

## **CRITICAL SUCCESS FACTORS FOR INFORMATION TECHNOLOGY (IT) PROJECTS IN SOUTH AFRICA**

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### **ABSTRACT**

The purpose of this study is to identify critical success factors for IT projects in South Africa. Successful management of IT projects is a primary concern for organisations

Research has shown that IT and its projects can yield huge return on investments. While organisations are increasingly investing in projects as a mean of boosting their investment, it is recognized that investing alone cannot guarantee productivity gains. Other project management aspects such as methodologies, tools, techniques and critical success factors also need to be considered for the successful implementation of IT projects.

Literature emphasises that projects need to be managed within context. For each specific context, researchers have identified specific success factors to consider in order to achieve the project objective. Research have been done on critical success factors for different countries, different industries and different environments. It, however, remains unclear in the context of South Africa. The South African environment is unique and presents specific project management challenges that need investigation.

A quantitative approach was used with survey design. These questionnaires were distributed electronically via email to individuals working on project of within the IT industry in South Africa. Participants were selected using probabilistic sampling strategy as the intention was to generalise the results to the entire context of IT projects in South Africa.

This research has provided to the South African project management environment, critical success factors that one should adhere to, in order to achieve success.

The critical success factors identified address the broader IT project management field, therefore might not fully solve the need of being specific to the context. Considering that IT projects can be of different types thus bringing different size and complexity, there is a need for a further research to develop critical success factor that applies to specific IT areas such as software development, so that factors that have a great impact on specific IT projects are uncovered in order to improve the broader IT industry in South Africa.

It emerged that politics, legalities, the state of the economy and corruption are making the South African project environment different from other environments. Therefore being a project manager in the South African environment require

more than mastering the project management body of knowledge. The above control environment characteristics as well as the critical success factors identified should be the driving force behind the project manager's tool set that would determine his performance and the ultimate performance of projects.

This research contribute to the project management literature by contextualising critical success factors of IT projects and identifying 25 unique factors applicable to South Africa, and the key parameters that defines the uniqueness of the South African project environment.

**Key words:** Project Management; Project Environment; Critical Success Factors; Information Technology Projects; South Africa

## **INTRODUCTION**

The Information Technology (IT) industry is one of the industries that make a great contribution to business and a nation's economic development (Mia, 2011). The government and economists are continuously looking into IT, to ensure better service delivery, development of skills, better productivity and economic growth (Kyobe, 2011). As a result, the management of IT and its' projects also plays a major role in the economy. Research has shown that IT can provide huge return on investments. Investing alone, however, without proper management, is not enough to drive productivity gains (Mia, 2011), it is also important for organisations to make use of tools, techniques and critical success factors (CSFs) in the management of their IT projects. CSFs refer to characteristics, conditions or variables that have a significant impact on the success of a project, when they are properly sustained, maintained and managed (Alias, Zawawi, Yusof & Aris, 2014).

An increasing number of organisations are using projects to implement their strategies business operations (Kernzer, 2011). Projects and programmes are the core of any organisation's strategic initiatives (KPMG International Co-operative, 2017). Today IT has shifted from the implementation of just IT applications, to an era of IT enabled business change (McKinsey, 2013). IT assists in specifying an organisations objectives and strategies, ensures a smooth flow of information across different units and departments in an organisation and guides an organisation in adopting the most viable business practices (Moharana, Murty, Senapati , & Khuntia, 2012).

Organisations are investing in IT for a number of reasons which include: (i) IT allows for anytime and anywhere progress, (ii) IT provides a good sense of information security, which is important because an organisations information is one of its valuable assets and (iii) The need for speed, which will result in value added work. The problem is that projects are failing more than they are succeeding and thus inhibits organisations from yielding returns from their IT project investment.

According to the Standish Group (2013), 31.1% of projects are cancelled before they are completed; furthermore, 52.7% of projects cost 189% of their original

estimates. 9% of projects in large organisations, 16.2% in medium organisations and 28% in small organisations were successful. With regards to challenged projects, 61% of projects in larger companies, 47% in medium companies and 50.4% in small organisations.

The major causes for these project failures, according to the [8] are restarts, cost overruns, time overruns and content deficiencies. Standish Group (2013) also identified, among others, factors contributing to project failure: (i) Unrealistic project scope, (ii) Improper management of the scope creep, and the continuous expansion of project scope, (iii) Technology that is essential for implementing the project, that has not been developed and, (iv) the misunderstanding of the organisational issues.

