



## Identifying and Evaluating the Critical Success Factors for IT Projects in Saudi Arabia

**Umar Ammar Altahtoo**

Taibah University - College of Business Administration CBA - Madinah

[utahtoo@taibahu.edu.sa](mailto:utahtoo@taibahu.edu.sa)

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\*Corresponding author:

**Umar Ammar Altahtoo**

**Taibah University - Madinah**

### Abstract:

Success factors consist of those elements of a management system contributing to the success of a project, either directly or indirectly. This study explores the Critical Success Factors (CSFs) impacting on project success in Saudi Arabia, with the aim of identifying those currently in place, as well as evaluating their significance for the outcomes of IT projects. The researcher selected 27 success factors from the literature, then assessed them by means of a survey of 241 professionals. In addition, the researcher analyzed the data from the questionnaire using frequency, severity, and importance indices. This was followed by a reliability test, using Cronbach's alpha to identify 17 key success factors essential for successful project implementation in Saudi Arabia's IT industry. This study identified the five most critical factors as: (1) project leadership; (2) effective communication; (3) top management support; (4) resource availability; and (5) clear project objectives. The purpose of these findings is to assist practitioners focus on prioritized areas, in order to enhance project delivery.

## تحديد وتقييم عوامل النجاح الحاسمة لمشاريع تقنية المعلومات في المملكة العربية السعودية

عمر عمار الطحطوح

جامعة طيبة المدينة المنورة - كلية إدارة الأعمال

[utahtooh@taibahu.edu.sa](mailto:utahtooh@taibahu.edu.sa)

### المستخلص

تتألف عوامل النجاح من عناصر نظام الإدارة التي تُسهم في نجاح المشروع، سواءً بشكل مباشر أو غير مباشر. هذه الدراسة تستكشف عوامل النجاح الحاسمة التي تؤثر على نجاح المشاريع في المملكة العربية السعودية، بهدف تحديد العوامل المطبقة حالياً، وتقييم أهميتها لنتائج مشاريع تقنية المعلومات. اختار الباحث 27 عامل نجاح من الدراسات السابقة، ثم قيّمها من خلال استبانة شملت 241 متخصص. بالإضافة إلى ذلك، حلل الباحث بيانات الاستبانة باستخدام مؤشرات التكرار والشدة والأهمية. وأعقب ذلك اختبار موثوقية باستخدام معامل ألفا لكرونباخ لتحديد 17 عامل نجاح رئيسي ضروري لتنفيذ المشاريع بنجاح في قطاع تقنية المعلومات بالمملكة العربية السعودية. هذه الدراسة حددت أهم خمس عوامل على النحو التالي: (1) قيادة المشروع؛ (2) التواصل الفعال؛ (3) دعم الإدارة العليا؛ (4) توافر الموارد؛ (5) وضوح أهداف المشروع. تهدف هذه النتائج إلى مساعدة الممارسين على التركيز على المجالات ذات الأولوية، لتحسين تنفيذ المشاريع.

**الكلمات المفتاحية:** المملكة العربية السعودية، عوامل النجاح الحاسمة، نجاح المشروع.

### 1. Introduction

The rapidly evolving landscape of Information Technology (IT) now dictates that the successful execution of projects forms a cornerstone for organizational growth, economic development, and technological advancement. Saudi Arabia is undergoing significant transformation under its Vision 2030 initiative, and has therefore placed substantial emphasis on IT as a catalyst for diversifying its economy beyond the current dependency on oil. The Kingdom's ambitious agenda for digital transformation has led to a surge in IT projects across both the public and private sectors. However, there is no guarantee that these projects will prove successful, as this depends on a complex interplay of factors influencing their outcomes. This demonstrates the importance of practitioners, policymakers, and organizations understanding the Critical Success Factors (CSFs) that drive IT project success in Saudi Arabia, in order to navigate the unique challenges of the region's dynamic environment. IT projects are, by their nature, intricate endeavors characterized by high levels of uncertainty, along with technical complexity, and stakeholder diversity (Altahtooh and Emsley, 2015; Alsayat & Alenezi, 2018). Globally, IT projects have historically faced high failure rates, with a number of studies indicating that a significant percentage either exceed their budgets, miss deadlines, or fail to meet intended objectives. In Saudi Arabia, these challenges are compounded by a number of contextual factors, i.e. the rapid

adoption of technology, and a reliance on a workforce that is diverse and frequently reliant on expatriates. Thus, CSFs are defined as the key elements, or inputs, within a management system that directly, or indirectly, leads to the success of projects (Dyrhaug, 2002). These factors encompass a broad range of dimensions, including technical, managerial, organizational, and environmental. Within the context of Saudi Arabia, CSFs are influenced by the country's strategic priorities, i.e. fostering innovation, enhancing workforce capabilities through Saudization, and aligning projects with national development goals. Previous research has highlighted aspects pivotal to project success as including top management support, effective risk management, clear project objectives, and technical expertise. However, the relative importance of these factors can vary significantly across different industries and regions, so necessitating a focused investigation into the IT sector in Saudi Arabia. The importance of studying CSFs in Saudi Arabia's IT industry cannot be overstated. For instance, the reliance on expatriate professionals in the IT sector introduces complexities when it comes to team dynamics and knowledge transfer, while the rapid pace of technological adoption can place a strain on organizational capacities. Thus, understanding which factors most significantly influence project outcomes can help practitioners prioritize resources and strategies to mitigate these challenges. Furthermore, the government's demand for localization under Vision 2030 has led to policies aimed at increasing the participation of Saudi nationals in the workforce, which introduces both opportunities and challenges in building technical expertise and project management capabilities (Altahtoh, 2019; Winarni & Permana, 2022; Moshashai et al., 2020). In addition, the study uses an empirical analysis, involving a sample of IT professionals in Saudi Arabia, to evaluate the relative importance of these factors, alongside their impact on project outcomes. The findings are intended to provide actionable insights for project managers, policymakers, and organizations, to enhance project delivery by focusing on high-priority areas. This study therefore not only contributes to the academic discourse on project management, but also offers practical guidance for practitioners seeking to achieve excellence in IT project execution within the Saudi context. Thus, by prioritizing and addressing the most beneficial CSFs, organizations will be able to enhance their capacity to deliver projects that drive innovation in the Kingdom, along with economic growth, and technological advancement.

