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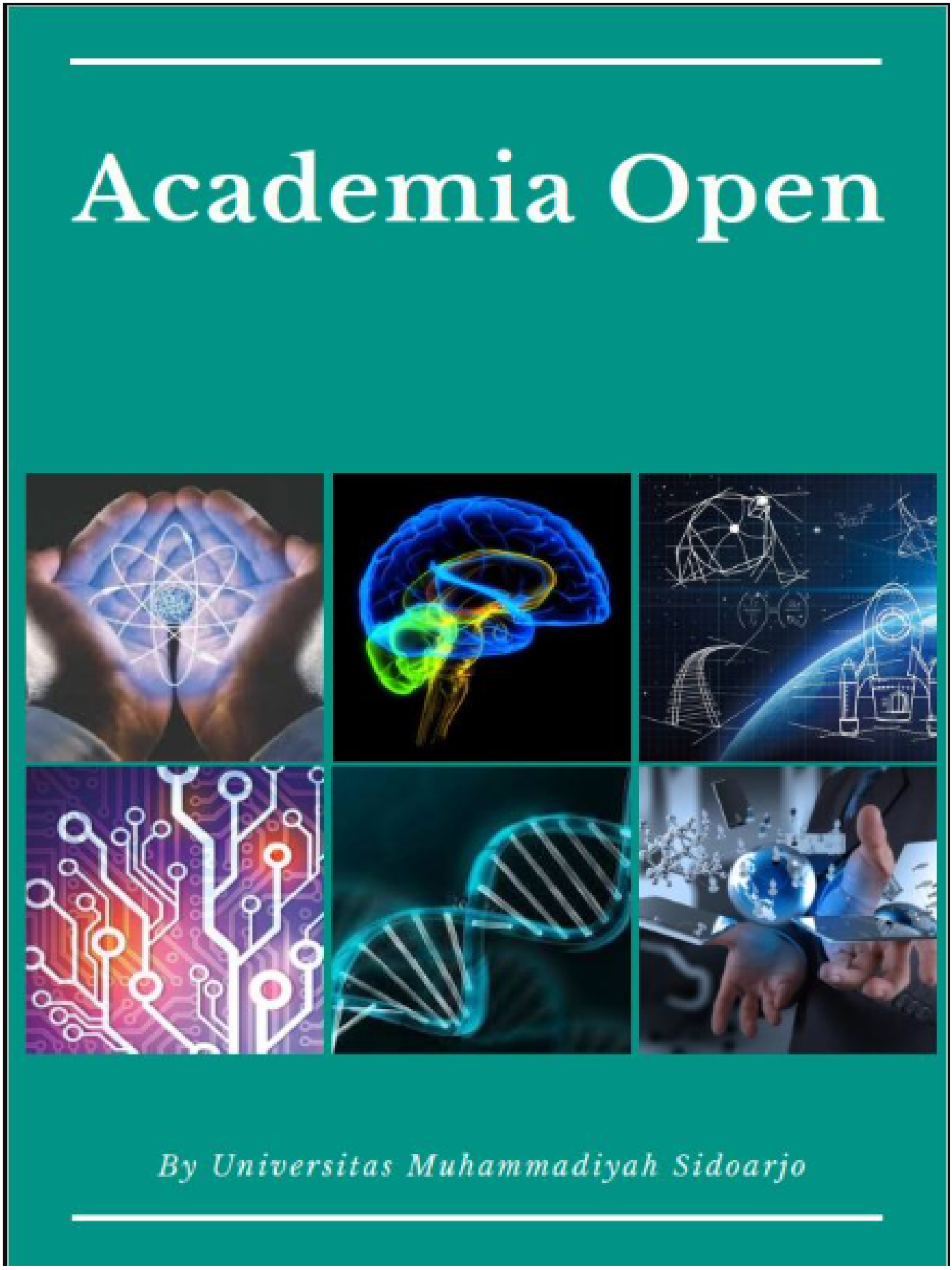

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Generative Artificial Intelligence in Contemporary Project Management: Kecerdasan Buatan Generatif dalam Manajemen Proyek Kontemporer

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Abstract

General Background: Digital transformation has reshaped project management practices across industries. **Specific Background:** Generative artificial intelligence has emerged as a novel technological development supporting planning, decision-making, and coordination activities in project environments. **Knowledge Gap:** Despite growing interest, empirical evidence on how project managers appropriate generative artificial intelligence in their daily tasks remains limited. **Aims:** This study aims to examine the role and application of generative artificial intelligence within project management practices. **Results:** The findings indicate that generative artificial intelligence is primarily utilized to support project planning, decision support, and task execution, while human judgment remains central to managerial decision-making. **Novelty:** The study provides empirical insights into human–AI collaboration in project management, an area that is still underexplored in current literature. **Implications:** The results contribute to academic understanding and offer practical guidance for project managers seeking to integrate generative artificial intelligence responsibly within project workflows.

