

The effect of information technology governance on successful project management in public agencies: A case of Tanzania Ports Authority (TPA)

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ABSTRACT

The study examined the effect of Information Technology (IT) governance on successful project management at Tanzania Ports Authority (TPA). This study was guided by the IT governance framework but also looked at the project management theory. The study was cross-sectional and was conducted at Tanzania Ports Authority. The population of the study was workers and leaders of the Tanzania Ports Authority. The sample size of the study was 95 respondents who were found randomly and purposively. Primary data were collected using questionnaires and interviews. Data analysis was done using the Statistical Package for Social Sciences (SPSS) and thematic analysis. The findings showed that IT governance practices are aligned with strategic objectives; however, financial and human resources are not allocated to IT projects based on their strategic importance. The study also found that risk management mechanisms in IT projects at Tanzania Ports Authority are effective. It was also found that organizational silos, risk-averse culture, insufficient funding, and digital skills gaps are some of the challenges facing TPA in implementing IT governance frameworks. Therefore, it is recommended that TPA should adopt a structured approach to allocate financial and human resources based on the strategic value of IT projects. It is also recommended that a dedicated IT budgeting process should be established to ensure that high-priority IT projects receive adequate funding. It is recommended that TPA should strengthen its cybersecurity framework by implementing advanced security protocols, regular vulnerability assessments, and employee cybersecurity awareness programs to address emerging threats.

Keywords: Information Technology Governance, Project Management, Public Agencies, Tanzania Ports Authority

I. INTRODUCTION

Not only in public agencies, the growth of information technology in governance matters cut across the globe, as far as the project management is concerned. All the organizations in public agencies apply Information Technology (IT) governance in the management of projects simply because it enables to easily track the achievement on the strategic objectives in alignment with the goals of the organization. Weill and Ross (2021) defined information technology governance as whole the processes, all the structures, as well as all the mechanisms which guide the utilization of IT resources effectively in achieving the goals of the organization.

The role that IT governance plays in project management base on giving a framework or base in which decision is made in an organization, by measuring the performance and managing risk of all the projects of an organization which are IT related (Highsmith, 2020). Public sectors have large scale and complex operations which are not easy to handle manually. The use of IT governance makes it easier for the organization to manage these large scale and complex operations of an organization in public agencies. Strategic alignment of the objectives of the organization with the IT initiatives in project management lies more on IT governance. Without IT governance it is very difficult to align the objectives of the organization with the IT initiatives (Tan et al., 2019).

In order to deliver outcomes which are measurable it is important to define roles and responsibilities, it is important to make sure that resources are efficiently allocated, it is also important to make that there is accountability, all these are enabled by IT governance (De Haes & Grembergen, 2020). So, in that matter IT governance makes sure that accountability is in place, roles and responsibilities are defined, but also resources are efficiently allocated. All the above roles are just a few roles of IT governance among many others when it comes to project management in technological way.

Furthermore, more IT governance makes it possible for the organization to easily have a follow-up on its key performance indicators (KPIs), the follow-up also on the frameworks for risk management, as well as follow-up on strategies of making sure that stakeholder is engaged, as far as quality and sustainability of the project is concerned. The utilization of IT governance simplifies the way in which risk management is handled, key performance indicators are handled, but also simplifies the way in which stakeholder is engaged in project management.

The utilization of IT governance in public agencies has played an important role in making sure that everything works well, when compared to the manual way of project management which has a number of challenges including limited resources, regulatory requirements, as well as changing technological environments. Taking for example the Tanzania Ports Authority (TPA), it has been very easy to manage projects on infrastructure, a number of them by utilizing fully IT systems in making sure that operational efficiency is in place (Musomba & Njau, 2023). IT governance has enabled TPA to align its strategic goals with these projects by reducing risks on technology adoption, resources constraints and the satisfaction of stakeholders in executing these projects. Through IT governance it has been very easy to have quick follow-up of these projects while being executed all the time (Musomba & Njau, 2023).

It has been evidenced by different scholars that public organization which has been able to apply IT governance have been getting higher achievement of the projects in most developing countries (Alotaibi et al., 2022). Through IT governance developing countries have been able to make their projects more successful. Although IT governance has a number of advantages when applied in managing projects, yet there are a number of challenges which limits its adoption. Some of the challenges that were pointed out included lack of sufficient experts in IT, lack of clear governance structures, but also resistance to change by some organization (Huang et al., 2023). Some organizations for example are not easily ready to adopt changes, moving from traditional ways of project management of modern ways of project management through IT governance.

Being the case, the Tanzania Ports Authority has no choice other than adopting more IT solutions in order to compete in ports industry. In order for TPA to make sure that it is efficient delivering services but also it must be accountable all the time (Musomba & Njau, 2023). So, the integration of more and more IT solutions is very important as far as the efficiency of TPA activities are concerned. This study therefore aims to examine the effect of IT governance on successful project management at TPA.

1.1 Statement of the Problem

Successful project management in public organizations in modern era for public organizations like the Tanzania Ports Authority depends much on IT governance use in all aspects. Despite the fact that Tanzania Ports Authority has adopted IT systems over a period of time yet there are challenges as far as the alignment of IT projects and the TPA goals in supporting strategic operations on the development of infrastructure, challenges in resource optimization, but also challenges in reducing risks. Project execution inefficiencies, insufficient number of experts, but also challenges in decision making are some of the challenges which face public agencies, TPA being one of them (Musomba & Njau, 2023).

The problem of delays in deliveries of the imports from abroad, cost overruns, as well as less performing IT projects are also major challenges that discourage stakeholders of the TPA. These challenges show that there is a gap that this study needs to address on how IT governance is aligned with the TPA project strategic goals. Although the role of IT governance is to make sure that project management is successful, yet this is not the case with the Tanzania Ports Authority because still their delays, cost overruns, but also less performing IT systems. This study addressed these gaps by examining the effect of IT governance on successful project management at TPA.

1.2 Research Objectives

- i. To what extent do IT governance practices aligned with strategic objectives of TPA
- ii. To evaluate the effectiveness of risk management mechanisms in IT projects at TPA
- iii. To identify challenges facing TPA in implementing IT governance frameworks

1.3 Research questions

- i. to what extent do IT governance practices aligned with strategic objectives of TPA?
- ii. how effective are the risk management mechanisms in IT projects at TPA?
- iii. what are the challenges facing TPA in implementing IT governance frameworks?

II. LITERATURE REVIEW

2.1 Theoretical Review

This section looked at the IT governance framework, but also looked at the project management theory.