## **2. Literature review**

The following literature review offers an academic, in-depth and relevant exploration of both topics, focusing on IT projects, particularly in the context of Saudi Arabia. The review draws on established theories, empirical studies, and contemporary research, in order to provide a comprehensive and rigorous analysis.

## 2.1 Project Success

Research describes project success as a complex, situational concept that remains a subject of significant academic discussion. Project success has been traditionally measured using the "iron triangle" of time, cost, and quality (Atkinson, 1999; Prabhakar, 2008; Lim & Mohamed, 1999; Kendra & Taplin, 2004). This framework posits that a project is successful if it is delivered on schedule, within budget, and meets predefined quality standards. However, this narrow definition has been criticized for its inability to capture the broader dimensions of success, particularly in complex and dynamic fields such as IT. Thus, Shenhar et al. (2001) expanded the concept by proposing a multidimensional framework including aspects such as: (1) efficiency; (2) impact on the customer; (3) influence on the team; (4) business success; and (5) preparation for the future. This broader perspective is particularly relevant in Saudi Arabia, where, under Vision 2030, IT projects are frequently aligned with national strategic goals, such as economic diversification and technological innovation. The definition of project successes is also impacted by its subjective nature. Furthermore, stakeholders frequently demonstrate differing expectations and priorities. For instance, a government-funded IT project in Saudi Arabia may prioritize compliance with national policies, while a private-sector project can emphasize Return On Investment (ROI). Baccarini (1999) distinguished between effective project management and product success. This distinction is critical in IT projects, where technical deliverables are required to align with organizational objectives and the needs of users. In the Saudi context, cultural factors, can influence stakeholder perceptions of success, so necessitating a localized approach to its definition and measurement (Alotaibi & Mafimisebi, 2016). The measuring of project success requires a balanced approach incorporating both quantitative and qualitative metrics. Quantitative measures are straightforward, but limited in scope (Pallant, 2020). Qualitative measures are more complex to quantify, but are recognized as critical for long-term success. Shenhar and Dvir (2007) proposed a framework for assessing success across various time horizons: firstly, short-term (i.e. project efficiency); secondly, medium-term (i.e. customer impact); and thirdly, long-term (i.e. business and strategic outcomes). The Standish Group's CHAOS Report (2020) found that only 31% of IT projects are considered fully successful, with many failing to meet goals of time, cost, or functionality. Similar trends have been observed in Saudi Arabia, with studies citing barriers to success as including scope creep, inadequate risk management, and cultural misalignment (Al-Turki, 2011). In order to address these issues, researchers have advocated for customized criteria to reflect a project's context, along with the priorities of its stakeholders (Müller & Jugdev, 2012).

## 2.2 Contextual Considerations in Saudi Arabia

Research highlights various elements that impact the success of a project, typically grouping them into four main areas: technical, managerial, organizational, and environmental. Firstly, technical factors include the use of appropriate tools, methodologies, and expertise. Thus, in relation to IT projects, it is critical to ensure technical proficiency in areas like software development, system integration, and

cybersecurity (Standish Group, 2020). In Saudi Arabia, which prioritizes rapid technological adoption, the availability of skilled professionals plays a significant role in project outcomes (Al-Gahtani, 2004). Secondly, managerial factors include effective planning, communication, and leadership. Pinto and Slevin (1987) emphasized the role of project leadership in aligning team efforts with project goals. In Saudi Arabia's hierarchical organizational culture, it is essential to facilitate strong leadership, in order to navigate stakeholder dynamics and ensure clear communication across diverse teams. Thirdly, organizational factors include top management support and resource allocation. Belassi and Tukel (1996) noted that organizational culture and structure can have a significant impact project on outcomes, particularly in environments with bureaucratic tendencies, as is often the case in Saudi public-sector projects. Finally, environmental factors can add a further layer of complexity. In Saudi Arabia, Vision 2030 has created a unique environment, in which IT projects are driven by government policies aimed at digital transformation. However, these can be hindered by challenges such as skill shortages, resistance to change, and a reliance on foreign expertise (Al-Sedairy, 1994; Al-khateeb, 2020; Misra & Khurana, 2017). Therefore, the interaction among these factors highlights the importance of adopting a comprehensive perspective when examining project success within the Saudi IT environment. As noted above, Saudi Arabia's IT sector operates within a unique socio-economic and cultural context that shapes project success. The Kingdom's Vision 2030 emphasizes technology as a driver of economic diversification, leading to increased investment in IT infrastructure, alongside smart cities, and e-governance. However, project outcomes can be impeded by challenges such as a shortage of skilled local talent, leading to a reliance on expatriate workers, as well as cultural resistance to technological change (Al-Ghamdi, 2013). A further layer of complexity concerns the government's Saudization policies, which aim to increase the participation of Saudi nationals in the workforce. Thus, while these policies align with national goals, they can create challenges for IT projects requiring specialized skills not yet locally available. Furthermore, the fast-paced nature of Vision 2030 initiatives places pressure on project teams to deliver rapid results, often at the expense of thorough planning or risk management (Alotaibi & Mafimisebi, 2016). These contextual factors therefore highlight the need for a tailored approach to achieving and measuring project success in Saudi Arabia's IT industry. The recent literature has emphasized the role of emerging technologies in enhancing project success, including Artificial Intelligence (AI) and agile methodologies. Agile approaches, which prioritize flexibility and iterative development, are particularly suited to IT projects, where requirements often evolve during implementation (Highsmith, 2009). As traditional project management methods are dominant in Saudi Arabia, an effective approach could be to adopt agile practices by enabling teams to respond to requirements and stakeholder expectations. Additionally, the integration of AI tools for project planning, risk assessment, and resource management is gaining traction, offering opportunities to enhance efficiency and decision-making (Kerzner, 2017; Mikhaylov, 2023). In Saudi Arabia, this could involve exploring

how Vision 2030 policies shape project priorities and outcomes, or how cultural values influence stakeholder collaboration.