Keywords: Generative Artificial Intelligence, Project Management, Digital Transformation, Human–AI Collaboration, Decision Support

Key Findings Highlights:

1. Generative AI is mainly applied as a support tool in managerial tasks.
2. Human expertise remains essential in interpreting AI-generated outputs.
3. Adoption patterns reflect ongoing digital transformation in projects.

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Introduction

The breathtaking advances in today's technological landscape have transformed the concept of administrative labour through the digital revolution. Innovative computing systems are now employing generative artificial intelligence (AI), which serves as a system enabler, facilitating human activity in developing novel content and creative solutions that fall outside existing paradigms. The importance of such a variable goes beyond mere operational automation and reaches the level at which intelligent systems theatrically complement human intelligence. Together, we seek to make accurate predictions in an uncertain world and help people make smarter decisions under difficult work conditions. Importance of role The effectiveness of this mode depends on the natural dimensions, starting with how much the job is clearly specified to provide helpful outputs, based on the degree to which AI complements human or acts in place of them and breaks their own risk exposure, extending up to extending contact modalities that afford productive joint tasks between user(s) and system.

In a similar context, these capabilities are intrinsically integrated with digital project management systems that are fundamentally based on the ability to interact with digital systems, largely data-filling systems, to gain a competitive advantage over time. An AI flexible framework to enable information flow is made possible by the human factor, which involves the ability and innovativeness to deploy such tools. Thus, the intersection of technology and digital innovation emerges as a decisive factor in reconfiguring administrative processes once flexible organization configurations start to determine what should be adopted in terms of IoTs and cloud data, besides being responsible for operational effectiveness improvement, power, and sustainability of the digital projects in a context marked by uncertain and permanent complexity. The study framework consisted of four major sections. The investigation presented the first paragraph on methodology; the second one was woven around a review of the literature related to the variables (main research and their sub-dimensions); the analysis results of the study were discussed in the body of the third paragraph. It ended in the fourth paragraph, where research findings brought the environment to bear on generalisation, implications, etc., which emerged as outcomes of the statistical analysis.

Methodology:

This part includes the problem, objectives, significance, research methodology, data collection tool, and analytical instrument used, and statistical processing as follows:

1. **The problem :**

The theoretical framework of this study is derived from a gap that arises despite the novelty of (CONCEPTUAL) generative artificial intelligence and the existence of intellectual frameworks that explain its interaction mechanisms, with success in digital project management within Arab administrative structures. Hence, it is important to establish this association scientifically. The practical issues are the limited use of existing smart technology resources within the Investment Authority and the unreasonably high level of control over personal expertise during decision-making to solve project problems. This results in delays in responding to digital changes and makes human error in difficult strategic decisions more likely. Accordingly, we aim to overcome this gap by exploring how generative technical dimensions can make sense of the unemployment of organizational efficiency and lift standard project management practices from business-as-usual frameworks towards the horizons of sustainable digital innovation. To make the problem, we ask:

- To what extent are the employees in the studied organization aware of the concept of generative artificial intelligence and its role in the success of digital project management?
- What is the relationship between generative artificial intelligence and the success of digital project management?
- What is the relationship between the individual dimensions of generative artificial intelligence and the success of digital project management?

1. **Objectives**

- The purpose of this study is to construct a knowledge base on GAI and digital project management by exploring the philosophical and theoretical underpinnings that bind these two concepts, and to determine the core dimensions of each, taking into account contemporary contributions from the management literature. It also tries to logically connect the generative ability of an intelligent system with digital project success as a product and sports , presenting a hypothetical integrated model that accounts for both direct and indirect effect paths. This helps close the theoretical gap in Arabic literature that could be used by researchers in this critical area.
- Field objectives comprised identifying the level of awareness among Karbala Investment Authority staff regarding generative AI concepts and digital project success requirements, and estimating the overall impact of the independent variable on the dependent variable. The research also seeks to identify the unique effects of each facet of generative AI (task definition, contribution AI, interaction method, structure AI, and human personality) on project management success. This will enable the delivery of recommendations that can be put in place to both improve Authority efficiency and leverage smart technologies to increase investment outcomes.

