect the project as well as provide the project team with what they require to achieve success. Arias et al. (2012) highlighted the importance of effectively managing the relation with top management positions such as sponsor. Periodical meetings with sponsors are needed to keep them updated about project progress and seek their support to resolve problems beyond the capabilities of the project team in order to minimize risks of failure. Furthermore, it is vital to involve top management in the approval process of change management according to business requirements. Absence of significant support from top management would prevent project managers from aligning project objectives with business objectives. Top management needs to be clear and communicate any doubts they have about the project from day one, otherwise their support to the project would be weaken at a later stage and that might cause the whole project to fail (Neimat, 2005).

2.3.2 Strong Project leadership

Project leadership significantly affect success of IT projects. According to Biehl (2007), poor leadership would negatively affect the timeline of project and this results in deviation from planned delivery and sometimes causes project to fail. In the domain of IT projects, Aronson et al. (2013) explained that the project leader is responsible for building and protecting project's spirit, which is crucial for the project to succeed. This can be achieved only if the leader has sufficient technical and personal capabilities. Fortune and White (2006) also perceived these capabilities vital to project success. Competences of project leaders are pointed out in literature as a key factor to achieve success. Xia & Lee (2004) claimed that weak project managers would lose the direct control over project teams, which affects success of the project. Arias et al. (2012) concluded that assigning the role of project manager to someone from the team only because he is technically capable might lead the project to fail; instead, this role should be assigned to someone who has adequate qualifications and project management capabilities in addition to technical skills. Nasir & Sahibuddin (2011) explained that a skilled and capable project manager could lead the project towards success. Setting clear responsibilities of project manager is essential to the success of the project besides skills and competences that the project manager must have (Arias et al., 2012). For McLeod & MacDonell (2011), in order to prevent failure, the project must be managed by a strong leader who knows how to utilize his leadership competences to the benefit of the project. Leaders should motivate new learning opportunities and technical challenges due to their importance in building and maintaining spirit of any IT project (Aronson et al., 2013).

2.3.3 Adequate Planning

Importance of this factor to project success is not related only to building project schedule. The project manager should consider it as a creative activity that supports project team in building a strategy they have to follow in order to achieve project target (Arias et al., 2012).

Montequin et al. (2014) highlighted the impact of building achievable and realistic project plans with accurate time and cost estimation on overall project success. Neimat (2005) explained that poor planning leads to building wrong schedule, cost and resources estimates. Realistic estimation of both timeline and cost is vital to IT project success (Nasir & Sahibuddin, 2011). Poor planning is also seen as a reason behind changing requirements during projects execution. As a result, project will not proceed as required and might end up with a failure. According to Gulla (2011), poor planning leads to serious issues that might cause any project to fail: project team does not have enough awareness of why the project is and what to deliver; missing some items that would be captured in case of proper planning; and assigning wrong people to some project tasks.

2.3.4 Selecting the Right Team

Management should give high attention to the activity of selecting project team whose members are involved in all project activities, and are responsible for building the product. Management must keep beliefs of individual team members in consideration while selecting project team. Management also mandated to promote vision and artefacts of the project between members of the team (Aronson et al., 2013). Xia & Lee (2004) explained that chances of failure are higher if project staffing was not sufficient or skills of project team members did not comply with project's nature. Selecting the right people to form a project team that will perform tasks and activities was realised by Reel (1999) as a crucial factor to project success. Importance of this factor was also highlighted by Fan (2010) who explained that stability of the project will be affected and conflicts will happen if the selected team was not appropriate to the project. Nah et al. (2011) studied enterprise resource planning projects as an example of IT systems that most organizations need to have, their study proved that building IT project team is crucial to overall success of the project. Management should build

multi-functional teams with best people who are experts in technical as well as business domains.

2.3.5 Adequate Team Capabilities

Team members of the IT project must have capabilities in many areas, including technical knowledge expertise in the domain as well as having sufficient information about structure, functions, and objectives of the firm they work for (Salmeron & Herrero, 2005). Neimat (2005) explained that it is challenging to take decisions about which skills are required to fulfil IT project needs especially with large projects. This is caused by the increased competition in the global market, the fast evolution of knowledge, and the endless changes of technology. According to McLeod & MacDonell (2011), having these capabilities would improve the development process and lead to boosted success rates of the project. Nauman et al. (2005) focused on distinctive technical capabilities and highlighted the importance of having them in order to deliver complex activities of IT projects such as data migration. Lack of these skills is a common reason behind failure of IT projects. According to Biehl (2007) and Sudhakar (2012), the spirit of Teamwork is another factor critical to achieving success of IT projects. Cooperation between team members in achieving project tasks leads to building team integration capability, which is essential to extend project success magnitude. Gulla (2011) explained that a capable team should have soft skills in addition to technical skills; otherwise, team members would not be flexible and adaptable if unplanned changes happened.

2.3.6 Clear Goals and Objectives

Setting clear, measurable, and realistic goals found in literature as a key critical factor, can steer the project to achieve success or result in a failure. Brocke et al. (2009) who conducted a study on IT companies in Europe, proved the high correlation between project success and

understanding what are the business goals and objectives expected from the project. Nasir & Sahibuddin (2011) underlined the importance of setting clear project goals in order to achieve success. According to Neimat (2005), it is important to clarify project goals and objectives from the beginning as well as making sure that team members are aware of these goals. In order to achieve this, planning and requirement gathering activities would take longer but that will certainly enhance the success magnitude of the project. Montequin et al. (2014) surveyed 3,668 project managers and concluded that defining clear goals and objectives from the beginning of the project is one of the five most important factors affecting project success. McLeod & MacDonell (2011) explained that clarifying project objectives from the start of the project would assist in setting needs and expectations of all stakeholders out of the project. Lack of clear and realistic goals that are agreed on by all stakeholders is a major reason behind failure of IT projects.

2.3.7 Effective Communication

Roles and responsibilities must be clear to all members of the project team and stakeholders as well as clarifying project objectives, and this is where effective communication comes to the picture as another critical factor of project success. According to Sudhakar (2012), effective communication has to be clear and direct with no loopholes. Poor communication is the main reason behind the failure of many IT projects. Communication issues are higher with larger projects since these projects require more complex analysis, which leads to an increase in project fragility (Neimat, 2005). Communication factor is considered by Montequin et al. (2014) as a vital factor to project success, communication between all stakeholders of the project should be clear, fluent, and frequent as project needs. Effective communication requires building a plan that clearly defines the right methods and tools based on project characteristics. For instance, managing communication between co-located project teams is easier than a project with distributed teams, which requires different tools and

communication modes. Team size also affect communication strategy; bigger teams require communication that is more formal and vice versa. Another variable that affects communication mode is the domain of the project (Hummel et al., 2013). Gulla (2011) listed characteristics of bad communication, which might cause projects to fails. Communicate less frequent than project needs; subjective and biased status reports; and inability to enrol some key stakeholders like vendors.

2.3.8 Effective Monitoring and Control

Project should be monitored and controlled sufficiently in order to preserve quality and prevent deviances. Fortune & White (2006) explained that all succeeded projects had been effectively monitored and controlled. For Fan (2010), project monitoring and control must be proactive as a condition to protect the project from facing serious issues; consequently, preventing project failure. Monitoring and control were defined by Arias et al, (2012) as the continuous activities taking place during project life cycle from initiation to closure, and which aim to measure, manage, & prevent diversions between current status of the project and how it is expected to be. Tools such as status reports and status meetings are utilized in monitoring & controlling the project. These tools are used to report and discuss risks, challenges, and progress of the project, and then actions are taken to prevent and correct any deviation. It is mandatory for IT project manager to utilize the necessary tools and methodology in monitoring and controlling the project, absence of adequate tools and methodology is a reason behind IT projects failure (Gulla, 2011).

2.3.9 Adequate Requirements Management

Researchers described requirement gathering as one of the challenging activities in the project. Building detailed scope and understanding what exactly need to be delivered by the project is essential to achieving project success. Salmeron & Herrero (2005) pointed out that

project failure is common if requirements' gathering is not done properly. According to Ding & Wang (2008), it is necessary to collect requirements from all stakeholders of the project in order to manage project requirements in a sufficient way. If requirements were not managed in the right way then stakeholders would not provide sufficient information about what they need or keep changing these needs during project lifecycle, which surely affects overall success of the project (Xia & Lee, 2004). Nauman et al. (2005) highlighted one of the main challenges with severe effect on requirement management; that is replacement of key project stakeholders. This change mainly on the client side usually leads to change in scope and requirements of the project because interests of new stakeholders might not be the same. If requirements are changed after completing planning stage, it would negatively influence the project.