### **2.3 Critical Success Factors**

CSFs are defined as the key elements or conditions that must be present for a project to achieve its objectives (Rockart, 1979). In project management, CSFs represent the essential inputs that contribute directly, or indirectly, to success. In the context of IT projects, CSFs are particularly important due to the high complexity, uncertainty, and stakeholder diversity inherent in these initiatives (Pinto & Slevin, 1987). The concept of CSFs originated in management literature, but has since been widely adopted by project management to identify the most influential factors for achieving success. Rockart (1979) emphasized that CSFs are not static, but vary depending on industry, project type, and organizational context. In Saudi Arabia's IT sector, CSFs are shaped by the country's unique socio-cultural and economic environment, including its Vision 2030 agenda, which prioritizes digital transformation and workforce localization (Al-Ghamdi, 2013).

Empirical research has identified a range of CSFs appropriate for IT projects, having some variation across contexts, with the Standish Group (2020) identifying user involvement, executive support, clear requirements, and proper planning. In Saudi Arabia, studies have highlighted similar factors, while including unique nuances. For instance, Al-Gahtani (2004) identified top management support, risk management, and technical expertise as critical due to the complexity of managing diverse teams and aligning projects with national objectives. Similarly, Al-Turki (2011) emphasized the importance of objective management and stakeholder communication in overcoming cultural and organizational barriers. A further critical CSF concerns risk management, particularly in relation to IT projects, which frequently face uncertainties such as scope creep and technological obsolescence. In Saudi Arabia, projects often involve large-scale investments and multiple stakeholders, indicating the importance of effective risk management for mitigating potential disruption (Alotaibi & Mafimisebi, 2016). Additionally, the prioritization of CSFs is influenced by cultural factors, such as collectivism and respect for authority, i.e. stakeholder engagement may require culturally sensitive approaches to ensure buy-in from diverse groups. The identifying of CSFs typically involves a combination of literature reviews, surveys, and statistical analyses. Pinto and Slevin (1987) developed a framework for assessing CSFs based on their impact on project outcomes, using tools including factor analysis and importance indices. In Saudi Arabia, researchers have employed similar methodologies, often adapting them to account for local factors. For example, Al-Ghamdi (2013) used a questionnaire-based approach to identify CSFs in Saudi IT projects, analyzing data with indices that focused on frequency, severity, and importance. Reliability tests, such as Cronbach's alpha, are commonly used to validate the significance of identified factors. Recent studies have also explored the use of advanced analytical tools to examine the relationships between CSFs and project success (Kerzner, 2017). The approaches establish a strong structure for prioritizing CSFs and evaluating their differing levels of importance. Within the Saudi context, they are

particularly beneficial for determining which factors play the most decisive role in addressing the difficulties presented by Vision 2030 related initiatives.

#### 2.4 CSFs in the Saudi Arabian Context

In Saudi Arabia, CSFs for IT projects are shaped by the country's unique socio-cultural, economic, and political environment. Vision 2030 has created a demand for IT projects that support digital transformation, smart cities, and e-governance. However, there remain a number of challenges requiring tailored CSFs, such as skill shortages, reliance on expatriate workers, and bureaucratic processes. Studies have identified top management support, risk management, technical expertise, and objective management as critical in this context (Al-Turki, 2011). Additionally, the prioritization of CSFs tends to be influenced by cultural factors, requiring project managers to adopt culturally sensitive strategies (Alotaibi & Mafimisebi, 2016). A further layer of complexity is added by the Kingdom's policy of Saudization, which aims to increase local workforce participation. While this aligns with national goals, it can lead to difficulties for IT projects demanding specialized skills. This indicates that CSFs, such as effective training and knowledge transfer programs, are critical to ensure project success (Al-Gahtani, 2004). Furthermore, the fast-paced nature of Vision 2030 initiatives places pressure on project teams to deliver results quickly, so highlighting the importance of agile methodologies and flexible planning as emerging CSFs.

**Table 1. Summary of Literature Reviews on CSFs for Project Success**

| Critical Success Factor     | Relevance to Project Success  | Key References  |
|-----------------------------|---|---|
| 1. Top Management Support   | Ensures alignment with organizational goals, facilitates resource allocation, and resolves conflicts. | Pinto and Slevin (1987); Al-Gahtani (2004)              |
| 2. Clear Project Objectives | Reduces scope creep and aligns stakeholder expectations.  | Baccarini (1999); Al-Turki (2011)                       |
| 3. Effective Communication  | Enhances coordination and reduces misunderstandings.  | Pinto and Slevin (1987); Alotaibi and Mafimisebi (2016) |
| 4. Risk Management          | Critical for IT projects with high uncertainty.   | Al-Ghamdi (2013); Kerzner (2017)                        |
| 5. Technical Expertise      | Ensures quality deliverables in IT projects.  | Standish Group (2020); Al-Gahtani (2004)                |
| 6. Stakeholder Involvement  | Improves user satisfaction and project acceptance.  | Standish Group (2020); Alotaibi and Mafimisebi (2016)   |
| 7. Project Planning         | Reduces delays and cost overruns; critical for large-scale Saudi IT projects.                         | Pinto and Slevin (1987); Al-Turki (2011)                |
| 8. Resource Availability    | Ensures project execution without interruptions.  | Belassi & Tukel (1996); Al-Gahtani (2004)               |
| 9. Project Leadership       | Drives team performance and decision-making.  | Pinto & Slevin (1987); Al-Sedairy (1994)                |
| 10. Change Management       | Minimizes disruptions in dynamic IT projects.   | Kerzner (2017); Al-Ghamdi (2013)                        |