In order to address the failure of IT projects, organisations should make use of among others tools, techniques and CSFs in the management of their IT projects.

Research has been done on the theory of CSFs, however it still remains unclear in the context of South Africa and further research still needs to be conducted regarding issues such as why certain CSFs are success factors and others are not, and why individuals continue to have different perspectives on success (Whitney & Daniels, 2013).

## **LITERATURE REVIEW**

IT can generate huge returns for business because of the large and wide-ranging impact that IT systems, resulting from IT projects, have on business processes (Moharana, Murty, Senapati, & Khuntia, 2012). Quite a lot has been written about project success, however the meaning and measure of success still need to be exhausted (Muller, & Jugdev, 2012). One of the key tools for achieving success in project management is the use of critical success factors during the implementation of projects.

Research on CSFs has been conducted in many countries including BRICS countries, such as Brazil and India. The same research has also been done per industry. It however, remains unclear in the context of IT projects in South Africa nothing has been to enlighten practitioners in order to empower them to achieve success in managing projects.

A project is understood as a group activity that is temporary and is initiated to produce a unique product, service or result (Ika, Diallo, Thuiller, 2010), while Project Management is the application of knowledge, skills and techniques in order to execute projects effectively and efficiently (Ika, Diallo, Thuiller, 2010). It is considered as a method of solving complex organisational problems and handling organisational activity (PMI, 2013). Organisations use project management as a strategic competency to tie their project results to the business objectives, compete better, and be successful in their markets (Soderlund, 2004).

### **2.1 Project Success**

According to Fayaza, Kamalb, Amina, and Khana (2017), project success is one of the concepts that literature struggle to provide a common understanding. Long ago, it had been established that project management teams should use the simple golden triangle that is comprises of schedule (time), budget and quality, to determine their project management success (Kenelly, 2013). Relying on success criteria such as time, costs and quality can only lead to an overly narrow definition of projects success (Kernzer, 2011).

There tend to be a general agreement that project success entails efficiency and effectiveness (Drury-Grogan,2014) , that it is a matter of perspective, that there is a criteria of project success and that success refers specifically to conditions, events and circumstances (Pulmanis, 2013). The success of a project is often associated with the final result of the project, therefore a project can be successful even when it is managed badly, or associated with project processes, therefore a project can be successful when the final product performs poorly (Ika, 2009). Our understanding within this study is that success should encompass both the project management processes, and the project product.

### 2.1.1 Project Success Internationally

Many studies are conducted internationally to evaluate the performance of projects, examine how organisations can manage change and, identify strategies for improving project outcomes [5][19]. Table 1 illustrate project performance from different longitudinal studies in three different continents.

Please divide the main body of text under sensible, clear headings.

Table 1. Project performance comparison

Project Outcome	CHAOS (USA)								Prosperus (SA)		University of Oxford (UK)	
	1994	1996	1998	2000	2002	2004	2006	2008	2003	2008	2003	2008
Successful	16	27	26	28	15	29	19	24	22	32	16	27
Challenged	53	33	46	46	51	53	46	44	35	44	74	36
Failed	32	40	28	28	34	18	35	32	43	24	10	37

[19] Have evaluated project performance or success rate within the African continent in order to draw comparisons among African countries. Table 2 shows a comparison of project success from different countries within the SADC region.

