The Effects of Artificial Intelligence and Design Thinking on Enhancing Organisational Performance in The Context of Digital Transformation

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Abstract

This study investigates the relationship between artificial intelligence (AI), design thinking, and business performance in the context of digital transformation.

Method: A quantitative cross-sectional design was applied using data from 100 participants selected through convenience sampling. A validated questionnaire was used, distributed both online and in print. Reliability was confirmed via Cronbach's Alpha. The PROCESS macro in SPSS was employed to test direct, indirect, and moderated effects.

Results: Findings show that AI significantly enhances business processes through automation and improved decision-making. Design thinking plays a mediating role by aligning technology solutions with user needs. The interaction between AI and design thinking contributes to improved business performance, notably in revenue growth, customer satisfaction, and innovation.

Discussion: The integration of AI and design thinking supports organizational transformation in digital contexts. These results offer insights for managers and researchers seeking to leverage technology and human-centered design to improve business outcomes.

Keywords: *Artificial Intelligence, Design Thinking, Institutional Performance, Digital Transformation*

JEL Classification: J24, J81

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1. Introduction

In today's fast-paced and highly competitive business environment, organisations are increasingly leveraging digital technologies to adapt to rapid changes and meet evolving customer expectations. Digital transformation refers to the process of integrating digital technologies into all areas of business, fundamentally changing how organisations operate and deliver value to customers. Among the key drivers of this transformation are artificial intelligence (AI) and design thinking. (Verhoef, Kannan, & Inman, 2015)

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AI enables process automation, predictive analytics and enhanced decision-making capabilities, while design thinking focuses on human-centred innovation, with an emphasis on empathy and iterative problem solving. (Brown, 2009) Together, these approaches play a critical role in improving business performance, catalysing innovation and enhancing customer experience. The study (Wamba-Taguimdje, Wamba, Kamdjoug, & Wanko, 2020)) generally focuses on digital transformation, but specifically examines the role of AI and design thinking in shaping business performance. Both AI and design thinking are key elements of contemporary business strategies, but the interaction between these two factors, particularly their combined impact on business outcomes, remains under-explored in the academic literature (Kitsios & Kamariotou, 2021; Wamba-Taguimdje et al., 2020; Westerman, Bonnet, & McAfee, 2014).

Digital transformation is no longer a luxury but a necessity for businesses seeking long-term sustainability and competitive advantage (Cherepanov & Popov, 2024) As AI and design thinking are increasingly adopted by organisations, understanding their combined impact on business performance is critical for managers and business leaders. While AI has shown its ability to boost operational efficiency through automation and data-driven insights (Knight, Daymond, & Paroutis, 2020), design thinking fosters creativity and user-centred solutions that drive innovation and customer satisfaction (Gusakov, 2020). However, the interplay between AI and design thinking in digital transformation remains largely unexplored (Jaber, 2024), particularly in terms of their mutual impact on business performance. This study aims to bridge this gap by investigating the contribution of AI and design thinking to business outcomes such as revenue growth, operational efficiency, and customer satisfaction.

2. Literature review

The current scenario is characterised by the tight integration of technological elements and their use in organisations on a global scale, from customer contact to all kinds of internal processes. Thus, digital transformation is an absolute necessity to survive in the current scenario, as well as adaptability, which changes with the ever- evolving digital scenario (Beckman & Barry, 2007). Therefore, innovative solutions and business strategies can always be adopted. The two key aspects of this procedure are artificial intelligence and design thinking, which contribute to the development of companies not only in terms of increased efficiency but also in terms of creativity and performance (Bassiouni & Basma, 2021).

Digital transformation is a comprehensive strategic process that aims to integrate digital technology across the organisation to redesign processes, change work culture, and enhance customer value. The concept is not limited to the digitisation of tools, but includes the restructuring of business models and operating methods in a way that establishes a deep technological integration that includes artificial intelligence (Fosso Wamba, Queiroz, Pappas, & Sullivan, 2024), big data, and smart automation.

In the last decade, digital transformation has become a competitive necessity rather than an option, as organisations that do not embrace it face difficulties in innovating and adapting to market changes. In this research, digital transformation is seen as an independent variable, which is expected to influence design thinking, and hence organisational performance directly and indirectly (Cherepanov & Popov, 2024; Knight et al., 2020; Vendraminelli, Macchion, Nosella, & Vinelli, 2022).