|                             |   |  |
|-----------------------------|---|--|
| 11. User Training           | Enhances adoption and satisfaction.                                     | Standish Group (2020); Al-Turki (2011)                   |
| 12. Quality Management      | Ensures functionality and reliability of IT systems.                    | Atkinson (1999); Al-Gahtani (2004)                       |
| 13. Project Monitoring      | Enables early detection of issues.                                      | Pinto and Slevin (1987); Al-Turki (2011)                 |
| 14. Team Collaboration      | Enhances efficiency in diverse teams with expatriate and local workers. | Belassi and Tukul (1996); Alotaibi and Mafimisebi (2016) |
| 15. Technology Selection    | Ensures compatibility and performance.                                  | Standish Group (2020); Al-Ghamdi (2013)                  |
| 16. Scope Management        | Maintains focus on objectives.  | Baccarini (1999); Al-Turki (2011)                        |
| 17. Stakeholder Alignment   | Reduces conflicts.  | Pinto and Slevin (1987); Alotaibi & Mafimisebi (2016)    |
| 18. Cultural Sensitivity    | Hierarchical culture for effective collaboration.                       | Al-Sedairy (1994); Alotaibi and Mafimisebi (2016)        |
| 19. Budget Management       | Prevents cost overruns.   | Atkinson (1999); Al-Gahtani (2004)                       |
| 20. Schedule Management     | Ensures timely delivery.  | Atkinson (1999); Al-Turki (2011)                         |
| 21. Contract Management     | Reduces disputes and ensures smooth execution.                          | Kerzner (2017); Al-Ghamdi (2013)                         |
| 22. Knowledge Transfer      | Supports Saudization.   | Al-Gahtani (2004); Alotaibi and Mafimisebi (2016)        |
| 23. Agile Methodologies     | Enhances adaptability in dynamic IT projects.                           | Highsmith (2009); Al-Turki (2011)                        |
| 24. Organizational Support  | Facilitates resource access and alignment.                              | Belassi and Tukul (1996); Al-Sedairy (1994)              |
| 25. User Acceptance Testing | Improves functionality and adoption.                                    | Standish Group (2020); Al-Ghamdi (2013)                  |
| 26. Regulatory Compliance   | Ensures alignment with Vision 2030 and government policies.             | Al-Gahtani (2004); Alotaibi and Mafimisebi (2016)        |
| 27. Innovation Management   | Supports goal of fostering technological innovation under Vision 2030.  | Shenhar and Dvir (2007); Al-Turki (2011)                 |

### 3. Research Methodology

This study employed a field survey methodology to identify and analyze those CSFs influencing the success of IT projects in Saudi Arabia. The researcher considered a survey-based approach utilizing questionnaires to be highly effective, due to its ability to collect standardized data efficiently. This also aligned with the research objectives of systematically uncovering key factors contributing to project success. According to Walters (2021), the generalizability of findings is enhanced by a survey protocol incorporating random sampling techniques, as it enables a relatively small representative sample to reflect the characteristics and perspectives of a larger population. This methodological choice was deemed particularly suitable for the Saudi IT industry, whose diverse stakeholders and complex project dynamics necessitate robust data collection strategies to capture meaningful insights. An extensive review of project management literature resulted in the researcher selecting 27 CSFs as relevant to IT projects. These factors were

identified based on their prominence in prior studies specific to IT project management, so ensuring their applicability to the context of this research. Notably, this study excluded CSFs commonly associated with construction projects, due to these being considered less relevant to the unique challenges and dynamics of IT projects in Saudi Arabia. Thus, the selected factors are the most representative of the IT project environment in the Saudi context. This deliberate focus ensured that the selected factors were tailored to the technological, organizational, and cultural nuances of the IT sector, particularly in the context of Saudi Arabia's Vision 2030, which emphasizes digital transformation and innovation. In addition, a pilot study was conducted prior to the main data collection, to ensure the validity and clarity of the research instrument. This tested the draft questionnaire to confirm its relevance, comprehensibility, and alignment with the study's objectives (Lowe, 2019). Moreover, the questionnaire was reviewed by a panel of five experts, comprised of two university professors with expertise in project management and three researchers specializing in IT-related fields. Their feedback was instrumental in refining the questionnaire, including leading to revisions to improve its clarity, structure, and appropriateness for the target audience. This rigorous validation process enhanced the reliability of the data collection tool, ensuring that it accurately captured the perspectives of IT professionals in Saudi Arabia. The finalized questionnaire required respondents to evaluate the 27 CSFs using a five-point Likert scale, which provided a structured framework for assessing both the frequency and severity of each factor's impact on project success. For the frequency index, the scale was defined as follows: 0 = No (never occurs); 1 = Rarely; 2 = Sometimes; 3 = Often; and 4 = Always. Similarly, the severity index was measured using the following values: 0 = No (no impact); 1 = Little; 2 = Moderate; 3 = Very; and 4 = Extreme. This dual-scale approach allowed for a nuanced analysis of both how frequently a factor influences project outcomes and the intensity of its impact, thus providing a comprehensive understanding of the relative importance of CSFs. This methodology assisted the study in generating actionable insights for practitioners and policymakers seeking to enhance the success of IT projects in Saudi Arabia, particularly within the context of the nation's rapidly evolving technological landscape. Data for this research was gathered using a Google Forms survey, which provided a cost-effective and accessible solution for reaching participants. The study specifically targeted middle and senior management professionals working in Saudi-based organizations, as their insights were critical to understanding the dynamics of IT project success in the region. A total of 241 responses were collected, providing a robust dataset for analysis. The study employed a purposive sampling approach to ensure that participants were drawn from organizations located in Saudi Arabia's key geographical regions, i.e. Central, Northern, Western, Eastern, and Southern. This method was chosen to capture a representative cross-section of the Kingdom's diverse economic landscape, encompassing industries such as technology, finance, healthcare, and government services. In focusing on these regions and sectors, the research aimed to reflect the unique contextual factors influencing IT project outcomes in Saudi Arabia, particularly in alignment with the nation's Vision 2030

objectives for digital transformation and economic diversification. Thus, this targeted approach enhanced the study's relevance and applicability to the Saudi IT industry. The characteristics of the study participants are detailed in Tables 2 and 3.

In order to provide a comprehensive understanding of the organizations participating in the research, the researcher collected data concerning their characteristics, focusing on aspects such as localization, sector, age, and size. Data were gathered from 241 respondents between February and September 2024, representing a diverse sample of Saudi-based organizations. These were distributed across Saudi Arabia's key regions: the Central region accounted for 68 organizations (28.22%), followed by the Eastern region with 52 organizations (21.58%), the Western region with 46 organizations (19.09%), the Southern region with 45 organizations (18.67%), and the Northern region with 30 organizations (12.45%). This regional diversity ensured that the study captured perspectives from Saudi Arabia's major economic hubs, so reflecting the Kingdom's varied socio-economic landscape, which is critical for understanding the contextual factors influencing IT project success. The organizations represented a number of sectors, with the IT sector comprising the largest share at 51 organizations (21.16%), thus underscoring the study's focus on IT projects. Other sectors included: (1) Healthcare (35 organizations, 14.52%); (2) Tourism and Hospitality (40 organizations, 16.60%); (3) Manufacturing (22 organizations, 9.13%); (4) Education (38 organizations, 15.77%); (5) Energy (40 organizations, 16.60%); and (6) a smaller group of other industries (15 organizations, 6.22%).