2.1.1 IT Governance Framework

The structured approach which makes sure that IT enhances and support an organization in achieving its goals, by aligning its objectives and strategies, but at the same time making sure that risk is managed and resources are optimized is what we call IT governance. So, these frameworks under the IT governance include structures, processes, and policies through which decision making is based in an organization (Kerzner, 2020). Thus, in IT governance there must be policies in place, structures must be in place, but also processes must be in place to be accommodate in IT systems, in

order for the system to make sure that the goals of the organization are achieved, but by aligning the strategies and objectives of that organization (Huang et al.,2023).

There is a number of IT governance frameworks in place to date, some of which include the International Standards Organization (ISO) 38500, Control Objectives for Information and Related Technologies (COBIT), and Information Technology Infrastructure Library (ITIL). Each of these has its own procedures to follow when an organization needs aligning its strategies and its objectives in a given project. The COBIT, for example, is more applicable in aligning strategies and objectives, it helps in risk management, but also more applicable in IT resource optimization, but also in all being specified in delivering goals of an organization. If not adopted yet, the TPA can adopt COBIT in order to help it align its objectives with strategies in order to achieve TPA objectives in port operations (Weill & Ross, 2021).

Coming to Information Technology Infrastructure Library (ITIL), being another kind of IT governance framework, also makes sure that the project is executed according to the needs of the organization, by ensuring alignment of the strategies and objectives as far as the organization goals are concerned. If not adopted yet, TPA can adopt ITIL in order the framework to help in aligning strategies with objectives of TPA by making sure that its goals are achieved. By adopting ITIL, the TPA can find itself in a better position of getting more profit in its port projects. The main base of ITIL is ensuring that from time-to-time projects are more improved to deliver more, but also to make sure that delivery of the value required is in place in public agencies (Aljitri et al.,2023).

Coming now that ISO 38500 as another kind of IT governance framework, it provides principles of IT governance which are of high level, and plays a better in making sure that senior management in an organization are in a position of oversee all its IT decisions. Through ISO 38500 the management of an organization knows all steps undertaken in IT systems from one stage to another in project management. If not adopted by TPA, the adoption of ISO 38500 by TPA will enable its top management to have a look at all procedures undertaken in project management through IT systems. ISO 38500 ensures that the projects are managed properly in regard to adherence to principles but also compliance of regulatory standards, in making sure that the expectation of the public is met (Nwachukwu & Asongu, 2019)

In actual sense the utilization of the mentioned explained IT governance frameworks by TPA will enable it in making sure that issue like delays, overruns in budget, and performance matters are in controlled easily. Furthermore, the utilization of IT governance frameworks above will also enable TPA to achieve success of the projects, but also optimization of resources such as human, technological or financial, which at the end of the day will result to achievement of the TPA mission.

2.1.2 The Project Management Theory

The project management theory provides a base for planning, organizing and executing projects, with the aim of getting results in allocated time, budget, but also by observing resources in place (PMI, 2021). In other words, the project management theory emphasizes more in making sure that the project planned in in accordance to the available resources, budget, but also adheres to the time required for the completion. In fact, it is very important to consider all these parameters when conducting a project in order to make sure that all the projects initiated are completed in time, but also with the allocated budget and resources put in place (PMI, 2021).

Project management methodologies are many; however, some of the common methodologies are Project Management Body of Knowledge (PMBOK), systems theory, as well as the Agile. All these methodologies provide a base for managing different projects. The Project Management Institute (PMI) developed PMBOK to enable project management in different organizations. In fact, PMBOK has been one of the most popular and used project management methodologies in management of projects. The PMBOK concentrates in areas like scope, cost, quality, time, and risk management, at the same time PMBOK works according to the project stages which include initiating, planning, executing, monitoring and controlling, as well as closing (PMI, 2021). All these stages of the project are followed in PMBOK when used in managing projects. So just like the case of TPA, PMBOK principles can help it in making sure that its organizational goals go hand in hand with its strategies and objectives.

On the other hand, Agile as another kind of project management methodology, helps organizations in situations where their environmental changes in deciding to be flexible in order to accommodate changes in project management. The breaking down of the projects into smaller parts that can be easily manageable by the organization helps it to cope with environmental changes and enable it to easily adjust according to the changes and being able to provide feedback quickly to stakeholder (Highsmith, 2020). Therefore, through Agile allowing flexibility can enable TPA to change according the available environment such as changes in technology, occurrence of external factors, like changes in market demands, but also changes in government regulations. So, in this way Agile can play an important role for making TPA not to get losses when there are environmental changes.

Coming now to Systems Theory, as another project management theory, it bases more in connecting all the components of the projects which include, resources, processes and people, to work as one unit. When the organization has large and complex IT projects taking the case of TPA, the use of TPA can enable the interconnection of all the

components and at the end of the day making projects more easily to be managed. So, through Systems theory organization come more informed and make decisions on what they have known already, but also the systems theory help organization to have resource optimization, at the same time ensure that the project is successful (Kerzner, 2020).

2.2 Empirical Review

2.2.1 The Extent to which IT Governance Practices are Aligned with Strategic Objectives

A study by Tan et al. (2019) studied IT governance alignment practices and the objectives of an organization. In their study objectives of the organization was the dependent variable while IT governance was the independent variable. In their study COBIT as one of the IT governance frameworks was adopted, and played role in showing the effectiveness the goals of an organization and the IT operations. Their findings indicated that better resource utilization, enhanced compliance with regulations, as well as more trust of stakeholders was engineered by adoption of IT governance frameworks in these organizations.

Another study by Sharma et al. (2019) found that the use of TOGAF framework in North America and Europe helped enterprises abroad in making the alignment between IT architecture and the objectives of the organizations via planning which is systematic, but also management of resources. However, the study also found that there are challenges in the use of TOGAF in those enterprises. These challenges included resistance to change by the management of some of the top management of these organizations but also difficult in integrating legacy systems.

Another study by Tan et al. (2019) revealed that GEIT played a good role in enabling enterprise to get optimal IT investments, furthermore enterprises were in a position to reduce risk, but also organizations were in a position to comply with requirements of both law and regulations. The study also pointed out the importance of involving stakeholders in decision making matters as well as having clear communication in all business units.

2.2.2 The Effectiveness of Risk Management Mechanisms in IT Projects

Tan et al. (2019) found that one of the reasons for the failure was exceeding their budgets (18 percentage). Furthermore, other reasons for the failure of objectives included lack of clear objectives, non-involvement of top management, but also lack of sufficient execution and control. All the above-mentioned reasons were found to be the major reasons for the failure of different IT projects globally. Alotaibi et al. (2022) found that risk management mechanisms alignment with organization strategy was very important in enhancing the effectiveness of these FinTech industries. Meaning that the alignment of risk management mechanisms with strategies of the organization was the better means or reducing risks in these FinTech industries.

