Title Page

The Role of Information and Communication Technology (ICT) In Construction Project Risk Management in Jordan.

Abstract

During our investigation, we realised that the technical resources in question had been assigned to previous construction endeavours. They were making far more headway than any of the other companies in the construction industry. Lack of knowledge was the most central issue affecting their construction management, and the risk management problem could be remedied using information technology. Both of these issues were affecting the company negatively.

It is essential to beef up the information technology (IT) infrastructures of the building projects that are now being carried out in Jordan to enhance the total construction effort being put forward. The Kingdom of Jordan is currently working on various building projects at different stages of completion. It is vital to implement information and communications technology (ICT) as soon as it is logistically practicable if you want your construction projects to be successful in the long term. If you do not, your projects will not be successful. Should this not be done, the project's success might be jeopardised. They have to get on board with information and communication technology as soon as they possibly can since doing so provide them with the impetus they need to accomplish their objectives in the long term. Because heavy equipment, which is often employed in building projects, is directly managed with the help of information technology, every construction project is dependent on information technology.

They can save their data correctly with its assistance, and the accuracy it gives is high, which enables them to get information promptly whenever they want it. One further advantage that comes with the use of technology is that it makes it possible to carry out a rigorous monitoring of the project as a whole. According to the conclusions of many studies, those construction projects that were already well-prepared with information technology had a greater chance of success. They are advancing far further than other people who aren't equipping themselves at the same rate.

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CHAPTER ONE

Introduction

Information technology has a dynamic role because it helps to overcome the diverse types of challenges in a particular scenario, even it helps to ensure that the construction project occurs properly over a certain period. Most construction projects had equipped their project with information technology. It helps reduce their workload and enhance the productivity of the product in Jordan. Currently, the construction task is well equipped with technology because they are well aware of the importance of technology. It helps them store their data correctly, and accuracy is higher, so whenever they need data, they can get it immediately. Another aspect of technology is that they could monitor the whole project in a systematic pattern. According to studies, those construction projects had equipped themselves with information technology (Alkhlaifat 2021). They are progressing more rather than what they are not providing. The completed products are highly valued in the building and construction sector. The industry's main product is construction, and consumers decide the kind of project they want and the degree of intricacy that will be included in the design.

The fact that clients have a wide range of demands and expectations will inevitably lead to the implementation of projects that stand out for their particular characteristics. It's challenging to have two construction projects that are precisely the same since so many distinct variables are at play during the process. The task results will be directly impacted by these fundamental project elements, including the design, location, resources available, weather, and the people working on it. These elements will significantly affect how the project turns out in the end. One may argue that it is challenging to have two construction projects replicas of one another. Making the most effective use of one's skills and resources is essential for a construction firm to succeed in this line of work, given that the very nature of the construction industry makes it a challenging endeavour. When it comes to reducing the risk involved in doing business in the construction sector, making the most of organisational learning skills and using prior experience effectively are both significant advantages. This is particularly true when lowering the probability of expensive errors. ICT, or information and communication technology, can provide practical tools for implementing suitable risk management procedures. In turn, this would lead to the successful management of project risks and the execution of countermeasures to those risks. ICT is referred to as IT.

A substantial amount of information must be managed and analysed as part of the risk management process, which is constantly improving (Alyan 2022). The main objectives of risk management are the identification, appraisal (evaluation, analysis), response, and control of risks. Among the main goals of risk management are: There is also discussion of recognising threats, assessing them, and developing defences against them. The continuous use of risk management methods throughout the project would significantly benefit the team's efforts to achieve the project objectives they specified effectively. The project team has established these goals. The purpose of this study, which is a component of an ongoing research project, is to evaluate the ICT tools and approaches that may be used to control project risk and to emphasise how important they are to the process' success (Almuhaisen Habes and Alghizzawi 2020). The main goal of the research project is to highlight the role that information and communication technology (ICT) plays in effectively enabling the execution of the building risk management process. These objectives will be accomplished by emphasising this study's role in facilitating the effective implementation of the construction risk management technique. The main goal of the research project is to shed light on the role that information and communication technology plays in effectively easing the way for the construction industry to execute risk management systems correctly.

Figure 1.1 This figure directly indicates the diverse aspect of a construction project, which could be collectively covered by applying appropriate strategies and methods for success.

Since the project's participants come from very different cultural backgrounds and the construction crew comprises a highly diverse collection of people, it may be difficult for them to interact with one another and properly integrate into the workforce. If the team hopes to fulfil the objectives it has set for itself, there must be cohesion and cooperation among the individuals working on the

project. Since this is the period when it is most valuable, it is essential that there be an adequate flow of information among the workforce while the construction is being done (Çelik and Gökçekuş 2021). An enormous amount of information must be handled and consistently communicated regarding construction projects. Processing of this data is required. The kind of technical report produced and the degree of complexity connected with that report are also influenced by the amount of reporting and the intervals at which messages are generated. This is because the reporting frequency is affected by both the amount of reporting and the intervals at which reports are generated.

For this reason, creating standardised templates and a secure cloud storage solution is crucial for a project team. As a result, it will be possible for the processed information to be shared and stored in a manner that is risk-free and beneficial. To elaborate more on this subject, it should be noted that the construction process is fundamentally dynamic, and a sizable number of unanswered questions are related to the process as a whole.

The creation of control systems is crucial to assisting the construction team in managing the project successfully and ensuring that the desired outcomes are realised. The knowledge and experience of building a business are beneficial assets at the process stage known as the development of standardised management and control systems. An organisation picks up new information anytime one of its subsystems perceives it as potentially helpful to the organisation (Xu and Maitland 2019). This presumption was founded on the idea that it learns anytime one of an organisation's subsystems receives new knowledge. He went on to say that it is crucial to look at organisational learning alongside the four concepts that are intimately connected to it. This essential step, he determined, must be taken. These concepts include knowledge acquisition, information dissemination, interpretation, and organisational memory.