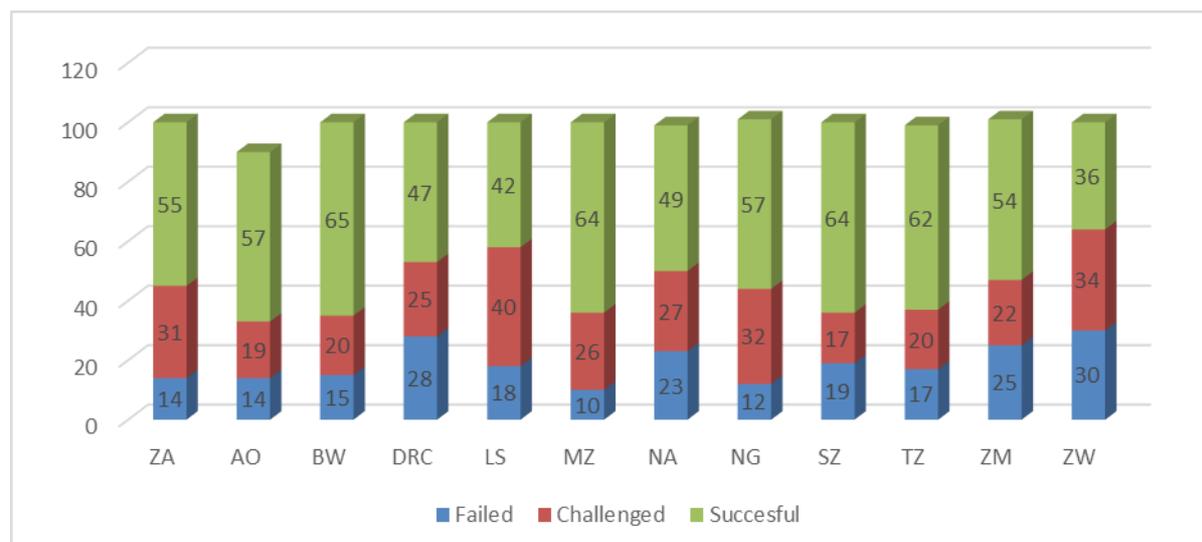


Figure 1. Project performance in SADC countries

Table 1 and figure 1 results indicate that the poor performance of projects is an international problem, considering both overseas as well as other African countries. We still have the rate of failed and challenged projects (put together) higher than that of successful ones.

### 2.1.2 Project Success in South Africa

The focus on South Africa stems from the fact that South Africa is the largest Information and Communication market in Africa. It is therefore important that IT project management practices and their performance be investigated and understood (Eloff, Labushagne, Marnewick, Steyn & Peter, 2013).

Ramos and Mota (2014) indicate an improvement in the performance rate of projects from 2008-2010. 55% of projects in 2010 were perceived as successful which is an increase of 37% from 18% in 2008, 31% of projects were challenged which is a decrease of 5% from 36% in 2008 and 14% of projects were perceived as failed from a whopping 27% in 2008.

However the study conducted Eloff et al. (2013) found that since 2003, the percentage of successful projects in South Africa has decreased from 43% to 34%, while the percentage of failed projects has increased from 23% to 32%. This clearly shows that there is a problem that needs to be addressed especially because these projects are to provide economic benefits to organisations and to the country as a whole.

## 2.2 Critical Success Factors

When considering CSFs, it is necessary to look at the wider project environment including the surrounding environments external to the organisation where the project is implemented (Nazeer, Erasmus, Marnewick, 2014).

There are various lists of CSFs which have changed over years. Back in the 90's, the most well-known contribution was provided by Todorovic, Petrovic, Mihic, Obradovic and Bushuyer (2015), and include CSFs such as project mission, top-management support, project schedule, client consultation, personnel, technical tasks, client-acceptance, monitoring and feasible communication, and troubleshooting.

From the work of Todorovic, et al. (2015) numerous research have been done to enlighten the concept of CSFs. However Pinto, and Slevin (1998) takes a different perspective by stressing the need for establishing key performance indicators (KPIs) as a prerequisite for measuring the achieved project performances, and these measurements will differ from organisation to organisation (Quershi, Warraich, & Hijazi, 2009).

Reh (2015) consider that what matters in the context of IT project management is to exercise controls or manage risks. Previous research have proved that a high level of risk can directly or indirectly result in low IT project performance (Deng, 2014) while on the other hand, the effective enforcement of formal control mechanism that relies on process and outcome evaluation and informal control can enhance IT project performance (Gepp, Hellmith, Schaffler, & Vollmar, 2013).

Alias, et al. (2014) developed a conceptual framework that illustrated the variables for project performance which makes it easier to determine the CSFs for successful project management practice. These variables are: Project Management Actions, Project Procedures, Human Factors, Project Related Factors and The External Environment. Based on these 5 variables one can therefore establish critical success factors relative to his environment. Table 2 provide a summary of literature on critical success factors.

For convenience the quick styles have been set up in this template, however, a summary of the styles used is available in the table below.