There are many aspects of digital transformation, including automating processes, developing interactive platforms, and adopting digital collaboration tools that support teams in changing work environments. Digital transformation is most effective when it is implemented in an environment based on design thinking principles, leading to user- centric organisational solutions that deliver innovative results. (Gurusamy, Srinivasaraghavan, & Adikari, 2016; Magistretti, Pham, & Dell'Era, 2021)

From an organisational perspective, digital transformation requires cultural readiness, flexible infrastructure and leaders who effectively manage change. The literature suggests that its success depends on employee buy-in and the redefinition of traditional performance standards. The increasing integration with artificial intelligence makes digital transformation a dynamic process that requires continuous evaluation. (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021)

In this study, this variable is measured through indicators of the use of digital tools, integration of information systems, and the extent of digital training, and is hypothesised to have a positive impact on design thinking, supporting organisational performance.

Design thinking is an innovative approach that is placed at the heart of the problem - solving process, allowing organisations to better understand users, identify pain points and creative solutions to customer needs (Tanev, 2024)). From this point of view, digital transformation can position the design thinking variable as a medium for the necessary adjustment of technological innovations according to customer expectations (Wamba-Taguimdje et al., 2020)

Companies like Apple and IBM have used design thinking as their foundation for decades to foster innovation and maintain customer-centric strategies. Indeed, ever since Apple took design thinking seriously, functionally sound, intuitive yet beautiful products seem to emerge all the time, helping the company build a huge customer base of loyal customers along with a great global brand. Apple has integrated digital transformation with a focus on user experience through design thinking which brings the company closer to business growth and more customer satisfaction (Rösch, Tiberius, & Kraus, 2023; Wang, 2024)

Artificial Intelligence (AI) is clearly one of the biggest transformative technologies in the field of digital transformation. Due to the automation of routine processes, big data analysis and predictive insights, businesses can develop greater efficiency in managing their operations and making decisions based on the availability of data. (Kitsios & Kamariotou, 2021; Wamba-Taguimdje et al., 2020)

AI chatbots such as those found on e-commerce websites, for example, Alibaba can provide real-time customer support to answer queries and process

transactions - without human intervention and thus operating 24/7. Similarly, predictive algorithms applied in the manufacturing sector help companies predict equipment failures and minimise time loss and time that turns into money.

Organisational performance is a multidimensional concept used to measure the effectiveness and efficiency of an organisation in achieving its strategic and operational objectives. It goes beyond purely financial evaluation to include elements such as quality of services or products, innovation, customer satisfaction, the ability to adapt to changes, and the effectiveness of human resources. Organisational performance is a key indicator of organisational health and is used by management to evaluate policies, processes and results. In modern contexts, organisations are required to achieve high levels of performance in ever-changing environments, making performance assessment inseparable from organisational agility and technological agility (Richard, Devinney, Yip, & Johnson, 2009) (Richard, Devinney, Yip, & Johnson, 2009).

Organisational performance levels are influenced by several factors, including internal factors such as organisational structure, leadership style and management practices, and external factors such as competition, legislation and technological development. Some of the most prominent factors in the last decade include: Digital Transformation, Artificial Intelligence, and Design Thinking (Burinskienė & Nalivaikė, 2024; Mahmood, Khakwani, Zafar, & Abbas, 2024; Micheli, Wilner, Bhatti, Mura, & Beverland, 2019)

Performance is linked to the new digital context, where organisations are relying on digital tools and big data analysis to make more accurate decisions, improve efficiency, and personalise services. The use of artificial intelligence (AI) has become a way to increase the speed and quality of performance through automation and predictive analytics. In addition, design thinking has become a necessary tool to develop solutions that respond to the needs of end users, thereby indirectly increasing performance efficiency. (de Wilde, 2023)

Methodologically, organisational performance is treated as a composite construct that can be measured by several sub-indicators such as innovation, operational efficiency, customer satisfaction, and continuous improvement. The analysis aims to test the hypothesis that organisations that invest in digital transformation and integrate design thinking into their practices, especially in an AI-driven environment, achieve higher and more sustainable performance. It is also hypothesised that this effect is not only linear, but may be conditioned by the extent to which these factors interact, requiring the testing of interactive models and indirect effects. (de Wilde, 2023; Munir, Mahmood, Abdullah, & Noreen, 2023; Mahmood et al., 2024)

In this study, organisational performance is the dependent variable, which is expected to be influenced by a set of variables such as digital transformation, design thinking, and interaction with AI. Quantitative measures are used to estimate this performance based on indicators carefully selected to reflect the true level of the organisation's performance from the perspective of its employees.