According to Zhang, C et al., 2022, an organisation learns anytime its subsystems acquire knowledge that it recognises as having the potential to be advantageous to the organisation. This presumption was founded on the idea that anytime one of an organisation's subsystems receives knowledge, it may learn. The premise that an organisation can improve its future performance by more effectively using the information it currently knows is the basis of the concept of "organisational learning." The underlying idea at the centre of the term "organisational learning" is this. The phrase "information and communications technology" (ICT) refers, in the conclusions

of this study project, to the tools and techniques that employ computer hardware and software to aid management and decision-making throughout the processes of building. This covers both the conceptual and practical aspects of construction. Information and communication technology could enable the collection, processing, control, sharing, storing, and access of project-related data in various ways (Anh Huy and Phuc, 2021). Constructing it in a way that allows it to handle both simple and complicated information is feasible. It is possible to do this.

On the other hand, it may be a general tool used in various projects or a specialised agency created primarily to support a specific project or activity that is a component of a project. In either case, it might be a comprehensive tool used across many projects or a specialised tool created primarily to serve a particular need. In any case, it may be seen as a resource down the road. This might happen. Despite the apparent lack of ICT in the construction industry, the industry's adoption rate of information and communications technology (ICT) has lagged behind ICT adoption rates in other sectors.

Despite this, (Utzig Mane, A.K. and Mikuła 2022) discovered that the understanding of the need to integrate ICT into building practices has grown over time. The use of information and communications technology (ICT) in the building and construction sector has also been the subject of several studies to understand the possible advantages of such usage better. The authors (Ullah Lill and Witt 2019) continued by noting that research had been carried out expressly to highlight the disconnect between ICT and the construction industry and to identify the barriers to ICT adoption in the building process. The authors' additional material referred to this. This was indicated in the authors' given extra information. The driving factors behind the adoption of ICTs within the construction industry can be summed up as follows: increasing the level of productivity in the construction processes; globalisation; and the distinctive qualities that are associated with the construction industry. Here is a summary offered by Tedesco et al. (2021), when it comes to incorporating information and communications technology, the construction sector is confronted with six main problems; these difficulties may be divided into three groups: Examples of these problems include the inability to adapt, the high cost of specialised software, the use of conventional techniques, the tendency of experts to be cautious, and the high expenses of staff training (Ali Gueyié and Okou 2021). For any project to successfully overcome these obstacles,

senior management support is needed. This support is necessary to bring about a shift in the company's culture.

According to the research that Sami et al. (2022) did and published, "Top management support and commitment" is the most crucial driver out of all the critical ICT implementation elements they have found. They came to this conclusion based on the results of the study they conducted. Senior management will need to endorse your request for information and communication technology investment. Therefore, you must provide concrete evidence that such an expenditure is feasible. It is essential to confirm that an investment in information and communications technology would be viable for a particular construction project in terms of the cost, the duration, the level of quality, or the degree of safety. To ensure that an investment in information and communications technology would be viable is required. These are the four factors that must be considered at all costs. T[he results of their investigation led (Shao Fan Huang and Chen 2022) to conclude that the construction industry's project-based structure, along with the constrained time and budgets associated with specific projects, creates barriers to adopting information and communications technology (ICT). They continued by saying that one of the circumstances under which it would not be employed was if the project team did not immediately see any advantages from adopting the ICT. Additionally, they said this was one of the circumstances in which it would not be used.

A company's internal control and audit are two examples of risk management controls, and ICT risk management is often a component of both. This managerial oversight, however, demonstrates both business and technology control, both of which are critical to catering to customer demands and keeping a firm's operations under tight regulatory supervision. Implementing business and IT controls through an organisation's processes, infrastructure, and staff (Abdul-Samad and Kulandaisamy 2022). The most vital components of risk management have been internal control and audit. When used correctly, internal audit and control can "(a) provide risk management and control advice to relevant staff across the organisation, (b) provide independent assurance to the board about the adequacy and effectiveness of key controls and other risk management activities across the organisation, and (c) act as risk and control educators across the organisation." Risks, such as those associated with doing business or using information and communications

technology, may be monitored and mitigated using internal controls and auditing procedures. In addition, they record all communications and dealings inside a company.

When a company has a system of internal control and audit, it can monitor and assess the accuracy of its accounting records. Corporate governance is responsible for performing this function. Keep in mind that if a corporation has adequate risk management practices, it is an indication of sound corporate ethics (Fannakhosrow et al., 2021). To effectively manage information and communications technology (ICT), this standard provides a framework for doing so. However, because this is a brand-new standard, there is currently no documentation detailing its implementation. As a result, this piece highlights the existing standards and other frameworks by concentrating on information and communication technology (ICT) governance, information security (IS) governance, and information security management. Due to its narrow focus, corporate governance tends to place less value on ICT risk management. Leadership is responsible for overseeing the use of information and communication technologies. The IT department's responsibility is to ensure that the company's resources are used toward productive ends. ICT risk management is a unique position of executive management in ICT governance. In particular, the ICT governance framework is linked with IS governance to provide a unified approach to ensuring the management of company assets. Control of information security (IS) focuses on leadership, organisational structures, and policies to enable an enterprise to safeguard information in universally recognised ways. Specifically, it helps with "(a) increased predictability and less uncertainty in business operations by lowering information security-related risk to a definable and acceptable level, (b) assurance of effective information security policy and policy compliance, and (c) a solid foundation for efficient and effective risk management, process improvement, and quick incident response related to securing information.

Background of the Problem

In recent years, more construction projects have been initiated due to the rising need for new homes, roads, and other infrastructure. Participating in these activities entails a significant degree of danger since it is uncertain what will occur. For projects to be completed on schedule, project managers are responsible for identifying potentially hazardous conditions and adopting realistic solutions to eliminate the related risks (Qazi et al., 2021). Due to the diversity of firms that produce significant, permanent things, building projects may be challenging at times. Consequently, it is difficult to transfer objects once they have been manufactured. A construction project may face

several obstacles, including economic, safety, legal, and managerial issues, to mention a few. Standard risk management tactics for projects have proved beneficial for preserving order in construction projects and keeping possible risks at bay to keep the project moving ahead and achieving its objectives. The risk management process consists of six steps: planning, identifying risks, performing risk assessments, devising risk solutions, and ultimately monitoring and managing the operations (Pilabré et al., 2021). Access to information is essential for systematic and proactive attempts to detect problems early and find answers promptly (Lee et al., 2016). ICT will now be used for its intended purpose. The fundamental objective of this dissertation proposal is to examine the role of information and communication technology (ICT) in risk management in Jordanian construction projects and to study how ICT impacts these risks. Integration of information and communication technology (ICT) in building and construction projects is becoming more prevalent due to the fast development of technology in this industry (Çelik and Gökçekuş 2021). It is anticipated that the construction industry will undertake risk assessments more often utilising ICT-developed project management software.

