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The Successful Factors for Digital Transformation in Project Management

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Abstract: In the era of Industry 4.0, the advent of the digital revolution is reshaping project management processes, and digital transformation is advancing with a heightened focus on its influence on project success. Research on the success factors for digital transformation in project management is limited, particularly in drawing industry-specific conclusions, owing to varying levels of digitization across projects. The exploration of success factors' impact on the digital transformation process and the distinctive characteristics of different industries remains largely uncharted territory. This research aimed to explore key aspects of digital transformation projects, focusing on success factors that significantly influence their outcomes. A Thematic analysis approach was used to draw insights. The analysis delves into four crucial success factors. These key themes included organizational change management, organizational efficiency enhancement, organizational process management, sustainability, and societal management. Each factor is examined for its role in shaping successful digital transformations. The conclusion succinctly summarizes the key findings and emphasizes the importance of these success factors in the context of digital transformation initiatives. These findings go beyond the scope of prior research, delving into the intricacies of industry perspectives, which can drive the digital transformation of project management practices.

Keywords: Digital Transformation, Project Management, Project Success Factor, Thematic Analysis

1. Introduction

In the era of Industry 4.0, a notable shift towards digital transformation in project management is observed. This transformation enhances management efficiency by fully integrating projects with digital tools and technologies. The convergence of pertinent technologies and the evolving dynamics of customer needs collectively expedite the digital transformation in project management. Consequently, ongoing research is actively leveraging digital technologies to enhance organizational management. The manifestation of digital transformation is evident in the rapid progress of convergence of digital technologies, interconnectedness, centralized data, and diversified skills.

The integration of digital tools and technologies for communication and collaboration by project managers is becoming more prevalent in addressing the intricate nature of project management. This incorporation aims to enhance integration, cooperation, communication, and coordination within projects [1]. Effectively utilizing digital tools for stakeholder management presents a significant

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opportunity for digital transformation across diverse projects. It is also crucial to acknowledge the substantial variations in projects across countries concerning cultural, political, and digital development aspects. Consequently, success will display distinct characteristics factors for digital transformation of project in different contexts.

The initial stage in investigating the success of digital transformation projects involves establishing the criteria for project success. The definition of project success has developed in tandem with the growing emphasis on project management practices. Presently, the prevailing definition of project success (demonstrated in Figure 1) is the fulfillment of a project in the designated scope of cost, time, and quality.

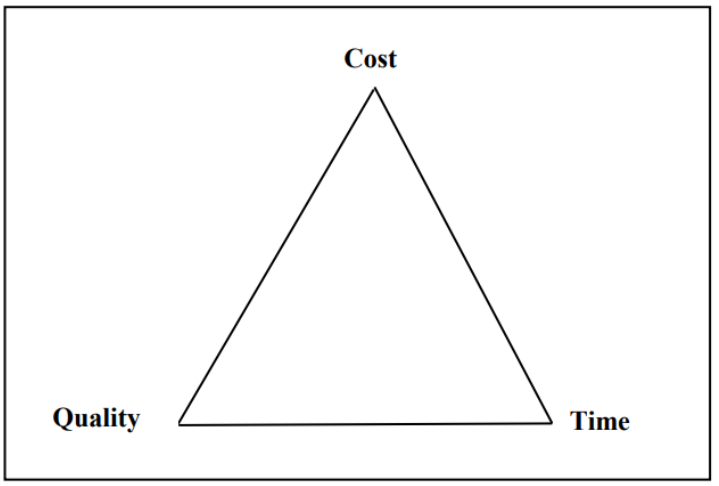

Figure 1: The Iron Triangle (Picture: Original).

Many scholars characterize project success by dividing it into two aspects. One is the success of the final project product, centered on the final deliverable. The other is the success of project management, based on the components of the iron triangle. Earlier models for comprehensive quantitative assessment acknowledged the differences between them, considering crucial indicators for both aspects. Supplementary elements, including project sponsor engagement and stakeholder satisfaction, as well as the accomplishments of strategic goals, were added to broaden the standard of project success. Subsequently, a more encompassing definition emerged, characterizing project success as the timely, cost-effective, and scope-compliant completion of a project, fully meeting the needs of the sponsor and client [2].