1. **Importance:**

- The need for this research is to offer the top management of the Investment Authority a clear, scientific, and applied vision of how generative artificial intelligence tools can be used to develop digital project management from traditional patterns to a more efficient, innovative approach. That is being done to minimise operational risks and

expedite the completion of critical projects.

- In terms of its cognitive significance, it advances administrative literature with a contemporary theoretical scaffold that connects generative artificial intelligence techniques to digital project success. It will also open new research frontiers for academics to investigate the structure of the relationship between human capabilities and intelligent systems, and to explore how we can incorporate this framework into an Arab context.
- **The Hypothetical Mode of Research**

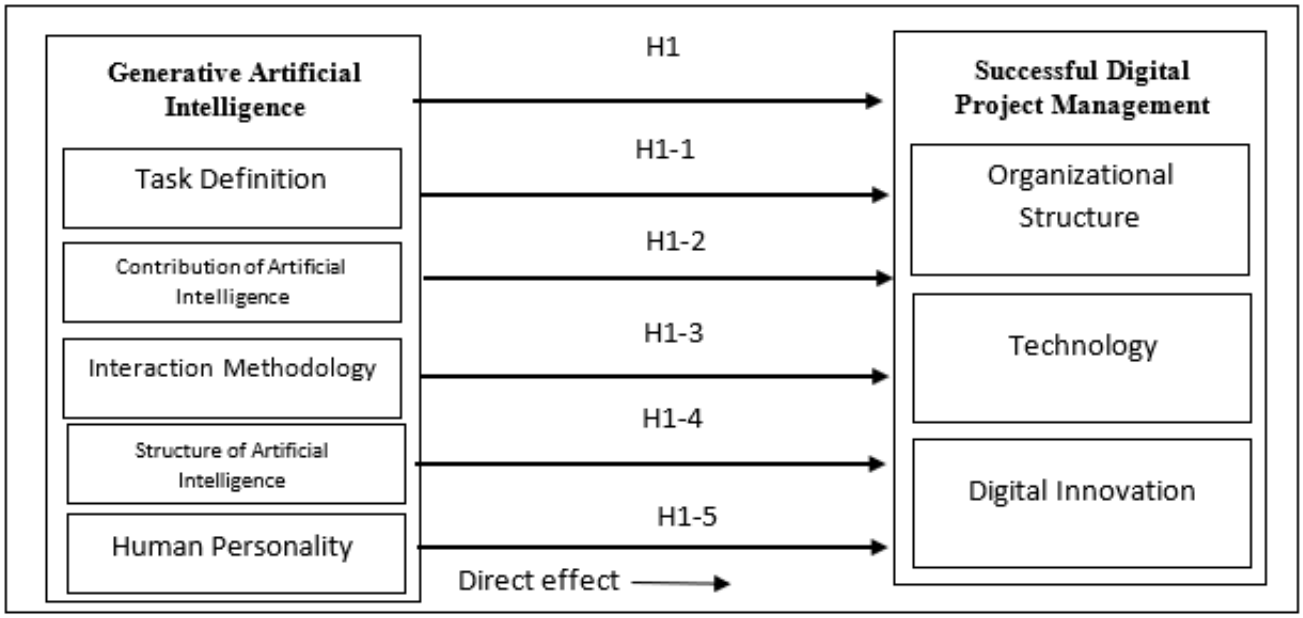

Figure 1. Figure () Hypothetical model of the research Source: Prepared by the researcher based on scientific sources.