**Table 2. Demographic characteristics (N = 241)**

| Organization's Characteristics | Frequency | %     |
|--------------------------------|-----------|-------|
| Organization Localization      |           |       |
| Central                        | 68        | 28.22 |
| Western                        | 46        | 19.09 |
| Eastern                        | 52        | 21.58 |
| Southern                       | 45        | 18.67 |
| Northern                       | 30        | 12.45 |
| Organization Sector            |           |       |
| IT                             | 51        | 21.16 |
| Healthcare                     | 35        | 14.52 |
| Tourism and Hospitality        | 40        | 16.60 |
| Manufacturing                  | 22        | 9.13  |
| Education                      | 38        | 15.77 |
| Energy                         | 40        | 16.60 |
| Other*                         | 15        | 6.22  |
| Organization Age               |           |       |
| Less than 5 years              | 55        | 22.82 |
| 5–10 years                     | 75        | 31.12 |
| 11–15 years                    | 42        | 17.43 |
| 16–20 years                    | 38        | 15.77 |
| More than 20 years             | 31        | 12.86 |
| Organization Size              |           |       |
| Less than 100 employees        | 130       | 53.94 |
| Between 100 and 349 employees  | 50        | 20.75 |
| Between 350 and 599 employees  | 36        | 14.94 |
| Between 600 and 1999 employees | 15        | 6.22  |

|                         |    |      |
|-------------------------|----|------|
| 2000 employees and more | 10 | 4.15 |
|-------------------------|----|------|

\*Other: Insurance, Transport and Telecommunications

This sectoral diversity highlights the broad applicability of the findings across the economy of Saudi Arabia, particularly in sectors aligned with Vision 2030's emphasis on digital transformation and economic diversification. In addition, 55 organizations (22.82%) were less than 5 years old, so reflecting the growing entrepreneurial ecosystem in Saudi Arabia. Organizations aged 5–10 years were the most represented, with 75 organizations (31.12%); followed by 42 organizations (17.43%) aged 11–15 years; 38 organizations (15.77%) aged 16–20 years; and 31 organizations (12.86%) over 20 years old. This distribution indicates a mix of emerging and established organizations, thus offering insights into how organizational maturity influences IT project outcomes. Furthermore, the majority had fewer than 100 employees (130 organizations, 53.94%), followed by 50 organizations (20.75%) with 100–349 employees; 36 organizations (14.94%) with 350–599 employees; 15 organizations (6.22%) with 600–1999 employees; and 10 organizations (4.15%) with 2000 or more employees. This predominance of smaller organizations aligns with Saudi Arabia's growing Small and Medium-sized Enterprise (SME) sector, which plays a significant role in the IT industry. Such a variety of organizational characteristics provides a robust foundation for analyzing how these factors interact with CSFs in driving the success of IT projects across the Kingdom.

**Table 3. Participants' characteristics (N = 241)**

| Organization's Characteristics | Frequency | %     |
|--------------------------------|-----------|-------|
| Participant's Qualification    |           |       |
| Bachelor's degree              | 180       | 74.69 |
| Master's degree                | 35        | 14.52 |
| PhD                            | 5         | 2.07  |
| Other*                         | 21        | 8.71  |
| Participant's Position         |           |       |
| Project Coordinator            | 30        | 12.45 |
| Assistant Project Manager      | 25        | 10.37 |
| Project Manager                | 140       | 58.09 |
| Senior Project Manager         | 20        | 8.29  |
| Portfolio Manager              | 5         | 2.07  |
| Other**                        | 21        | 8.71  |
| Participant's Work Experience  |           |       |
| 1–4 years                      | 46        | 19.09 |
| 5–10 years                     | 110       | 45.64 |
| 11–15 years                    | 55        | 22.82 |
| 16–20 years                    | 15        | 6.22  |
| More than 20 years             | 15        | 6.22  |

\*Other: High School and Diploma

\*\*Other: Project Team Members, Project Administrator and Resource Manager

To ensure a comprehensive understanding of the professionals contributing insights into CSFs for IT projects in Saudi Arabia, the researcher collected data to establish the characteristics of each participant. Data were gathered from 241

respondents between February and September 2024, revealing a diverse group of professionals in terms of qualifications, positions, and work experience. The majority of participants held a Bachelor's degree (180 respondents, 74.69%), followed by 35 respondents (14.52%) with a Master's degree, 5 respondents (2.07%) with a PhD, and 21 respondents (8.71%) with other qualifications. This distribution highlights the predominance of undergraduate-educated professionals in Saudi Arabia's IT sector, with a smaller (but significant) proportion of advanced degree holders, reflecting the growing emphasis on specialized expertise in the Kingdom's rapidly evolving technological landscape. In addition, the majority of participants were Project Managers (140 respondents, 58.09%), underscoring their central role in IT project execution. Other roles included: (1) Project Coordinators (30 respondents, 12.45%); (2) Assistant Project Managers (25 respondents, 10.37%); (3) Senior Project Managers (20 respondents, 8.29%); (4) Portfolio Managers (5 respondents, 2.07%); and (5) other positions (21 respondents, 8.71%). This diverse range of roles reveals a strong representation of project management professionals, thus confirming that the study captures perspectives from individuals directly responsible for project outcomes, which is critical for identifying factors influencing success in Saudi Arabia's IT industry. The participants' work experience further enriched the dataset, with the largest group having 5–10 years of experience (110 respondents, 45.64%), followed by 11–15 years (55 respondents, 22.82%); 1–4 years (46 respondents, 19.09%); and both 16–20 years and more than 20 years (15 respondents each, 6.22%). This distribution reflects a blend of early-career and seasoned professionals, providing a balanced perspective on the challenges and opportunities in IT project management. It should be noted that the inclusion of participants with varying levels of experience is particularly relevant in Saudi Arabia, where the push for Saudization and rapid technological adoption under Vision 2030 demands a workforce with diverse expertise. These participant characteristics strengthen the study's ability to generate actionable insights for enhancing IT project success in the Kingdom's dynamic economic and cultural context.