2.2.3 Challenges facing Public Agencies in Implementing IT Governance Frameworks

Another study by Tan et al. (2019) found that one of the challenges facing public agencies in implementing IT governance framework is organizational silos. The study further pointed out that organizational silos do affect the IT governance frameworks implementation in a number of government agencies. The study pointed out that organizational silos result into divided strategies and decisions making processes which at the end of the day affect the speed with which an organization adopt or implement an integrated IT governance model. In other words, organizational silos not only delay decision making in initiating projects, but also results in non-completion of the projects initiated.

Huang et al. (2023) pointed out that one of the challenges facing public agencies in implementing IT governance frameworks is risk-averse culture. The study further details that resistance to change do affect organizations when in need to adopt new IT technologies in project management. In organizations there are people who are not ready for change; they always rely on the traditional methods of doing things. To such people when a new technology comes, they are not easily ready to adopt it, and as a result delaying the progress of the organization. Furthermore, the study also found that budget inefficiency also does affect the implementation of IT governance frameworks. Lack of sufficient budget allocated in IT governance frameworks to limit project management initiatives.

Another study by Sharma et al. (2019) showed that another challenge facing public agencies in implementing IT governance frameworks in their organizations are gaps in digital skills. The study further pointed that lack of digital skills affects the way in which IT governance frameworks are implemented in organization. Technical know-how is very important as far as the IT governance implementation in project management is concerned.

Another study by Techtarget (2023) found that complexities in technology, which include legacy systems, as well as integration issues, do affect the implementation of modern IT governance frameworks. For better technology implementation the IT personnel need to be more informed on how to use the available modern technology in order to apply it in managing projects, and at the end of the day projects giving out expected positive results.

III. METHODOLOGY

This study adopted cross sectional design because it is a one stop design that allows the collection of data only once from field. Furthermore, due to the time constraints in conducting this study for the award of master degree, cross sectional research design is of the best choice for the researcher. The Tanzania Ports Authority in Dar es Salaam was the base for carrying this study. Tanzania Ports Authority in Dar es Salaam is chosen due to the reason that TPA is the main government agency dealing with maritime in the country; furthermore, no similar studies have been conducted at TPA.

The population for this study included workers and the management of Tanzania Ports Authority, who are approximated to be 2000. The sample size of the study was 95 respondents, of which 80 respondents were the ordinary TPA workers while 15 respondents were the TPA top management. Both random and purposive sampling techniques were used. Specifically, purposive sampling was used in getting respondents from the top management of TPA, while random sampling was used in getting respondents from the ordinary TPA workers.

Primary data was the most important in answering the research questions in this study. Both the questionnaire and interview guide were used in data collection. Quantitative data was analysed using descriptive statistics, correlation and by regression, while qualitative data was described thematically. Thematic analysis was done by looking at the common themes from the interview conducted.

IV. FINDINGS & DISCUSSION

4.0 Summary of the section

This section presents both descriptive and inferential statistics. Under descriptive statistics, the section presents characteristics of respondents, the extent to which IT governance practices are aligned with strategic objectives of TPA, the effectiveness of risk management mechanisms in IT projects at TPA, as well as challenges facing TPA in implementing IT governance frameworks. Under inferential statistics, the section presents correlation between the variables as well as regression results.

4.1 Descriptive Statistics

4.1.1 Characteristics of Respondents

Upon doing the analysis as far as gender of respondents are concerned, the study findings revealed that 68.4 percent of the respondents were males while 31.6 percent of the respondents were females as shown in figure 1 below. The majority of the respondents for that matter were male. By having a large number of males than females in this study is a good representation because due to the nature of activities conducted at TPA require more male than female. So, for that matter it was worthwhile having a large number of males in this study to represent men.

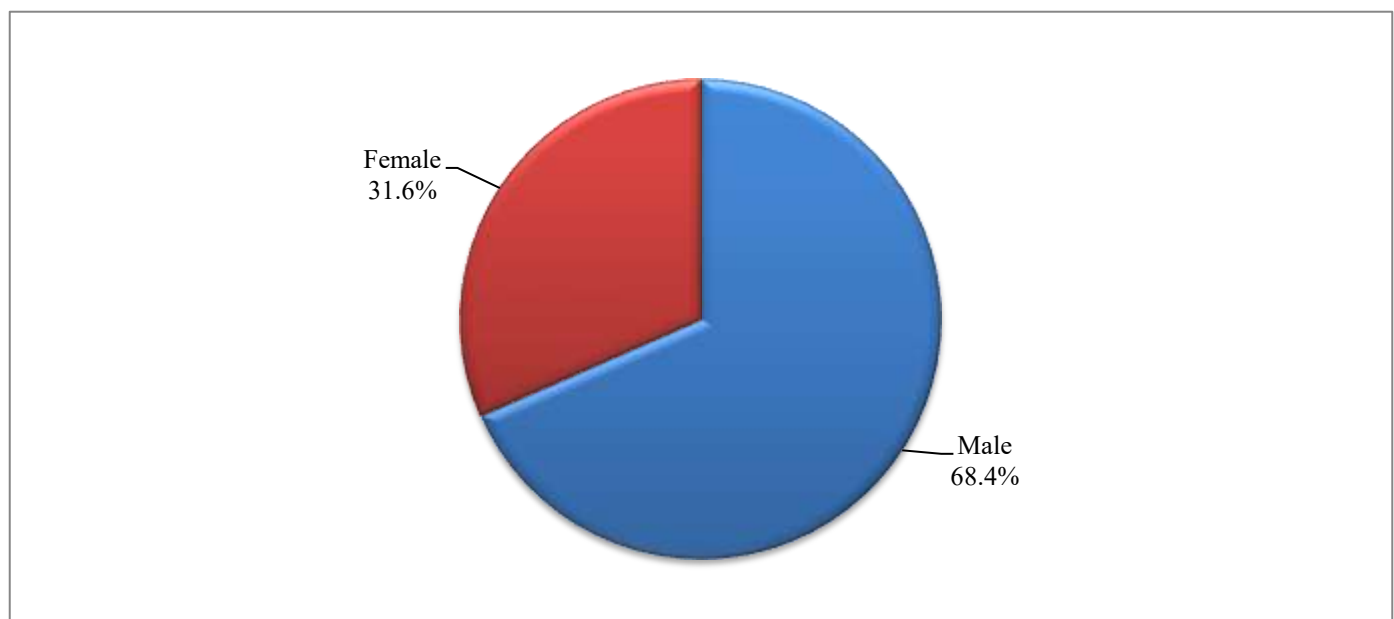


Figure 1
Gender of Respondents

When looking at the educational level of the respondents, the study findings revealed that 8.4% (8) percent of the respondents had primary education, 53.7% (51) percent of respondents had secondary education, 4.2% (4) percent of respondents had college education and 33.7% (32) percent of the respondents had university education as shown in

Figure 2 below. So according to these findings the large number of respondents had secondary education. Due to the nature of port activities, it is not surprising to find the large number of workers having the secondary education.