Due to sustained research focus, the modern recognition of project success has transformed into a multi-dimensional framework, encompassing the traditional iron triangle, stakeholder satisfaction (including clients and project sponsors), and the realization of anticipated project outcomes. This also has universal applicability and guiding significance for the research on the success factors of project digital transformation.

2. Success Factors for Digital Transformation Projects

Previous studies in the realm of digital transformation in project management has primarily concentrated on agile methodologies and the transformative potential of digital technologies in project management. Contributions to the digital transformation process often involve creating theoretical models based on transformation paths and establishing digital indicators [3]. Academia frequently employs the digital maturity model to illustrate the extent of digital transformation within an organization.

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Digital transformation in project management extends across various industries, facilitating value realization at different levels. Studies highlighted that digital transformation is not exclusive to the traditional sectors like manufacturing and construction sectors; it also provides organizations which focus on services with ways to achieve unique and competitive advantages. Beyond enhancing management efficiency to increase economic values, the digital technologies involved in the digital transformation process contribute to a green transformation, fostering sustainable development of environmental and social value. As projects undergo digital transformation, the researcher has explored several perspectives for comprehensive investigation using a thematic analysis. The key themes can be classified as: organizational change management, organizational efficiency enhancement, technology-driven innovation, sustainability and societal management, and stakeholder management.

2.1. Organizational Change Management

The exploration into change management strategies and processes examines the integration of digital transformation into organizational structures. Appio's framework clarifies the interaction between organizational digital transformation process and project management, highlighting the focus on restructuring capabilities to meet challenges [4]. Existing literature on change management processes scrutinizes impacts on individuals in the digitalization process, emphasizing topics like team management through theoretical and empirical studies. Addressing challenges of changes in digital transformation, including employee resistance, organizational restructuring and cultural conflicts, is crucial. The dependent effects of digital transformation on middle managers' involvement and the evolving role of leadership in an increasingly digital world are well-founded [5].

Furthermore, management level leadership roles play a pivotal role in fostering the essential competencies requisite for success in projects involving digital transformation. In the ever-evolving landscape of digital transformation, the intersection of technological innovation and environmental dynamics accentuates the need for nuanced leadership strategies. As organizations embark on the digital journey, project leaders play a pivotal role, equipped with a profound comprehension of the distinct challenges encountered at each phase of transformation. Their adaptability to leverage the opportunities presented by digital tools becomes a critical factor in steering projects towards success. Transformational Leadership and Adaptive Leadership have surfaced as indispensable approaches, adept at managing behavioral shifts and facilitating a swift adaptation to new and dynamic environments. Recent research has also delved deeper into the intricate dynamics of digital project teams, shedding light on the importance of empowerment, continuous learning, and leadership development as essential elements propelling organizations toward triumph in the realm of digital transformation. This multifaceted exploration underscores the significance of leadership acumen in navigating the complexities of the digital era.

2.2. Organizational Efficiency Enhancement

Organizational efficiency enhancement is also a critical success factor in the context of digital transformation within project management. This facet delves into how digital transformation can elevate organizational productivity, trim costs, refine business processes, and truly impact overall organizational performance. The integration of advanced digital tools is instrumental in streamlining processes, optimizing resource allocation, and enhancing overall productivity. After analyzing 478 articles through bibliometrics, Carl et al. highlight the digital landscape of project management. They argue that the adoption of agile methodologies in implementing digital technologies and digital transformation can result in positive effects, specifically in enhancing organizational efficiency gains

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[6]. These technologies facilitate improved communication and collaboration among project teams, expediting decision-making and reducing delays.

Besides, the data-driven nature of digital transformation empowers organizations to make informed decisions, monitor project progress effectively, and adapt swiftly through agile methodologies. This focus on efficiency ensures punctual project delivery, high-quality outcomes, customer satisfaction, and adaptability to evolving market dynamics. In essence, enhancing organizational efficiency serves as a foundational element in cultivating an agile, collaborative, and adaptive project management environment in the digital era.