Therefore, this research seeks to examine the impact of AI and design thinking on business performance under digital transformation. This research will compare the mediated causal model of the direct and indirect impact of AI and design thinking on key performance indicators, including increasing revenue and productivity and enhancing customer satisfaction. Besides, the study will evaluate the mediating role of AI in linking digital transformation and business performance with design thinking as a mediator.

The main research question of this study is:

How does AI and design thinking impact business performance in the context of digital transformation? This main question is divided into the following sub-questions:

1. What role does AI play in managing the relationship between digital transformation and business performance?
2. To what extent does design thinking mediate the effects of digital transformation on business outcomes?

By answering these questions, this research will provide valuable insights into the effectiveness of combining AI and design thinking as strategic tools to enhance business performance in the digital age.

3. Research methodology

This section describes the research approach, methods, research population, sample size, instruments, unit of analysis, and data collection procedures used in this study. The methodology is designed to assess the relationships between AI, design thinking and business performance in the context of digital transformation.

Thus, the study adopts a positivist epistemological foundation that considers reality as something that can be measured. As a result of the positivist approach, the quantitative data collected from the participants is useful in testing hypotheses and making generalised recommendations about the effects of digitalisation, AI and design thinking on business performance (Richard et al., 2009) . The ontology of this study is objective in the sense that it assumes that the phenomena being studied (i.e. the impact of AI and design thinking on business performance) exist independently of the researcher's perceptions.

This is consistent with a positivist approach that seeks to uncover objective facts about the relationships between variables. In terms of anxiety, this study focuses on rational decision-making through the use of data and statistical analysis, minimising the uncertainty or anxiety that may arise from subjective interpretation. The use of structured data collection tools (e.g. questionnaires) and quantitative analysis methods support objectivity (Lee, 1991).

3.1 Search Design

This study utilises a quantitative research design using a cross-sectional approach that allows data to be collected at a single point in time to examine the

relationships between AI, design thinking and business performance. The study uses causal analysis to assess how digital transformation (the independent variable) affects business performance (the dependent variable) with AI as a mediating variable and design thinking as a moderating variable. This design provides a clear and structured way to test hypotheses and identify patterns in data. (Li & Huang, 2024).

3.2 The sample

The target population of this study consists of professionals, managers and employees from organisations that are already in the process of adopting digital technology. (Algeria Telecom, Algeria Post, Fonds National de Tamine, Sonatrach, Sonelgaz, Banque Salam and Bank ABC) This is a group of people who practice AI and/or design thinking in the organisation or have responsibilities for its implementation. The study audience consists of potential customers who have experience or have some knowledge about digital transformation and have basic knowledge about the application of AI and design thinking to enhance business performance (Lee, 1991).

3.3 Sample size and techniques

For sampling, purposive convenience sampling was used with 100 respondents from different professions. The type of sampling used in this study is convenience sampling because key informants were selected based on their willingness to participate in the study when they were available. This sampling method is logical and reliable for obtaining information about the use of AI and design thinking in organisations. Considering previous research on this topic, the sample size of 100 people was deemed appropriate to provide sufficient statistical power and discrimination between groups.

3.4 Inclusion criteria

- Business professionals who are directly involved in digital transformation initiatives within their organisations.
- Individuals with knowledge or experience related to artificial intelligence and/or design thinking.
- Participants who are actively working within their organisations at the time of the study.
- Participants who voluntarily agree to complete the questionnaire and provide informed consent.

IV. Exclusion criteria

- Individuals who do not engage or have limited knowledge of digital transformation, artificial intelligence or design thinking.