Objectives of the Study

The research will be informed by the following objectives, which include:

1) Reduce building costs in Jordan by increasing the use of ICT.
2) Enhance the overall quality of building projects using ICT.
3) Thanks to ICT, all construction projects were completed on schedule.
4) Utilising ICT to boost construction employees' productivity.

Research Questions

To ensure that the following research questions will be used as a basis for the study, the researchers will need to know how big the inquiry is about the goals.

1) How does the use of ICT make building projects in Jordan run better?
2) How do information and communication technology changes affect how well a construction project is managed?
3) How much can information and communications technology (ICT) get around the problems that traditional project risk management creates?
4) How may information and communications technology (ICT) be used to enhance construction project team performance?

Research Rationale

After considering the many factors that increase the risk of building projects in Jordan, it was deemed that more conventional approaches to managing risk were warranted. Before developing a strategy to mitigate them, project managers must have a shared understanding of what constitutes a risk to the project. However, developments in information and communication technology have greatly facilitated upgraded risk management assessment practices on building projects. Given the dynamic nature of building projects, more sophisticated approaches to risk management are required. This research will aid project managers in doing their jobs more effectively by assisting them in identifying potential hazards in their projects and developing strategies to mitigate such risks. Considerable weight should be given to this investigation.

Theoretical Frame work

The "three-pronged approach" is a method of project management often used in the construction industry. The scope of the undertaking, available resources, and anticipated completion date form its basis. Paying close attention to the "iron triangle" of the project management model may help construction sector manager's lower risk. Schedule, or the amount of time allocated for project management, dramatically affects the project's phases and activities. The firm may lose money or see a decrease in return on investment if the project's objectives are not fulfilled. When managing a building project, timing is crucial. Managers in the construction industry now have access to all the data and tools they need to improve the efficiency of their projects. According to Anh and Phuc (2021), the "iron triangle" of the project management paradigm significantly affects the success of a project. The investment of time, energy, and resources, as well as the emphasis placed on quality, have made this a reality. These three factors are essential for effective risk management on any construction project.

CHAPTER TWO

Literature Review

Figure 1.1. The Iron Triangle of Project Management

Brief aspects of literature Review

1) The literature review will look at studies that have already been done on the subject of project risk management.
2) This section of the literature will also look at the things we don't know about how Jordanian construction projects usually handle risks.
3) The proposed research to combine information and communication technologies to fill in the gaps in this area would significantly affect traditional project risk management.

This section aims to synthesise the existing literature on a particular topic, theoretical framework, or methodological strategy (Abdul-Samad and Kulandaisamy 2022). These findings illuminate current academic work in the case of project risk management, particularly as it pertains to the construction sector. To better grasp the significance of the ideas and concepts central to the findings of this research on project management, I recommend reading the part devoted to the

literature review. The construction industry's reliance on ICT must be included in risk assessments (ICT). ICT stands for "information and communications technology" and is the infrastructure of computers, software, peripherals, and Internet connections required to process information so that applications can be run and services can be given. Information and communications technology are also sometimes reduced to "ICT," which stands for "information and communications technology." infrastructure is an abbreviation of infrastructure, which is also an acronym. This definition claims that information and communications technology came together when microelectronics, computer technology, and telecommunications came together. This convergence has become a global phenomenon in fields including education, governance, business, market share, labour, productivity, culture, trade, and commerce, to mention a few. It discusses how a developing nation may preserve its position by noting that "its legitimacy derives from its capacity to generate and sustain prosperity." Development is a process that encompasses both substantial changes to local and global economies and high rates of economic growth that don't slow down. The development combines quick economic expansion and changes in how things are put together. The World Bank says that a country stays a developing nation as long as it: "Establishes its legitimacy on its ability to create and maintain development." As soon as a country "establishes its ability to foster and sustain growth as its foundation for legitimacy," People think that the government is in a growth stage. Japan was the first nation to develop this theory and the idea of a state that could preserve its position in the hierarchy of progress. Only South Korea, Hong Kong, and Singapore have begun doing things comparable to what is done in Japan. Hong Kong, for example, has already started to put these types of restrictions in place.

Traditional project management approaches should be compared with several academic sources that assess how well these approaches operate when information and communication technologies are incorporated to reduce performance gaps and achieve better outcomes. According to Ahmad Thaheem and Maqsoom (2018), project risk management software aims to identify issues with the present state of the project. Rather than spending a great deal of time examining the dangers that projects will unavoidably encounter, as is the case with typical project risk management procedures, managers may focus on areas where they can make improvements using these methods. Research is now being conducted to determine ways to use IT and software to analyse hazards in project management. Using modern means of communication and information storage can streamline your project management and make it simpler for everyone to stay in the loop.

Therefore, additional coordination is required to guarantee that all parties involved can monitor all activities and promptly devise answers to any issues that may develop. Without sufficient funding, there can be no progress for the organisation as a whole (Alkhlaifat 2021). To effectively manage financial risks, assessing all available financial resources is crucial. Maintaining open communication channels with all parties involved in project funding is essential to financial risk management.

However, the available financial resources and the gaps that need to be filled may be reviewed regularly using the project risk management system. Managers may use the tool to monitor the competitiveness of the construction industry and the rate at which building materials are increasing in price. Managers will be armed with the knowledge they need to make initial adjustments to spending to ensure they don't go over budget. The delivery of services, including building projects, is always impacted by environmental factors. Project managers can do little to alter the external factors that affect their endeavours. It is crucial to saving enough money throughout construction to ensure the project can continue despite unforeseen environmental changes. Risks to a project may be predicted during its creation and would make it impossible to complete in the allocated time. Most construction firms now believe that information and communication technology (ICT) can enhance data transmission and communication throughout the construction process. The task required more than what could be done with a PDA or a tablet computer. Despite the widespread availability of information and communication technology (ICT) devices like PCs, laptops, digital cameras, and smartphones.