#### 4. Results and Discussion

##### 4.1. Data analysis and results

This study calculated the Frequency Index (FI), Severity Index (SI), and Importance Index (IMP I) to analyze responses from a survey, likely related to the CSFs for IT project success in Saudi Arabia (Kadu et al., 2021). These indices are commonly employed in project management research to quantify the perceived frequency, severity, and overall importance of various factors based on respondent feedback. Data analysis was performed utilizing a three-way system of indices: (1) frequency, (2) severity, and (3) importance. The frequency index is mathematically determined by the following formula:

$$F.I = \sum_0^4 ai ni / 4N$$

where,

- $aia_{iai}$ : The weight assigned to each response category on a five-point scale. Based on the earlier context, the scale is:
  - 0 = No (never occurs)
  - 1 = Rarely
  - 2 = Sometimes
  - 3 = Often
  - 4 = Always These weights reflect the frequency with which a CSF is perceived to occur in IT projects.
- $n_i$ : The frequency number of responses for each category.
- (N): The total number of responses (241).
- $\sum_0^4$  : The summation over all five categories (0 through 4), meaning the weighted responses for each category are added together.
- 4: The maximum weight on the frequency scale, used as the denominator's multiplier to normalize the index to a scale from 0 to 1 (or 0% to 100% when multiplied by 100).

The FI measures how often a CSF is observed in IT projects. A higher FI suggests the factor is frequently present, which is critical in Saudi Arabia's IT industry, where factors may vary due to cultural or organizational influences.

$$S.I = \sum_0^4 a_i n_i / 4N$$

where,

- $aia_{iai}$ : The weight assigned to each response category on a five-point scale. Based on the earlier context, the scale is:
  - 0 = No (no impact)
  - 1 = Little
  - 2 = Moderate
  - 3 = Very
  - 4 = Extremely

These weights reflect the frequency with which a CSF is perceived to occur in IT projects.

- $n_i$ : The frequency number of responses for each severity category.
- (N): The total number of responses (241).
- $\sum_0^4$  : The summation over all five severity categories.
- 4: The maximum weight on the severity scale, used to normalize the index.

The SI quantifies the perceived intensity, or impact, of a CSF on project success. In Saudi Arabia, where IT projects may face unique challenges, a high SI for factors such as risk management could indicate their critical role in mitigating severe issues.

$$IMP I = FI \times SI$$

The IMP I combines frequency and severity to determine the overall priority of a CSF. A higher IMP I suggests a factor is both frequently observed and significantly impactful, making it a priority for project managers. In the Saudi context, factors can score high on IMP I, reflecting their dual relevance to frequent occurrence and severe impact on IT project outcomes.

#### 4.2. Discussion

Table 4 presents the study's assessment of the relevant factors, using a composite of Frequency, Severity, and Importance Indices, to identify five key elements as pivotal to the success of projects: (1) project leadership; (2) effective communication; (3) top management support; (4) availability of resources; and (5) clear project objectives. These form the core of project governance, stakeholder alignment, and operational execution. Data shows that leadership and communication are consistently rated highest in importance, however, shortcomings in project objectives and quality management have, when they occur, the most significant impact. Thus, a robust project management approach should emphasize strong leadership and communication (soft skills), while strictly maintaining planning and quality control standards (hard skills). The following discussion investigates deeper into these factors' empirical connections and provides actionable recommendations for project organizations. Table 4 highlights the key factors ensuring project success, ranked by importance, with frequency and severity indices providing additional context. Project leadership itself ranks highest (0.809, rank 1). The results thus argue that project leadership forms the central mechanism driving the success of all other factors. They also indicate that effective leadership is crucial for navigating the complexities inherent in project management, ensuring successful outcomes from initiation through execution and monitoring (Fokina et al., 2023). Moreover, this surpasses merely administrative tasks, requiring project managers to add significant value by providing visionary guidance and fostering a productive environment, rather than simply reporting status or managing minutiae (Olugboye et al., 2021). Leaders are therefore tasked with employing operational execution to bridge strategic objectives, thereby enabling the team to fulfill each project milestone. This links to contemporary project management theory and its role in managing complexity and team dynamics.

**Table 4. Frequency, Severity and Importance Indices of Factors Impacting Project Success**

| N  | Success Factor           | Frequency index | Severity index | Importance Index | Rank |
|----|--------------------------|-----------------|----------------|------------------|------|
| 1  | Top Management Support   | 0.760           | 0.771          | 0.586            | 3    |
| 2  | Clear Project Objectives | 0.638           | 0.811          | 0.517            | 5    |
| 3  | Effective Communication  | 0.815           | 0.747          | 0.609            | 2    |
| 4  | Risk Management          | 0.784           | 0.428          | 0.336            | 21   |
| 5  | Technical Expertise      | 0.829           | 0.551          | 0.457            | 9    |
| 6  | Stakeholder Involvement  | 0.556           | 0.749          | 0.416            | 14   |
| 7  | Project Planning         | 0.719           | 0.478          | 0.344            | 20   |
| 8  | Resource Availability    | 0.801           | 0.729          | 0.584            | 4    |
| 9  | Project Leadership       | 0.809           | 0.801          | 0.648            | 1    |
| 10 | Change Management        | 0.448           | 0.449          | 0.201            | 27   |
| 11 | User Training            | 0.815           | 0.503          | 0.410            | 15   |
| 12 | Quality Management       | 0.603           | 0.84           | 0.507            | 6    |
| 13 | Project Monitoring       | 0.499           | 0.612          | 0.305            | 25   |
| 14 | Team Collaboration       | 0.707           | 0.467          | 0.330            | 22   |
| 15 | Technology Selection     | 0.511           | 0.821          | 0.420            | 13   |
| 16 | Scope Management         | 0.525           | 0.589          | 0.309            | 24   |
| 17 | Stakeholder Alignment    | 0.671           | 0.693          | 0.465            | 8    |

|    |                         |       |       |       |    |
|----|-------------------------|-------|-------|-------|----|
| 18 | Cultural Sensitivity    | 0.540 | 0.806 | 0.435 | 12 |
| 19 | Budget Management       | 0.692 | 0.658 | 0.455 | 10 |
| 20 | Schedule Management     | 0.589 | 0.624 | 0.368 | 19 |
| 21 | Contract Management     | 0.425 | 0.491 | 0.209 | 26 |
| 22 | Knowledge Transfer      | 0.831 | 0.793 | 0.659 | 18 |
| 23 | Agile Methodologies     | 0.741 | 0.536 | 0.397 | 16 |
| 24 | Organizational Support  | 0.462 | 0.835 | 0.386 | 17 |
| 25 | User Acceptance Testing | 0.655 | 0.682 | 0.447 | 11 |
| 26 | Regulatory Compliance   | 0.795 | 0.415 | 0.330 | 23 |
| 27 | Innovation Management   | 0.617 | 0.755 | 0.466 | 7  |