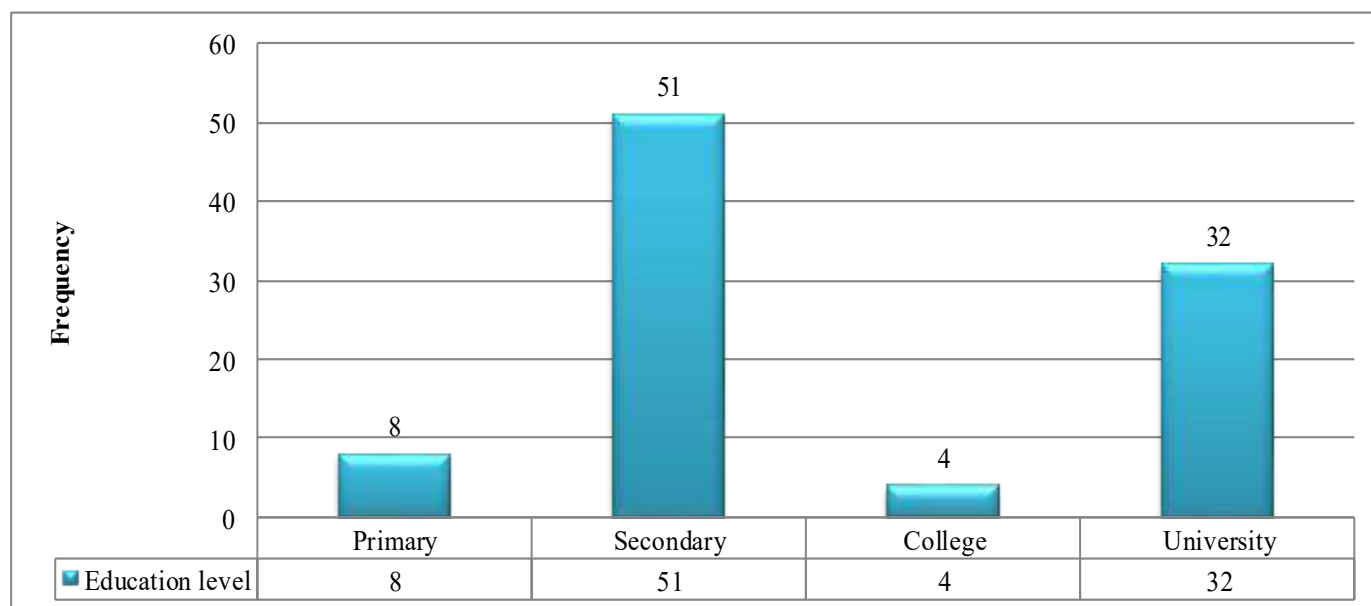


Figure 2
Education Level of Respondents

Researcher continued analyzing the marital status of respondents. Upon looking extensively on the marital status of respondents, researcher came to realize that 74.7 percent of the respondents were married, 14.7 percent of the respondents were single, and 6.3 percent of the respondents were divorced while 4.2 percent of the respondents were either widow as shown in figure 3. These findings have shown that the majority of the respondents were married. In fact, this is not surprising because these are professionals employed, they have already completed their professional studies and for that matter it is not surprising to find majority of them being married.

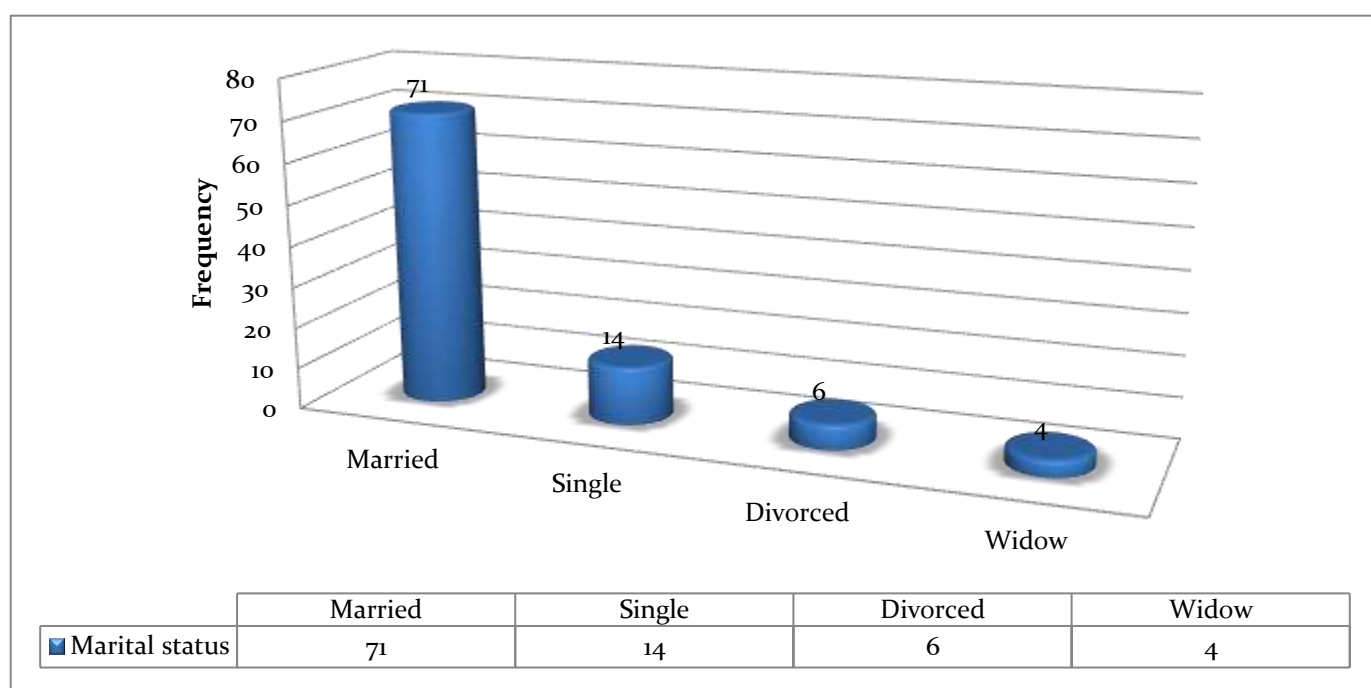


Figure 3
Marital Status of the Respondents

Understanding on the on the age of respondents as far as research is concerned is also very important. Researcher for that matter looking on how the respondents were distributed as far as their age is concerned. Findings from this

analysis evidenced that 9.5 percent of the respondents were of the age between 18 to 25 years, 10.5 percent of the respondents were of the age between 26 to 35 years, 69.5 percent of the respondents were of the age between 36 to 45 years and 10.5 percent of the respondents were of the age between 46 to 60 years as shown in figure 4. These findings inform that the majority of the respondents were aged between 36 to 45 years. When looking at these age groups it is visible that the majority of the respondents were aged between 36 to 45 years. In this manner it obvious that the information was collected from the right people as far as age of the respondents is concerned.