A favourable outlook on ICT, in general, was shared by the organisations, which may have had varying consequences on their propensity to employ it. However, it seems that, at the moment, individuals are just using the most fundamental IT tools. When asked about their information and communication technology usage, most of the organisations questioned claimed to be at approximately the national average. The building sector can't expand until novel production methods are developed. This is essential for the industry to reach even a fraction of its potential. Those involved in the initiative now have a clearer picture of their roles. This results in fewer errors and happier consumers by encouraging teamwork(Lutfi, A., 2022). Whether used in tandem or separately, these components guarantee the project's success. There are a lot of potential problems that might arise during a construction project, and none of them should be

discounted or disregarded. Integrating any kind of intelligence into a system might improve its performance. Problems and problems include determining the potential outcomes of a decision, dealing with the uncertainties of a dynamic reality, and settling disputes when competing claims about a shared value system have opposite but equally weighted effects.

Companies must employ information and communication technology (ICT) to earn more money from their operations. Countries more receptive to information and communication technology will likely see their international commerce grow simpler and cheaper (ICT). It is conceivable that this will happen. In addition to saving billions of dollars a year on expenditures, these trade practices may also make the supply chain safer and more transparent. They can acquire these advantages. It has been proved that embracing information and communication technology (ICT) helps the economies of developing nations expand. Governments, corporations, and individuals all around the globe are beginning to recognise how information and communication technology (ICT) can assist all sections of the economy flourishing. It has a direct effect on what has transpired thus far. It immediately impacts the economies of various nations, increasingly relying on each other. Professionals in information and communications technology claim that the effects of irresponsible ICT usage include more people being engaged in governance, capacity development, e-Learning, government, environmental management, and providing individuals and community's greater power.

This whole mess of difficulties and concerns demonstrates how a single set of values may have positive and negative outcomes depending on the claims made. A variety of novel approaches, including the use of ICT, might be employed if necessary. The process includes investigating how the most current developments in ICT-based construction techniques might contribute to the company's product (Khahro, Zainun and Javed, 2021). This necessitates researching the latest shifts from standard construction practices. At the outset of the trip, we discussed innovative approaches to enhancing the sector's use of ICT to address its most pressing challenges. If you're seeking a solution to the issue, you should start here. Information and communication technology solutions for the construction industry are developed with the help of the Project Management Institute's nine knowledge areas and six stages of the project life cycle. These two concepts serve as the backbone of the article's structure. The books released by the Project Management Institute (PMI) examine each school of thinking. Construction, farming, manufacturing, information

technology, and education are just a few places where this technique is often used. Several nations with expanding economies have seen a rise in the number of persons interested in project management over the last several decades. As the number of initiatives involving many organisations increased, more individuals realised how valuable project management was. ICT risk management at the corporate and operational levels was examined in the three Thai case studies. Complete ICT risk management strategies are established at the company level. Technical security is managed uniquely at the operational status of ICT projects. Research from the corporate and working groups of the three companies also reveals that organisational policy, organisational strategy direction, human resource management and planning, information security management, and ICT management are the most important factors to consider when attempting to manage ICT risk. These examples clearly show that preparation for ICT risk management requires both broad ICT and security-focused ICT. The three firms employ two-way technology to link an entire pipeline, which they believe is an effective method to handle ICT risks.

The Project Management Institute defines risk as "an unexpected event or scenario that, if it happens, affects the project's goals, either positively or negatively" (PMI). According to the Project Management Institute, the risk is "an unexpected event or scenario that, if it happens, can either help or hurt the project's goals" (PMI). Effective project management means finishing a project before the deadline, getting better results than expected, and using all the project's resources. Projects aren't the only thing that has risks. Risks can worsen projects, but they can also make other things happen. Risks have many effects, making it hard to carry out a plan. Even though it is not the primary goal of risks, it is one of them that makes it hard to carry out a plan. But if risk management isn't done, project managers' work may be wasted, and it may take much longer than planned to finish a construction project. So, risk management is an integral part of managing projects and taking responsibility for a wide range of activities. It is a proactive way to find, analyse, evaluate, and rank risks throughout the lifecycle of a project. This is done by discovering, analysing, evaluating, and putting the project's risks in order of importance before they happen. So, it helps a lot to achieve the project's strategic goals during the whole project process.

It is a method for finding, examining, analysing, and keeping an eye on risks in the context of a priority list throughout a project. But risk management needs to be kept separate from other

strategies for setting priorities and making plans to help organisations deal with future challenges, risks, and unknowns. This has to happen for businesses to be able to use it. The risk-mitigation program was made to ensure that the project would benefit from the work being done. During the whole process of making the plan, this goal was taken into account. Risk management can help businesses deal with problems they didn't know they had, another of its many benefits. This can be done by always being ready for the "worst-case" scenario while keeping a positive attitude. It also gives a detailed plan for finishing the task as quickly as possible. It is important to remember that possibilities and risks do not cancel each other out. Keep this at the front of your mind, so you don't forget it. So, risk identification techniques that work well consider opportunities and threats in the places they are used. This is one of the most important things to consider when judging how well a building project went.

Globally, the newest technology breakthroughs will significantly influence how firms operate their everyday operations. The owner's objective in constructing and construction is to create a structure of superior quality via meticulous preparation and design. There are numerous ways to accomplish things. Quality control in construction projects includes ensuring that everything is done according to the plans, standards, and laws mentioned in the permits. The American Society of Civil Engineers believes that quality is "the totality of a building's features, traits, and characteristics." The American Society for Quality Assurance and Quality Control came up with this definition. It is typically termed that, and its performance is measured by how well it fits particular conditions. In other words, its worth relies on how well it satisfies the standards. At each phase of the construction process, such as planning, designing, constructing, and finishing, a quality-assurance program is put in place and monitored by a quality-control system. It makes sure that the final product is of excellent quality. It is done to ensure that the end product is of good quality. For this firm to attain its full potential, workers must learn more about utilising these technologies. There is evidence that information technology may save money while making things better and safer. Jordan's economy is typically viewed as one of the most stable in the Middle East.