1. **Study Population and Sample**

An appropriate determination of the study site and population shall be further emphasized, as this is one of the most important issues for the precision and truthfulness of the results, as well as for the consistency in verifying hypotheses in this research. Thus, HKAIA, together with its branches and divisions, will be selected as the unit to which the study will be applied in practice within a private-sector setting, where hypotheses can be tested in an Iraqi context. The Holy Karbala Investment Commission comprises several associated, auditable sample project management experts and is therefore a goldmine of research data. Accordingly, we selected a purposeful sample of (188) employees who have a diploma and higher from a population of (198) who held diplomas or higher. The reason for selecting this sample is that it is closely related to the study's objective and problem and has a high capacity to respond to questionnaire items. The questions were constructed based on a five-point Likert scale. Personal Information of the Study Sample The sample was chosen from various aspects, whether individual or professional, among them age, sex, scientists, years of experience, and area of specialization, as follows:

Age	Repetition	%
24-29 years	35	18.6%
30-39 years	50	26.6%
40-49 years	45	23.9%
50 years and above	58	30.9%
Total	188	100
Gender	Repetition	%
Male	117	62.2%
Female	71	37.8%
Total	188	100
Educational Qualification	Repetition	%
Diploma	22	11.7%
Bachelor's	101	53.7%
Master's	41	21.8%
PhD	24	12.8%
Total	188	100
Years of Experience	Repetition	%
5 years or less	23	12.2%
6-10 years	24	12.8%
11-15 years	55	29.3%

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16-20 years	42	22.3%
20 years and above	44	23.4%
Total	188	100
Job Specialization	Repetition	%
Engineer	45	23.9%
Chief Engineer	15	8.0%
Specialist	33	17.6%
Programmer	11	5.9%
Administrator	72	38.3%
Other	10	5.3%
the total	186	100

Table 1. Table 1: Personal information of the study sample
The researcher's source, based on the questionnaire, shows the following:

Age

The respondents in the sample were assigned to age groups based on the age distribution: 30s, 40s, 50+, and so on. (30s: n=72 people; 34.1%, 40 ~ 49 years old: N=95 people;44.3%, □50 years old :n =48 people,,20%) For this reason, it seems likely that most experienced workers' self-reported work experience reflected a variety of work across their careers. Next up are the 30-39 year olds at 26.6% (which sounds like they've got a reasonable mix, with some still yet to peak). The 24-29-year age group is the least dominant, with 18.6 per cent participation, which might indicate a trend towards occupational security and a higher average experience in the sample.

- **Gender**

Gender imbalance: The gender profile of our sample is characterized by a significantly male majority at 62.2%, constituting nearly two-thirds of all respondents. In detail, women make up 37.8% of the overall sample. This distribution makes sense because there are more men than women in the sample, which is not surprising, since a couple of engineering and staff specialties in this workplace tend to be male.

- **Academic Qualifications**

Regarding educational attainment, the descriptive statistics indicate that the Bachelor's degree category was the largest (53.7%), suggesting that the majority of employees had the appropriate level of education. Those with a master’s-level degree are second (21.8%), and respondents with doctoral studies rank 3rd at 12.8%, showing that highly educated employees dominate this group.

The minority of the sample, at only 11.7%, are Diploma holders (the sample focuses on higher-education individuals at the postgraduate level).

Years of Experience

The number of years of experience shows that one-third (29.3%) of the sample has between 11 and 15 years of experience, making this the most represented group in terms of expertise and suggesting medium- to lon -term staff stability. The 16-20 and 20+ age categories combined account for a majority of the sample population, at over 45%, reinforcing the earlier conclusions about extensive work experience. While the least represented -those with 6 to fewer than ten years’ experience and those with 10 or fewer- already are, this is yet another confirmation of the fact that most respondents have long service.

- **Job Specialization**

characterized in the sample is administrative, which represents 39 of the respondents, being the highest percentage, which emphasizes the prominence of the administrative occupation in the sample. Next is engineering at 23.9%, followed by senior engineer at 17.6%, which shows that a mix of administrative, engineering, and technical roles dominates the sample. Program editors and chiefs are the least represented (5.9%) in the sample, while chief engineers are represented at 8.0%, something to keep in mind when examining digital project attitudes in this sample.

1. **Theoretical Aspect.**
    - **The Concept of Generative Artificial Intelligence:**

Generative artificial intelligence is a set of computer systems designed for human use to perform tasks and roles that often lead to innovative applications, the creation of creative ideas and new methods adaptable to functions, and the generation of creative solutions to solve problems or improve performance in digital and non-digital projects **[1]**. Ban (2023) argues that artificial intelligence (AI) is a revolution in the digital landscape, capable of generating high-quality, contextually relevant content that is almost indistinguishable from human work. This results in the development of creative, realistic, and unique content, together with humans and intelligent systems, across business and private settings**[2]**. AI technology is being embraced in many different ways, particularly for process optimization and decision-making to enhance the performance and activity of digital projects. Barcaui (2023) points out that generative AI is a general-purpose tool: it evolves by learning from data inputs and creates new, modern content, activities, and tasks that share a degree of similarity with human work. This underpins decision-making to enhance the performance and quality of digital projects. Generative AI also supports

efficient and effective human resource management for digital projects, thereby ensuring the sustainability of the function **[3]**.

