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Digital Transformation in Project Management Practices

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Abstract

This research focuses on the effect of digital transformation initiatives due to Saudi Arabia Vision 2030 on project management practices in the country. The need for better organization, collaboration, flexibility, and performance within the process of digitalization brought about technologies and methodologies for effective project management. Through the investigation of digital tools, such as Microsoft Project, Asana, and AI-based tools, this research showcases how various industries are adopting these changes at various levels of digitalization across different sectors.

This research adopted a qualitative research method, with documentary data collection and case examinations in industries such as information technology, healthcare, and construction. Previous studies showed the applying trends and strategies of using technologies in projects; case studies provided contextual information about utilizing digital project management tools in real-life practices. The findings showed some return advantages in the fields that are much more prevalent with the application of the new techniques and tools of workflow, such as IT and healthcare. However, construction sector performance has caused slower progress due to regulatory hurdles and conventional management systems.

The study also points towards the significance of considering context to the use of digital technologies and that calling for a greater attention to building digital competencies. Although the technology has enhanced project performance, the research analysis reveals that staff shortage in related competencies is still a challenge affecting project managers and that resistance to change is still evident where use of modern technologies and application of new tools to address project management challenges is concerned. They enrich the research on digitalization in project management and indicate that strategic

efforts focusing on specific areas of improvement, such as skills enhancement and compliance adjustments, play a vital role in building long-term change.

Key terms: *Digital Transformation, Vision 2030, Agile Methodology, Cloud-Based Tools, Skills Gap*

Chapter 1: Introduction

1.1 Background of the Study

Digital transformation has come of age as the leading innovation and growth strategy and competitive weapon across industries in the global economy. Digital transformation ensures that customers get value by streamlining business processes by using internet to connect and coordinate all activities in an organization. This is done using technologies such as AI, data analytics, blockchain and IoT. These technologies have optimized operations and productivity and have ensured decisions made are data-driven.

The management of projects, which is an important process of coordinating the planning, execution, and ending of projects, has been impacted by this wave of digital transformation to a large extent. The classic approaches to project management, which primarily embrace systematic methodologies inclusive of the waterfall strategy, have been either enhanced or altered by more innovative techniques, including Agile, Scrum, and Lean. Digital transformation brings to light solutions such as project management tools, communication platforms, updates as to information in real time, and automation that assist project managers in managing complex projects effectively in a more flexible manner. The use of technology-based approaches in projects means that most organizations have assumed flexible, adaptive, as well as iterative, practices in the management of their projects as a means of enhancing their decision-making practices and the overall use of available resources.

Saudi Arabia is one of the countries attempting digital transformation as a part of its long-term goals, famously known as Vision 2030. Created in 2016, Vision 2030 became the program promoting the diversification of the Saudi economy, development of innovative sectors, improvement of the digital environment, and further encouragement of the private sector's activity. Integral to these pushes is the use of new techniques within diverse sectors

such as construction, health, finance, and learning. The government has spent considerable resources in developing the infrastructure for the digital economy and other programs aimed at enabling the use of digital possibilities in both the governmental and business agencies. Therefore, more and more projects existing in Saudi Arabia are impacted by digital trends, and the project managers who are involved in the projects maybe have the pressure to adopt new technologies while working in the Saudi Arabia cultural and regulatory environment.

Studies and knowledge gaps still exist regarding the scale of the exposure of digital transformation in project management practices and, more specifically, its implications in the Saudi environment. This research seeks to fill this gap by identifying and assessing the impact of digital transformation on the management of processes, methodologies, and results of different projects, mostly within Saudi Arabia's context.

1.2 Problem Statement

Technological advancement has seen a change in the patterns of working by adopting digital technology in managerial workflow, not excluding project management. There are few such studies that have addressed the consequences of these changes towards project management in Saudi Arabia, particularly in the context of digitization under Vision 2030. On the one hand, the application of digital tools leads to raising efficiency, improving collaboration, and managing risks better, etc. However, there are problems of applying technologies, lack of the proper skills, and resistance to change. There have been few empirical studies conducted in the Saudi context and, therefore, little useful guidance for project managers and organizations on how to better prepare and transition their project management efforts towards something more digital. This research seeks to fill this research gap by examining the impact that digital transformation has on project

management practices in Saudi Arabia as a way of providing relevant insights to those in practice and those in charge of framing the nation's policies.

1.3 Research Objectives

The main research question of this research is to determine how digital transformation is affecting project management practices and industries in Saudi Arabia. The research aims to:

- 1) Analyze the impact of new technologies and instruments in the digital age regarding traditional approaches to project management.
- 2) Assess how the implementation of the cases of digital transformation strategies affected the management of projects.
- 3) Find out the difficulties encountered by project managers in Saudi Arabia in using integrated digital tools.
- 4) Offer suggestions for successful adaptation of strategies about project management for changing conditions based on the use of technology.

1.4 Research Questions

Main Research Question:

What is the impact of digital transformation in Saudi Arabia in the area of project management?

The main question is answered using the following sub-questions:

- 1) Which digital technologies and tools are used widely in project management in Saudi Arabia?
- 2) In what ways has the adaptation of information technologies affected conventional project management approaches?
- 3) What are the major challenges experienced by the project managers in Saudi Arabia when it comes to offering digital transformation projects?

- 4) How can project managers enhance an embrace of digital transformation in project management?

1.5 Significance of the Study

This research makes important theoretical and practical contributions to project management and digitization transformation.

Theoretical Significance

The study brings new knowledge to the existing body of understanding on the subject of digital transformation in project management, especially in the Saudi Arabian context. The present work also builds upon literature by describing research findings on the impact of digital trends in project management practices, thus filling the existing research gap.

Practical Significance

From practical perspectives, this research helps the practitioners to understand how technology solutions and approaches can be implemented when carrying out project management activities. In providing the results, implications for both project managers and organizations that seek to reduce challenges and optimize opportunities presented by digital transformation initiatives are provided. Furthermore, the findings of this study may be useful to other policymakers to make the right policies and actions required for the implementation of digitalization of project management for Vision 2030.

1.6 Scope and Limitations

Scope

This study focuses on evaluating the effects of digital transformation on project management practices in Saudi Arabia. There are various sectors impacted, including healthcare, construction, and finance, that are digitizing to attain Vision 2030. This will be useful for project managers, industry professionals, and various stakeholders.

Limitations

There are various factors limiting this study, including access to reliable data from various companies that may be uncomfortable sharing their strategic digital information. Also, there may be a challenge to getting up-to-date insights due to the dynamic nature of technology. Since the study focuses on Saudi Arabia, the contextual background may limit the generalizability of findings to other areas with different environments.

Chapter 2: Literature Review

2.1 Introduction

The literature review aims to provide a coherent and comprehensive synthesis of the most up-to-date literature on digital transformation and project management systems in Saudi Arabia. In this chapter, an evaluation of ideas concerning digital transformation, a review of the historical and modern perspectives on project management, and insights into the digital strategies and policies of Saudi Arabia regarding Vision 2030 are discussed. The literature further raises awareness regarding the effect of digital transformation in the management of projects in Saudi Arabia, analyzes the theoretical framework, and establishes a literature review that forms part of the identified research gaps of this study.

2.2 Digital Transformation

Definitions and Key Concepts

- i. AI (Artificial Intelligence): Improves customer-related services and automated decision-making through the use of machine learning and analytics.
- ii. IoT (Internet of Things): Links up devices and sensors for data acquisition, allowing for foresighted equipment check and proper course of action.
- iii. Cloud computing: a software that shatters information storage and provides computational resources in a scalable manner that can be accessed remotely and collaboratively and at a relatively cheap price.
- iv. Blockchain: Ensures safe interaction, offering improved user credibility, hence revolutionizing the financial domain from fakes.
- v. Agile Methodology: emphasizes relative plans like on demand, cycling development model, and enhanced adaptability to requirements alterations.