*Table 2. Critical success factor identified in the literature*

<i>Critical Success Factors</i>	<i>Pinto &amp; Slevin (1987, 1989)</i>	<i>Boyd (2001)</i>	<i>Yeo (2002)</i>	<i>Andersen et. al. (2002)</i>	<i>Kerzner (2003)</i>	<i>Frese &amp; Sauter (2003)</i>	<i>Turner &amp; Muller (2005)</i>	<i>Hyvary (2006)</i>	<i>Khang &amp; Moe 2008</i>	<i>Alias et al. (2014)</i>
<i>Project Mission</i>	✓		✓	✓	✓	✓		✓	✓	
<i>Top Management Support</i>	✓		✓	✓		✓	✓	✓	✓	✓
<i>Project Schedule</i>	✓			✓						
<i>Client Consultation</i>	✓	✓		✓	✓			✓	✓	
<i>Realistic time and Cost estimates</i>	✓	✓	✓		✓					
<i>Technical Tasks</i>	✓									
<i>Client Acceptance</i>	✓									
<i>Feasible Communication</i>	✓	✓		✓		✓		✓		✓
<i>Adequate Funds and Resources</i>	✓			✓	✓			✓	✓	
<i>KPI's reflecting CSFs</i>										
<i>Troubleshooting</i>	✓									✓
<i>Problem Solving Abilities</i>	✓							✓		
<i>Competent and Motivated project Team</i>	✓			✓			✓	✓	✓	
<i>Skilled Managers and Designers</i>										✓
<i>Time Management</i>	✓			✓						
<i>Personnel</i>	✓									
<i>Monitoring performance and providing Feedback</i>	✓	✓	✓	✓	✓	✓	✓	✓		
<i>Project Performance and Quality</i>		✓			✓					
<i>Project Ownership</i>	✓				✓	✓	✓		✓	
<i>Planning /Controlling</i>	✓		✓	✓	✓	✓	✓		✓	

As it can be perceived from the table 2 that views on critical success factors are diverse beside some communalities that are even inconsistent as you compare the different literatures.

### *2.2.1 Critical Success Factors across Industries*

The researcher has emphasised that projects have special characteristics that make them unique. It is therefore safe to deduce that projects differ from one industry to another, and also from one country to another.

The construction industry has been considered as one of the most important industries in any economy (Nguyen, et al., 2004) because it interacts with nearly all fields of human endeavours.

Most projects in the financial industry, specifically in Africa are World Bank Projects. World Bank projects are very specific due to their unique environment, as they are characterised by complexity, the high delicacy and relative intangibility of their ultimate objective of poverty reduction, their large heterogeneous stakeholders, the need for compromise, their charm in the eyes of politicians, their profound culture and geographical gap between project designers and their beneficiaries, as well as the prevalence of bureaucratic rules and procedures (Muller & Jugdev, 2012).

Other industries that have enjoyed coverage in the literature include engineering and Information Technology. Table 3 depict critical success factors per industry.

*Table 3 Critical success factors per industry*

	Industry			
	(Grobler, et al., 1992; Nguyen, et al., 2004; Guidene et al., 2013) Construction	(Ika, et al., 2012; Robertson, 2011; Ihuah, et al., 2014) Financial	(Koutsikouri, et al., 2006; Gepp, et al., 2013) Engineering	Fayaz, et al., 2017 ; Ramos et al., 2014; Sudhakar, 2012; Tuzcu & Estoglu, 2011 Information Technology
<i>Critical Success Factors</i>				
Well organized & Cohesive Facility	✓	✓		
Teamwork	✓		✓	✓
Conflict Management	✓			
Risk and Reward Allocation	✓			

	Industry			
	(Grobler, et al., 1992; Nguyen, et al., 2004; Guidene et al., 2013) Construction	(Ika, et al., 2012; Robertson, 2011; Ihuah, et al., 2014) Financial	(Koutsikouri, et al., 2006; Gepp, et al., 2013) Engineering	Ramos et al., 2014; Sudhakar, 2012; Tuzcu & Estoglu, 2011 Information Technology
<i>Critical Success Factors</i>				
Experience	✓			✓
Timely and valuable optimized information	✓			
Competent Project Team and Manager	✓	✓	✓	✓
Adequate Funding and resources	✓	✓		✓
Client Involvement	✓	✓	✓	✓
Internal and External Factors	✓			Fayaz, et al., 2017 ;
Project Understanding		✓	✓	✓
Risk Management	✓	✓		✓
Project size	✓			
Talent		✓		✓
Commitment	✓			