Arias et al. (2012) has pointed out problems linked with requirement management; first is lack of awareness by users about what they need from the product intends to be delivered by the project. Second is the communication gap that may occur between project manager and other stakeholders which leads to wrong understanding by project management of what stakeholders need. Finally, the improper planning of the process of collecting requirements, who should provide them, who will approve them and how to maintain them. Requirements of the IT project must be complete and well-defined in order to achieve project success, lack of accuracy in customers' requirements negatively influences project success. To keep changing requirements is also seen as one of the reasons behind IT project failure (Montequin et al., 2014). According to Nasir & Sahibuddin (2011), who examined 26 CSF's of IT projects, concluded that building clear and fixed requirements document is a major success factor of IT projects.

2.3.10 Effective Risk Management

According to Fan (2010), effectively managing project risks would have significant impact on project success by eliminating threats of failure or at least reducing them and thus positively affecting project success. This can be achieved if stakeholders were aware of their responsibilities and accountable for them (Ding & Wang, 2008). Gładysz et al. (2015) who studied factors behind deviation from budget in IT projects, concluded that competent risk management practices significantly affect project budget and as a result are seen as one of the reasons behind project failure. For instance, absence of risk identification that relies on experts' evaluation would increase the likelihood of exceeding budget in IT projects, while following a clear risk management plan will assist in keeping project budget under control. Flyvbjerg & Budzier (2011) proved that IT projects are greatly exposed to unexpected events with high impact; therefore, it is mandatory to pay more attention for risk management in IT projects than other fields. This significance is also related to the fact that IT projects are now in relation almost with all other functions in the company and their failure will affect the company as a whole.

2.3.11 End users involvement

Lam et al. (2013) highlighted the strong relation between efficiently involving end users and success of the project. Achieving satisfaction of users is crucial to project success (Belout & Gauverea, 2004). This satisfaction cannot be realized without involving users in all phases of the project and giving them the chance to say their word and contribute. Neimat (2005) explained that some projects might change lifestyle of end users even outside company time and boundaries, which is why its mandatory to increase their commitment to the project otherwise they will see it as an extra load and will not provide enough dedication. End users might be already overwhelmed with other tasks and that requires top management to clarify priorities and facilitate proper users' assignment. Gulla (2011) concluded that if poor

coordination with end users' leads to collection of poor information about what exactly they need from the project, it would drive the project into delivering wrong requirements. Budget, as one of the elements in project success criteria, is significantly impacted by the level of end users involvement and the relations with them. Unhealthy relations with end users would lead IT project to exceed budget, accordingly, reduce opportunities to achieve success (Gładysz et al., 2015)

2.3.12 Minimize Project Complexity

Muller et al. (2012) defined project complexity as "a multi-dimensional construct, stemming from the trust in the ability to produce project's outcome, the amount of information to be processed, dynamic, and uncertainty engrained in projects, and the interaction of the actors involved, including both personal and political layers". In the area of IT project management and according to Whitney & Daniels (2013), IT projects are complex because they usually involve several uncertainties and unclear scope. Complexity related issues start occurring in IT projects from day one of planning phase including struggling with requirements definition and client approval. Xia & Lee (2004) concluded that complexity of IT projects is usually higher than the expectations of the project team. This is caused by a set of reasons such as involvement of compound software environments and technology platforms; participation of several users and suppliers; integrations with other applications and services; and continuous changes in technology. According to Montequin et al. (2014), IT projects are subjected to higher complexity than any other type of projects, which leads to more failure-based results and prevent projects from achieving anticipated success. This proposition is also supported by Dix (2010) who referred the high complexity in IT projects to the nature of the product that the project will deliver. According to Murray (2001), reducing complexity of IT projects will positively affect the project and increased complexity is one of the main reasons behind their failure. One clear example of complex projects in IT is Software development projects.

Reel (1999) explained that these projects require intelligent team members with special capabilities in order to facilitate the use of complex tools to deliver complex requirements.

Based on the analysis of literature about critical success factors of information technology projects, this study proposed twelve factors to be critical for the success of IT projects in UAE. Candidate factors will be examined in the analysis sections by utilizing questionnaire that will target IT project managers in UAE.

Table below shows that each of the nominated factors considered critical to IT project success by four to seven researchers.

Success Factors	Supporting Literature
Top Management Support	(Fortune &White, 2006) , (Biehl, 2007) , (Xia & Lee, 2004) , (Arias et al., 2012) , (Lam et al., 2013) , (Mulcahy, 2011) , (Neimat, 2005)
Strong Project Leadership	(Biehl, 2007) , (Aronson et al., 2013) , (Fortune & White , 2006) , (Xia & Lee, 2004) , (Arias et al., 2012) , (Nasir & Sahibuddin, 2011) , (McLeod & MacDonell, 2011)
Adequate Planning	(Arias et al., 2012) , (Montequin et al., 2014) , (Neimat, 2005) , (Nasir & Sahibuddin, 2011) , (Gulla, 2011)
Selection of the Right Team	(Aronson et al., 2013) , (Nah et al., 2011) , (Xia & Lee, 2004) , (Reel, 1999) , (Fan, 2010)
Adequate Team Capabilities	(Salmeron & Herrero, 2005) , (Neimat, 2005) , (McLeod & MacDonell, 2011) , (Nauman et al., 2005) , (Biehl, 2007) , (Sudhakar, 2012), (Gulla, 2011)
Clear Goals and Objectives	(Brocke et al., 2009) , (McLeod & MacDonell, 2011) , (Nasir & Sahibuddin, 2011) , (Neimat, 2005) , (Montequin et al., 2014)
Effective Communication	(Sudhakar, 2012) , (Neimat, 2005) , (Montequin et al., 2014) , (Hummel et al., 2013) , (Gulla, 2011)
Effective Monitor &	(Fortune & White, 2006) , (Fan, 2010), (Arias et al, 2012) ,

Control	(Gulla, 2011)
Adequate Requirements management	(Salmeron & Herrero, 2005) , (Ding & Wang, 2008), (Xia & Lee, 2004) , (Nauman et al., 2005) , (Arias et al., 2012) , (Montequin et al., 2014) , (Nasir & Sahibuddin, 2011)
Effective Risk Management	(Fan, 2010) , (Ding & Wang, 2008) , (Gladysz et al., 2015) , (Flyvbjerg & Budzier, 2011)
End User involvement	(Lam et al., 2013) , (Belout & Gauverea, 2004) , (Neimat, 2005) , (Gulla, 2011) , (Gladysz et al., 2015)
Minimize Project Complexity	(Whitney & Daniels, 2013) , (Xia & Lee, 2004) , (Montequin et al., 2014) , (Dix, 2010) , (Murray, 2001) , (Reel, 1999)

Table 1: Critical Success Factors

2.4 Conceptual Model

Based on the literature discussed above; *critical success factors* and *project success criteria* were gathered from previous studies to help in constructing the conceptual framework of this study. This conceptual framework consists of three main components: First component comprises of the list of the twelve factors that reported by literature as critical to the success of IT projects, and are candidate to be critical for success of IT projects in UAE. Second component represents the effect of each of the candidate factors on elements of project success criteria. Each of the elements has been utilized as an indicator to verify if the project achieved planned targets or not, and to which level. The four success criteria elements established by reviewing literature are *Timeline, Budget, Scope, and Quality* of the product. Third and last component in the conceptual framework which represents the effect of achieving success in criteria elements, on the overall success of IT project. Framework illustrates that independent variable of the study is the group of CSF's concluded from literature review, and the independent variable is the success of IT projects in UAE.

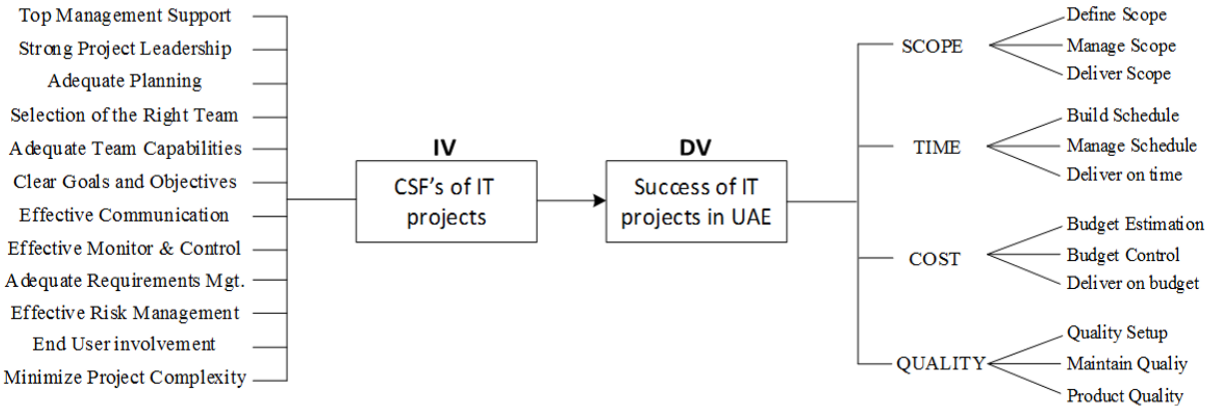

Figure 1: Conceptual Framework

2.5 Hypothesis Development

The main objective of this study is to examine success factors concluded from the literature review to find if they can be considered critical to the success of IT projects in UAE. To achieve this objective, the following list of hypothesises has been constructed based on the designed conceptual framework in order to test candidate success factors by finding their collective impact on the overall success of IT projects in UAE, as well as their collective impact on each of the success dimensions of IT projects in UAE:

ID	Null Hypothesis
H1	There is no influence of critical success factors on achieving success of IT projects in UAE in terms of scope.
H2	There is no influence of critical success factors on achieving success of IT projects in UAE in terms of time.
H3	There is no influence of critical success factors on achieving success of IT projects in UAE in terms of budget.
H4	There is no influence of critical success factors on achieving success of IT projects in UAE in terms of quality.
H5	There is no influence of critical success factors on achieving overall success of IT projects in UAE.