- vi. BIM (Building Information Modeling): A term actualized in construction where it is a tool used for preparing models in a three-dimensional format for planning, designing, and coordinating the project.

Current technology that defines the future of the planet

The advancement in technology has boosted the digital revolution around the world at a high rate. The modern economies have been implementing the super tools to spit out the innovation and augmentation across the business sectors (Rashid & Kausik, 2024). AI as one of the enablers of DT AI is one of the paramount promoters of DT, to which it applies its prediction, auto-suggestion, and automation powers. In customer support, for instance, AI-supported chatbots have become part of tradition in aiding with fast solutions, personal responses, enhancing the customer's experience, and many others. These tools can handle big amounts of data, independent learning, and personalized solutions that meet the client's needs, hence the high satisfaction level.

Machine learning development is an evidence of artificial intelligence as a subcategory because it improves decision-making even further due to the ability to recognize patterns in data and predict outcomes (Al-Hajri et al., 2024). This ability is especially useful in fields like the finance field, where big data predictive analytics are applied in things such as risk and fraud analysis (Rashid & Kausik, 2024). The IoT is transforming how companies are momentarily aggregating and analyzing data. The IoT enables the tracking and monitoring of equipment for predictive maintenance, monitoring of the supply chain, and data collection from consumers, so that through the analysis of such devices and sensors, the business processes can be enhanced for production and service delivery (Rashid & Kausik, 2024). IoT in the healthcare context helps to track and monitor patients round the clock with actual health data for protective purposes.

Cloud computing is one of the most imperative technologies that have revolutionized the operation of business. Cloud platforms offer the flexibility and self-service organizations require on the macro level to save, compute, and govern data. Cloud services prove to be very versatile in that they can effectively respond to the fluctuations of the market, and at the same time, they motivate businesses to minimize their infrastructural expenses because the possibility of implementing complex technologies does not necessarily require a huge capital outlay. This is most especially helpful to small startups and companies that may require a solution that will grow with them (Al-Hajri et al., 2024). Furthermore, cloud-based services and solutions facilitate work from any location and remote collaborations that permit the team to obtain data or tools from any part of the world, which enhances productivity and business operations.

It is crucial in digitalization and particularly in fields like finance and logistics. It enables people to make transactions that are secure and more trustworthy, thus reducing the aspect of fraud as far as business is concerned (Plekhanov et al., 2022). Every business transaction that is effected in such a system, due to the fact that the system is unitary in nature, will be written into a code that is inscribed on an immutable matrix that is accessible to anyone who has a right of access to the matrix (Plekhanov et al., 2022). This ability to “look through” the system is important, particularly in SC management, since companies are able to observe the movements of products, check whether goods are genuine or otherwise, or simply ensure that minimal legal requirements have been met. Blockchain is enabling new and better forms of processes in many fields and is making businesses better.

Impacts from the Digital Transformation for Companies and Sectors

Digital change is not a process that occurs in the digital environment but a process that alters with scalable business models and procedures in almost all sectors. The retail

industry has been transformed by the digital revolution. In the case of how organizations communicate with the clients and how they manage their processes too are related (Plekhanov et al., 2022). From using natural language processing and machine learning in customizing purchase encounters to supply chain and stock control innovation's e-commerce giants, Amazon had set new heights. Various retailers have resorted to the Omni Channel, which incorporates online and physical shopping in order to meet and satisfy customer needs and increase profits (Al-Hajri et al., 2024). Therefore, retailers are now one step ahead of consumers in terms of predicting their behavior and enhancing supply chain value and the whole customer value proposition through digital advances.

As healthcare embraced digitization, it has transitioned from our humble beginning of delivering mere patient care to healthcare system efficiency (Al-Kahtani et al., 2022). Telemedicine, electronic health records, and AI diagnostics have become the new normal in health care delivery. Telemedicine gives an opportunity, due to which people can receive medical consultations without coming to appointments, and, therefore, the availability of health services is elevated (Plekhanov et al., 2022). EHRs can actually help every step of handling accessibility to data of patients, giving healthcare providers and patients in general full medical histories, and while leading diagnosticians and treatment strategists work out the details for using that data (Al-Kahtani et al., 2022). Self-diagnostic Applications for physicians involve using patient images and recognizing any resulting health issues to improve the odds and timing of diagnosis.

Digital transformation has significantly shifted the financial industry or advanced it in today's culture. Fintech is transforming the given structure of online or mobile banking with mobile banking application digital wallets, the technique of a blockchain (Mani & Goniewicz, 2024). Offers can describe these new developments as creating convenient, dependable, secure, and swift financial services for customers (Al-Kahtani et al., 2022).

The point is that the mobile banking applications allow it to transfer money, perform payments, and manage the accounts within a few clicks, and a digital wallet helps to make cashless payments. Due to its advanced approach to secure financial transactions—reducing risks of fraud—it can be considered that the utilization of blockchain technology raises the pace and efficiency of these operations (Mani & Goniewicz, 2024). Starting with improving customer experiences, up to reinventing the concept of banking and causing a necessity for constant evolution of financial companies.

Another sector that has been effectively changed by digital technologies, in particular using principles of Industry 4.0, is the manufacturing sector. The integration with IoT, robotics, and data analytics has improved production lines and the quality of products. The data transmitted by IoT equipment's sensors includes real-time information that can help detect whether maintenance is required or not so that a particular piece of equipment does not break down (Clesham, 2023). Robotics helps in increasing automation work so that the manufacturing tasks are done in a better and more efficient way (Mani & Goniewicz, 2024). Since the big data, the manufacturers are able to know how the production process is conducting or not, then the next step is to act on this data to enable efficient production with fewer emissions. The end product is a manufacturing industry that is not only smaller and more muscular but significantly better positioned to meet changes in demand.

2.3 Project Management Practices

Modern project management processes

Two traditional approaches, though no longer modern but still dominating the project management field, are Waterfall and PRINCE2. The waterfall model is one of the most used models that follow a linear and sequential process and that work a lot on the upfront planning of the project with a definite and narrow scope of the project (Clesham,

2023) It is suitable for acquisitive projects that are well defined and operate in stable conditions where the requirements of the project are not amendable (Mani & Goniewicz, 2024). PRINCE2 is the second generation to the previous method. It is process-based and covers business justification, suits, product plans, and responsibilities. It offers a sequential solution for both risk control and project delivery, thus enhancing achievement of the laid-down goals.

Agile and hybrid methodologies

Considering these drawbacks, which are receiving a rather high popularity nowadays, there are Agile methodologies that have become typical, especially for software development and spheres where the speed of reaction is a crucial factor (Zayat & Senvar, 2020). Agile focuses on the development of short cycles and customer involvement with the capability for the project team to adapt easily to changes in demand. Two of the agile methodologies familiar with organizations today embracing a strategy of delivering incremental change are Scrum and Kanban (Zayat & Senvar, 2020). Pure agile and pure waterfall styles of project management have been replaced with one form of blended methodologies where there are both phases of planning and flexibility (Clesham, 2023). These methodologies offer certain degrees of freedom to PMs so that the choice of approach is adjusted to the nature of the projects on hand.