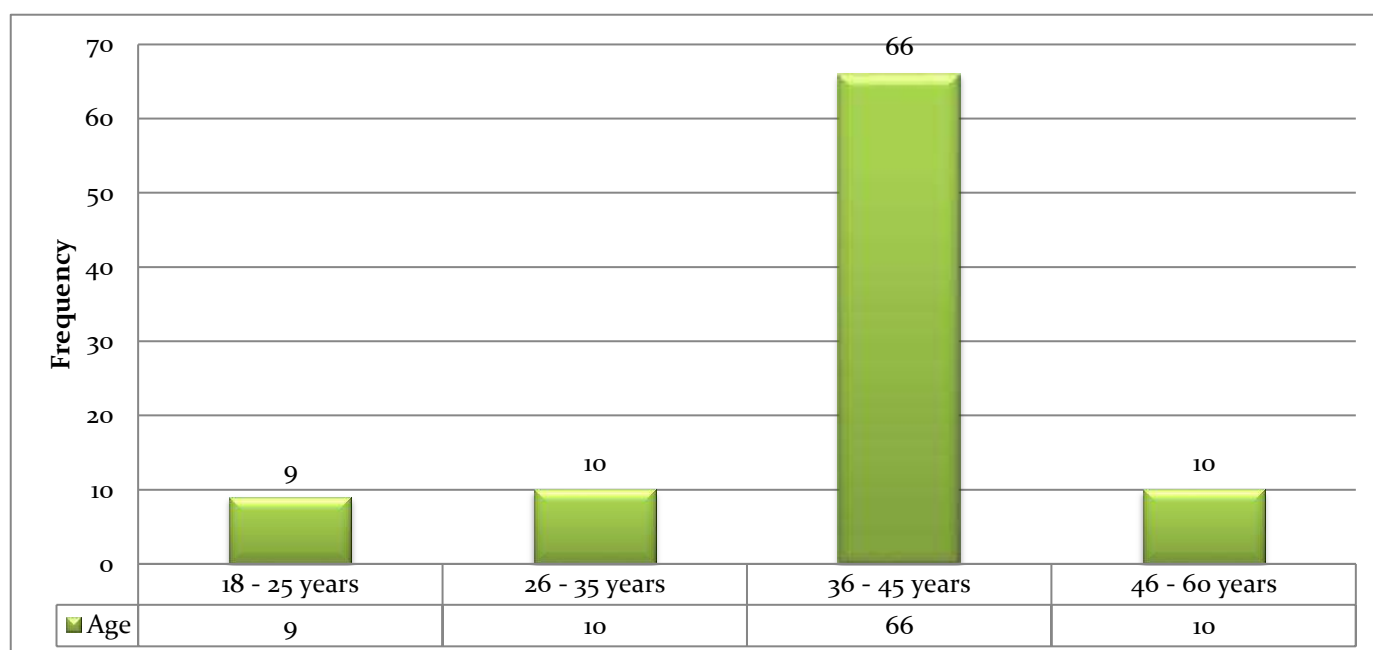


Figure 4
Age of the Respondents

The findings above in relation to gender, education level, marital status and age of the respondents have shown that respondents were distributed into various groups according to their gender, education level, their marital status as well as their age. In that matter we can be confident that the information collected was from right people as far as education level and age of the respondents is concerned.

4.1.2 The Extent to which IT Governance Practices are Aligned with Strategic Objectives at TPA

The first objective aimed to assess the extent to which IT governance practices are aligned with strategic objectives of TPA. In order to achieve this objective, researcher determined the following; first, researcher determined whether IT governance is linked to projects at TPA. Findings were as follows; 5.3 percent of respondents strongly agreed that IT governance is linked to projects at TPA, 70.5 percent of respondents agree, 9.5 percent of respondents were neutral, 8.4 percent of respondents disagreed, and 6.3 percent of respondents strongly disagreed (see Table 1). According to these findings, the majority of respondents agreed that IT governance is linked to projects at TPA.

Table 1
IT Governance is linked to Projects at TPA

Response	Frequency	Percent
Strongly agree	5	5.3
Agree	67	70.5
Neutral	9	9.5
Disagree	8	8.4
Strongly disagree	6	6.3
Total	95	100.0

Secondly, researcher determined whether TPA top management is involved in IT governance decision-making. Findings were as follows; 80.0 percent of respondents strongly agreed that TPA top management is involved in IT governance decision making, 10.5 percent of respondents agreed, and 9.5 percent of respondents were neutral (see Table 2). According to these findings, the majority of respondents agreed that TPA top management is involved in IT governance decision making.

Table 2*TPA Top Management is involved in IT Governance Decision-Making*

Response	Frequency	Percent
Strongly agree	76	80.0
Agree	10	10.5
Neutral	9	9.5
Total	95	100.0

Thirdly, researcher determined whether key performance indicators are used to measure the success of IT initiatives in achieving strategic goals. Findings were as follows; 5.3 percent of respondents strongly agreed that key performance indicators are used to measure the success of IT initiatives in achieving strategic goals, 87.4 percent of respondents agreed, and 7.4 percent of respondents were neutral (see Table 3). According to these findings, the majority of respondents agreed that key performance indicators are used to measure the success of IT initiatives in achieving strategic goals.

Table 3*Key Performance Indicators are used to Measure the Success of IT Initiatives in Achieving Strategic Goals*

Response	Frequency	Percent
Strongly agree	5	5.3
Agree	83	87.4
Neutral	7	7.4
Total	95	100.0

Fourthly, researcher determined whether financial and human resources are allocated to IT projects based on their strategic importance. Findings were as follows; 5.3 percent of respondents strongly agreed that financial and human resources are allocated to IT projects based on their strategic importance, 11.6 percent of respondents agreed, 4.2 percent of respondents were neutral, and 78.9 percent of respondents disagreed (see Table 4). According to these findings, the majority of respondents disagreed on the fact that financial and human resources are allocated to IT projects based on their strategic importance.