Table 2: List of Hypothesis

3. CHAPTER THREE: METHODOLOGY

This study has employed a mix of quantitative and qualitative techniques in order to fulfil its objectives. Qualitative techniques have been employed in the literature review section to study critical success factors of projects in the domain of information technology in both developed and developing countries. The qualitative part of the study aims to build a list of factors perceived critical to the success of IT projects by scholars in the IT domain, and candidate to be critical to the success of IT projects in UAE. The study then employs a set of quantitative tools to examine candidate factors in order to find if they are indeed critical to the success of IT projects in UAE or not. These tools are the sampling process and the design of a questionnaire that will be used to collect responses from IT project managers and professionals in UAE. Results will be generated using statistical analysis. This section will explain the research methods and tools utilized in this study. Starting with the study questionnaire that was built based on the introduced hypothesis. Then explain the sampling method utilized in this study, how targeted audience were contacted, and how their responses were collected, next section explain how collected data will be analysed and what are the tests and tools that will be utilised for the purpose of data analysis.

3.1 Study Questionnaire

The format and structure of the questionnaire has been constructed specifically to serve this study. A questionnaire is built based on the list of hypotheses, which was concluded from literature review chapter. Questions are formed to verify the validity of the set of hypotheses by collecting opinions of IT project managers and professionals in UAE in order to support the confirmation or rejection of the hypotheses. The questionnaire consists of two sections. First section aims to collect information about the respondents in order to validate suitability of their responses and assist in the analysis. Information collected in this part includes gender,

working for private or government sector, holding senior or junior IT project management position, years of experience in IT project management in general, and years of experience as an IT project manager in UAE. Second section aims to examine the impact of the antecedent variable on the criterion variable. The antecedent variable is the group of candidate critical success factors, and the criterion variable is the success of IT projects in UAE. The second section consists of 32 ordinal questions divided into groups; each group intends to collect responses and opinion from IT project managers in UAE about one of the candidate factors.

3.2 Sampling and Data Collection

Sample frame of the study includes all IT project managers with experience in UAE public or private sectors. Sample of participants was carefully selected to make sure that it is strictly representing the sample frame. Only IT project managers currently working, or having recently worked in UAE have been requested to answer the study questionnaire. Selected sample frame consists of three parts: 25 IT project managers personally contacted by sending survey URL using email. BUID students contacted through student administration office. And project managers on LinkedIn contacted through posting on two groups specialized in project management in UAE. Groups are The Emirates Project Management Academy (EPMA) and UAE IT Project Managers (ITPM's). Census of respondents consists of 42 project managers, representing the targeted sample. The reason behind using this convenient sampling method was due to the failure to find the source of random sample that can be trustworthy. Google Forms was utilized as a tool to collect responses from surveyed project managers. Likert scale has been utilized to rank candidate factors based on a range from one to five; one stands for strongly agreeing, two for agreeing, three for neutral, four for disagreeing, and five for strongly disagreeing. All questions have been set mandatory to prevent respondent from submitting incomplete data.

3.3 Data Analysis

Responses received from project managers on the questionnaire are the sets of data to be analysed. Data analysis will take place in the results and analysis section of this research in order to examine validity of the research hypothesis, SPSS statistical software program employed to accomplish data analysis. Statistical tests conducted on the collected data are *Reliability test (Cronbach Alpha),* which has been used to find the internal consistency of questionnaire items and discover those affect the level of consistency to get rid of them "if any". *Correlation analysis* was performed to measure the strength of the relationship between variables in the study and the direction of this relationship. *Regression analysis* performed to examine the degree of goodness of fit between each of the independent variables "candidate project success factors" and the dependent variable "IT project success in UAE". Significance and direction of the relation between variables will be analysed as well. According to Wateridge (1998), regression aids the inspection of how each independent variable contributes towards the model. The steps of regression analysis start with injecting data sets to SPSS, then generating a regression model for each candidate factor. Then, the degree of goodness will be reported by observing values of R square and adjusted R square, which indicate the percentage of variance in the dependent variable caused by independent variable. Then generate ANOVA table to report F-ratio value, which is used to report if the regression model of the factor "IV" predicts success of IT projects in UAE "DV". Finally, the direction of the relation between the candidate factor and project success will be reported by observing if Beta value in coefficient table was positive or negative.

4. CHAPTER FOUR: RESULTS AND ANALYSIS

Responses of IT project managers on the questionnaire have been analysed in this section of the research in order to test research hypotheses. Accepting or rejecting each hypothesis leads to verify if the candidate factor that hypothesis introduced to test is critical or not to IT projects' success in UAE. SPSS statistical software is used to automate analysis of questionnaire results. Examining hypothesis is performed by testing how the dependent variable "IT project success in UAE" is affected by the independent variable "the candidate factor with hypothesis constructed to test". This examination is accomplished through regression analysis, which intends to report the degree of goodness of fit between the influences of independent variables on dependent variables. Each hypothesis has been tested by reporting R square and adjusted R square, which shows the percentage of variation in project success that can caused by specific factor. Directions "positive or negative" of the affect measured by the value of Beta value.

This chapter proceeds with data test and analysis starting from frequencies analysis, reliability tests, correlation analysis, and then regression analysis.

4.1 Frequencies

This part intends to report demographic information of the questionnaire respondents and confirm validity of the census.

Frequencies tables exported from SPSS present the following information:

- The *Statistics* table shows that 42 project managers responded to the questionnaire. All responses are valid without missing information, which is because all questions in the questionnaire have been set mandatory to prevent respondent from submitting incomplete data.

- *Gender* table shows distribution of responding project managers' gender is near, with 57% males and 43% females. This means that the census strongly represent project managers from both genders.
- *Sector* table explains that about 70% which is more than two third of the project managers who responded to the questionnaire work for government sector while only 30% of them working in the private sector. As a result, we believe that representation of the government sector in this study is higher that private sector since majority of respondent currently working for government entities. On the other hand; private sector also represented with 30 percent and this percentage should be higher because those currently working for government might already worked for private sector before joining government.
- *Seniority* table indicates that senior project managers responded to the questionnaire more than junior ones, at 60% of the total, however, junior project managers strongly represented at 40%.
- *Total experience* table shows that research census represents project managers with all ranges of experiences. 50% of the respondents have less than 5 years' experience as IT project managers, 31% have 5 to 10 years, and 19% have more than 10 years' experience.
- *UAE* Experience table indicates that 52% of the respondents have less than 5 years' experience as IT project managers in UAE, 31% have 5 to 10 years, and 14% have more than 10 years' experience. This table also shows that one respondent out of the 42 did not work as an IT project manager in UAE. This respondent has been ignored from further analysis.