	Industry			
<i>Critical Success Factors</i>	<i>(Grobler, et al., 1992; Nguyen, et al., 2004; Guidene et al., 2013) Construction</i>	<i>(Ika, et al., 2012; Robertson, 2011; Ihuah, et al., 2014) Financial</i>	<i>(Koutsikouri, et al., 2006; Gepp, et al., 2013) Engineering</i>	<i>Ramos et al., 2014; Sudhakar, 2012; Tuzcu &amp; Estoglu, 2011 Information Technology</i>
<i>Training</i>		✓		
<i>Information/ Communication</i>	✓	✓		✓
<i>Top Management support</i>				✓
<i>Realistic Expectation</i>				✓
<i>Planning and scheduling</i>				✓
<i>Troubleshooting</i>				✓

Fayaz, et al., 2017 ;

### 2.2.2 Critical Success Factors for IT Projects across countries

Ika (2009) conducted a study on Brazilian companies focusing on the determinants of success and failure of projects, and how they are related and graded. They concluded that the number of IT projects that fail is quite high

therefore understanding the perceptions of the factors of success and failure in IT projects, requires answers from what influences the outcome of a project.

According to Repiso, Setchi, and Salmeron (2007), in order for IT project management to be successful, certain qualities that make IT projects different from other types of projects and what increases their probability of failure, need to be observed. Thus Ika (2009) summarise the most important CSFs for IT project management.

Han and Huang (2007) focused on creating a model of critical success factors for software projects in India with the purpose of developing a conceptual model of CSFs for software development project that provide broad categories of success factors.

Fayaza, Kamalb, Amina, and Khana (2017) determine critical success factors of IT projects in Pakistan using an investigated survey that resulted in 15 CSFs for the successful management of project in that country. Table 4 compare IT critical success factors across 4 countries.

*Table 4 Critical Success Factors for IT Projects grouped by country*

<i>Critical Success Factors</i>	<i>Country</i>			
	<i>Brazil (Ramos &amp; Mota, 2014)</i>	<i>India (Sudhakar, 2012)</i>	<i>Turkey (Tuzcu &amp; Estoglu, 2011)</i>	<i>Pakistan (Fayaz, et al., 2017)</i>
<i>Client Involvement</i>	✓	✓		✓
<i>Communication</i>	✓	✓		✓
<i>Schedule</i>	✓		✓	✓
<i>Teamwork</i>	✓	✓	✓	✓
<i>Planning</i>	✓		✓	
<i>Cost</i>	✓	✓		✓
<i>Scope</i>	✓		✓	✓
<i>Technical Skills</i>		✓		✓
<i>Troubleshooting</i>		✓		
<i>Top Management support</i>		✓	✓	✓
<i>Realistic Expectations</i>		✓		✓
<i>Project Management experience</i>			✓	✓
<i>Risk Management</i>	✓		✓	✓

## **RESEARCH METHODS**

Since the aim of the study was to investigate the “what” issue of CSFs for IT projects in South Africa, the research followed a quantitative approach, using survey designs with questionnaires as a means of data collection. The questionnaire was made up of 3 sections: (I) Respondent Details, (II) About the Projects and (III) Critical Success Factors for IT Projects in South Africa. The questionnaires were used to determine what Critical Success Factors should be

considered in ensuring the success of IT projects in South Africa. In order to ensure the main research question the following sub-questions were addressed:

- What makes South Africa project environment different from other environments?
- What are the problems and challenges that South African organisations face in managing their IT projects?
- What do IT project managers consider to be critical success factors for IT projects in South Africa?

These questionnaires were sent out electronically by means of email to individuals of different professions within the IT industry, but specifically those involved in projects on their typical work day. Participants were selected using probabilistic sampling strategy as the researcher intended to generalise the results to the entire context of IT projects in South Africa.

Throughout the duration of the research, the researcher aimed to be independent in other words an outsider and the researcher aimed to predict and explain by generalising to an entire population of IT projects in South Africa from carefully selected samples.

## RESULTS AND DISCUSSION

### 3.2 Experience versus Critical Success Factors Awareness

Figure 2 below shows that the more years' experience one has in IT projects in South Africa, the more aware they become of the importance of critical success factors. This means that the more one works with IT projects, the more aware they are of the importance of critical success factors in the management and implementation of their IT projects.