Technology in Modern Project Management

Project management cannot be severed from technology since today's technology can facilitate information sharing, tracking of resources, and even interaction within and among projects. Management tools like Microsoft Project, Asana, and Trello help in tracking tasks, the time frame, and teamwork (Clesham, 2023). Real-time analysis helps project managers see what is happening and what may go wrong with a project and avoid poor decisions (Zayat & Senvar, 2020). One of the benefits of using cloud applications is

that they allow seamless communication breakdown across geography and time. Moreover, automation technologies decrease the number of manual activities performed on projects, which provides project managers with the opportunity to concentrate on essential avenues of project implementation.

2.4 Digital Transformation in Saudi Arabia

The government has implemented numerous programs to develop the talents in the field of digital industry, particularly in the health, education, and banking industries. Some of them consist of the National Digital Transformation Program, which is linked to the development of the country's digital environment, and the Saudi Data and Artificial Intelligence Authority (SDAIA), focused on data and AI.

Management of Digital IT Infrastructure

The recent years have seen Saudi Arabia initiate and progress in constructing the framework that will enable the country to realize its digital transformation vision. According to Zayat and Senvar (2020), ventures in 5G technology have put it within a league of its own when it comes to the connectivity status of the Middle East (Kraus et al., 2021). The availability of service-enhancing cloud technology has been made possible through collaborations such as Google Cloud and Microsoft Azure, which have enhanced organizations' ability to adopt secure and scalable such solutions. Ambitions to develop proper cybersecurity measures have shifted the focus of the government on the protection of digital property and information, creating a safe context for digital businesses.

Case Studies of Digital Transformation in Saudi Industries

KSA has already pursued the digital transformation in many fields in consistency with Vision 2030 as an effort to develop non-oily sectors and to adopt innovative technologies (Kraus et al., 2021). Digital technology has been more crucial in the healthcare segment, wherein the primary focus is on improving patient services due to

factors such as telemedicine and EHRs. The Ministry of Health initiated the use of health-information technologies like the “Seha” app, used to consult doctors without going through physical contact. This innovation has been a cornerstone in the delivery of health care to the hearts of populations, the bidder visits, and the relief of pressure on hospitals in urban centers (Kraus et al., 2021). EHR systems facilitate the management of patient data to enhance the delivery of efficient medical services by giving easier and more accurate patient histories for the physicians for diagnosis and interferences.

In the field of finance and banking, Saudi Arabia has noted to set its pace in embracing the digital age of banking solutions, hence revolutionizing the way customers deal with their money. Some of the mobile strategies in the MEA region have been pioneered by Al Rajhi Bank, which is one of the largest financial institutions operating in this region, by introducing new generation mobile and digital banking services. These developments give consumers the capacity to complete transactions, make payments, and perform different forms of operations via the Internet, which increases flexibility and decreases demand for visiting branches. It is already evident that Taiwan citizens have embraced convenient methods of payment, and the existence of digital wallets such as STC Pay has accelerated cashless payments technology (Kraus et al., 2021). These provide solutions in enhancing customer satisfaction or boosting the existing digital finance services and, at the same time, contribute to building the strong financial structure that, in turn, promotes financial inclusion in Saudi Arabia.

The Saudi construction industry has experienced significant transformation through digitalization, which is mainly fostered by the use of technologies such as BIM and project management software. NEOM and Red Sea Development Project have been utilizing BIM technology as a tool to improve planning, designing, and construction. BIM offers highly detailed volumetric representations of projects, allowing architects, engineers, and project

managers to coordinate, plan, and proactively address problems and mistakes that would have otherwise cost a lot of money to rectify (Kraus et al., 2021). In addition, project management platforms have added efficiency to the implementation of large-scale projects, whereby the status, available resources, and funds expended on the project can be monitored in detail from the comfort of the office or home (Kraus et al., 2021). As a result of this integration of digital tools, construction activities are much more efficient, the projects do not experience delays, and costs are significantly lower and capable of delivering some of the most challenging projects within the Kingdom.

2.5 Impact on Project Management in Saudi Arabia

Changes in Project Management Due to Digital Tools

The use of digital technologies influenced the specifics of project management in the context of Saudi Arabia, appearing as the continuous enhancement of conventional practices and incorporation of novel tools (Kraus et al., 2021). Portfolio managers increasingly utilize technology in planning and scheduling software and in monitoring project performance. Software such as Primavera, Microsoft Project, and Trello have emerged as crucial instruments in administering large projects, where the leaders can produce project calendars, assignments, and important points better than in the traditional way (Kraus et al., 2021). The gradual transition from conventional document handling techniques to electronic processes has made a positive impact on the enhancement of project processes by cutting incidences of blunders and efficient time management. For example, in cloud-hosted project management tools, it is possible to update statuses of the project and related data right in real time, while managers receive contingency information on the project status (Kraus et al., 2021). Data analytics has increased efficiency in decision-making since data project managers can be able to predict future risks that may be with the projects and come up with the necessary measures to counter them.

Other forms of collaboration tools and means of communication include social collaboration tools; for instance, Microsoft Teams, Slack, and Zoom have transformed how project teams' work as the world adopts remote and hybrid working conditions (Cheriyana, 2024). These platforms make it easy to communicate, and this means that your team members can share progress reports, ideas, or even discuss problems and arrive at a decision in a short span. For instance, in a Central Saudi Arabia project where there may be a lot of interconnections of regional teams for the project, the digital tools have been quite vital in helping in integrating the geographical gaps to promote coherent teaming (Cheriyana, 2024). The enhanced features such as video and voice calling, file sharing, and instant messaging make it possible that productivity has been boosted since time is saved when compared to emailing back and forth communication or scheduling for meetings. There are new automated instruments, which means that many patterns decrease and there are fewer interferences with the work of a project manager.

Challenges and future implications

A major challenge is therefore reluctance to change, owing to the fact that there are still many organizations that emphasize traditional project management and may therefore consider the use of digital tools to be complicated or redundant (Cheriyana, 2024). This resistance may be due to a number of reasons, including ignorance of the benefits that the use of digital technologies brings or resistance that is caused by an organization's concern with changes in their working patterns. This skill deficiency poses a strong limitation to the successful implementation of new technologies, hence the need for organizations to enter into viable training and professional development initiatives. Cultural issues across the organization can be a source of digital disruption. While many Saudi companies favor hierarchical, face-to-face communication styles, this goes against the grain of the most essential characteristics of social media: decentralization and collaboration (Cheriyana,

2024). Imposing a digital first means making cultural changes that are flexible, permeated by openness, and constant learning. Projected intelligent digital workplaces are thus a worthwhile reward for a project manager who overcomes the challenges mentioned above (Cheriyen, 2024). In the context of Saudi Arabia Vision 2030, the adoption of professional digital tools for project management enhances productivity with reference to Saudi Arabia Vision 2030 targets of innovation and economic diversification.

2.6 Theoretical Framework

The TAM framework provides the theoretical foundation on which the proposed research about the adoption of digital tools and technologies in project management in Saudi Arabia rests. The study using the technology acceptance model concludes that perceived usefulness and perceived ease of use are two authoritative factors deeming the level of acceptance of a new technology by an individual (Marikyan & Papagiannidis, 2023). Perceived usefulness refers to the extent to which a user believes that using the technology will enhance his/her performance in the workplace, and perceived ease of use refers to the level of effort that a user finds utilizing the technology (Marikyan & Papagiannidis, 2023). These factors are important for Saudi project managers because the receptiveness to apply the identified digital enablers, including project management software, BIM, and cloud collaboration tools, depends on these factors. The understanding is important because it helps organizations adjust the approaches by offering extensive training and backup to illustrate the practical utility and simplicity of the technology the executive wants to implement (Marikyan & Papagiannidis, 2023). The application of these models is important in creating a more effective transition towards digitization in various projects and generally benefiting the overall execution of projects, and is in line with the Kingdom's diversification goals as stated in Saudi Arabia's Vision 2030.