Ban (2023) and Chowdhury (2024) explain generative AI as business generated through the installed practices, operations, and business models, or aspects of innovation. This can introduce a new era of management practices and innovative work patterns in digital projects using generative AI. Companies need a plan for implementing generative AI to ensure the desired value from projects. General AI is not like previous technological revolutions that lacked built-in functionality to create context-appropriate content on demand, learn from one's responses, and improve based on what it knows **[2][4]** . López (2025) defines generative AI as "AI producing new insights, creative ideas, and predictions. Using generative AI can greatly transform the value chain, helping workers become more productive, providing decision support for strategic endeavors, and allowing business-led digital projects to compete by innovating and building proprietary value **[5]**

1. **Dimensions of Generative Artificial Intelligence:**

Doshi and Alastair (2025) specify generative artificial intelligence in terms of the following dimensions **[6]**:

1. **Task Definition** –the clarity of a digital task outcome. This level corresponds to the organisation's capability to structure and create tasks with generative AI that are comprehensible, analyzable, and applicable in real-world settings for both HR within organisations and projects, as well as for AI technologies. The necessity of generating clearly formulated, analysable, and relevant tasks is emphasized, allowing one to turn future problems/targets into clear objectives along which work can be done. This adds to the effectiveness of assigning new digital tasks to projects (Bordas et al., 2024). Galkin (2025) claims that in digital projects and operations, task definability influences how well they can be submitted to generative AI, i.e., automated. The higher the accuracy and clarity of a prompt, the more accurate and appealing the results will be for further transformation into innovative ideas or solutions **[7] [8]**.
2. **AI Contribution:** The second dimension of AI contribution reflects how AI is used in the duality of task completion and human effort. More precisely, AI can add value to a task by substituting or complementing human's work force skills, analysis of supporting complement to human useful labour capacity **[9]**. Participation of generative AI (see, Goller 2025) in undertaking activities and tasks on digital projects such as replacing human resources for automated activities or integrating with human resource work to enhance efficiency thus improving the quality of results and outputs resulting from the digital project can promote faster delivery times for a project, lower levels of risk or make it possible to mitigate risk through forecasting what to expect in future incarnations. It also provides cutting-edge digital concepts and solutions that help projects achieve high growth potential and success in the business environment **[10]**.
3. **Interaction Methodology:** Humans-AI Co-creative interaction is the cooperative mode between human agents and generative AI systems, which serves to achieve collective intelligence in the different creative aspects of digital projects. Collaboration and interaction between humans and AI enhance an individual's creative performance in planning, designing, and innovating with new ideas, as well as in making real-time, objective decisions. This is useful for individuals and senior management in directing, manipulating, and encouraging those who manage digital projects **[11]**. Wu et al. (2025) also stress the necessity of interaction and cooperation among intelligence, manual work, and artificial intelligence. Artificial intelligence was once confined to routine or repetitive work, but it now complements human labor in cognitive tasks. With the advent of generative AI creating compelling content such as text, images, and synthetic data, we aim to facilitate clear and articulate communication. This form of conversation (which bears similarities to AI in certain aspects) is similarly essential to producing results and digital outputs that serve as an incentive for new digital projects based on a new style of doing digital **[12]**.
4. **Structure of Artificial Intelligence:** This refers to the AI systems implemented by the organization to run its digital projects, including the hardware & software tools, how they work, and how they fit into the project setting. This category comprises factors such as data quality, its analysis & processing, and the accuracy and presentation of generative AI outputs. It also considers the degree to which the final results of generative AI outputs align with the project's activities and system. The AI architecture assists in planning, forecasting, and managing activities, expertise, skills, and competencies within digital projects (Banh, 2023). (Yan et al., 2024) To design structures that support individuals in learning and training in artificial intelligence skills and working alongside generative AI. The more flexible the structure and the more it is designed to support AI use, the better the performance of digital projects and the fewer risks and errors they will encounter **[2][13]**.
5. **Human Personality,** or human interaction, plays a pivotal and effective role in the use of generative AI through the simulations and inputs individuals provide, as well as the behaviors they exhibit when interacting with AI. Some individuals who use AI possess the necessary skills and experience to be creative in its use, thereby improving administrative processes and procedures in digital projects and organizations. However, individuals who lack the essential skills and qualifications to use and interact with AI face difficulty in working and adapting to modern digital developments **[14]**.