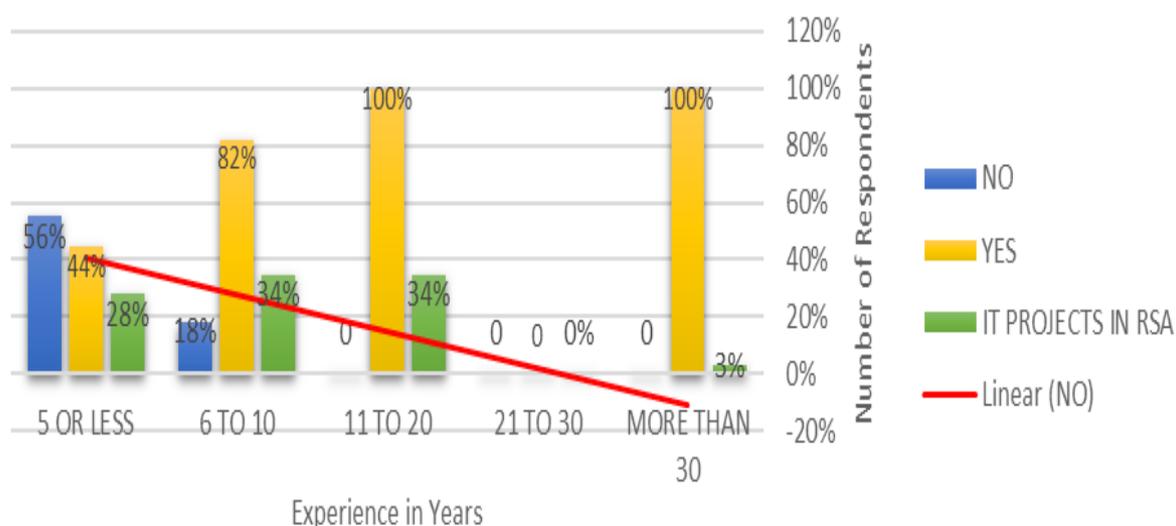


Figure 2: Experience vs Awareness

This result supports the theory of continuous learning beyond the school environment and further into their jobs. It is also evidently important that project

managers and the organisation executives to make that learning within their organisations possible. Offering training and encouraging participation in communities of practice, are some of the ways in which continuous learning can be facilitated.

### 3.3 The South African Environment

Figure 3 below illustrates that political, legal, economic and corruption factors are at the top of the factors that make the South African project environment different from other project environments. The researcher can therefore deduce that the South African project environment is influenced by its politics, laws and regulations, and its economy.