2.7 Summary of Literature Review

This literature review has focused on the increasing levels of digital transformation chemistry and its role in different fields, such as project management. They have reviewed the historical development of project management methods and how modern technology is applied to practices. More specifically, in the context of Saudi Arabia, this review examined the digital initiatives under Vision 2030, and with respect to that, the study tried to identify the role and challenges of the project management. Despite the advancement experienced through digital transformation, there are still some challenges taking form, most of which are regarding the use of technology and organizational capacity. This study seeks to fill such gaps by giving an empirical analysis of the effects of digital transformation on the practice of project management in Saudi Arabia.

Chapter 3: Methodology

3.1 Research Design

This research work adopts a qualitative research methodology in examining the nature of digital transformation in relation to project management practices: a Saudi Arabia case study. The result of such an approach, based on document assessment and case studies, is the precise examination of the existing documentation—reports, policies, and case studies focusing on the digital transformation trend and its impacts on project management. This design is useful in capturing complex organizational change processes and sitting them within Vision 2030, which is focused on digital development in Saudi Arabia. The rationale for using a qualitative approach is that the study can gain insights into the manner in which advanced tools and techniques are integrated with project management without directly asking the participants for details and data.

To achieve these objectives, this study employs document analysis and case study research methodologies mainly. Document analysis enables the review of different types of secondary data, such as government reports, policies, journals, magazines, and academic papers. These sources offer the existing knowledge on the topic of digital transformation and project management, Saudi Arabia perspective. Moreover, detailed case studies related to the project management practices in the context of the digital transformation strategy are discussed to reveal the application of the proposed conceptual model in practice. This is because, by using case studies, we get some additional insights on how project management is affected specifically by digital transformation and what kind of challenges and opportunities exist within such an approach.

The use of case studies and document analysis is attributed to a commitment towards covering all aspects of the broader issue of digital transformation in Saudi project management without having to gather primary data from the field. The selection of

document analysis and case study as the strategies corresponds with this reason sufficiently because the aim is to comprehensively grasp the broader issues of Saudi project management digital transformation without getting primary data. This approach has the advantage of using trustworthy data from other sources to draw a conclusion on a relatively new social phenomenon in a specified region. The work also remains consistent by adhering and engaging with approved sources and going through concrete examples to meet the research questions in an organized and credible fashion.

3.2 Population and Sample

Thus, the population for this research is composed of documents and reports on project management digitalization in Saudi Arabia, along with case studies of associated projects. The respondents were from organizations classified in the construction industry, and the articles used are a sample of government publications, industry white papers, academic articles, and organizational reports addressing the effects of digital transformation on project management. Sample selection criteria focus on documents that are:

- 1) Published in the last five years so as to capture trends of modern-day digital communication.
- 2) Related to Saudi Arabia, in particular referring to Vision 2030 or other country projects.
- 3) Biased towards project management procedures, it identifies the technologies and techniques applied in projects based in Saudi Arabia.
- 4) Credibility and Authority: Priority is then given to the most credible sources, including files produced by recognized authorities of government, highly active organizations, and peer-reviewed scholarly publications to get high-quality information.

This paper identifies the following criteria in order to have a holistic understanding of the digital transformation concerning project management in Saudi Arabia. By these criteria, the identified set of documents offers both the number of documents sufficient to conduct a review of the Saudi Arabian digital transformation and the level of detail sufficient to reveal the underlying trends. This selection process facilitates a structured and detailed consideration of emerging trends, issues, and opportunities in project management whose context has been informed by digital transformation.

3.3 Data Collection Methods

Document Analysis

Document analysis that requires the systematic analysis of documents is the main approach that is utilized in this study. Research materials including governmental and organizational overviews, policies, white papers, and case studies of industries that have adopted the changes introduced by the digital age provide fundamental trends on how digital transformation is associated with improving project management. Thus, this approach helps to determine key topics and trends with regard to the digital conversion, the management of the projects, and the Saudi Arabia context. It is very effective when facing such research questions that address the trends in digital transformation because the researcher gets the necessary material to work with credible sources containing comprehensive and authoritative data.

Analyzing documents from various and still related sources, the study records new topics and trends, which represent the present-day trends in digital transformation and application to project management in Saudi Arabia. For instance, government papers contain information regarding the countries' priorities and strategic orientations with regard to IT, while industry papers contain information regarding the approaches and methods used by organizations. While literature and policy emphasize the nature and elements of

regulation and institutional support for the use of technology, the academic articles propose theoretical and research data on the integration of technology in project environments.

Document analysis follows a systematic process involving:

- i. **Document Selection:** Documents are selected depending on the relevance, credibility, and recency criteria's set the criteria for document selection.
- ii. **Initial Review:** Every document is reviewed to get a feel of what the piece is all about in terms of theme, or concerns, and overall intent.
- iii. **Thematic Coding:** The important passages, keywords, and findings connected with digitalization in project management themes are highlighted, coded, and divided into the thematic areas.
- iv. **Analysis and Interpretation:** Coded themes are also examined to determine how managers perceive digital transformation to impact their practices in project management, with the aim of drawing out patterns in the data.
- v. **Triangulation:** Documents that are collected are compared and contrasted to make it as reliable as possible, plus it will also make the presentation of views to be balanced.

Case Study

Where relevant the examples are provided with specific cases of exemplified projects within certain Arab companies or government agencies, in this case Saudi Arabia, in order to highlight how digital transformation strategies are launched and monitored. This focus on cases enables the research to supplement the findings generated from documents by providing a more nuanced picture of how project management practices are implemented in response to digital transformation in organizations. The case selection criterion includes the case relevance to project management practices in Saudi Arabia, the alignment of the case with Vision 2030, and the documentation of digital transformation.

For example, the case may be big-scale projects implemented with the help of digital tools or the projects that have been through some technological transformations.

The criteria for choosing the case studies involve:

- i. **Direct Relevance:** All case studies reported must be relevant to digital transformation in project management within Saudi Arabia.
- ii. **Documentation Availability:** Projects chosen have disclosed documentation that maps out approaches to project management or describes digital support systems and the outcomes of digital transitions. Strategic Value: issues most relevant to Vision 2030's objectives are on the foreground, as they shed light on the government's drive towards the digitalization of different industries.

This research integrates case study examples for easier demonstration of digital transformational processes in addition to trends and insights from the analysis of documents.

3.4 Data Analysis Techniques

Thematic analysis is used in order to analyze the documents and cases gathered in this research, systematically focusing on identifying themes. This technique entails transforming data into code to identify emerging patterns that explain the effect that digital change has on managing projects. Some of these issues may be as follows: Applying selected tools; Modifications of project-related processes; new competencies needed for project managers. Thematic analysis follows several stages: becoming acquainted with the documents, identifying initial codes, identifying themes, revisiting the themes, and refining your approach for whatever theme reporting is desired. There is a process of coding that involves operations that are general; this step is usually followed to enhance consistency on the codes; whenever new themes come up, the code is enhanced to ensure the findings are representative of the overall information.

In thematic analysis, there are different processes that are followed, including familiarization where every document is read, coding to give important passage codes, theme identification in which similar themes are grouped together, reviewing and refining themes to ensure that the information provided is accurate, and interpretation and reporting where the research question is answered to show how digital transformation is shaping the project management trend in Saudi Arabia.