Table 4*Financial and Human Resources are Allocated to IT Projects Based on their Strategic Importance*

Response	Frequency	Percent
Strongly agree	5	5.3
Agree	11	11.6
Neutral	4	4.2
Disagree	75	78.9
Total	95	100.0

The interview with some of the respondents also revealed that IT governance practices are aligned to a great extent. This was as quoted below;

“...of course, TPA is doing a lot in aligning IT governance practices with strategic objectives. Here at TPA for example we are using key performance indicators in measuring the success of IT initiatives in achieving strategic goals...”

The first objective as mentioned earlier assessed the extent to which IT governance practices are aligned with strategic objectives at TPA. In order to attain this objective researcher checked whether IT governance is linked to projects at TPA, whether TPA top management is involved in IT governance decision making, whether KPIs are used to measure the success of IT initiatives in achieving strategic goals, and whether financial and human resources are allocated to IT projects based on their strategic importance. Findings as showed above showed that IT governance is linked to projects; TPA top management is involved in IT governance decision making. Furthermore, KPIs are used to measure the success of IT initiatives in achieving strategic goals, however the study found that financial and human resources are not allocated to IT projects based on their strategic importance. Following the findings above we can state that IT governance practices are aligned with strategic objectives to a large extent although financial and human resources are not allocated to IT projects based on their strategic importance. The findings to this study are similar to those by Alotaibi et al. (2022) who studied IT governance alignment practices and the objectives of an organization. In their study objectives of the organization was the dependent variable while IT governance was the independent variable.

In their study COBIT as one of the IT governance frameworks was adopted, and played role in showing the effectiveness the goals of an organization and the IT operations. Their findings indicated that better resource utilization, enhanced compliance with regulations, as well as more trust of stakeholders was engineered by adoption of IT governance frameworks in these organizations.

4.1.3 The Effectiveness of risk Management Mechanisms in IT Projects at TPA

The second objective aimed to evaluate the effectiveness of risk management mechanisms in IT projects of TPA. In order to achieve this objective, researcher determined the following; first, researcher determined whether there is adequacy and clarity of mitigation strategies for identified risks. Findings were as follows; 83.2 percent of respondents strongly agreed that there is adequacy and clarity of mitigation strategies for identified risks, 13.7 percent of respondents were neutral on this issue, while 3.2 percent of respondents disagreed on the adequacy and clarity of mitigation strategies for identified risks (see Table 5). According to these findings the majority strongly agreed on the adequacy and clarity of mitigation strategies for identified risks.

Table 5

There is Adequacy and Clarity of Mitigation Strategies for Identified Risks

Response	Frequency	Percent
Strongly agree	79	83.2
Neutral	13	13.7
Disagree	3	3.2
Total	95	100.0

Secondly, researcher wanted to know how TPA identifies risks during the planning and execution phase. Using the information obtained from open ended questionnaires, the study found that TPA identifies risk during both the planning and execution phases through a structured and proactive approach. In the planning phase, TPA conducts environmental and feasibility studies to assess potential environmental, social, and economic risks associated with port expansion and infrastructure projects. Additionally, stakeholder consultants with government agencies, logistics companies, and local communities help identify regulatory and operational risks. TPA also reviews historical data to analyse past challenges, such as delays, security issues, and financial mismanagement, allowing for better risk anticipation. Furthermore, regulatory and compliance assessments ensure that all projects align with national laws and international maritime standards, reducing the likelihood of legal complications.

During the execution phase, TPA continuously monitors risks using real-time monitoring systems to track cargo movement, security threats, and operational bottlenecks. Regular risk audits and inspections help detect emerging risks, such as infrastructure failures, theft, or cyber threats. Additionally, incident reporting mechanisms encourage staff and stakeholder to report operational disruptions, enabling quick response and mitigation. TPA also has crisis and contingency planning strategies in place to manage unexpected risks like natural disasters, labour strikes, or global supply chain disruptions. This is as quoted below from the open-ended questionnaire;

“...at TPA risks during planning and execution phase are identified using by carrying out environmental and feasibility studies, by consulting stakeholders, by reviewing historical data, by regulatory and compliance assessments, using real-time monitoring systems, by carrying regular risks audits and inspections, by using incident reporting mechanisms, but also using crisis and contingency planning strategies...”

Thirdly, researcher wanted to know the methodologies used by TPA for risk analysis (whether qualitative or quantitative). Findings revealed that TPA employs both qualitative and quantitative methodologies for risk analysis to ensure a comprehensive assessment of potential threats. In qualitative risk analysis, TPA relies on expert judgment, historical data, and stakeholder input to assess risks based on their likelihood and impact. This includes risk identification, workshops, where experts, employees, and stakeholders collaborate to identify potential risks through brainstorming sessions. Additionally, TPA uses risk matrices and categorization to rank risks from low to high, allowing for better prioritization. Another key method is scenario analysis, where different risk scenarios, such as supply chain disruptions or security breaches, are evaluated to develop mitigation strategies. Strategic tools like SWOT (Strengths, Weaknesses, Opportunities, and Threats) and PESTEL (Political, Economic, Social, Technological, Environmental, and Legal) analysis further help in identifying external and internal risks that may impact port operations.

On the side TPA also uses quantitative risk analysis to measure risks using numerical values and statistical models. Probability and impact analysis allows TPA to calculate the likelihood of risks occurring and their potential financial or operational consequences. Advanced techniques like Monte Carlo simulation help TPA to predict different risk scenarios and their likelihood, particularly for financial and operational risks. Cost-benefit analysis also is employed by TPA to evaluate the feasibility of risk mitigation strategies by comparing the costs of prevention against potential

losses. Furthermore, TPA uses Key Performance Indicators (KPIs) and data analytics are used to monitor port performance, security breaches, and cargo handling efficiency, enabling early detection of emerging risks. This was as quoted from the answers from one of the open-ended questionnaires;

“...at TPA we are using both qualitative and quantitative approaches for risk analysis. Some of the qualitative methods we use include, risk identification workshop, where experts, employees, and stakeholders cooperate together in identifying risks. Another qualitative approach used in risk matrices and categorization, scenario analysis as well as SWOT and PESTEL analysis. On the quantitative methods, TPA uses probability and impact analysis, Monte Carlo simulation, cost-benefit analysis as well as use of KPIs...”

Fourthly, researcher wanted to know whether prioritization of risks aligns with projects objectives. Findings revealed that at TPA prioritization of risks aligns with project objectives. This is due to the fact that TPA ensures that risk prioritization aligns with its projects by using a structured approach that balances operational efficiency, financial sustainability, and regulatory compliance. TPA categorizes and addresses risks based on their potential impact on on-going and future projects. TPA ranks risks based on severity, likelihood, and project relevance. This was as quoted below from open-ended questionnaire responses;

“...yes, at TPA prioritization of risks aligns with project objectives. Lower-priority risks, such as minor procedural inefficiencies are managed through long-term improvement strategies. High-impact risks such as infrastructure failures, security threats, and regulatory non-compliance, receive immediate attention because they can significantly disrupt port operation...”