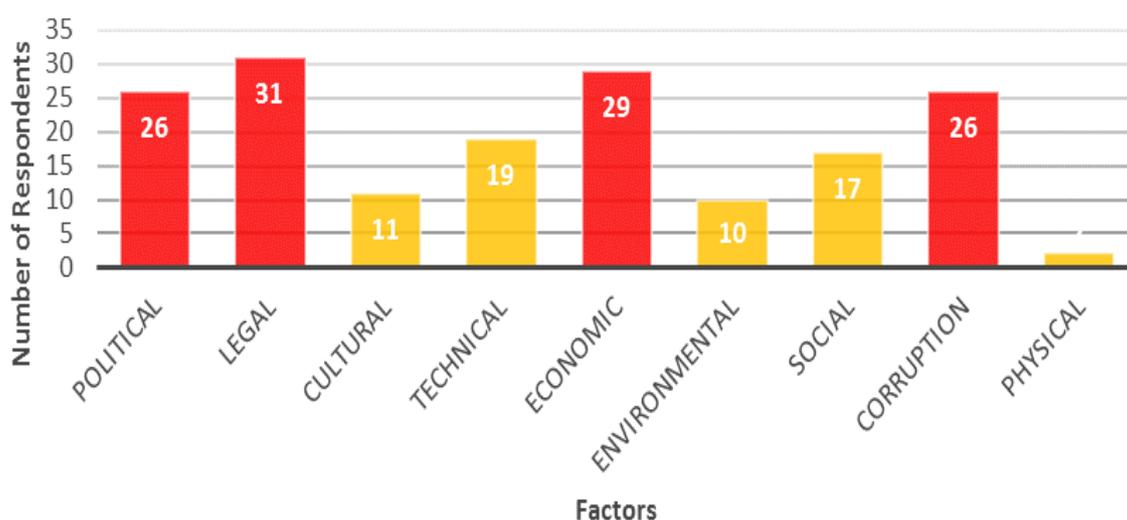
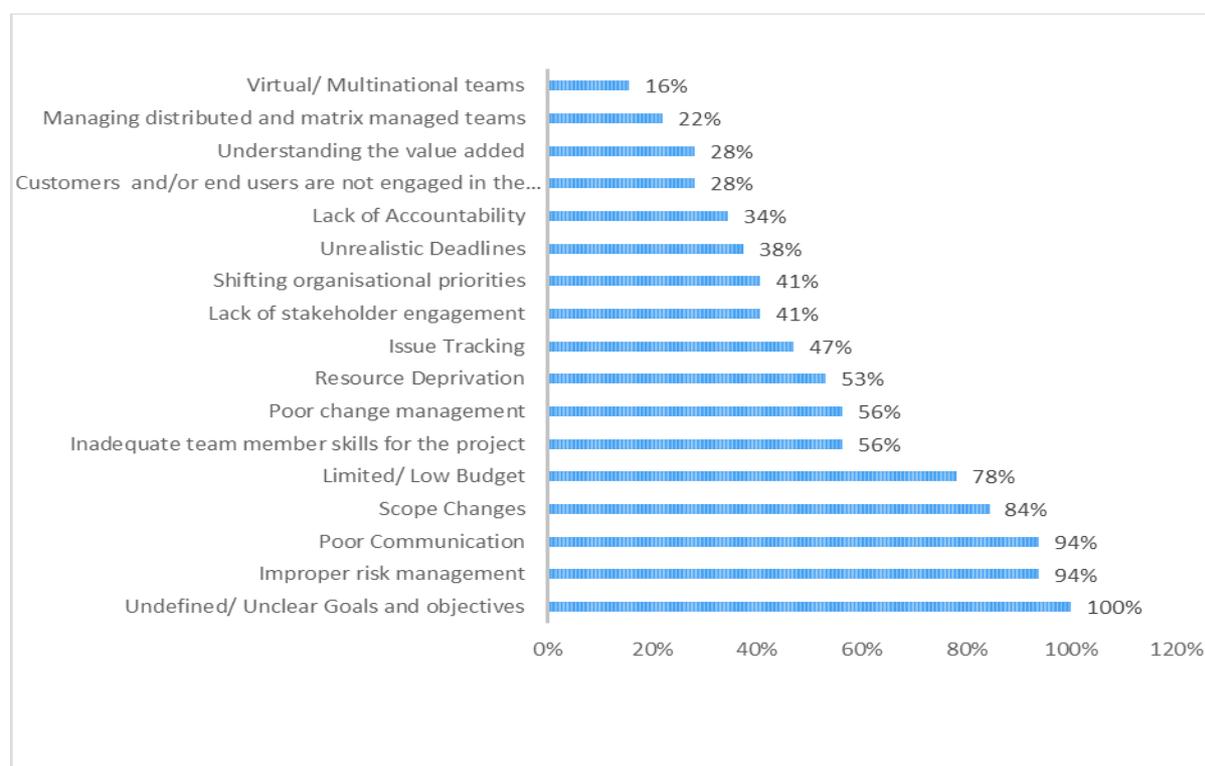


Figure 3: South African Environment

The rise and fall of governments is usually influenced by their economic performance while continued corruptions can have a negative impact on economic growth. This explains the closeness of these four factors and further research would need to be conducted on how and why exactly they play a major role in the context of South Africa.

### 3.4 South African IT Project Environment Challenges

South African organisations make use of IT operations that are made up of complex and multifaceted business processes. These operations can be anything ranging from help desks and troubleshooting response, to managing a portfolio of IT projects. Ensuring that these projects run efficiently and effectively, requires significant coordination and communication. Project management practices have drastically evolved over the years to help deal with project challenges, however managers and project team members are still facing challenges in ensuring that their IT operations runs smoothly. The researcher participants identified the following challenges depicted in figure 4 that are mostly faced by the South African IT projects environment:



*Figure 4: Project challenges*

Failing to address these challenges has the potential to affect an organisation's IT operations and as a result, lead to increased: (I) operation and development costs, (II) service and product delivery delays (III) the failure to respond to changing business conditions and demands (Sullivan, 2013). The implementation of CSFs can help to address these challenges.