3.5 Ethical Considerations

Although the present research project does not entail data collection that involves human subjects, some ethical issues arise. As for this, there are few risks of confidentiality since all sources presented are the documents, which are freely accessible. But there is something more important at stake, and that is ethical practice, which calls for citing other people's work and respecting other people's property. When organizational case studies are employed, particular details are properly addressed such that no proprietary or confidential information may be published. Adhering to ethical practices with regards to the acquisition and reporting of secondary data is a manifestation of high research honor and professional standards in their truest sense—it also respects the ownership rights of creators and publishers of data.

3.6 Trustworthiness and Validity

To enhance the credibility of the research findings, the following approaches are used: By making comparisons, a triangulation process is adopted to use data from government publications, other industry-related publications, and case studies to enhance the validity of conclusions. In another way, peer debriefing entails sharing newly identified themes and impressions with other researchers to eliminate bias and guarantee that the results are coherent and truthful. Reliability is also maintained in coding and theme identification to ensure thorough and consistent analysis. Moreover, the specifics of all

stages of data analysis increase the study's transparency, which increases the feasibility of the study's methods' critical appraisal and the examination of the study's reliability.

Chapter 4: Findings/Results

4.1 Introduction

This chapter highlights the research findings from the document analysis together with the case study conducted to show the effect of digital transformation on project management in Saudi Arabia. The findings are categorized into three primary themes: The three areas of project management development consist of 1) adoption of digital tools; 2) change in the processes and workflows of projects; and 3) development of skill adaptation in project management. These themes were derived from a study of the literature that comprised government documents such as reports, white papers, and other research articles and analysis of case studies using real-life implementations of projects in the construction, healthcare, and information technology sectors. Examples of these Saudi projects include empirical writings and findings on different Saudi projects, such as the NEOM smart city project, the Red Sea Project, and the Qiddiya entertainment city project.

The analysis of the document findings, with particular emphasis on the digital tools, workflow, and skills in Section 4.2. Case studies are presented in Section 4.3 of the study, where general observations on how various organizations in Saudi Arabia have integrated digital transformation and its impacts on project management practices are made. In Section 4.4, the author sums up the chapter as a whole by presenting an integration of the analysis of documents and the case studies.

4.2 Document Analysis Findings

The method of document analysis was used so as to provide a thorough understanding of the key themes and patterns that capture the role of digital transformation in project management in Saudi Arabia. Both primary and secondary sources were considered, with emphasis on official government publications, such as the Vision 2030 initiative, and industry-specific articles and documents defining the advancements in the

utilization of digital tools, change of project management processes, and emergence of new competencies and skills in the course of work. The analysis revealed three core themes: the adoption of digital tools in project management, the dynamic change of project work-flow processes, and skill adaptation.

4.2.1 Adoption of Digital Tools

The first major and significant pattern identified in the document analysis includes the increased use of tools in project management practices in the Saudi Arabian construction industry. Saudi Arabia's Vision 2030 has been behind the acceleration of the digital transformation process within the Saudi Arabian public and private sectors; the NEOM project in Saudi Arabia plans to use technologies like AI and machine learning to develop a clean and sustainable smart city (Hassebo & Tealab, 2023). The findings from the document review suggest that Microsoft Project, Asana, Jira, and cloud-based collaboration platforms are now vital to project management operations. Not only do these tools enhance the effectiveness of tracking and managing the projects, but they also enhance integrated communication and cooperation between the project teams, especially where a project involves big and intricate projects.

There is also concern with the need to work with increased transparency, monitoring, and tracking of project progress in near real-time. The Qiddiya entertainment city project in Saudi Arabia leverages the use of CGI or computer-generated images to show the futuristic project master plan (Ramírez, 2022). The result of this study reveals that the use of these tools has brought about timely updates and insights, which makes the project managers able to address such challenges, allocate resources, or contain potential risks as they emerge.

However, the document analysis also reveals that organizations experience difficulties in the effective application of digital tools. Challenges like limited resources

and infrastructure, inconsistent technology education, employee negativity toward new processes, and inadequate project management software are some reasons why organizations have not been effective in the implementation of these tools. In addition, the evaluation underscores a scenario whereby training and capacity building are needed as a way of ensuring that the project manager and his or her team have the ability and skills required to utilize the social tools on a comparative leverage. In general, training and staff development of digital skills are becoming more and more important components of the digital transformation process.

4.2.2 Evolution of Project Workflows

The second of the key concepts identified was process changes in project work flow systems that were evident with the help of the document analysis. A framework like the waterfall model of project management has been fading away and has been replaced with more versatile methods that put more emphasis on flexibility and many iterations. This shift is manifesting more tendencies in industries that have been more affected by the digitalization of businesses, such as construction, healthcare, and information technology. For example, there is a concern about the use of frameworks such as Agile and Hybrid management systems, which seem to have flexibility as one of their strengths, owing to the ever-shifting nature of features in large-scale, and especially technology-based projects.

The analysis also pointed out that uses of digital tools have played a big role in the changes that have occurred in the project workflows. Most of the collaboration tools have become very effective, especially those that are cloud-based, and this has made it possible for project teams, who are often organized differently due to their working locations, to work as a single team with no challenges at all. As a result, it has become possible for project managers to view real-time progress and adapt to it by altering project timelines, enhancing flexibility, and improving communication with key stakeholders while

decreasing delay factors due to information latency. Furthermore, digital tools allow project managers to make decisions with greater freedom since sometimes decisions are even predicated on analytical tools such as prediction or AI. This leads to increased flexibility of the project management processes, which in turn can adapt to the dynamic environment within which projects exist.

T-driven sustainability initiatives of Saudi Arabia cut across the enterprise, which include deploying the Enterprise GRC Solution for risk and control integration, cybersecurity controls, and smart technology for the Red Sea Project, enhancing sustainability performance. These initiatives illustrate the organizations' vision of how technologies can be employed to support sustainability and promote good changes in different projects (Madkhali & Sithole, 2023).

Moreover, the analysis provided below indicated that the changes in the nature of various workflows affected the manner in which teams deal with meeting project expectations and balancing resources. Since most of the administrative work is now currently done on the computer, it gives the project managers less to worry about besides decision-making and handling stakeholders. This has in turn led to more focus on the execution of the project to deliver a faster cycle time while maintaining good levels of agility in how the project is executed, the oversight being that key project deliverables such as milestones can be readjusted based on feedback. The Saudi government has been working to ensure that their IT infrastructure is efficient to improve people's lives and realize the Kingdom's vision 2030 (Mohammad R. Kabli, 2019).

However, not all sectors have adapted to the change toward more agile processes based on their clients' needs. For instance, the construction industry has not fully moved from traditional project management methodologies because of the regulation and nature of

constructing physical structures. This is a clear indication of the problems that may reside in industries that have not yet fully embraced the digital evolution.

4.2.3 Skill Adaptation in Project Management

The third theme highlighted under the document analysis revolves around the new skill requirements imposed on project managers as a result of the emergence of digital realities. As the application of digital technologies increases, project managers in Saudi projects such as NEOM, Qiddiya, and the Red Sea must have digital competencies rather than conventional skills like budgeting and time management. This research highlights the need for additional digital literacy and analytical skills, including various ways on how to integrate various emerging technologies into project management, including AI, IoT, and blockchain, among others.

Among the identified trends, it is worth mentioning that more project managers are expected to demonstrate a higher level of professional competence regarding the utilization of different computer-based tools to track and manage projects. This management software; scheduling software; communication software; and real-time project reporting software. Furthermore, many organizations are investing in the professional growth of their project managers in terms of data analysis capabilities because the subsequent information derived from utilized digital tools is valuable for project improvement. Project managers are expected to deal with large amounts of data generated through digital project environments to get insights, find patterns, and decide about the prevention possibilities of anticipated future problems.