In addition, Table 4 identifies the second most important factor as effective communication, with a frequency of 0.815, severity of 0.747, and an importance index of 0.609, so placing is second out of 27 factors. This high ranking underscores its critical role in project success, and reflects its frequent occurrence and significant impact when issues arise. The data thus suggests that a cornerstone for achieving project goals consists of clear and efficient communication across teams and stakeholders, so minimizing misunderstandings, and enhancing collaboration. This also indicates that effective communication forms a cornerstone of successful project execution, directly impacting stakeholder engagement, alongside the mitigation of risk, and overall project outcomes (Ramsing, 2013). Its position above technical expertise (rank 9) and project planning (rank 20) highlights that, while technical skills and planning remain vital, the ability to communicate effectively often determines the successful execution and outcome of projects. This emphasis indicates that organizations should prioritize communication training and strategies to bolster overall project success. Furthermore, the table identifies top management support as a critical factor, with an importance index of 0.767, making it third among those listed. This high ranking underscores its pivotal role in ensuring project success, reflecting the need for strategic alignment, resource allocation, and decision-making authority from upper management. Top management support is widely acknowledged as a critical factor across various project types, ranging from information systems projects to complex infrastructure developments (Young & Jordan, 2008). The frequency index of 0.638 indicates that top management support is a consistent factor across projects, so suggesting it as a standard expectation, rather than an occasional intervention. However, the severity index of 0.711, while significant, is moderate compared to other factors such as project leadership (0.809) or clear project objectives (0.815). This implies that, while its absence can hinder progress, its impact may be mitigated with strong leadership at the project level. Top management support tends to foster a supportive environment for project teams through approval of project goals, provision of necessary resources, and resolution of escalated issues. The fact that it is ranked below clear objectives and project leadership suggests that it serves as an enabler, rather than acting as the sole driver of success. The data implies that effective project outcomes depend heavily on consistent executive backing, particularly in complex or resource-intensive initiatives, although its effectiveness may vary based on how actively it is engaged throughout the project lifecycle. The table indicates resource availability to be a

vital success factor, with an importance index of 0.801 and a rank of 4, placing it among the top contributors to project success. This ranking reflects the critical role played by access to adequate human, financial, and material resources to enable project teams to meet objectives. The frequency index of 0.712 indicates that resource availability is a recurring concern across projects, suggesting it is a challenge leaders are consistently required to address. The severity index of 0.584, while moderate, underscores that shortages or misallocations can significantly disrupt progress, although proactive planning may manage their impact. In addition, the adequate availability of resources is a critical determinant of project success. This encompasses the financial capital, skilled labor, and essential materials crucial for ensuring a smooth workflow and the proper execution of defined project aims (Maxwald et al., 2020). Moreover, resource availability is likely to influence project leadership by empowering teams to execute tasks efficiently and adapt to unforeseen demands. Its high importance and frequency suggest that leaders must prioritize securing and optimizing resources, often in collaboration with top management (ranked 3 with 0.767 importance). Furthermore, the data implies that a cornerstone of successful leadership involves the effective management of resources, particularly in resource-intensive or time-sensitive projects. However, the moderate severity indicates that, while critical, its challenges can be mitigated through strategic foresight and contingency planning.

Table 4 also identifies clear project objectives as a cornerstone for success, boasting the second-highest importance index of 0.815 and a rank of 2. This ranking highlights the essential role played by well-defined goals in guiding teams, aligning efforts, and measuring success, making it a top priority for effective leadership. The frequency index of 0.748 indicates that the presence (or absence) of clear objectives is a consistent factor across projects, and thus a fundamental element leaders must establish early. The severity index of 0.659, while notable, is moderate compared to the importance. This implies that, while unclear objectives are capable of derailing projects, their impact can be mitigated with strong communication and leadership. Clear project objectives likely serve as a roadmap, providing direction and enabling stakeholders to stay focused on deliverables. Their high ranking, above top management support (0.767, rank 3) and resource availability (0.801, rank 4), suggests that goal clarity is a prerequisite for the effective leveraging of other resources. The data underscores that successful project leadership hinges on articulating objectives that are Specific, Measurable, Achievable, Relevant, and Time-bound (SMART), fostering team cohesion and accountability. This emphasis reflects the need for leaders to prioritize objective-setting to navigate complexities and ensure that project outcomes align with strategic intent. Establishing clear project objectives is a foundational element in navigating the inherent complexities of large-scale endeavors, particularly within the dynamic economic and social transformation currently underway in Saudi Arabia. In addition, clear project objectives are fundamental for guiding all subsequent project phases, including planning, execution, and monitoring, by providing a definitive purpose and direction for all activities (Pardee, 2005).

### 4.3. Reliability analysis

This evaluation seeks to determine the dependability of the results obtained by this study. The researcher conducted tests on the scales associated with each factor, in order to assess their reliability, utilizing Cronbach's alpha as the primary metric. Cronbach's alpha is a widely used statistical measure for evaluating the internal consistency of items within a scale, or the responses to questions crafted to represent a specific construct (Garson, 2022). In addition, this measure provides insights into how well the items in a scale align, in order to measure the same underlying concept, ensuring the robustness and coherence of the scale. In applying this method, the analysis aims to confirm whether the scales capture the intended constructs both consistently and accurately, thereby validating the reliability of the results. The construct was designed to identify negative Cronbach's alpha values, which indicate problematic scales, while accepting positive alpha values within the range of 0 to 1.0, where higher values reflect greater internal consistency. A widely accepted threshold (or cut-off value) for reliability is 0.70, meaning that for items to be considered cohesive and suitable for use together as a single scale, their Cronbach's alpha must exceed this benchmark. As a general guideline, if removing a specific item from the scale results in a higher alpha value compared to the current total scale, it is typically recommended to eliminate that item, unless deemed theoretically essential for the construct being measured.