Statistics

		Gender	Sector	Seniority	Total_Experience	UAE_Experience
N	Valid	42	42	42	42	42
	Missing	0	0	0	0	0

Mean		1.57	1.31	1.60	1.69	1.67
Std. Deviation		.501	.468	.497	.780	.816

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	18	42.9	42.9	42.9
	Male	24	57.1	57.1	100.0
	Total	42	100.0	100.0	

Sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government	29	69.0	69.0	69.0
	Private	13	31.0	31.0	100.0
	Total	42	100.0	100.0	

Seniority

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Junior Project Manager	17	40.5	40.5	40.5
	Senior Project Manager	25	59.5	59.5	100.0
	Total	42	100.0	100.0	

Total_Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5	21	50.0	50.0	50.0
	5 to 10	13	31.0	31.0	81.0
	More than 10	8	19.0	19.0	100.0
	Total	42	100.0	100.0	

UAE_Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5	22	52.4	52.4	52.4
	5 to 10	13	31.0	31.0	83.3
	More than 10	6	14.3	14.3	97.6
	I didn't work as an IT project manager in UAE	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Table 3: Respondents Frequencies - Source: Calculation of the researcher (SPSS version 23)

4.2 Reliability

In this section, Cronbach's alpha test utilized to measure the internal consistency between groups of items (questions). Items categorized in the questionnaire into four groups, each group consists of three questions aims to measure one of the success criteria elements "Scope, Cost, Time, and Quality". According to Field (2009), the minimum acceptable value of Cronbach's alpha in order to consider the internal consistency reliable is 0.7. Reliability coefficient reported below for each of the success criteria elements:

4.2.1 Scope

- *Reliability Statistics* table shows that Cronbach's alpha value of scope found above 0.7 at 0.818, which means that reliability of internal consistency is good.
- *Item-Total Statistics* table shows that no need to remove any of the three items to increase the value of Cronbach's alpha.

Reliability Statistics	
Cronbach's Alpha	N of Items
.818	3

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	**Cronbach's Alpha if Item Deleted**
Define Scope	8.12	3.510	.656	**.765**
Manage scope	8.15	3.628	.627	**.793**
Deliver Complete Scope	8.12	3.060	.735	**.682**

Table 4: Reliability Analysis (Scope) - Source: Calculation of the researcher (SPSS version 23)

4.2.2 Cost

- *Reliability Statistics* table shows that Cronbach's alpha value of cost found above 0.7 at 0.908, which means that reliability of internal consistency is high.
- *Item-Total Statistics* table shows that no need to remove any of the three items to increase the value of Cronbach's alpha.

Reliability Statistics	
Cronbach's Alpha	N of Items
.908	3

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	**Cronbach's Alpha if Item Deleted**
Estimate Budget	8.46	4.455	.825	**.874**
Manage Budget	8.63	3.638	.813	**.877**
Deliver On Budget	8.51	3.706	.836	**.853**

Table 5: Reliability (Budget) - Source: Calculation of the researcher (SPSS version 23)

4.2.3 Time

- *Reliability Statistics* table shows that Cronbach's alpha value of time found above 0.7 at 0.760, which means that reliability of internal consistency is acceptable.

- *Item-Total Statistics* table shows that no need to remove any of the three items to increase the value of Cronbach's alpha.

Reliability Statistics	
Cronbach's Alpha	N of Items
.760	3

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	**Cronbach's Alpha if Item Deleted**
Estimate Timeline	7.76	3.289	.483	**.791**
Manage Schedule	7.73	2.601	.682	**.567**
Deliver on Time	7.98	2.774	.615	**.649**

Table 6: Reliability Analysis (Time) - Source: Calculation of the researcher (SPSS version 23)

4.2.4 Quality

- *Reliability Statistics* table shows that Cronbach's alpha value of quality found above 0.7 at 0.730, which means that reliability of internal consistency is acceptable.
- *Item-Total Statistics* table shows that no need to remove any of the three items to increase the value of Cronbach's alpha.

Reliability Statistics

Cronbach's Alpha	N of Items
.730	3

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	**Cronbach's Alpha if Item Deleted**
Plan Quality	7.85	3.128	.585	**.620**
Manage Quality	8.15	2.528	.545	**.665**
Deliver on Quality	7.90	2.890	.547	**.650**

Table 7: Reliability Analysis (Quality) - Source: Calculation of the researcher (SPSS version 23)

4.3 Correlation

In this section, the Pearson Correlation test employed to measure the strength of the relation between variables "candidate success factors from a side and success criteria elements on the other side". Relation is weak if value of correlation is between 0.0 and 0.2, moderate if correlation value is between 0.3 and 0.6, and strong if correlation value is between 0.7 and 1.0. Pearson correlation test also reports the significance of the relation between variables.

Correlations						
		SCOPE FACTOR	COST FACTOR	TIME FACTOR	QUALITY FACTOR	GLOBAL PROJECT SUCCESS
Top Management Support	Pearson Correlation	.516**	.478**	.393*	.465**	.536**
	Sig. (2-tailed)	.001	.002	.011	.002	.000
	N	41	41	41	41	41
Strong Project Leadership	Pearson Correlation	.463**	.504**	.350*	.386*	.496**
	Sig. (2-tailed)	.002	.001	.025	.013	.001
	N	41	41	41	41	41
Adequate Planning	Pearson Correlation	.471**	.410**	.360*	.342*	.459**
	Sig. (2-tailed)	.002	.008	.021	.028	.003
	N	41	41	41	41	41
Selection of the Right Team	Pearson Correlation	.635**	.534**	.583**	.495**	.648**
	Sig. (2-tailed)	.000	.000	.000	.001	.000
	N	41	41	41	41	41
Adequate Team Capabilities	Pearson Correlation	.696**	.625**	.495**	.582**	.695**
	Sig. (2-tailed)	.000	.000	.001	.000	.000
	N	41	41	41	41	41
Clear Goals and Objectives	Pearson Correlation	.657**	.488**	.627**	.479**	.647**
	Sig. (2-tailed)	.000	.001	.000	.002	.000
	N	41	41	41	41	41
Effective Communication	Pearson Correlation	.475**	.597**	.561**	.490**	.614**
	Sig. (2-tailed)	.002	.000	.000	.001	.000
	N	41	41	41	41	41
Effective Monitor & Control	Pearson Correlation	.686**	.530**	.394*	.367*	.577**
	Sig. (2-tailed)	.000	.000	.011	.018	.000
	N	41	41	41	41	41
Adequate Requirements management	Pearson Correlation	.655**	.539**	.445**	.464**	.610**
	Sig. (2-tailed)	.000	.000	.004	.002	.000
	N	41	41	41	41	41
Effective Risk Management	Pearson Correlation	.501**	.498**	.390*	.293	.491**
	Sig. (2-tailed)	.001	.001	.012	.063	.001
	N	41	41	41	41	41
End User involvement	Pearson Correlation	.679**	.502**	.489**	.384*	.596**
	Sig. (2-tailed)	.000	.001	.001	.013	.000
	N	41	41	41	41	41
Minimize Project Complexity	Pearson Correlation	.715**	.596**	.386*	.331*	.595**
	Sig. (2-tailed)	.000	.000	.013	.035	.000
	N	41	41	41	41	41
SCOPE FACTOR	Pearson Correlation	1	.654**	.647**	.594**	.838**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	41	41	41	41	41
COST FACTOR	Pearson Correlation	.654**	1	.674**	.769**	.901**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	41	41	41	41	41
TIME FACTOR	Pearson Correlation	.647**	.674**	1	.679**	.857**
	Sig. (2-tailed)	.000	.000		.000	.000

	N	41	41	41	41	41
QUALITY FACTOR	Pearson Correlation	.594**	.769**	.679**	1	.871**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	41	41	41	41	41
GLOBAL PROJECT DV	Pearson Correlation	.838**	.901**	.857**	.871**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	41	41	41	41	41

Table 8: Correlation Analysis- Source: Calculation of the researcher (SPSS version 23)

4.3.1 Relationships Analysis of the Success Factors

Referring to the correlation table above, relation between the twelve candidate factors and success elements reported below and sorted by strength of the relationship with overall project success, starting with the factor with strongest relationship:

- **Adequate Team Capabilities:** The relationships between adequate team capabilities and each of the success criteria elements is moderate, significant & positive: relationship with scope success ($r = .696$, $p < .001$). Relationship with cost success($r = .625$, $p < .001$). Relationship with time success ($r = .495$, $p < .001$). Relationship with quality success ($r = .582$, $p < .001$). Relationship with overall project success ($r = .695$, $p < .001$).
- **Selection of the Right Team:** The relationships between selection of the right team and each of the success criteria elements is moderate, significant & positive: relationship with scope success ($r = .635$, $p < .001$). Relationship with cost success($r = .534$, $p < .001$). Relationship with time success ($r = .583$, $p < .001$). Relationship with quality success ($r = .495$, $p < .001$). Relationship with overall project success ($r = .648$, $p < .001$).
- **Clear Goals and Objectives:** The relationships between clear goals and objectives and each of the success criteria elements is moderate, significant & positive: relationship with scope success ($r = .657$, $p < .001$). Relationship with cost success($r = .488$, $p < .001$). Relationship with time success ($r = .627$, $p < .001$). Relationship with

quality success (r =.479, p < .001). Relationship with overall project success (r =.647, p < .001).