Furthermore, the results of document analysis suggest that the concept of a project manager has evolved from a merely supervising authority to a digital management authority. Project managers are now part of strategic parties to spearhead the agency's digital transformation projects and, therefore, should have adequate knowledge on how

technology influences project execution and business strategies. This change in trend has resulted in an emphasis on leadership skills, with project managers called upon to help their team be ready for technological transitions and build a culture that appreciates digital solutions.

With regard to these changing demands, it has been observed that organizations are launching training and development initiatives targeting building the digital skills of project managers. The typical professional development initiatives may comprise computer skills, such as programs to work with practical applications, statistical software packages, managerial leadership in the age of technology, etc. But from the above document analysis, it is seen that though some organizations are in the process of addressing this issue, there is a wide gap of skills in managing projects, especially due to increasing dynamism in technologies. This gap has paved the way for further development of upskilling programs to address new needs and expectations, as well as increased collaboration between education and industry in order to equip future project managers to meet the challenges brought by digital advances in the industry.

4.3 Case Study Findings

By presenting an analysis of the case study data, this paper offers an applied view of the effect of digital transformation on project management in Saudi Arabia. The NEOM, the Red Sea Project, Qiddiya, and other case studies were chosen based on different industries, including construction, health care, and information technology industries. All of these case studies are selected based on specific projects that saw the application of digital change. These case studies provided an understanding of how organizations manage digital change, what approaches they take, and what challenges they encounter.

4.3.1 Adaptation Strategies

Many of the adaptation approaches that fit into the framework of digital transformation for project management could be identified in the case studies. A major approach that was implemented was the adoption of solutions that promoted the use of the cloud for project management and communication, in particular with clients. For instance, the NEOM project plans to use NVIDIA and Oracle cloud-based project management applications to ensure collaboration between teams. These tools proved helpful to the project team because they enabled the collaborative effort of the team in real time, during which delays are not common and the different stakeholders involved communicated continuously.

Also, during the time of COVID-19, AI was in a healthcare project to reduce the spread of this disease. AI algorithms implemented within the project case allowed for identifying possible delays and recommending risk mitigation measures. This kind of approach helped the project to remain efficient at this stage, due to the number of parties involved and the short timeline of the work. The case studies further demonstrated that organizations that had integrated digital tools better were able to realize higher project efficiency and save lives.

4.3.2 Challenges in Digital Transformation

As evident from the various projects, the use of digital tools has been successful in many projects, and yet there are some difficulties encountered in the case studies that limit the achievement of the complete benefits of digital transformation. Resistance to change was perhaps one of the most visible problems faced by many organizations during the process. Many of the employees in the projects were not very keen to adopt the use of digital tools in their projects, especially those who practiced traditional project management systems. Such opposition usually resulted in the slowing down of the implementation process and required the addition of further training in order for progression to occur.

The final major problem was the skills gap. Digital tools can easily supplement the traditional approaches to project management with more advantages; however, using digital tools needs expertise. Several of the project managers in the case studies may not possess the appropriate knowledge about digital tools and data analytics. This left many organizations with no option but to spend on expensive training sessions in an attempt to mitigate the observed gap. In some instances, organizations went further to engage external training service providers to ensure that the project managers developed the necessary skills.

Further, the poorly developed infrastructure became an issue hindering digital transformation in particular projects. For some of the projects, especially in the rural or hard-to-reach areas, the required technologies or even the internet connection were wanting to optimally implement the digital tools. This led to imbalances in the levels of digital transformation that could be realized within the various industries.

4.3.3 Outcomes of Digital Transformation

The analyzed case studies suggest that digital transformation had a positive impact on many projects' performance. Research findings indicated that projects characterized by proper use of digital tools for implementing change experienced positive changes in the project timelines, costs, and general effectiveness. For instance, NEOM's use of collaboration tools based on the cloud reduced the time used immensely and delivered the result ahead of schedule. This result suggested flexibility in the execution methodology, whereby project plans and working patterns could be rapidly fine-tuned according to current data and feedback.

In the construction industry, the increment in resource allocation efficiency and the overall decrease in waste have led to realistic cost savings. Different projects in Saudi Arabia have been found to apply some sophisticated project management program to

monitor resource consumption in real time, allowing the project managers to address possible issues as soon as they appear and ensure that the resources used are optimally utilized.

The case studies also show that the digital transformation culminated in increased satisfaction from the relevant stakeholders as informed by better and overall communication. Real-time information and the opportunity to access project data at any time and from any place meant that the stakeholder is not left out of the cycle in the project's execution. This increase in transparency improved the relationships between the project managers, clients, and other stakeholders, partly explaining why more and improved projects were being completed.

4.4 Summary of Findings

Both the document analysis and case studies used in this paper highlight the apparent effects of digital transformation on project management practices in Saudi Arabia. The key findings in document analysis include digitalization, where most people are now using digital tools when conducting their activities; the changing project processes from linear to more project-oriented dynamic structures; and the call for continuous change and improvement among project managers. The case studies showed how the change could be made successfully in terms of application of online tools and automation through cloud and application of artificial intelligence and machine learning tools and what the barriers to it were for organizations, including resistance to change, lack of applicability of existing skills, and lack of existing infrastructure.

Based on research findings, digital transformation provides the greatest opportunity for enhancing project performance, communication, and results. But it also needs a more strategic approach, investment, and training in order to develop the project managers and the teams to respond to the digital future as it is beginning to unfold. Finally, organizations

that have accepted the digitization agenda will be capable of delivering top-notch outcomes in demanding projects, which has been evidenced by the case studies. Combining these results, this study offers a clear-sighted vision for Saudi Arabia concerning the function of keeping up with digital transformation in the context of the future of project management.

These findings also complement the argument of the impact of digital transformation by showing the prospects with emphasis on the competitive advantage in project management. Firms that effectively adopt digital technologies and adopt agile processes often experience not only productivity improvement but also the improvement of the ability to manage environment and customer expectations. This flexibility is particularly crucial in the context of Saudi Arabia's Vision 2030 since new technological solutions are quickly altering the industry. Digital transformation is depicted not as application of new technologies but as an organizational need for projects to be successful.

Chapter 5: Discussion

5.1 Introduction

In this chapter, an attempt will be made to make sense of the document analysis and case studies that were discussed in Chapter 4. The discussion centers on the primary research questions: 1) In what ways have project management practices been enhanced through digital transformation in Saudi Arabia? 2) The new means of supporting work in different sectors as a result of digitalization and the competencies needed in leading digital projects. 3) What problems have been experienced by the organizations during this transitional phase? Answering these questions, this chapter offers a qualitative analysis of the consequences of digital transformation in project management practices and positions the findings of the study within the body of knowledge. It discusses the applied and theoretical implications of this work fully.

5.2 Interpretation of Findings

Impact of Digital Transformation on Project Management Practices

Emerging changes examined within the scope of the study reveal that Change is in synergy with the general digitalization agenda of the country as it progresses in the overall Vision 2030 plan. The shift from conventional project management practices to lean, mean, use of technologies, and customer-focused solution approaches imply increasing importance of productivity, teamwork, and adaptability to changes within the project domain. This discussion will build on these trends and compare the achievements between sectors, as well as offer a detailed assessment of the implications for project management practice in Saudi Arabia.