The building sector is one of the economy's most dynamic and bustling areas. Jordan's construction sector is one of the most active in the Middle East and one of the busiest in the nation. It has been rising faster than any other element of Jordan's economy and continues to grow more

quickly. During Jordan's recent economic expansion, there have been hints that the building sector is rising. It might be because Jordan's population is expanding, and its life level is improving. Jordan's economy, primarily centered on service, is powered by real estate and tourism. Jordan is a well-known area for travelers to visit. Real estate and construction have recently become two of Jordan's most significant companies, helping the country's economy develop hugely. Between 2002 and 2009, the construction sector contributed an average of 4.6% to the nation's gross domestic product (GDP). (GDP). The overall market expanded by an average of 13.3% per year throughout the same period as the research. The entire industry was able to attain this target. Jordanian development is mainly for private residences. Between 2005 and 2009, 87 percent of all construction permissions were for private dwellings. Public buildings make up the final thirteen percent of Jordan's structures. During the inquiry, this proportion has been very much the same (Eldeen Abumalloh George and Aldossary 2018). In the last several years, the Jordanian government has led the way on several significant measures that everyone in the nation has embraced. The Jordanian economy has profited greatly from these improvements, and it's performing better today than before information and communication technology may help individuals accomplish better at what they do. It is vital to make building projects and operations practicable. The main idea that several industries have accepted and are employing is information technology. On the other hand, not much effort has been paid to studying the progress of information technology from the point of view of genuine users. So, the researcer objective to find out how information technology (IT) influences the quality of construction projects in Jordan.

A "construction risk" is an unplanned event or occurrence that can affect the building project in a good or bad way. This could cause things to take longer than planned, cost more than expected, or cause other problems. This result could happen before, during, or after building. In the context of a construction project, this is a change from how the project was supposed to be finished. This is because things don't always go the way people think they will. (Jorge-Vázquez Chivite-Cebolla and Salinas-Ramos 2021) made a clear link between uncertainty and the possibility of some loss in almost all construction projects. In the building and construction industry, the word "risk" means the chance of a financial loss, damage to property, or bad effects on the progress of a project. All of these things turn out badly. There is a link between what makes people want to do building activities and what they end up making. For example, the problem could have been caused by a lack of readily available labour or resources. As a result, the construction design

could not be carried out as planned. So, the problem might have been what caused the problem. Risks are often grouped based on how often mistakes happen during construction.

These mistakes can affect the expected results in terms of quality, time, and money, and the effects vary based on the building strategy used. Threats in the construction sector are examined for risk assessment based on their impact on the entire project execution and the dangers of working in the construction industry. The review will figure out if this goal was reached or not. Construction project management has grown significantly in the last 40 years, leading to several significant breakthroughs and new ideas. These changes in technology have turned out to be very helpful. Construction projects in developing countries are more likely to run into problems that were not expected. It has to do with the way these countries are put together. Risk management is often used in construction projects to make it less likely that problems will come up that weren't expected. This is done to make sure that the project will be finished well. It is done to make the project more likely to be completed successfully. Taking this step will make the project more likely to be finished and put to rest. Due to the involvement of many people, building projects have been split into two groups: those that are risky and those that seem to have an assumed risk (Alyan, M.A.A., 2022). In many countries, there are now a lot of building projects going on.

CHAPTER THREE

Methodology

The methodology applied for conducting the research is qualitative, in which the researcher focuses on secondary resources because it helps enough to identify the flaws in the construction project due to technology. Here we'll discuss the study's overarching themes and how they all fit together. The use of interpretivism will assist in identifying Jordan's issues with project risk management. These problems may be determined by focusing on a specific aspect of Jordan's project management. The results of this research demonstrate the significance of technological advancements in enhancing the efficiency of construction endeavours. Interpretivism, a naturalistic approach to gathering knowledge from secondary sources and some sources from the Jordanian construction sector, is the ideal approach for this study. Utilising natural research methods, interpretivism collects data from secondary sources. The research and analysis have excellent depth and breadth, necessitating an interpretivist approach.

Data Collection

The research team used numerous strategies to collect the required supplementary data for the inquiry. The data's usefulness, accessibility, and congruence with the study objectives are profoundly affected by the procedures used in its collection. In addition to ensuring that the project will be completed on schedule, the research questions provide direction for data collection.

Natural resources fall into three categories: This research will include a scan of academic sources and a literature evaluation of works about the building sector. Numerous scholarly articles have previously been published on project risk management, providing valuable insights and potential findings for the present inquiry. To do this, we will consult back issues of relevant historical periodicals and publications.

Secondary Data

Secondary data was employed in this study since it provided insights that couldn't have been obtained in any other way. By not doing as much primary research, the team could save time and money. The credibility of the data depends on the standing of the institutions and media outlets that compiled the secondary data. Practical research relies on accurate and trustworthy data, such as that gleaned through completed case studies. According to Johnston, using secondary data that is good quality and has been utilised in credible studies may be supportive (Almuhaisen Habes and

Alghizzawi 2020). Instead of spending time searching for potentially biased observational data, researchers often rely on secondary data.

Data Analysis

The Strategy: Researchers conducted qualitative data analysis to examine journal articles available via the most prominent publishing and scholarly search engines, including Growing Science, Emerald, and Google Scholar, to learn more about how ICT influences risk management in the Jordanian construction industry. The study developed a conceptual framework detailing how information and communication technology (ICT) influences risk management in the Jordanian construction industry. The researcher has uncovered several secondary sources, and she has to find out how to evaluate and analyse them. Information and communication technologies (ICT) impact on construction industry project risk management will be tested via a series of hypotheses.

Hypothesis

Since traditional project management doesn't use risk management software, it hasn't provided project managers with an immediate, accurate picture of their projects' dangers. The research hypotheses may be tested and confirmed using this approach. Therefore, the researcher has used various keyword combinations to ensure that all relevant aspects of the study's subject matter are addressed. Some of the terms in these categories are ICT, construction project management, risk management, and the building trade.