**Table 5. Findings From the Validated Reliability Assessments**

| N  | Success Factor           | Cronbach alpha |
|----|--------------------------|----------------|
| 1  | Top Management Support   | 0.91           |
| 2  | Clear Project Objectives | 0.81           |
| 3  | Effective Communication  | 0.92           |
| 4  | Risk Management          | 0.75           |
| 5  | Technical Expertise      | 0.71           |
| 6  | Stakeholder Involvement  | 0.68           |
| 7  | Project Planning         | 0.77           |
| 8  | Resource Availability    | 0.84           |
| 9  | Project Leadership       | 0.96           |
| 10 | Change Management        | 0.69           |
| 11 | User Training            | 0.59           |
| 12 | Quality Management       | 0.76           |
| 13 | Project Monitoring       | 0.63           |
| 14 | Team Collaboration       | 0.80           |
| 15 | Technology Selection     | 0.62           |
| 16 | Scope Management         | 0.70           |
| 17 | Stakeholder Alignment    | 0.80           |
| 18 | Cultural Sensitivity     | 0.65           |
| 19 | Budget Management        | 0.59           |
| 20 | Schedule Management      | 0.74           |
| 21 | Contract Management      | 0.55           |
| 22 | Knowledge Transfer       | 0.72           |
| 23 | Agile Methodologies      | 0.77           |
| 24 | Organizational Support   | 0.50           |
| 25 | User Acceptance Testing  | 0.80           |
| 26 | Regulatory Compliance    | 0.49           |
| 27 | Innovation Management    | 0.73           |

The results of the reliability tests, including the accepted positive alpha values, are presented in Table 5, providing a clear and systematic overview of the scales meeting the reliability criteria. This analysis ensures that the current study only employs robust and internally consistent scales, so enhancing the validity of the findings. Table 5 presents a comprehensive list of factors contributing to the success of a project, ranked by their Cronbach alpha values measuring their internal consistency or reliability in contributing to project outcomes. Firstly, there is project leadership, with a Cronbach alpha of 0.96, indicating its exceptionally high reliability and pivotal role in ensuring project success. Secondly, there is top management support, with a value of 0.91, which underscores the strong influence of executive-level backing on project performance. Thirdly, there is effective communication at 0.92, highlighting its critical importance in facilitating clear and consistent information flow. Fourthly, there is clear project objectives, with a value of 0.81, emphasizing the necessity of well-defined goals for project alignment. Mid-tier factors include risk management (0.75) and technical expertise (0.71), suggesting that proactive risk mitigation and specialized skills are consistently vital. Stakeholder involvement (0.68) and resource availability (0.84) further indicate that engaging stakeholders and ensuring resource access are reliable contributors. Project planning (0.77) and change management (0.69) also show moderate reliability, pointing to the importance of structured planning and adaptability. Lower-ranked factors, such as contract management (0.55), technology selection (0.62), and regulatory compliance (0.49), exhibit lower Cronbach alpha values, suggesting they are less consistently emphasized but still relevant depending on project context. In addition, further factors, like quality management (0.76), team collaboration (0.80), and innovation management (0.73), fall in between, indicating a balanced contribution to success. Overall, the data reveals that leadership, support, and communication are the most reliable drivers, while factors such as compliance and contract management show more variability in their impact. The results of the reliability test indicate that 17 success factors achieved Cronbach's alpha scores exceeding the threshold of 0.70, while remaining below 1.00, so signifying strong internal consistency and reliability for these factors within the scale. These scores suggest that these 17 factors are cohesive and effectively measure the intended constructs related to successful project implementation in large-scale IT projects in Saudi Arabia. Conversely, 10 factors fell outside the acceptable alpha range, indicating that they lack the necessary reliability or relevance to accurately contribute to the construct of true satisfaction in the context of successful project execution. As a result, these 10 factors are deemed non-essential for ensuring successful outcomes in large Saudi IT projects and may be excluded from the scale unless supported by strong theoretical justification. This analysis highlights the importance of focusing on the 17 reliable factors to ensure robust and meaningful insights into project success, as detailed in the tabulated results.

## 5. conclusion

This research has highlighted the pivotal role played by the operating environment in shaping the CSFs that drive effective project outcomes. The study identified five key factors that significantly influence the success of IT projects in Saudi Arabia: firstly, project leadership; secondly, effective communication; thirdly, top management support; fourthly, resource availability; and finally, clear project objectives. These factors emerged as foundational elements for achieving successful project implementation in the region's IT industry. The study employed Cronbach's alpha to assess the reliability of the scales, which revealed that 17 success factors achieved alpha scores within the acceptable range of 0.70 to 1.00, indicating high internal consistency and reliability. In contrast, 10 factors produced alpha scores outside this range, suggesting they are less critical or reliable for measuring project success, and therefore may not contribute meaningfully to ensuring true satisfaction in project implementation. The analysis underscores that these 17 reliable factors are essential for fostering the successful execution of a project, particularly in the context of large-scale IT initiatives in Saudi Arabia. Among these, the five CSFs (i.e. leadership, communication, top management support, resource availability, and clear objectives) stand out as indispensable for practitioners aiming to minimize the risk of project failure and enhance overall success rates. Thus, by prioritizing these areas, project managers and stakeholders can strategically focus their efforts on high-impact elements, thereby optimizing project outcomes. The findings offer actionable insights, enabling practitioners to better understand the core components that drive project success and to implement targeted strategies that align with these priorities. Importantly, the implications of this research extend beyond Saudi Arabia, offering valuable guidance for practitioners in other developing nations possessing similar economic, cultural, or operational characteristics. The success factors identified provide a universal framework capable of being adapted to comparable contexts, so broadening the applicability of the study's findings. The researcher therefore strongly advocates for the integration of these results into project management practices, as they represent critical pillars for achieving successful project delivery.

Moreover, these five CSFs can serve as key input variables for developing predictive models or analytical frameworks designed to forecast and enhance project success. By leveraging these insights, stakeholders in the IT industry and potentially other sectors can refine their approaches, reduce inefficiencies, and achieve project outcomes that are more consistent, and of high quality, across diverse settings.

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