- **Effective Communication:** The relationships between effective communication and each of the success criteria elements is moderate, significant & positive: relationship with scope success (r =.475, p < .001). Relationship with cost success(r =.597, p < .001). Relationship with time success (r =.561, p < .001). Relationship with quality success (r =.490, p < .001). Relationship with overall project success (r =.614, p < .001).
- **Adequate Requirements Management:** The relationships between adequate requirements management and each of the success criteria elements is moderate, significant & positive: relationship with scope success (r =.655, p < .001). Relationship with cost success(r =.539, p < .001). Relationship with time success (r =.445, p < .001). Relationship with quality success (r =.464, p < .001). Relationship with overall project success (r =.610, p < .001).
- **End User Involvement:** The relationships between end user involvement and each of the success criteria elements is moderate, significant & positive: relationship with scope success (r =.679, p < .001). Relationship with cost success(r =.502, p < .001). Relationship with time success (r =.489, p < .001). Relationship with quality success (r =.384, p < .001). Relationship with overall project success (r =.596, p < .001).
- **Minimize Project Complexity:** The relationships between minimize project complexity and each of the success criteria elements is moderate, significant & positive except for scope success that is strong, significant & positive: relationship with scope success (r =.715, p < .001). Relationship with cost success(r =.596, p < .001). Relationship with time success (r =.386, p < .005). Relationship with quality

success (r =.331, p < .005). Relationship with overall project success (r =.595, p < .001).

- **Effective Monitor & Control:** The relationships between effective monitor & control and each of the success criteria elements is moderate, significant & positive: relationship with scope success (r =.686, p < .001). Relationship with cost success(r =.530, p < .001). Relationship with time success (r =.394, p < .005). Relationship with quality success (r =.367, p < .005). Relationship with overall project success (r =.577, p < .001).
- **Top Management Support:** The relationships between top management support and each of the success criteria elements is moderate, significant & positive: relationship with scope success (r = .516, p < .001). Relationship with cost success (r = .478, p < .001). Relationship with time success (r = .393, p < .005). Relationship with quality success (r = .465, p < .001). Relationship with overall project success (r = .536, p < .001).
- **Strong Project Leadership:** The relationships between strong project leadership and each of the success criteria elements is moderate, significant & positive: relationship with scope success (r = .463, p < .001). Relationship with cost success(r = .504, p < .001). Relationship with time success (r = .350, p < .005). Relationship with quality success (r = .386, p < .005). Relationship with overall project success (r = .496, p < .001).
- **Effective Risk Management:** The relationships between effective risk management and each of the success criteria elements is moderate, significant & positive except for quality success that is moderate and positive but not significant: relationship with scope success (r =.501, p < .001). Relationship with cost success(r =.498, p < .001).

Relationship with time success (r =.390, p < .005). Relationship with quality success (r =.293). Relationship with overall project success (r =.491, p < .001).

- **Adequate Planning:** The relationships between adequate planning and each of the success criteria elements is moderate, significant & positive: relationship with scope success (r =.471, p < .001). Relationship with cost success(r =.410, p < .001). Relationship with time success (r =.360, p < .005). Relationship with quality success (r =.342, p < .005). Relationship with overall project success (r =.459, p < .001).

As clarified above, all the relationships between each of the success factors and project success found either moderate or strong and no factor have a weak relationship. On the other hand and as per the below, strength is different based on the factor itself and success criteria element:

- **Scope Success:** the factor *Minimize Project Complexity* have the strongest relationship with scope success of IT projects in UAE, the next highest factor is *Adequate Team Capabilities*, followed by *Effective Monitor & Control*. On the other hand, the least factor affecting scope success is *Strong Project Leadership* followed by *Effective Communication* and then comes *Adequate Planning.*
- **Cost Success:** the factor *Adequate Team Capabilities* have the strongest relationship with cost success of IT projects in UAE, the next highest factor is *Effective Communication*, followed by *Minimize Project Complexity*. On the other hand, the least factor affecting cost success is *Adequate Planning* followed by *Top Management Support* and then comes *Clear Goals and Objectives.*
- **Time Success:** the factor *Clear Goals and Objectives* have the strongest relationship with time success of IT projects in UAE, the next highest factor is *Selection of the Right Team*, followed by *Effective Communication*. On the other hand, the least factor

affecting time success is *Strong Project Leadership* followed by *Adequate Planning* and then comes *Minimize Project Complexity.*

- **Quality Success:** the factor *Adequate Team Capabilities* have the strongest relationship with quality success of IT projects in UAE, the next highest factor is *Selection of the Right Team*, followed by *Effective Communication*. On the other hand, the least factor affecting quality success is *Effective Risk Management* followed by *Minimize Project Complexity* and then comes *Adequate Planning.*

4.3.2 Relationship Analysis of Success Criteria Elements:

Referring to the correlation table above, the effect of success criteria elements on how IT project managers in UAE perceive success is very near. Relation found strong and significant for all of the four success elements. These elements sorted by their relation are cost success ($r = .901$, $p < .001$), quality success ($r = .871$, $p < .001$), time success ($r = .857$, $p < .001$), and scope success ($r = .838$, $p < .001$).

4.4 Regression

Regression analysis aims to test and analyse the degree of goodness of fit between the impacts of independent variables and dependent variables. Each hypothesis has been tested by reporting R square and adjusted R square, which indicate the percentage of variation in project success that can caused by specific factors. Directions "positive or negative" of the impact measured by Beta value. Value of F-ratio utilized to explain if the regression model of the factor "Independent Variable" predicts scope success, cost success, time success, quality success, and overall success of IT projects in UAE "Dependent Variables". The five Hypothesis constructed at the end of Literature review chapter of this study have been analyzed below:

4.4.1 H1: There is no influence of critical success factors on achieving success of IT projects in UAE in terms of scope.

This null hypothesis has been introduced to examine if the independent variable "joint impact of candidate success factors" would lead to higher success rates in the IT projects in UAE in terms of scope. As presented in the following model summary table, the value of R Square is .574 and the value of adjusted R Square is .564. This means that the degree of goodness of fit of the regression model is high. Additionally, the result of R Square means that almost 57 % of variation in IT project success in UAE in terms of scope could be described by the joint impact of candidate success factors. ANOVA table below states that the value of F-ratio is 52.656, which is significant at $p < .001$ this means that the regression model predicts success of IT projects in UAE in terms of scope. Direction of the relation between independent variable and dependent variable reported by Beta value in coefficient table below. At .238, Beta shows that candidate success factors positively affect IT project success in UAE in terms of scope.

According to the above analysis, Null hypothesis (H1) is rejected, which means that there is influence of critical success factors on achieving success of IT projects in UAE in terms of scope.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.864[a]	.747	.741	1.348

a. Predictors: (Constant), GLOBAL FACTORS IV
b. Dependent Variable: SCOPE FACTOR

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	209.587	1	209.587	115.365	.000[b]
	Residual	70.852	39	1.817		
	Total	280.439	40			

a. Dependent Variable: SCOPE FACTOR
b. Predictors: (Constant), GLOBAL FACTORS IV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.452	1.288		-1.127	.266

	GLOBAL FACTORS IV	.283	.026	.864	10.741	.000
a. Dependent Variable: SCOPE FACTOR						

Table 9: Regression Analysis (Scope) - Source: Calculation of the researcher (SPSS version 23)

4.4.2 H2: There is no influence of critical success factors on achieving success of IT projects in UAE in terms of time.

This null hypothesis has been introduced to examine if the independent variable "joint impact of candidate success factors" would lead to higher success rates in the IT projects in UAE in terms of time. As presented in the following model summary table, the value of R Square is .574 and the value of adjusted R Square is .564. This means that the degree of goodness of fit of the regression model is high. Additionally, the result of R Square means that almost 57 % of variation in IT project success in UAE in terms of time could be described by the joint impact of candidate success factors. ANOVA table below states that the value of F-ratio is 52.656, which is significant at $p < .001$ this means that the regression model predicts success of IT projects in UAE in terms of time. Direction of the relation between independent variable and dependent variable reported by Beta value in coefficient table below. At .272, Beta shows that candidate success factors positively affect IT project success in UAE in terms of time.

According to the above analysis, Null hypothesis (H2) is rejected, which means that there is influence of critical success factors on achieving success of IT projects in UAE in terms of time.

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.758[a]	.574	.564	1.922
a. Predictors: (Constant), GLOBAL FACTORS IV b. Dependent Variable: COST FACTOR				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	194.432	1	194.432	52.656	.000[b]
	Residual	144.007	39	3.692		
	Total	338.439	40			
a. Dependent Variable: COST FACTOR b. Predictors: (Constant), GLOBAL FACTORS IV						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.340	1.836		-.185	.854
	GLOBAL FACTORS IV	.272	.038	.758	7.256	.000
a. Dependent Variable: COST FACTOR						

Table 10: Regression Analysis (Budget) - Source: Calculation of the researcher (SPSS version 23)

4.4.3 H3: There is no influence of critical success factors on achieving success of IT projects in UAE in terms of budget.