Ethical Consideration

Secondary sources were used instead of primary sources since primary sources were unavailable. Notable primary data collection methodologies were not used to construct the conclusions of this research (such as interviews, questionnaires, or data sampling). This study's research papers and scholarly pieces were all publicly available online at different academic and publishing websites. Throughout the data collection procedure, the Harvard referencing style was employed. We did this for the benefit of openness and clarity and to prevent unauthorised access to or duplication of critical data.

Consequently, the model used to ensure the authenticity of the research data has improved. The researcher must provide credit to the original source by using their full name when using the information. The original author is correctly attributed as a result of this. As a result, ethical issues will play an essential part in developing the foundation for the whole research endeavour. Because

of the rigorous attention to ethical standards, no volunteer in any research will be exposed to any type of damage, either verbal or physical, because it is ethically proper to do so. Ethical concerns should drive all research.

CHAPTER FOUR

Findings

It has been found that the construction projects in Jordan need to reorganise their social structure to achieve the intended goals they have set for themselves over time. This is because doing so will assist them sufficiently in attaining those wanted aims. Those construction endeavours had been outfitted with suitable information technology to prepare for the modern era. They are making far more progress than any other building project, and even though they are significantly more adaptive, the percentage of accurate data has also increased. This is the case. Even among the projects that had been reformed, the progress produced by the teams was becoming better day by day. There were several various building projects, most of which were working on the infrastructure. We can lower the cost of the construction project down to a more manageable level by suitably outfitting ourselves with information technology (Lee et al. 2022). Information technology (IT) can reduce the amount of work that needs to be done by a team and is one of the most significant benefits brought about by the rise of IT. The machines that are controlled by technology are the ones that have the most incredible potential power. It reduces the cost of labour and makes the work substantially easier for the entire team.

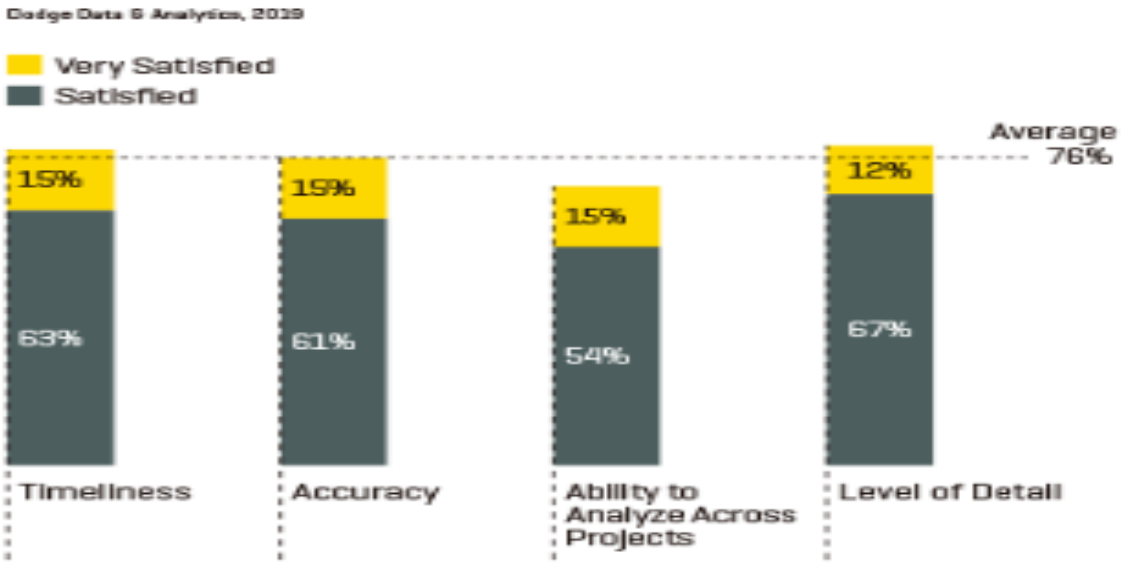

Figure 1.2 This figure indicates the whole ratio of satisfaction due to information technology

As a direct result of receiving this support, the owners now have a better ability to keep an eye on their entire development project. When information technology is utilised, the prices are decreased

directly, which is one of the many benefits. It raises the general bar for the quality of the construction projects in Jordan. Those projects in Jordan that, for a variety of reasons, need to be finished as quickly as possible. It is possible because the support provided by construction reduces the amount of work that needs to be done by each team member on average. It helps to improve the overall business of the construction sector, and as an added benefit, the information technology safeguards the safety of the construction project. This is an advantage. Because of this, we have revised the entirety of the building projects that are now underway. The essential benefits brought about by advances in information technology are the following: an increase in both productivity and the level of happiness experienced by customers; an increase in both the enrichment of skills and the reduction of risks; global recognition; and global recognition that results. Construction companies can reduce the costs associated with their projects by using various forms of information technology. It is possible to achieve greater levels of safety with the assistance of modern information technology, which is the single most essential component of the overall project. It increases the incentive of everyone on the team to work together, which eventually results in higher productivity for the group as a whole. Monitoring in the appropriate method is something that the Chief Executive Officer should do because it is functional.

CHAPTER FIVE

Analysis (Discussion)

Research studies show that using information technology significantly contributes to improving the many construction projects now being undertaken in Jordan. As a direct result, individuals will find that it is much simpler to enhance their productivity and complete the assignment before the deadline. The single most crucial factor that must be taken into account is that recent advancements in information technology have significantly reduced the chance of a wide range of unfavourable results. The usage of information technology greatly influences the progress of the building project overall, whether in a good or bad way.