### **3.6 Critical Success Factors for IT projects in South Africa**

When considering CSFs, it is necessary to look at the wider project environment, and all factors from the surrounding environments external to the organisation where the project is implemented (Todorovic et al, 2014). In this study, the research identified politics, laws, corruption and the economy as the external environment factors that need to be considered for implementing IT projects in South Africa.

There are various lists of CSFs, which have changed over the years. For the purpose of this study, as evident in the literature, the researcher combined those critical success factors that were commonly identified previously. The researcher then reached 44 CSFs that are found the most in previous studies. These were presented to the respondents, and in the end only 25 of those were found to be applicable in the South African context.

Within the IT Industry, there are different CSFs for different countries. This comes to show the impact that the macro environment has on an IT project that is run within it.

The percentage of projects failing in South Africa is alarming and thus something needs to be done. The project success rates in some organisations remains to be lower than that of the failed and challenged project. Should project managers and project teams apply the 25 CSFs that have been identified, they would possibly increase the rate of success for IT projects in their organisations.

*Table 5: Critical Success Factors of IT projects in South Africa*

<i>Rank</i>	<i>CSF</i>	<i>% of respondents</i>
1	<i>Project manager has good project management skills and the ability to monitor project scope, time, cost and quality.</i>	100%
2	<i>Necessary project team technical skills, expertise and knowledge</i>	100%
3	<i>Availability of resources</i>	100%
4	<i>Teamwork</i>	100%
5	<i>Strong business case in place</i>	100%
6	<i>Project team should possess both business and technical knowledge</i>	100%
7	<i>Political stability</i>	100%
8	<i>Communication</i>	100%
9	<i>Training</i>	100%
10	<i>Adequate funding until project completions</i>	100%
11	<i>Clear Requirements</i>	100%
12	<i>Project focus is on the continuous delivery of incremental business value throughout</i>	100%
13	<i>Prioritising</i>	100%
14	<i>Commitment</i>	97%
15	<i>Adaptive management style</i>	97%
16	<i>Schedule is detailed and realistic</i>	97%
17	<i>Project team, users and project customers are co-located and have easy and regular access to one another.</i>	94%
18	<i>Manager appreciating different viewpoints</i>	94%
19	<i>Adequate Testing</i>	94%
20	<i>Project manager and project team resource authority</i>	94%
21	<i>Clearly stated and measurable project goals and objectives.</i>	91%
22	<i>Effective Monitoring throughout the implementation lifecycle</i>	88%
23	<i>Effective change management</i>	81%
24	<i>Project Team motivation</i>	78%
25	<i>Smaller project milestones</i>	53%

**Table Notes**

CSF = Critical Success Factors

Rank = Position in Ranking

% of Respondents = The percentage of Respondents that chose that specific CSF

The table above is the list of CSFs for IT projects in South Africa. They are ranked according to the percentage of respondents that chose each specific CSF.

## **CONCLUSIONS**

Organisations are making use of IT for the implementation of their strategies and the running of their business operations. IT has advanced from an era of a support function, to an era of IT enabled business change.

Different Industries deal with different types of projects in term of size, client, complexity and many other characteristics, hence the different models and CSFs for different environments. CSFs have been identified for different countries and different industries, however none yet for IT projects in South Africa. This research sought to identify critical success factor for IT projects in South Africa.

The research has contributed to the IT project management literature by examining critical success factors of IT projects and identifying 25 factors applicable in the context of South Africa. Project environments differ, especially from one country to another. It has also emerged that politics, legalities, the state of the economy and corruption are making the South African project environment different from other environments.

The rise and fall of government is usually influenced by its economic performance while continued corruption can have a negative impact on economic growth. This explains the closeness of these four factors.

Further research would need to be conducted on how the factors that play a major role in the context of South Africa should be dealt with to create a conducive environment for successful project management results. Secondly the uniqueness of critical success factors does not only apply to the environment, but it also applies to the type of project being managed. It is therefore our recommendation that the methodology used in this study be applied to more specific IT areas in South Africa, for example software development, so that more influential and factors that have a great impact on specific IT projects can be uncovered in order to improve the IT industry in South Africa

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