This null hypothesis has been introduced to examine if the independent variable "joint impact of candidate success factors" would lead to higher success rates in the IT projects in UAE in terms of budget. As presented in the following model summary table, the value of R Square is .434 and the value of adjusted R Square is .420. This means that the degree of goodness of fit of the regression model is high. Additionally, the result of R Square means that almost 43 % of variation in IT project success in UAE in terms of budget could be described by the joint impact of candidate success factors. ANOVA table below states that the value of F-ratio is 29.927 which is significant at $p < .001$ this means that the regression model predicts success of IT projects in UAE in terms of budget. Direction of the relation between independent variable and dependent variable reported by Beta value in coefficient table below. At .196, Beta shows that candidate success factors positively affect IT project success in UAE in terms of budget.

According to the above analysis, Null hypothesis (H3) is rejected, which means that there is influence of critical success factors on achieving success of IT projects in UAE in terms of budget.

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.659[a]	.434	.420	1.835
a. Predictors: (Constant), GLOBAL FACTORS IV b. Dependent Variable: TIME FACTOR				

ANOVA[a]					
Model	Sum of Squares	Df	Mean Square	F	Sig.

1	Regression	100.752	1	100.752	29.927	.000[b]
	Residual	131.297	39	3.367		
	Total	232.049	40			

a. Dependent Variable: TIME FACTOR
b. Predictors: (Constant), GLOBAL FACTORS IV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.270	1.753		1.295	.203
	GLOBAL FACTORS IV	.196	.036	.659	5.471	.000

a. Dependent Variable: TIME FACTOR

Table 11: Regression Analysis (Time) - Source: Calculation of the researcher (SPSS version 23)

4.4.4 H4: There is no influence of critical success factors on achieving success of IT projects in UAE in terms of quality.

This null hypothesis has been introduced to examine if the independent variable "joint impact of candidate success factors" would lead to higher success rates in the IT projects in UAE in terms of quality. As presented in the following model summary table, the value of R Square is .369 and the value of adjusted R Square is .353. This means that the degree of goodness of fit of the regression model is high. Additionally, the result of R Square means that almost 37 % of variation in IT project success in UAE in terms of quality could be described by the joint impact of candidate success factors. ANOVA table below states that the value of F-ratio is 22.784 which is significant at $p < .001$ this means that the regression model predicts success of IT projects in UAE in terms of quality. Direction of the relation between independent variable and dependent variable reported by Beta value in coefficient table below. At .178, Beta shows that candidate success factors positively affect IT project success in UAE in terms of quality.

According to the above analysis, Null hypothesis (H4) is rejected, which means that there is influence of critical success factors on achieving success of IT projects in UAE in terms of quality.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.607[a]	.369	.353	1.912

a. Predictors: (Constant), GLOBAL FACTORS IV
b. Dependent Variable: QUALITY FACTOR

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	83.306	1	83.306	22.784	.000[b]
	Residual	142.596	39	3.656		
	Total	225.902	40			

a. Dependent Variable: QUALITY FACTOR
b. Predictors: (Constant), GLOBAL FACTORS IV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.347	1.827		1.832	.075
	GLOBAL FACTORS IV	.178	.037	.607	4.773	.000

a. Dependent Variable: QUALITY FACTOR

Table 12: Regression Analysis (Quality) - Source: Calculation of the researcher (SPSS version 23)

4.4.5 H5: There is no influence of critical success factors on achieving overall success of IT projects in UAE.

This null hypothesis has been introduced to examine if the independent variable "joint impact of candidate success factors" would lead to higher success rates in overall success of IT projects in UAE. As presented in the following model summary table, the value of R Square is .703 and the value of adjusted R Square is .695. This means that the degree of goodness of fit of the regression model is high. Additionally, the result of R Square means that almost 70 % of variation in overall IT project success in UAE could be described by the joint impact of candidate success factors. ANOVA table below states that the value of F-ratio is 92.137 which is significant at $p < .001$ this means that the regression model predicts overall success of IT projects in UAE. Direction of the relation between independent variable and dependent variable reported by Beta value in coefficient table below. At .929, Beta shows that candidate success factors positively affect the overall IT project success in UAE.

According to the above analysis, Null hypothesis (H5) is rejected, which means that there is influence of critical success factors on achieving overall success of IT projects in UAE.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.838[a]	.703	.695	4.95745

a. Predictors: (Constant), GLOBAL FACTORS IV
b. Dependent Variable: GLOBAL PROJECT DV

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2264.401	1	2264.401	92.137	.000[b]
	Residual	958.477	39	24.576		
	Total	3222.878	40			

a. Dependent Variable: GLOBAL PROJECT DV
b. Predictors: (Constant), GLOBAL FACTORS IV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.825	4.737		.808	.424
	GLOBAL FACTORS IV	.929	.097	.838	9.599	.000

a. Dependent Variable: GLOBAL PROJECT DV

Table 13: Regression Analysis (Global Success) - Source: Calculation of the researcher (SPSS version 23)

5. CHAPTER FIVE: DISCUSSION

This study presented extensive information about the factors that can affect the success of IT projects in UAE. The aim of this study was to assist IT project managers and professionals in UAE to achieve higher rates of success in their projects. This target accomplished by proposing a list of success factors that seen critical to IT projects by previous researchers in other countries, then measure the impact of these factors in order to conclude if they can be considered critical to IT projects in UAE. Factors impact on the overall success of IT projects was measured by examining their influence on success criteria elements collected from the literature including time, cost, scope, and quality.

Studying the impact of critical success factors on IT projects comprehensively discussed in the literature in many places all over the globe, however; we couldn't find any study meant to construct a list of CSF's that are suitable for the IT market in UAE and measure their collective impact to these projects. This is where finding of this study expected to contribute to the field of IT project management.

5.1 The Twelve Critical Success Factors

As presented in the results chapter, the study proved that all of the twelve proposed factors are critical to the success of IT projects in UAE. These factors have been discussed below:

- **Effective Communication**: Influence of this factor to project success is not the same for all projects and depends on the nature of the project itself (Hummel et al., 2013). For example, managing communication is easier with co-located teams while a distributed team requires the project manager to pay more attention and use multiple complex communication modes and tools. Hummel et al. (2013) recommended using agile methodology in order to improve communication which leads to increase productivity of

the team, achieve higher quality product, and reduce time and cost of the project, as a result, achieve higher rates of success.

- **Top management support:** Achieving project success requires top management to realize the urgency of the project and give it required attention. The project manager needs to explain the project to top management to increase their awareness about their role in the project; as a result, obtaining approvals whenever needed from top management will be much easier. Imtiaz et al. (2013) evidenced that project failure increased if top management poorly understood it. Top management support also has direct influence on the cost plan of the project since top management is responsible for assigning and approving project budget and cash flow.
- **Project leadership**: Project execution expected to take more than planned if the project manager does not have required leadership skills, which affects overall schedule of the project and may lead to project failure (Imtiaz et al., 2013). Project managers need to have strong technical and interpersonal capabilities and skills. They need to be charismatic and use their influence to build healthy working atmosphere McLeod & MacDonell (2011). According to Ibrahim et al. (2013), a competent project leader is the one who can encourage his team and increase their commitment to the project. To achieve these targets, the leader needs to be fair and prove to the team that he trusts them. Effective project lead who manages his team purposefully and in a cohesive way can achieve higher success rates and bypass obstacles issues challenges facing the project. Achieving this effectiveness requires the project leader to develop soft skills such as empathy and creativity (Whitney & Daniels, 2013).
- **Team Capabilities:** Project team members should have capabilities in many areas, including technical knowledge expertise in the domain as well as having sufficient information about structure, functions, and objectives of the company. Lack of these

capabilities would negatively affect the development process, which influence project schedule and overall project time plan (McLeod & MacDonell, 2011).

- **Monitor and control:** Due to the intangible nature of IT projects where the product, as a result, it is more challenging to monitor and control progress of the project, the importance of giving attention to this factor is increased. Arias et al, (2012) explained that monitoring and control aims to measure, manage, & prevent diversions between current status of the project and how it is expected to be by utilizing tools such as status reports and status meetings.
- **End User Involvement**: This study research evidenced that end user involvement is crucial to IT project success in UAE. If users were not involved in the project they will never realize the importance of the project, hence do not show any commitment to it. They can even feel threatened by the project which makes them act against it. Ibrahim et al. (2013) explained that a project would never achieve success if end users do not feel the importance of their involvement from the start of the project and constantly throughout project lifecycle.
- **Adequate Planning**: Managing this critical factor requires the project manager to stop looking at project planning as an activity to build the schedule. Instead and as explained by Arias et al. (2012), project planning must be seen as a creative activity that supports project team in building a strategy they have to follow in order to achieve project target. Project plan must be realistic and achievable with accurate time and budget estimation (Montequin et al., 2014).
- **Clear Goals and Objectives:** In order to control this critical factor as another pillar of achieving success, project manager must give attention to establish clear list of goals and objectives before starting project execution. This will assist in understanding the exact needs and expectations of all stakeholders from the project (McLeod & MacDonell,

2011). Inappropriately managing this factor would lead to delivery of a product that does not meet all stakeholders' expectations which means failure of the project.