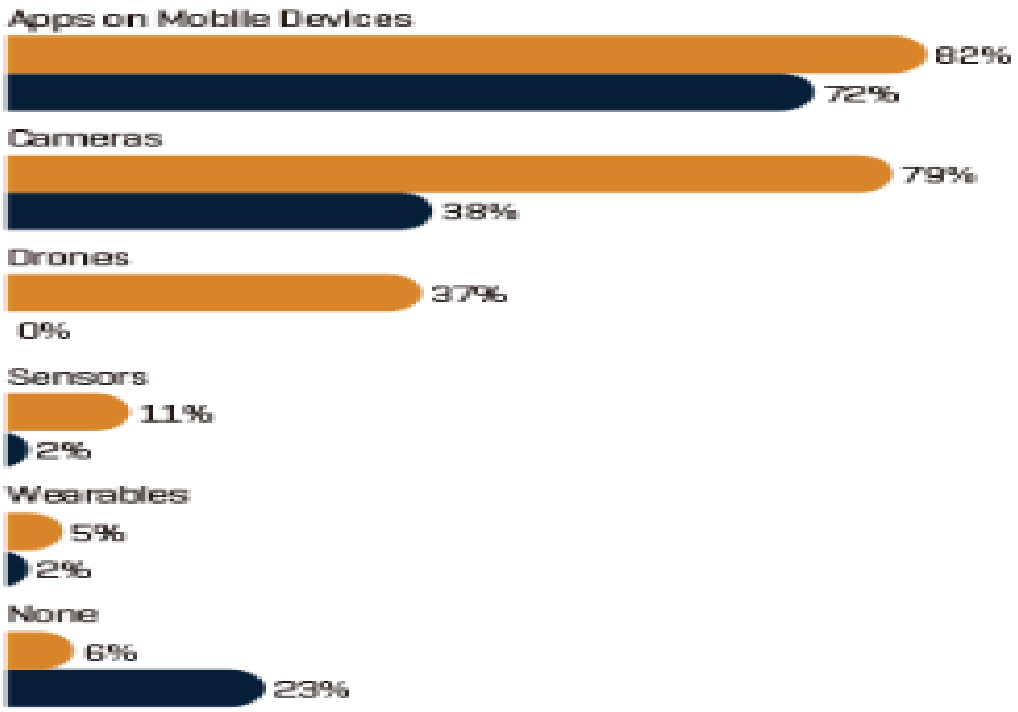

Figure 1.3 This figure proclaims the information usage in diverse platforms in the construction project to reduce risk management factors.

The results of a huge variety of research studies led to the conclusion that construction projects utilising information technology were more effective. Because of how they work, they often yield better outcomes than any other construction endeavour. Information technology makes it possible to reduce the amount of work that has to be done by all individuals participating in a building project since it enhances people's flexibility. This is due to the fact that information technology

allows for a reduction in the quantity of work required. They were able to effectively maintain a high level of quality control over the construction project they were working on, thanks to the help they received from the chief executive officer (ICT). It's not out of the question for information technology to influence the level of success that may be obtained by starting businesses. According to the results of considerable research, there may be a link between success and regularly using various information technology in one's daily life. The advantage of doing so is that it is thought to be one technique that may ensure and develop efficient processes and systematics, which is helpful when working with information and data. This research sought to investigate the many factors that play a part in adopting information and communication technology. The findings of an investigation into how construction organisations utilise ICT focused largely on three factors: the size of the organisation, the usage of foreign currency, and the participant in the building project. The investigation's findings helped generate an opinion and particular conclusions pertinent to these three separate parts. The investigation that was conducted—based on the research conducted after the data from the inquiry were subjected to statistical processing and evaluation—can provide the following conclusions. The study's conclusions indicate that the size of the organisation and the use of funding from outside both impacts the rate at which construction enterprises use information technology. This is the inference made based on the study's results.

The research's findings may be used to draw the following conclusion. Information technology is one of the most crucial of these technologies and is heavily used in the administration and management of building projects. Due to the nature of the job involved in the construction business, this is the case. These information technologies can open up new opportunities for businesses, which will ultimately help increase the effectiveness with which those organisations run. The most notable qualities that set the building and construction business apart are the availability of a sizable amount of data, important economic and contractual links, a sizable number of parties, and the uniqueness of a sizable portion of the projects. Based on the traits and details that have been uncovered, it is reasonable to claim that competent management is crucial to the success of construction enterprises and individual building projects. This is because efficient management enables the timely and cost-conscious completion of activities. Adopting and effectively using various information technology forms is one method that may be utilised to assure consistent performance and exceptional results. Since the dawn of time, the world has been experiencing paradigm shifts practically every day, which has caused almost everything to undergo

a transformation (Manaseer and Alawneh 2019). Even though the world has existed for an unlimited length of time, this has always been the case. Since the time the technology was first put into use, the great majority of people all around the globe have been educated on the most current technological developments.

The world has evolved into a more technologically advanced era since it was in its natural state, and this age has now established itself as the norm for everyone. Since then, this more technologically enhanced era has taken the planet's place in its natural condition. Because of changes and advancements in the capabilities of different technologies, everything, including people, is subject to change. This takes into account all technological advancements. Our civilisation as we know it could disappear if we cut ourselves off from contemporary technology, but the earth would also perish. Since the advent of technological advancement, almost every economic sector has shifted from labour-intensive manual professions to fully automated positions. Almost simultaneously, this transition took place in all economic sectors. Nearly at the same time, this transformation occurred in each of these distinct industries. It is physically impossible for the construction industry to ignore the new era; thus, the sector must adapt to exist.Information technology is likely to play a big role in the work that needs to be done during the design phase of a building project. This is because the design process is fluid, the many organisations working on the construction project are connected, there is a high demand for high-quality goods, processes, and services, and there is a need for cooperation, flexibility, and a high level of coordination. Some other things that affect this situation.

The changes in information technology will affect the responsibilities of project managers in the architectural design process over the next 15 years. This article examines the effects of changes in information technology over the next 15 years. As a result of using this technology, the quality and productivity of the building design process could be improved without spending more money. Since information technology is changing so quickly, there doesn't seem to be much room for debate. No one disagrees that there is no way to argue against this. The challenge is figuring out how building design procedures can be re-calibrated and, if necessary, re-aligned to meet the needs of modern information technology. This is the problem that needs to be dealt with.