The Concept of Digital Project Management:

Al-Mawhab (2025) describes digital project management as a core capability that combines two primary dimensions: digital integration and data-based decision-making. Digital integration is an indicator of cross-platform synchronization and collaboration; (ii) it is easy to exchange data between tooling systems associated with the project phases, thus keeping them harmonized. This involves interoperability among systems, BIM with IoT sensors, project information systems (PIS), and ERP systems **[15]**. Data-driven decision-making is the ability to use empirical, quantitative, and real-time data and analysis to make strategic or operational decisions, rather than relying solely on intuition or logic. Chen et al. (2025) define digital

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project management as the tools for decision-making in digital projects, team coordination, and the capabilities required to support digital functions and features. It requires transforming the foundational management systems that generate project value and deliver services, as well as addressing uncertainty with newly introduced technologies, including AI, big data, cloud platforms, and the internet of things (IoT) **[16]**.

In multi-activity digital business and project environments, digital project management emerges as an organizational system that demands optimal planning, integration, and leadership **[17]**. This model requires management to oversee the outcomes of digital projects and assess them using analytical tools to drive the strategic implementation of digital transformations. The challenges in these projects require advanced technology to develop a smart series. Gonçalves et al. (2023) describe digital project management as the promotion and application of the firm's technology in planning, directing, and controlling projects already underway to an extent that exceeds mission by understanding them better than competitors, having other competitive advantages; efficiently apply resources-enable efficient labor utilization-plan necessary financial (economic), technological and social process for successful digital project management **[18]**.

2 -4- Dimensions of Digital Project Management

The dimensions of digital project management are **[19]**:

1. **Organizational Structure:** Every organization, regardless of size, market, history, traditions, or location, recognizes the need to become more digital. That's agility: flexibility and open-mindedness in responding to shifts in both an organization's needs and established administrative processes. Organizations should develop flexible organizational structures that align with digital transformation and support their employees by adopting a digital transformation culture in the project and its management **[20]**. [Digital project management structures] need to be adaptable in the face of external environment (digital/technological) changes and require clear role distributions and task definitions that reflect digital tasks in projects**[21]**.
2. **Technology:** Part two: Task manager. Being organized is key to digital projects. In broad terms, it's a mix of social, mobile, analytics, cloud, and the Internet of Things (IoT). It is essential to adopt such technologies for the organization and management of digital works, which facilitate planning, implementation, continuous follow-up , and the use of quality assurance systems. Technology has been used as a tool in optimising processes and interaction among members of the digital working project group **[22]**. According to Love and Jane (2019) **[23]**, the development of digital technologies, including information modelling, Internet-of-Things, and sensors, has made it possible to enhance project management and activities by automating conventional manual-based processes on paper. The overriding reason for investing in digital technology projects is to give managers fast, high-quality information to help them make better decisions, track performance trends, and/or cut costs.
3. **Digital Innovation:** Digital innovation is one of the cornerstones underpinning digital projects and their management. The use of digital technology in the innovation process generates new administrative processes, activities, and practices, converting radical change into the nature and structure of new products and services that create value for digital projects. (Nambisan et al., 2017). (Barthel, 2021). The innovation of the digital world lies at the heart of project and project-related management's digital transformation, which allows them to revolutionize how projects become valuable through disruptive management systems and solutions unique to digital projects **[24][25]**.

2-5- Linking the variables to the research hypotheses

1. **The Relationship Between Task Definition and Digital Project Management:** So sharp and precise boundary work in generative AI outputs to help with digital projects. And it draws clear lines around the work and expectations. The better-organized, neater, knowable the inputs or tasks are, the clearer, more accurate, and more recognizable the quality of their outputs will be. This clarity leads to higher-quality AI predictions and the development of new, innovative concepts and solutions that support digital PM through informed decision-making. Task analysis also reduces errors and enables good performance and success with digital projects **[26]**. From this, the following hypothesis is derived:

H11: There is a statistically significant effect of task definition on the success of digital project management in the studied entity.