- **Adequate Requirements management:** The project manager is required to manage requirements in the right way as a prerequisite to achieving project success. This requires him to enhance stakeholders' awareness about what they need from the product that the project intends to deliver. He is also responsible for bridging the communication gap that may occur between him and project stakeholders in order to understand exactly what they require out of the project. In addition, they need to properly plan for the process of requirements' gathering, which should provides them, who will approve them and how to maintain those (Arias et al., 2012).
- **Effective Risk Management:** This factor was proven by this study as one of those affecting success. Gładysz et al. (2015) evidenced that lack of effective risk management leads to deviation from planned project budget and thus affect overall project success. Managing risks in IT projects requires following clear and documented risk management process, identify risks based on expert judgment, employ business justification and build comprehensive risk management plan. Flyvbjerg & Budzier (2011) explained that the need of managing risks effectively is much higher with massive IT projects. They suggested risk management practices that can assist companies planning to implement massive IT project in reducing and effectively managing risks. First, companies have to measure their readiness to proceed with the project. This can be accomplished by answering the questions: is the company strong enough to handle the shock in case the project much exceeded budget and in case realized benefit was much less than planned? Second, those companies should increase their reliant on techniques of data analytics in decision-making.

- **Selection of the Right Team:** Success cannot be achieved if the team on the project was not capable and did not have knowledge relevant to the tasks of the project (Gingnell et al., 2014). Management need to consider two aspects while selecting project team. Firstly, team must include members who are familiar enough with business and policies of the organization. Secondly, having someone in the team from senior management who has high authority and influence in the company is beneficial (Akhavan et al., 2012)
- **Minimize Project Complexity:** higher complexity increase challenges in the project. Reducing project complexity proven by this study as a reason behind increasing the chance of achieving success. Project complexity is much higher with huge IT projects, these projects need to be broken down into smaller projects with smaller size and duration in order to reduce complexity and enhance success magnitude (Flyvbjerg & Budzier, 2011). Whitney & Daniels (2013) explained that most of the issues facing complex IT projects are socio-technical in nature, therefore, to resolve such issues, project manager need to be able to minimize project complexity, which require him to have emotional intelligence and spiritual intelligence.

5.2 Influence on Project Success

The main question answered by this study research was about the influence of the collected candidate factors on each of the success criteria of IT projects in UAE and as a result, to the overall success of IT projects in UAE. Referring to the results and analysis chapter of this study, the joint impact of the critical success factors was found to be critical to each of the success criteria elements as well as to the overall success of IT projects in UAE. Impact on each element is discussed below:

5.2.1 Scope Success

The proposed factors were found critical to the success of IT projects in UAE in terms of scope. The regression test of the factors joint impact verified that degree of goodness of fit is high where R2 is .574 and adjusted R2 is .564, which means that about 57% of variance in IT project success in UAE in terms of scope caused by the collective impact of the proposed factors. Regression model found significant at $p < .001$.

5.2.2 Time Success

The proposed factors were found critical to the success of IT projects in UAE in terms of time. The regression test of the factors joint impact verified that degree of goodness of fit is high where R2 is .574 and adjusted R2 is .564, which means that 57% of variance in IT project success in UAE in terms of time caused by the collective impact of the proposed factors. Regression model found significant at $p < .001$.

5.2.3 Cost Success

The proposed factors were found critical to the success of IT projects in UAE in terms of cost. The regression test of the factors joint impact verified that degree of goodness of fit is high where R2 is .434 and adjusted R2 is .420, which means that 43% of variance in IT project success in UAE in terms of cost caused by the collective impact of the proposed factors. Regression model found significant at $p < .001$.

5.2.4 Quality Success

The proposed factors were found critical to the success of IT projects in UAE in terms of quality. The regression test of the factors joint impact verified that degree of goodness of fit is high where R2 is .369 and adjusted R2 is .353, which means that 37% of variance in IT

project success in UAE in terms of quality caused by the collective impact of the proposed factors. Regression model found significant at $p < .001$.

5.2.5 Overall Project Success

The proposed factors were found critical to the overall success of IT projects in UAE. The regression test of the factors joint impact verified that degree of goodness of fit is high where R2 is .703 and adjusted R2 is .695, which means that 70% of variance in IT project success in UAE caused by the collective impact of the proposed factors. Regression model found significant at $p < .001$.

5.3 Limitations

Most of the project managers responded to the questionnaire of this study have been contacted personally. The majority of them are IT project managers in the field of applications and Software development. As a result, we believe that this study is more suitable to Software development projects in UAE and provides limited information about other domains of IT projects such as networking and infrastructure projects. Another limitation is the inability to segregate critical success factors suitable for projects based on the project management methodology followed in the project "Agile vs. Waterfall". We expect that factors suitable for projects following agile methodology might be different from those suitable for projects following waterfall methodology.

5.4 Future Studies

By completing this research study and answering questions of this research, we found a new question needs to be answered in future research in order to provide more benefit to the domain of IT project management in UAE. We suggest studying critical success factors of IT projects separately for every domain. Software development projects and infrastructure

projects are samples of these domains. We also suggest studying critical success factors of IT projects based on the followed project management methodology including Agile and Waterfall.

6. CONCLUSION

This research study aimed to identify the success factors that are most critical and have higher influence on the success of IT projects in UAE. Reviewing literature in the field of information technology demonstrated special focus on studying the impact of critical factors on the success of IT projects in many areas of IT projects. In the qualitative part of the study, literature reviewed to collect the factors considered critical to IT projects by scholars in different countries and different areas of IT projects and might be applicable to the IT market in UAE. Candidate factors are top management support, strong project leadership, adequate planning, selection of the right team, adequate team capabilities, clear goals and objectives, effective communication, effective monitor & control, adequate requirements management, effective risk management, end user involvement, minimize project complexity. These factors had been examined by utilising a questionnaire that used to collect opinions of IT project managers and professionals in the UAE. The results of this study evidenced that all of the twelve candidate factors are indeed critical to the success of IT projects in UAE. It also showed that strength of the relation between each factor and project success is different from factor to factor based on the relation between the factor and different success criteria elements "Scope, Cost, Time, & Quality". There was no earlier studies about the critical success factors in UAE. Therefore, findings of this study is expected to assist IT project managers in UAE to understand what are the factors they need to focus throughout project lifecycle in order to enhance chances of achieving success and prevent failure. The findings showed that this study more applicable to applications and Software projects since the majority of project managers who responded to the questionnaire are Software project managers. As a result, we believe that generalization of this study is weak for Hardware IT projects in UAE such as infrastructure and networking projects. Therefore, study suggested a future research that focus on each area of IT project management separately. Study also

suggested a future research that segregate success factors based on project management methodology "Agile and Waterfall" has been followed in the project.

7. REFERENCES

Akhavan, P., Jafari, M., & Fathian, M. (2012). Exploring the failure factors of implementing knowledge management system in the organizations.

Al Neimat, T. (2005). Why IT projects fail. The project perfect white paper collection, 1, 1-8.

Arias, G., Vilches, D., Banchoff, C., Harari, I., Harari, V., &Iuliano, P. (2012).'The 7 key factors to get successful results in the IT Development projects.' Procedia Technology, 5, 199-207.

Aronson, Z. H., Shenhar, A. J., & Patanakul, P. (2013). Managing the Intangible Aspects of a Project: The Affect of Vision, Artifacts, and Leader Values on Project Spirit and Success in Technology-Driven Projects. *Project Management Journal*, *44*(1), 35-58.

Baccarini, D. (1999), 'The logical framework method for defining project success', Project Management Journal, Vol. 30 No. 4, pp. 25-32.

Baker, B. N., Murphy, D. C., & Fisher, D. (2008). Factors affecting project success. *Project Management Handbook, Second Edition*, 902-919.

Belout, A. and Gauvreau, C. (2004), 'Factors influencing project success: the impact of human resource management', International Journal of Project Management, Vol. 22 No. 1, pp. 1-11.

Biehl, M. (2007). 'Success factors for implementing global information systems.' Communications of the ACM, 50(1), 52-58.

Brocke, H., Uebernickel, F., & Brenner,W. (2009). Success factors in it-projects to provide customer value propositions. In 20th Australasian Conference on Information Systems, Australia.