The second objective of the study evaluated the effectiveness of risk management mechanisms in IT projects at TPA. In order to achieve this objective researcher determined whether there is adequacy and clarity of mitigation strategies for identified risks. The study also determined how TPA identifies risks during the planning and execution phase. The study also determined methodologies used by TPA for risks analysis, and finally researcher determined whether prioritization of risks aligns with projects objectives. Findings as stated above showed that there is adequacy and clarity of mitigation strategies for identified risks. The study also found that TPA identifies risks during the planning and execution phase by carrying out environmental and feasibility studies, by consulting stakeholders, by reviewing historical data, by regulatory and compliance assessments, using real-time monitoring systems, by carrying regular risks audits and inspections, by using incident reporting mechanisms, but also using crisis and contingency planning strategies. The study also found that TPA uses both qualitative and quantitative approaches for risks analysis, and lastly the study found that at TPA prioritization of risks aligns with projects objectives. Following those findings above, we can state that risk management mechanism in IT projects at TPA are effective. The finding to this study are similar to those by Kerzner (2020) studied the causes of projects which fail and looked at the reasons on the failure of those projects. A total of 4,600 IT projects were surveyed throughout the globe. The study found that one of the reasons for the failure was exceeding their budgets (18 percentage). Furthermore, other reasons for the failure of objectives included lack of clear objectives, non-involvement of top management, but also lack of sufficient execution and control. All the above-mentioned reasons were found to be the major reasons for the failure of different IT projects globally.

4.1.4 Challenges Facing TPA in Implementing IT Governance Frameworks

The third objective aimed to identify challenges facing TPA in implementing IT governance frameworks. In order to achieve this objective, researcher determined the following; first, researcher determined whether organizational silos are one of the challenges facing TPA in implementing IT governance framework. Findings were as follows; 86.3 percent of respondents strongly agreed that organizational silos are one of the challenges facing TPA in implementing IT governance framework, 8.4 percent of respondent agreed, and 5.3 percent of respondents were neutral (see Table 6). According to the findings by the majority organizational silos are one of the challenges facing TPA in implementing IT governance framework.

Table 6

Organizational Silos is one of the Challenges Facing TPA in Implementing IT Governance Frameworks

Response	Frequency	Percent
Strongly agree	82	86.3
Agree	8	8.4
Neutral	5	5.3
Total	95	100.0

Secondly, researcher determined whether risk-averse culture is one of the challenges facing TPA in implementing IT governance framework. Findings were as follows; 80.0 percent of respondents strongly agreed that risk-averse culture is one of the challenges facing TPA in implementing IT governance framework, 4.2 percent of

respondent agreed, and 15.8 percent of respondents were neutral (see Table 7). According to the findings by the majority risk-averse culture is one of the challenges facing TPA in implementing IT governance framework.

Table 7

Risk-averse culture is one of challenges facing TPA in implementing IT governance frameworks

Response	Frequency	Percent
Strongly agree	76	80.0
Agree	4	4.2
Neutral	15	15.8
Total	95	100.0

Thirdly, researcher determined whether insufficient funding is one of challenges facing TPA in implementing IT governance frameworks. Findings were as follows; 86.3 percent of respondents strongly agreed that insufficient funding is one of the challenges facing TPA in implementing IT governance framework, 7.4 percent of respondent agreed, and 6.3 percent of respondents were neutral (see Table 8). According to the findings by the majority insufficient funding is one of the challenges facing TPA in implementing IT governance framework.

Table 8

Insufficient Funding is one of Challenges Facing TPA in Implementing IT Governance Frameworks

Response	Frequency	Percent
Strongly agree	82	86.3
Agree	7	7.4
Neutral	6	6.3
Total	95	100.0

Fourthly, researcher determined whether digital skills gap is one of challenges facing TPA in implementing IT governance frameworks. Findings were as follows; 8.4 percent of respondents strongly agreed that digital skills gap is one of the challenges facing TPA in implementing IT governance framework, 68.4 percent of respondent agreed, and 23.2 percent of respondents were neutral (see Table 9). According to the findings by the majority digital skills gap is one of the challenges facing TPA in implementing IT governance framework.

Table 9

Digital Skills Gap is one of Challenges Facing TPA in Implementing IT Governance Frameworks

Response	Frequency	Percent
Strongly agree	8	8.4
Agree	65	68.4
Neutral	22	23.2
Total	95	100.0

The interview with some respondents also pointed out that organizational silos, risk-averse culture, insufficient funding, and digital skills gap are some of the challenges facing maritime industry in implementing IT governance frameworks. This was as quoted below;

“... in fact, in any organization there are challenges, we are doing our level best but yet challenges like organizational silos, risk-averse culture, insufficient funding, and digital skills gap are some of the few challenges encountering TPA to date...”

The third objective determined challenges facing TPA in implementing IT governance frameworks. In order to achieve this objective researcher determined whether organizational silos, risk-averse culture, insufficient funding, and digital skills gap are challenges facing TPA in implementing IT governance frameworks. The study found that organizational silos, risk-averse culture, insufficient funding, and digital skills gap are some of the challenges facing TPA in implementing IT governance frameworks. The findings to this study are similar to finding by Sharma et al. (2019) pointed out that one of the challenges facing public agencies in implementing IT governance frameworks is risk-averse culture. The study further details that resistance to change do affect organizations when in need to adopt new IT technologies in project management. In organizations there are people who are not ready for change; they always rely on the traditional methods of doing things. To such people when a new technology comes, they are not easily ready to adopt it, and as a result delaying the progress of the organization. Furthermore, the study also found that budget inefficiency also does affect the implementation of IT governance frameworks. Lack of sufficient budget allocated in IT governance frameworks to limit project management initiatives.

4.2 Inferential Statistics

The multiple linear regression equation was used in this study to determine the relationship between successful project management which was the dependent and the IT governance alignment, risk management mechanisms, and challenges facing TPA which were the independent variables.

$$SP = \beta_0 + \beta_1 IG + \beta_2 RM + \beta_3 CT + \varepsilon_0 \dots \dots \dots (i)$$

Where:

SP = Successful project management

IG = IT governance alignment

RM = Risk management mechanisms

CT = Challenges facing TPA

β_0 = Constant

β_i = Coefficient of variables

ε_0 = Error term

4.2.1 Correlation between the Variables

Researcher also carried out a correlation analysis between the variables. The correlations' coefficients in table 10 revealed that IT governance alignment is positively associated with successful project management ($r = 0.5438$, $p < 0.05$). This finding agrees with a study by Alotaibi et al. (2022) who also found a positive relationship between IT governance alignment and successful project management. The correlations coefficients in table 4.10 revealed that risk management mechanisms is positively associated with successful project management ($r = 0.4355$, $p < 0.04$). This finding is supported by a study by Nwachukwu & Asongu (2019) who also found a positive relationship between risk management mechanisms and the successful project management.