The construction industry is a leading sign of economic growth because it allows people to invest in a wide range of related businesses and makes it possible for them to do so More and more people

are using information technology, which has improved the design and project management processes and work. Information technology has also become a big part of the building and construction industry, which makes it harder to ignore (Văidean and Achim 2022). One of the most important things that will affect whether or not the project is successful is how well the different people involved talk to each other. False information can lead to several evil things during the building process, such as disagreements, lawsuits, and claims between the owner and the contractor (Al Azmi et al., 2022).

Information technology has made it possible for the construction industry's information process sector to grow in many ways. The latest technological advances will significantly impact how organisations run their daily business. In building and construction, the owner's goal is to make a high-quality building by using planning and design well. There are different ways to do things. This goal will likely be reached if the right amount of work is done. Quality control in construction projects means ensuring everything is done according to the plans, standards, and rules written in the permits (Al Nawayseh, 2020). To make sure the final product is of good quality, a quality-assurance programme must be put into place and followed by a quality-control system at each step of the building process, including planning, designing, building, and finishing. This makes sure that the product the customer gets, in the end, is of high quality. This ensures that the quality control system works and that the entire programme is carried out as planned Al (Al Thawabieh, 2022). For this business to reach its full potential, employees will need to learn more about using these technologies. There are signs that information technology can save money while also making things better and safer.

Jordan is one of the safest countries in the Middle East. One of the most successful businesses there is building. Construction is one of the most critical industries in Jordan. It has been growing faster than any other part of Jordan's economy and is still growing faster than that (Almaiah and Nasereddin 2020). During Jordan's recent economic boom, there were signs of progress in the construction sector. This trend is made worse by the fact that Jordan's population is proliferating. Jordan's economy, which is mainly driven by the service sector, is primarily driven by real estate and tourism. Jordan is a popular tourist destination. Real estate and construction have become two of Jordan's most influential businesses in recent years, helping the country's economy grow in a big way. Between 2002 and 2009, the construction industry added an average of 4.6% to the

country's gross domestic product (GDP). The whole market grew by an average of 13.3% each year during the same period as the study. The entire industry was able to reach this goal.

The construction project which has equipped information technology, they are performing better than all other construction project even it redueces their risk management factors which usually directly affect the whole project of the construction. The main purpose of the information technology in the construction project is to enhance their capability and reduce the cost which might help them enough to properly grow up properly and complete their project certain period of time. It is very useful worldwide because it has modified the shape of the whole construction project. Those which are still facing barriers in their construction project need change their strategies and approaches for the betterment of whole project almost technology has reduced the uncertainities. The era of twenty first century is really fascinating because it is going to replace their whole social structure of construction project. Objectives of the construction project in Jordan could be systematically achieved by help of information technology.

CHAPTER SIX

Conclusions

Most construction projects have included the use of information technology in the planning phases of their specific tasks. This trend is expected to continue. As a direct consequence of this, the product that they make in Jordan is able to attain a better level of productivity, all while needing a lower total level of labour. This is possible since Jordan has a meagre unemployment rate. One of the essential things that can be done to lessen the risks associated with conducting business in the construction industry is to make the most of the organisational learning skills available and make the most of the experience gained in the past. This is one of the essential things that can be done to lessen the risks associated with conducting business in the construction industry. Recognising, examining (and analysing), responding to, and maintaining an acceptable level of risk are the primary objectives of risk management. The primary aim of the study project is to increase people's understanding of the part that information and communication technology (ICT) plays in ensuring that the procedure of constructing risk management is carried out in a well-organised and effective manner. Everyone working on the project must collaborate and use the same playbook if they want it to be a success so that it can be completed. There is a significant amount of data that has to be organised and sent promptly on a regular basis in order to meet the requirements. It is essential for a group of people who are collaborating on a project to have easy access to standardised templates and a secure method for storing information in the cloud. An organisation is said to have learned when one of its subsystems obtained new knowledge that it considered potentially beneficial to the organisation, as stated by (Haddad 2021).

To put it another way, when we speak of an organisation's learning, we refer to acquiring new information by one of its parts. Throughout the findings of this research project, the term "information and communications technology" (ICT) refer to the tools and procedures that use computer hardware and software to assist with management and decision-making during the construction process. These tools and procedures are known as "information and communications technology" (ICT).

Recommendations

It is essential to improve the information technology (IT) infrastructures of the building projects that are now being carried out in Jordan in order to enhance the entire construction effort. Getting on board with information and communications technology (ICT) as soon as feasible is essential for the long-term success of building projects; failure to do so might jeopardise such projects. Because doing so will provide them with the impetus they need to achieve their objectives in the long term, they need to come on board with information and communication technology as quickly as possible. Due to the fact that heavy equipment, which is often employed in building projects, is directly managed with the help of information technology, each and every construction project is dependent on information technology.

Even though they could more easily monitor their project as a consequence of improvements in information technology, the construction project's security level was increased. This was the case despite the fact that they were able to monitor the project more readily. During this process, the risk factors and the data often stored in the information technology are minimised to the greatest extent possible. This allows for the successful completion of the operation. There is potential for a decrease in the quantity of physical labour needed for the building process to be achieved via information technology. It is feasible that using information technology might help reduce the adverse effects of a shortage of available personnel. The ability of the several parties participating in the construction management project to work together in a way that is both more productive and more collaborative is made possible by information technology, which plays an essential role throughout the whole of the project.

Because Jordan is so well-known for its work in the construction industry, the Jordanian government is driven to modernise its information technology to maintain parity with the standards prevalent in other countries. They will have an easier time meeting the deadlines their clients have set as a direct result of the fact that the technology will make it possible for them to do so. The recent advances in information technology have made it feasible to bring down the entire cost of the construction project. This was previously thought to be impossible. For example, the project manager would often hire a group of labourers in the days gone by. Still, these days, he is able to buy specific equipment that may take the place of a group of people while also decreasing the amount of money spent appropriately.

Those construction projects, whether new or old, have not yet integrated any form of technology into their standard operating processes. They are not making the correct progress. Thus they will need to adopt new techniques to make the appropriate leaps toward growth and development. They are not making good progress right now. They will need to make some modifications to the strategies that they are currently using in order for those strategies to be successful in bringing them closer to achieving their objective.

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