Vision 2030 has been a major factor triggering change that laid the groundwork and created the necessary conditions for digitizing the Saudi Arabian economic sectors. Of course, as outlined in Chapter 4, the government's policy of diversification of the economy

and improvement of the level of operational efficiency places pressure on the organizations to update the approaches to the management of projects. From this, they have seen an increased growth towards using digital tools and technology to get the job done, for instance, cloud-based programs such as Microsoft Project, Asana, Jira, and collaboration tools. These have provided the needful in the proper management of projects, especially when it comes to task management and coordination, resource management, and real-time communication across the project. The mentioned tools have enabled project managers to make effective decisions and switch from intuition-based decision-making. The utilization of predictive analytics and project AI management tools like cyclic project management software has allowed project teams to identify the possibility of early risk factors in their delivery phases of projects and to prevent them. This way, using big data of project-related processes, the manager can make the right decision, change project plans, and use available resources effectively, which will help increase the success rates of projects.

The increasing digital trends for various firms are not consistent between the various industries. Specifically, additional uses have been observed in fields such as IT and healthcare since organizations of these industries demonstrate comparatively high degrees of digital development. For example, AI and machine learning software technologies and intelligent digital forecasting tools have crucially contributed to improving project management and delivery in these fields. They help in efficient management of risks, accurate predictions, and seamless communication, being efficient physical solutions for complex and fast-paced projects. The construction sector has proven to have a slow movement toward the uptake of digital tools and ways of working. The case analysis of documents and case studies shows that the adherence to the more ‘conventional’ or sequential approaches in managing projects, backed up by regulatory frameworks and challenges of managing large-scale construction projects, has faded attempts to adopt more

agile approaches. However, over the last year or two, we are witnessing small signs of a gradual transition towards digital project management as more construction companies try different tools and incorporate elements of Agile and hybrid frameworks into their operations. This transition is gradually being spurred on by the rising demand to improve the schedules of project execution, costs, and satisfaction of the customers, end users, and other interested parties.

One of the usual observations from the case studies is the continued shift from the customary sequential approach to project management to phase-based, flexible, and responsive paradigms. This change is illustrative of a general trend towards greater flexibility and adaptability in the management of projects. These new approaches to planning, which are popular among the country project managers and are based on iterative and incremental models, include; In the use of agile and hybrid project management methods, the current need for an ability to quickly adjust to changes in project and stakeholder needs is evident. These frameworks enable the project manager to make changes to his plans by embracing real data and feedback, thus minimizing the chances of a project stalling while at the same enhancing the capability of delivering value in small chunks. In fields such as IT, where the specification of a project may change quickly, the agile methodologies have become rather common; they allow teams to stay as productive as possible and be ready for new problem solving at any time. A mixture of the agile system with the conventional one is known as the Agile-Traditional hybrid project management technique. It has been applied in industries that involve a certain level of fit between the logistical requirements and the necessity for certain degrees of directional planning, including health care systems and infrastructural development projects. When implementing Agile in an organization, the organizations adopt the strengths of the Agile method by applying it in a method that is used with the traditional method while at the

same time providing the organizational structure, plans, and control that are offered by the waterfall model.

The new communication technologies and the ways in which they affect collaboration and knowledge sharing within project teams. The use of collaborative tools in cloud platforms has eradicated practicing barriers when it comes to information dissemination and current changes. It has been especially useful in the situation where there were several employees involved or the teams were located in different geographical locations, as the implementation helps increase the level of openness and, consequently, decrease the number of misunderstandings and the time needed to make decisions. Microsoft Teams, Slack, Trello, and so on are now part of project management tools, offering a central place for coordinating the work, sharing documents, and communication. Overall, these tools have helped to make the project process efficient to a level in which the project managers are able to monitor and track the project deliverables and the stakeholders involved. The communication tools have been integrated with project management software to provide notifications and updates on the progress of projects, therefore eliminating callbacks that would be necessary in traditional project management software. Furthermore, the incorporation of artificial intelligence and machine learning in the project management software enhances the prioritization and distribution of tasks. It is possible to achieve some really valuable results when such tools are used to analyze the historical data of the project; the resulting information may reveal the potential risks, so the project manager can take appropriate remedial action. This capability has been most beneficial in large and lengthy projects because change is frequent and can happen at any time.

The implementation of BIM is to be feared by one of the primary reasons that include: resistance to change, especially where there has been a longstanding practice of using traditional ways of completing projects, such as in the construction and

manufacturing businesses. Cultural and organizational inertia are typical for many organizations; people and managers are reluctant to change and use new tools and methodologies, preferring tried-and-true approaches. For example, there are regulatory constraints that have been a bottleneck in some areas, such as construction and health, which have numerous regulations to follow when executing the project. Most of these regulations set stringently high standards for digital tools, and, therefore, the transformation of project management tools could take a long time. Moreover, while access to the digital tools can be expensive at the first instance and may require a lot of training time for the staff, this may not be easily affordable by small organizations or those with limited financing. Making certain that the project teams are trained properly in the new software is therefore of central importance, and yet many organizations fail to provide the appropriate facilities for this transition.

Saudi Arabia's odyssey of EM's digital transformation in project management is in its infancy; nevertheless, the trend is progressively unambiguous. Therefore, it is probable that as more organizations adopt digital technologies and Agile approaches, there will be further enhancements in work productivity and communication with project participants and other stakeholders, as well as better organizational performance indicators when implementing those projects. There has been a focus on the development of information technology under Kenya's Vision 2030; the rise will only further propel developments in the future of project management. Saudi Arabia's digital transformation of project management: A leap towards greater efficiency, agility, and data. There are obstacles, especially in industries that are considered classical, but the overall trend is progressive, with more and more projects adopting digital as well as various approaches to agile. Incorporated in the letters and documents and the case studies, these changes serve as indications that the organizations have to adapt to the changes to remain relevant in the

modern project arena. With the country still working towards the vision 2030, project managers who embrace the above paradigms will be better placed to take responsibility for project performance and the nation's economic growth.

5.3 Comparison with Existing Literature

The result of this research supports the previous works on digital transformation in project management and its relevancy to Vision 2030 in Saudi Arabia. The benefits of the digital tools for managers and project performance, explaining how the cloud technology and AI project management software can contribute to the project environment regarding solution of the tasks, top-pick of the resources, and decision-making. The findings of this research are in support of these observations, and the case studies uncover how digital tools like Microsoft Project and Asana are making project management more efficient in sectors that possess high levels of digitalization, including the IT and healthcare sectors. This change in the management of projects towards adopting more flexible management and integrated practices aligns with international trends and the use of technology to respond to demand for adapting to new projects.

However, the study reveals some deviations from the previous literature, especially within the construction context. While many correspondents recommend that Agile should be employed extensively, this research demonstrates that traditional approaches to project management remain applicable in industries where compliance with regulations is highly important and where planning is considered to be highly formalized. Large-scale construction projects in the Kingdom of Saudi Arabia, such as the Saudi Arabian construction industry, have not been able to fully adopt Agile due to restrictions imposed by the authorities as well as the vast scale of construction work. This means that while digital transformation is occurring, a universal approach may be ineffective and micro-level approaches are needed. This study indicates that, while agile frameworks are valuable in

the modern organizational context, the application of these frameworks and strategies should be more sophisticated than the straightforward application of the same across industries.

The identified skills gap reveals existing difficulties project managers encounter when dealing with new technological tools and approaches. Use of increased training need and facility with data analytics to argue that although digital literacy has been discussed as necessary when moving forward through various stages of digital transformation, there is more need for that kind of preparation as the process continues. In the context of Saudi Arabia, bottom-up factors such as government programs like Vision 2030 help to push the digital initiatives and at the same time put pressure on organizations to ensure that they empower their employees with the relevant knowledge. This research advances knowledge in the extant literature by offering recommended solutions based specifically on the Saudi context, noting that specialized training programs and relevant support services are critical for addressing the digital divide and promoting the effective application of digital project management practices to various sectors.