Chow, T., & Cao, D. B. (2008). A survey study of critical success factors in agile software projects. Journal of systems and software, 81(6), 961-971.

Cortex, I. T. (2005). 'Failure rate, Statistics over IT projects failure rate.' Retrieved April 10, 2005.

Ding, R., & Wang, Y. (2008). 'An empirical study on critical success factors based on governance for IT projects in China.' In Wireless Communications, Networking and Mobile Computing, 2008. WiCOM'08. 4th International Conference on (pp. 1-7). IEEE.

Dix, J. (2010). Complexity of IT systems will be our undoing. Network World (Online), Retrieved from https://search-proquest-com.ezproxy.buid.ac.ae/docview/762710196?accountid=178112

Elmasry, T., Benni, E., Patel, J. & Peter, J. (2016). Transforming the region into a leading digital economy. Digital Middle East.

Essays, UK. (November 2013). Analysis Of The Burj Khalifa Tower Project Economics Essay?cref=1. Retrieved from https://www.ukessays.com/essays/economics/analysis-of-the-burj-khalifa-tower-project-economics-essay.php?cref=1?cref=1

Fan, D. (2010). Analysis of critical success factors in IT project management. In Industrial and Information Systems (IIS), 2010 2nd International Conference on (Vol. 2, pp. 487-490). IEEE.

Field, A. (2009). *Discovering statistics using SPSS (Introducing Statistical Methods)*. London: Sage Publications Ltd.

Flyvbjerg, B., & Budzier, A. (2011). "Why your IT project may be riskier than you think," Harvard Business Review, vol. 89, no.9, September 2011, pp.23-25.

Fortune, J., & White, D. (2006). 'Framing of project critical success factors by a systems model.' International journal of project management, 24(1), 53-65.

Gingnell, L., Franke, U., Lagerström, R., Ericsson, E., & Lilliesköld, J. (2014). Quantifying success factors for IT projects—an expert-based Bayesian model. Information systems management, 31(1), 21-36.

Gladysz, B., Kuchta, D., Frączkowski, K., & Pawlicki, A. (2015). Factors which Influence Keeping within a Project Budget in IT Projects. Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse. Rynki finansowe. Ubezpieczenia, (74 T. 1 Rynek kapitałowy, wycena przedsiębiorstw, inwestycje), 511-522.

Gomes, J. and Romão, M. (2016). 'Improving Project Success: A Case Study Using Benefits and Project Management.' Procedia Computer Science, 100, pp.489-497.

Gulla, J. (2011). Seven reasons why information technology projects fail. In SHARE Conference.

Hummel, M., Rosenkranz, C., & Holten, R. (2013). The role of communication in agile systems development. Business & Information Systems Engineering, 5(5), 343-355.

Ibrahim, R., Ayazi, E., Nasrmalek, S., & Nakhat, S. (2013). An investigation of critical failure factors in information technology projects. *Journal of Business and Management*, 10(3), 87-92.

Imtiaz, A., Al-Mudhary, A. S., Mirhashemi, M. T., & Ibrahim, R. (2013). 'Critical Success Factors of Information Technology Projects.' World Academy of Science, Engineering and Technology, International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering, 7(12), 3154-3158.

Kerzner, H. and Saladis, F.P. (2009), 'A Systems Approach to Planning, Scheduling, and Controlling,' Project Management 10th ed., John Wiley & Sons, Hoboken, NJ.

Lam, S. L., Cheung, R., Wong, S., & Chan, E. S. (2013). A survey study of critical success factors in information system project management. International Conference on Internet Studies.

Lech, P. (2013). Time, budget, and functionality?—IT project success criteria revised. Information Systems Management, 30(3), 263-275.

Marshall, R.A. (2007), 'The contribution of earned value management to project success on contracted efforts', Journal of Contract Management, Vol. 5 No. 1, pp. 21-33.

McLeod, L., &MacDonell, S. G. (2011). 'Factors that affect software systems development project outcomes: A survey of research.' ACM Computing Surveys (CSUR), 43(4), 24.

Montequin, V. R., Cousillas, S., Ortega, F., & Villanueva, J. (2014). Analysis of the success factors and failure causes in Information & Communication Technology (ICT) projects in Spain. Procedia Technology, 16, 992-999.

Mulcahy, R. (2011). PMP Exam Prep: Rita's Course in a Book for Passing the PMP Exam. RMC Publications, Inc..

Muller, R., J. Geraldi, and J. R. Turner (2012) 'Relationships Between Leadership And Success In Different Types Of Project Complexities' *IEEE Transactions on Engineering Management* 59.1 pp. 77-90.

Murray, J. P. (2000). Reducing IT project complexity. Information Strategy, 16(3), 30-38. Retrieved from https://search-proquest-com.ezproxy.buid.ac.ae/docview/214378813?accountid=178112

Murray, J. P. (2001). 'Reducing IT Project Complexity.' In New Directions in Project Management (pp. 435-446).Auerbach Publications.

Nah, F.F., Lau, J.L. and Kuang, J. (2001), 'Critical factors for successful implementation of enterprise systems', Business Process Management Journal, Vol. 7 No. 3, pp. 285-96.

Nasir, M. H. N., & Sahibuddin, S. (2011). Critical success factors for software projects: A comparative study. Scientific research and essays, 6(10), 2174-2186.

Nauman, A. B., Aziz, R., &Ishaq, M. (2005, September). 'Information systems development failure: a case study to highlight the IS development complexities in simple, low risk projects in developing countries.' In The Second International Conference on Innovations in Information Technology. Dubai: UAE University.

Nwakanma, C. I., Asiegbu, B. C., Ogbonna, C. A., & Njoku, P. P. C. (2013). Factors Affecting Successful Implementation Of Information Technology Projects: Experts' perception. European Scientific Journal, Esj, 9(27).

Peterson, D. K., Kim, C., Kim, J. H., & Tamura, T. (2002). The perceptions of information systems designers from the United States, Japan, and Korea on success and failure factors. International Journal of Information Management, 22(6), 421-439.

PMI (2016). The High Cost of Low Performance. Pulse of the Profession.

Prabhakar, G.P. (2008), 'What is project success: a literature review', International Journal of Business and Management, Vol. 3 No. 9, pp. 3-10.

Ramaswamy, G., & Dawson, M. (2014). DISCOVERING THE REASON FOR IT PROJECT FAILURE. Allied Academies International Conference: Proceedings Of The Academy Of Information & Management Sciences (AIMS), 18(2), 2.

Reel, J.S. (1999), 'Critical success factors in software projects', IEEE Software, Vol. 16 No. 3, pp. 18-23.

Salmeron, J. L., &Herrero, I. (2005). 'An AHP-based methodology to rank critical success factors of executive information systems.' Computer Standards & Interfaces, 28(1), 1-12.

Sauer, C. (1993). Why information systems fail: a case study approach. Alfred Waller Ltd., Publishers.

Selim, H. M. (2007). 'Critical success factors for e-learning acceptance: Confirmatory factor models.' Computers & Education, 49(2), 396-413.

Shepherd, D.A., Covin, J.G. and Kuratko, D.F. (2009). 'Project failure from corporate entrepreneurship: Managing the grief process.' *Journal of Business Venturing*, 24(6), pp.588-600.

Shenhar, A.J. and Dvir, D. (1996), 'Toward a typological theory of project management', Research Policy, Vol. 25 No. 4, pp. 607-632.

Rubinstein, D. (2007). Standish group report: There's less development chaos today. *Software Development Times*, *1*.

Hastie, S., & Wojewoda, S. (2015). Standish Group 2015 Chaos Report-Q&A with Jennifer Lynch. *Retrieved*, *1*(15), 2016.

Sudhakar (2012), A model of CSFs for software projects :'A model of critical success factors for software projects'.

Tukel, O.I. and Rom, W.O. (1998). 'Analysis of the characteristics of projects in diverse industries.' *Journal of Operations Management*, 16(1), pp.43-61.

UAE Vision (2017). Available at: https://www.vision2021.ae/en/national-priority-areas/national-key-performance-indicators

Wateridge, J. (1998). How can IS/IT projects be measured for success?. *International journal of project management*, 16(1), 59-63.

White, D. and Fortune, J. (2002), 'Current practice in project management – an empirical study', International Journal of Project Management, Vol. 20 No. 1, pp. 1-11.

Whitney, K. & Daniels, C. (2013). The Root Cause of Failure in Complex IT Projects: Complexity Itself. Procedia Computer Science, vol. 20, pp. 325-330.

Xia, W., & Lee, G. (2004). Grasping the complexity of IS development projects. Communications of the ACM, 47(5), 68-74.

Zafar, H. (2008, June). Information Technology Led Innovativeness–UAE perspective. In *18th Global Conference on Flexible Systems Management, New Jersey.*