2.3. Organizational Process Management

Investigating the forefront of innovation trends in organizational digital transformation involves harnessing emerging technologies to elevate operational workflows, introduce novel offerings, and fortify innovation capabilities within project teams. Take the burgeoning significance of big data analytics in financial endeavors, for instance, especially within trading and market activities, where it facilitates predictive analysis and prognosis. Additionally, the operation of digital transformation during various stages of digital innovation requires crucial elements like team-specific cognition and digital project-specific cognition [7].

Furthermore, digital tools and technologies have brought about a significant transformation in the process, fundamentally altering the logic projects are conceptualized, executed, and managed. This progress has ushered in greater efficiency and sustainability, increasing accuracy and collaboration to project processes. In the project process domain, numerous digital tools and technologies are applied across various industries to enhance project management processes (demonstrated in Table 1).

Table 1: Digital Tools and Technologies Applied in Projects Process Management.

Digital Tools and Technologies	Application in Project Process Management
Project Management Software	Tools like Microsoft Project, Asana, Trello, and Jira facilitate project planning, scheduling, and collaboration.
Collaboration Platforms	Platforms such as Slack, Microsoft Teams, and Google Workspace enable real-time communication, file sharing, and team collaboration.
Cloud Computing	Cloud services like AWS, Microsoft Azure, and Google Cloud provide scalable storage, computing power, and collaboration capabilities for projects.
Virtual Reality (VR) and Augmented Reality (AR)	VR and AR technologies enhance visualization, training, and simulation aspects of certain projects, particularly in architecture and construction.
Data Analytics and Business Intelligence (BI) Tools	Tools like Tableau, Power BI, and Google Analytics help analyze project data, track key performance indicators, and make data-driven decisions.
Artificial Intelligence (AI) and Machine Learning (ML)	AI and ML applications are increasingly used for predictive analytics, risk management, and process automation in projects.
Internet of Things (IoT)	IoT devices collect real-time data from project sites, enabling monitoring, tracking, and optimization of various processes.
Mobile Applications	Mobile project management apps provide on-the-go access to project information, communication tools, and task management.

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Table 1: (continued).

Blockchain Technology	Blockchain ensures secure and transparent transactions and data sharing, making it valuable for projects with a focus on data integrity and security.
Robotics and Automation	Robotic process automation (RPA) and robotics are employed for repetitive tasks, reducing manual effort and improving efficiency in certain projects.
Drones	Drones provide aerial views for surveying, monitoring, and inspecting project sites, especially in construction and environmental projects.
Geographic Information System (GIS)	GIS tools assist in mapping and spatial analysis, aiding projects related to urban planning, environmental management, and infrastructure development.
Collaborative Document Editing	Tools like Google Docs and Microsoft Office 365 enable real-time collaborative editing of project documents.

2.4. Sustainability and Social Management

From the perspective of environmental and social impact, it plays a crucial role as success factor in digital transformation within project management. This aspect examines how digital transformation contributes to sustainable development goals and its influence on environment and the society. In the context of project management, it involves leveraging digital technologies to foster environmentally friendly practices, reduce resource consumption, enhance social inclusion, and create job opportunities. Some studies advocate for digital transformation as an innovative approach that embraces digital technologies to revolutionize company operations, meet stakeholder expectations, and generate value with broader societal benefits. Researchers have emphasized how digital transformation can revolutionize company operations, aligning them with sustainable practices and delivering societal benefits. For instance, it may involve reducing the environmental footprint of projects, ensuring ethical and responsible use of resources, and promoting social equity.

Digital platforms and technologies are explored as tools to transform public sectors and contribute positively to societal and environmental well-being. Research by Senyo has introduced a Transformation Availability Framework (TAF) and offers insights into how digital platforms can bring transformative changes to the public sector, presenting recommendations for effective implementation [8]. This perspective aligns with broader global initiatives for sustainable and responsible business practices, making it a critical dimension of success in contemporary project management.

3. Digital Transformation Project in Different Industries

The criteria defining project success vary across industries. In the IT sector, for example, a study by Sulistiyani and Yulianing Tyas suggests that a combination of project technology and quality, organizational effectiveness, and stakeholder acceptance contribute to 78.73% of the variability in IT project success [9]. Gervasi et al. proposed a framework, derived from a literature review, to offer a project practitioners insights of significant success factors within IT project background [10]. Considering from the domain of information and communication technology (ICT) projects, research outcomes underscore the paramount importance of senior management endorsement, well-timed planning, and proficient communication as the top three pivotal factors conducive to enhancing project management efficiency and optimizing overall project success.