1. **The Relationship Between the Contribution of Generative AI:** Generative AI helps us to do, improve, and even automate many things that humans have done (or machines), such as: Artificial intelligence is clearly one of the most powerful technological advances -- and not just in terms of saved time, economic value creation, and social implications. Work previously performed by humans is now being executed by autonomous machines and digital technologies that are in charge of making critical decisions in digital projects (Pereira et al., 2024). Hossain et al. (2024), generative AI responds quickly and strategically to decisions based on the best combination of all available inputs and levels that can influence project development. These project management AI solutions provide several benefits: they automate routine tasks, enhance decision-making, and provide a deeper understanding of digital project outputs. The following hypothesis is derived **[27][28]**:

H12: There is a statistically significant effect of the interaction method dimension on the success

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of digital project management in the studied organization.

1. **The relationship between interaction method and digital project management:** Here, improved dialogue and interaction with AI enable generative AI to follow user direction and provide straightforward guidance on how they can help the digital project succeed. It is an important consideration for achieving efficient AI and improved project outcomes, particularly given the growing prominence of AI in projects **[29]** . As Victor (2023) argues, "the method of interaction and use of generative AI will be pivotal in the context of digital project management. When leveraged appropriately, generative AI can enhance productivity on digital projects and reduce human error. The use of these strategies to reduce defects in software development projects could be a critical factor in assessing project quality, as mistakes can occur at any step. AI makes project management better by offering a broader perspective on potential outcomes. The following hypothesis is derived **[30]**:

H13: " There is a statistically significant effect of the AI contribution dimension on the success of digital project management in the studied entity " .

1. **The Relationship Between AI Structure and Digital Project Management:** AI infrastructure is a cornerstone in the development and evolution of digital initiatives. It covers the basics of interaction, processing, idea generation, and the creative elements of a digital project. It is an important part of increasing efficiency of digital project processes as the framework provides procedures for sorting and classifying data and information, limits learning, thereby helping to improve the accuracy and clarity with which results are realised; progress made; speed achieved in completion of digital projects **[31]**. Noy (2023) highlights the role of generative AI structure in project work as it organizes and shapes information flows, while also managing and enhancing quality information flow, further building predictive capacity, which underpins operational decision-making in digital project management as well as supporting growth and process acceleration on a digital project; It fosters innovation and new ideas based on generative AI processes" The following hypothesis is derived **[32]**:

H14: There is a statistically significant effect of the AI structure dimension on the success of digital project management in the studied organization.

1. **The relationship between human personality and digital project management:** You could definitely say that human personality is an important factor in how generative AI methods and approaches are used in digital projects. Human attributes such as openness, experience and skills see employees differing in the extent they can effectively engage with generative AI techniques and thus derive maximum value from them in support of a digital project **[33]**. Riedl, (2022), signals the signi cance of e ective applications generators AI since it help s to optimize and improve e ciency and quality in digital processes for project work as well t he decision on a well grounded AI both put modi edly from clear output s. And in particular, it promotes and supports the innovation process in the projects, so that one of the paramount characteristics of AI is the creation of new content and products: this helps keep generating and sustaining new ideas and solutions for a digital project. The following hypothesis an be deduced**[34]**:

H15: There is a statistically significant effect of the human personality dimension on the success of digital project management in the studied organization.

1. **Practical Framework and Discussion of Results**
    - **Coding of the Study Scale, (Normal) Distribution, and Scale Reliability**

The study variables and dimensions were coded transparently, making them easy to interpret. This is because data needs to be processed and statistically analyzed using specialized software, such as SPSS or Amos version. 26. The current code attempts to provide short and distinct symbols for each dimension and principal variables (e.g., X for the independent variable, Y for the dependent) to help researchers when conducting statistical analyses or interpreting structural models.

Normality is a basic rule that should be tested, even when we are applying different parametric statistical tests or equations, as in multiple statistical analyses such as path analysis and structural modeling. This distribution is evaluated by calculating the Coefficients of Skewness and Kurtosis. Values close to ±1.96 indicate that the sample response is normally distributed and satisfies the normality assumption, enabling advanced statistical analysis of the data **[35]**.

Variable	The dimensions		The symbol	□□□□□□ □□□	Skewness	Kurtosis	Cronbach's Alpha
Generative Artificial Intelligence	Task Definition	X	X1	4	-1.766	1.654	87.7%