5.4 Implications of the Study

The findings of this study have several theoretical and practical implications. Consequently, this study offers the academic discipline new insights of digital transformation in project management from the Saudi Arabian context, though such a line of research is scarce in the literature. It demonstrates how project management practices have changed and how digital tools combined with agile methodologies define the project's flow. The paper raises awareness of skill adaptability, presenting an understanding of the key skills needed for project-based work in a technical environment.

The implications of the research contribute some insights toward managing projects, strategy formulation, and implementation by project managers, organizations, and

policymakers throughout the Kingdom of Saudi Arabia. The implications derived from the study are significant and revolving around the use of digital tools to support project management activities and the training of new skills to face the new dynamics of projects. The study results could be useful to policymakers, especially those behind Kenya's Vision 2030, as they design frameworks that will ease the spatial enablement of project management in various fields.

Chapter 6: Conclusion and Recommendations

6.1 Conclusion

The data collected for this work offer a comprehensive perspective into the effects of digital transformation on project management in Saudi Arabia. Therefore, using key documents and major case studies, including NEOM, the Red Sea Project, and Qiddiya, the research established several underlying themes that characterized the existing shifts in project management. Overall, it is evident from the study that the digital transformation has impacted the type of tools used in projects, the way projects are carried out, and the new skills required by project managers in handling these projects.

The use of such technological innovations as AI for project management, IoT for project control, and cloud technology for teamwork and collaboration has led to efficiency improvements in project coordination, monitoring, and decision-making. The case studies indicate that the adoption of these tools has a positive impact on duration, resource utilization, and interaction between the stakeholders. From NEOM and the Red Sea Project, we can see that digital capabilities are not only helpful in organizational and administrative work but deepen the correspondence between project successes and Vision 2030's sustainable development and technological objectives.

Furthermore, this paper establishes that there is a significant adoption of Agile and hybrid models, which gives the project managers an opportunity to flexibly address the requirements' evolution. These changes in project workflow patterns portray the dynamism of large-scale project development and implementation. However, it also means that project managers need to learn new competencies inherent in a digital landscape, such as digital competency and data analytics competency and competencies related to leading an organization in a digital environment. Based on the analysis of the benefits of digital transformation in Saudi Arabian project management mentioned above, the study has

revealed several challenges associated with digital transformation, such as; Digital tool adoption resistance Digital literacy gaps Infrastructure constraints in some regions.

Saudi Arabia's digital transformation is impacting project management in terms of process and performance. Nevertheless, sustained efforts aimed at increasing the levels of digital literacy and the capacities of digital networks are required in order to mitigate the issues described. This study supports the significance of the technology to realize the goals of Vision 2030 and brings to focus the fact that the field of project management has to continuously adapt to technological evolutions.

6.2 Recommendations

Taking into account the results obtained, the following recommendations are provided to the practitioners and policymakers to enhance the usage of the digital transformation in the context of project management in Saudi Arabia:

Recommendations for Practitioners

The managers of the projects should make conscious efforts to embrace technology in their operation through the tools that make use of real-time communications, tracking of projects, and even the resources. For example, AI-related applications and IoT monitoring systems can be used to predict delays in some operations and increase effectiveness. It will be to the advantage of practitioners to take time and invest in the understanding and proper application of these tools on the project.

Adopt Agile and Hybrid Methodologies

Based on the discussion of the strengths of agile and hybrid methodologies in meeting multifaceted project needs, there is a call on practitioners to shift from the traditional approaches of project delivery and embrace the iterative and incremental way of project delivery. Practitioners can minimize risk and make quick changes, all due to the agility in the application of methodologies in the project scope. A simple way of doing this

might be to offer training on agile principles and practices to the teams as a way of transitioning.

Focus on Digital Skill Development

To tackle digital literacy issues, the project managers need to learn as much as possible about the new tools and new technology. It is the reason why organizations should supplement this by providing training for the respective project management technologies. Promoting digital competence within the project teams will ensure the project managers create a convincing vision and culture of digital transformation and innovation, which is valuable for the project's successful completion.

Enhance data-driven decision-making

Data collection and analysis be carried out throughout the project life cycle by the practitioners. The relevant data collected and its analysis with the help of data analytics tools can help determine the project's performance and predict possible problems. To facilitate proactive project management, training teams on how to make use of analytics-based insights is also advisable.

Policymakers' recommendations

Invest in Digital Infrastructure

There is a need for the Saudi government to still spend money on digital infrastructure, particularly in rural or underserved areas. Availability of fast and efficient internet connection, effectively connected network, and modern digital platform is crucial when working in conditions that require real-time communication and data sharing in large projects.

Promote Digital Literacy Programs

The policymakers should contemplate introducing national-level programs on enhancing the digital literacy of the project managers and the teams. These could comprise

certification and courses in technologies, analysis of data, and new methodologies in project management, hence skilling the workforce in the application of modern technology to project management.

Support Collaborative Platforms for Knowledge Sharing

The government can support knowledge sharing by designing spaces where project managers from different industries can talk, share the lessons learned, the success stories, and the insights of advanced companies in their digital transformation journey. Such a cooperative arrangement would foster the sharing of best practices in the use of digital tools in different settings within projects.

Develop Policy Guidelines for Digital Transformation

To contribute to consistent digital transformation in various industries, there is a necessity to create a consistent set of standards and rules that will describe how digital tools and methodologies should be implemented in project management. Such rules could assist in working towards the achievement of national goals such as Vision 2030 and in bringing conformity in the application of digital practices across various fields.

6.3 Limitations of the Study

Despite the fact that this study delivers significant findings regarding digital transformation's effect on project management in Saudi Arabia, there are some limitations that should be discussed. First, the use of document analysis and specific case studies can be limited in terms of identifying all facets of project management experience across different industries. This emphasis on large-scale projects like NEOM, the Red Sea Project, and Qiddiya might restrain the application of findings to minor projects or organizations that might not have sufficient capital to invest in adequate digital transformation.

The use of secondary data is the key limitation of the present study, as more primary data from interviews with project managers might have been collected to provide richer

insights into project management experiences and problems. Such limitations could be the focus of future research to achieve a more diverse pool of case studies and conduct primary research to support the findings made in this paper.

6.4 Suggestions for Future Research

Broader Industry Coverage

Future research may focus on understanding the effects of digital transformation on project management in more sectors, including education or manufacturing. Extending the range would give more information about the state of digital transformation in various industries and the distinctive problems of various disciplines.

Quantitative Assessment of Digital Transformation Impact

This study investigated qualitative findings only, but future research could collect quantitative data to assess the extent of using digital tools for the performance of project goals, including costs, schedules, and satisfaction levels of stakeholders. This way, the researchers could offer a better practical view on the benefits of digital transformation.

In-Depth Analysis of Digital Skill Development

Since digital skills were discovered to be essential for project managers, subsequent research could examine what kind of digital skills are highly beneficial in project management. They could perhaps find out how various training activities affect project performance and whether new competencies may be required by the existence of new technologies.

Exploring Change Management in Digital Transformation

Future research could also perhaps focus on the impact of change management strategies on the achievement of digital transformation in the management of projects. Researching ways to eradicate or minimize resistance and to promote digital culture might be beneficial for project managers and organizations involved in digital transformation. By

following these recommendations, Saudi Arabia can gain more benefits by understanding how digital transformation of project management should be further developed. This can help improve the usage of effective digital practices consistent with Saudi Arabia's Vision 2030.

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