The correlations coefficients in table 10 revealed that challenges facing TPA is negatively associated with successful project management ($r = -0.8349$, $p < 0.00$). This finding is supported by a study by Tan et al. (2019) who also found a negative relationship between challenges facing port authorities and successful project management.

Table 10

Correlations between Variables

	Successful project management	IT governance alignment	Risk management mechanisms	Challenges facing TPA
Successful project management	1.0000			
IT governance alignment	0.5438	1.0000		
Risk management mechanisms	0.4355	0.7899	1.0000	
Challenges facing TPA	-0.8349	-0.5382	-0.4532	1.0000

4.2.2 Regression Results

The study carried out linear regression based on Ordinary Least Squares (OLS) in order to determine how successful project management as the dependent variable was related to IT governance alignment, risk management mechanisms, and challenges facing TPA, which were the independent variables. After running the linear regression (ordinary least squares) the variables were tested for multicollinearity. The mean Variance Inflation Factor (VIF) was found to be 2.42 (see Table 11a). If mean VIF is greater than 10 there is a problem of multicollinearity. In this case the variables in this regression had no problem of multicollinearity.

The coefficient for IT governance alignment was found to be 0.1973 (See Table 11). This coefficient was statistically significant at 1 percent level of significance. Meaning that for a unit increase in IT governance alignment there was 0.1973 units increase in successful project management. That is to say, more IT governance alignment increases successful project management. On other hand the study has found that for IT governance alignment resulted into successful project management at TPA. These findings are similar to those by Techtarget (2023). They also found a positive relationship between IT governance alignment and the successful project management.

The coefficient for risk management mechanisms was found to be 0.0282 (See Table 11). This coefficient was statistically significant at 5 percent level of significance. Meaning that for a unit increase in the effectiveness of risk management mechanisms there was 0.0282 units increase in successful project management. That is to say, more effective risk management mechanisms increase successful project management. On other hand the study has found that for effective risk management mechanisms resulted into successful project management at TPA. These findings are similar to those by Sharma et al. (2019). They also found a positive relationship between IT governance alignment and the successful project management.

The coefficient for challenges facing TPA was found to be -0.7304 (See Table 11). This coefficient was statistically significant at 10 percent level of significance. Meaning that for a unit increase in challenges facing TPA there was -0.7304 units decrease in successful project management. That is to say, more challenges facing TPA decreases successful project management. On other hand the study has found that in order to realize success in project management, challenges facing TPA should be reduced if not eliminated. These findings are similar to those by Techtarget (2023). They also found a negative relationship between challenges facing TPA and the successful project management.

Table 11*Linear Regression Results*

Dependent variable: Successful project management			
Variable	Coeff	Std. error	Sig
IT governance alignment	0.1973***	0.1169	0.000
Risk management mech	0.0282**	0.1452	0.046
Challenges facing TPA	-0.7304*	0.0664	0.095
Constant	0.0670	0.2626	0.799
Number of Obs. = 95	Prob> F = 0.0000	R ² = 0.8131	Adj. R ² = 0.7993

Legend: * = $P < 0.1$, ** = $P < 0.05$, *** = $P < 0.01$

Table 11a*Multicollinearity Test*

Variable	VIF	Tolerance
IT governance alignment	3.00	0.333120
Risk management mech	2.83	0.352873
Challenges facing TPA	1.42	0.704353
Mean VIF	2.42	

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The findings indicate that while IT governance practices at the Tanzania Ports Authority are aligned with strategic objectives, there is a disconnection between strategic importance and the allocation of financial and human resources for IT projects. This misalignment can hinder the successful implementation of critical IT initiatives, leading to inefficiencies, delays, and missed opportunities for technological advancement. Without proper resource allocation, even well-governed IT projects may fail to deliver the intended benefits, ultimately impacting the overall effectiveness of port operations and strategic growth.

The finding that risk management mechanisms in IT projects at TPA are effective suggests that TPA has established robust processes to identify, assess, and mitigate risks in its IT initiatives. This indicates a proactive approach to managing potential threats, ensuring that IT projects remain secure, efficient, and aligned with organizational objectives. However, while effectiveness is acknowledged, continuous improvement is necessary to adapt to evolving IT risks, such as cyber security threats, technological failures, and project delays. Maintaining this effectiveness requires ongoing evaluation, investment, and strategic adjustments.

The finding highlights significant challenges that hinder the effective implementation of IT governance frameworks at the TPA. Organizational silos limit collaboration and information sharing, leading to inefficiencies in IT governance. A risk-averse culture slows down digital transformation as employees and leadership may resist adopting new technologies. Additionally, insufficient funding restricts the implementation of necessary IT projects, while the digital skills gap prevents employees from effectively utilizing and managing IT systems. These challenges collectively weaken IT governance, reducing TPA's ability to fully leverage technology for operational efficiency and strategic growth.

5.2 Recommendations

It is recommended that TPA should adopt a structured approach to allocate financial and human resources based on the strategic value of IT projects. This can be achieved by implementing a prioritization model that evaluates projects based on their contribution to efficiency, security, and long-term sustainability. It is also recommended that a dedicated IT budgeting process should be established to ensure that high-priority IT projects receive adequate funding. It is also recommended that TPA should invest in IT skills development programs, including staff training, recruitment of specialized personnel, and collaboration with external IT experts.

It is recommended that TPA should strengthen its cyber security framework by implementing advanced security protocols, regular vulnerability assessments, and employee cyber security awareness programs to address emerging threats. It is also recommended that TPA should establish a continuous monitoring and improvement cycle to ensure that risk management strategies evolve alongside technological advancements and industry best practices. It is also recommended that TPA should ensure strict adherence to national and international IT governance standards for information security and regularly review compliance policies. It is also recommended that TPA should enhance its disaster recovery and business continuity plans to ensure rapid response and minimal disruption in case of IT-related failures or security breaches.

It is recommended that TPA should promote cross-departmental collaboration by implementing integrated IT governance structures, encouraging knowledge sharing, and using digital platforms for seamless communication. It is also recommended that TPA should foster an innovation-driven mindset through leadership support, digital transformation awareness programs, and change management strategies that highlight the benefits of IT governance. It is also recommended that TPA should advocate for increased budget allocations for IT projects by demonstrating their strategic value. It is also recommended that TPA should refine its IT governance policies, align them with international best practices and establish accountability mechanisms to ensure proper implementation and monitoring.

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