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In the construction sector, scholars contend that the conventional parameters of the Iron Triangle (cost, time, and quality) lack comprehensive sufficiency in delineating project success. According to Kumar, professionals in this industry are progressively turning to supplementary performance indicators to thoroughly evaluate and gauge the success of their projects [11]. Numerous studies conducted globally delve into various aspects of project success in construction. Some studies explore the interplay between different levels of management communication and project success. Others investigate how a company's technical capabilities, including application in project scope and job definition, contribute to project success. The advent of digital transformation technologies has significantly enhanced efficiency in the construction industry. Collaboration between construction practitioners and ICT researchers has also boosted productivity by automating workflows and management activities in construction projects.

The integration of ICT tools in effectively addresses technological complexity and rapid changes in requirements, facilitating data and resource management and security through iterative and incremental development. Generally, the digital transformation of projects fosters collaboration among cross-functional teams, representing a growing trend in construction project management. Effectively managing technological intricacies and swiftly adapting to evolving requirements, the integration of ICT tools in projects caters to data and resource management, ensuring security through iterative and incremental development [12]. Overall, the trend of digital transformation in projects encourages collaborative efforts among cross-functional teams, marking an ascendant trajectory in the realm of construction project management.

In the public sector, digital transformation stands out as a pivotal theme across countries, spanning from the national to organizational and citizen levels. Countries shape their strategies and visions by emphasizing digital transformation in their development and management processes. Investing in research, development, and training in digitization is crucial for propelling the entire public sector toward a more profound transformation in the coming years. The outbreak of COVID-19 in Spain, for instance, prompted a swift acceleration toward digital transformation, fundamentally altering the perspectives of local public administrators on ICT. This transformation has engendered heightened confidence in the effective application of ICT to propel cities towards economic, social, and environmental objectives. Simultaneously, the pandemic has intensified global demand for improving ICT technologies, placing substantial pressure on, and impacting the performance of innovative ICT solutions. As a result, the full and timely adoption of comprehensive digital technologies becomes paramount for success across projects in all industries.

4. Conclusion

The research provides a comprehensive exploration of digital transformation across diverse dimensions by identifying and analyzing the four crucial success factors, offering valuable insights in project practice.

The study delves into organizational change management, emphasizing the intricate interplay between digital transformation and project management. It identifies leadership roles and strategies crucial for success. The examination of organizational efficiency enhancement reveals the positive effects of agile and agile project management in the implementation of digital technologies. The research also investigates form project process domain, showcasing the transformative impact of emerging technologies such as big data and analytics on project processes. It underscores the significant role of digital tools in enhancing efficiency, accuracy, and collaboration in project management. Furthermore, from a sustainability and societal management perspective, the research positions digital transformation as an innovation that not only revolutionizes company operations but also contributes to societal well-being. The study explores the potential of digital transformation to

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address sustainable development goals, reduce resource consumption, increase social inclusion, and create jobs.

The study also explores the success criteria for projects from different industries, with distinct factors influencing outcomes. In different industries, recommendations are provided as follows.

Adaptability in IT projects:

- Emphasize adaptability to technological advancements.
- Prioritize stakeholder acceptance and organizational effectiveness.

Diverse performance metrics in construction projects:

- Encourage the adoption of varied performance indicators.
- Promote collaboration between construction and ICT professionals.

Strategic digital adoption in the public sector projects:

- Prioritize research, development, and training in digitization.
- Advocate for comprehensive and timely adoption of digital technologies.

It is also important to emphasize continuous monitoring and learning in all industries. The project manager is suggested to be responsible for regularly assess project dynamics and adjust strategies accordingly. The project team should foster a culture of continuous learning to stay abreast of technological and industry changes. For future research, exploring longitudinal dynamics, conducting cross-industry case analyses, and fostering global collaboration will contribute to a more comprehensive understanding of digital transformation, promoting efficient and sustainable project management practices.

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