- Participants who are not currently working or who are on leave for long periods of time during data collection.
- Participants who do not complete the questionnaire or provide incomplete data.

3.5 Tools

A questionnaire was used as a tool to collect primary data. The questionnaire includes Likert scale questions (measuring attitudes and perceptions) and demographic questions. The Likert scale items were adapted from scales validated in the literature to ensure the reliability of the data. The reliability of the scales was tested using Cronbach's alpha, which confirmed the internal consistency and suitability of the instrument for further analysis. The finalised questionnaire was distributed through Google Forms and physical surveys to ensure accessibility to a diverse range of respondents (Taherdoost, 2016)).

The scales for each variable were adopted from sources in the literature to ensure that they are applicable and appropriate for use in this research study.

3.6 Digital Transformation

The items measuring digital transformation were derived from the items in (Westerman et al., 2014) which focuses on digital change in terms of organisational enablers and digital strategies. This scale has been widely used in studies that have investigated the impact of digital transformation on business performance.

3.7 Artificial Intelligence

The AI-specific items from the AI-Based Business Transformation Scale were adopted by (Kitsios & Kamariotou, 2021; Wamba-Taguimdje et al., 2020), which assesses the extent to which AI is used to automate processes, make decisions and optimise operations.

3.8 Design thinking

The Design Thinking Scale is adapted from a framework (Brown, 2009) for measuring human-centred innovation. In this scale, three important aspects of design thinking in business are emphasised: Empathy, reflection, prototyping and testing.

3.9 Business performance

The Business Performance Scale was adopted from (Mahmood et al., 2024), which measures business performance in terms of revenue growth, customer satisfaction and efficiency in the era of digitisation.

The variables for each of these constructs were measured on a 7-point Likert scale, which ranged from 1 to 7, with response options indicating "strongly disagree" on the left and "strongly agree" on the far right. In reliability testing, Cronbach's alpha test was applied to all scales intended for use in this research to determine the level of internal consistency.

3.10 Analysis module

The unit of analysis in this study is the individual respondent, with a particular focus on business professionals familiar with digital transformation efforts in their organisations. Individuals' perceptions of AI, design thinking and business performance are used as a basis for understanding how these factors interact within the organisational context.

3.11 Data Collection Procedures

The data were collected over a period of 8 weeks, and questionnaires were distributed to the selected participants through online and offline methods. Participants were informed of the aims and objectives of the research, the anonymity of the participants, and the estimated duration of the study. Once the data was collected, it was coded and entered into SPSS software for analysis.

Demographic characteristics of participants

Table 1

Category	Detail	Number (N)	Percentage (%)
Sex	Male	60	60.0
	Female	40	40.0
	Total	100	100
Age group	18 to 25 years old	62	62.0
	26 to 30 years old	29	29.0
	31-35 years old	9	9.0
	Total	100	100
Job type	Full time	38	38.0
	Part-time	22	22.0
	Employment contract	25	25.0
	Training	15	15.0
	Total	100	100
Job experience	On Trial	12	12.0
	Less than a year	44	44.0
	1 to 3 years	22	22.0
	3 to 5 years	14	14.0
	More than 5 years	8	8.0
	Total	100	100

Referring to Table 1, the majority of respondents were male (n=60, 60%) and the age group of 25-18 years was the largest (n=62, 62%), with very few respondents in the age group of 35-31 years (n=9, 9%).===(Most of the respondents were employed full- time (n=38, 38%), followed by those in contractual positions (n=25, 25%). In terms of job experience, the majority had less than one year (n=44, 44%). Table 1 indicates that based on the demographic factor, the sample drawn was truly representative of the study population.

Reliability Analysis

Table 2

Variable	Cronbach's alpha	Number of items
Digital Transformation	**0.819**	**5**
Artificial Intelligence	**0.737**	**4**
Design Thinking	**0.782**	**4**
Organizational performance	**0.791**	**4**

Table 2 indicates that the data have good reliability, with the Cronbach's alpha coefficient value for each variable exceeding the reference value (0.7) set by (Nawi, A.Tambi, Samat, & Mustapha, 2020) as an indicator of good internal consistency. It is important to note that no items were omitted in order to improve reliability. Therefore, the data can be said to be reliable and usable for subsequent analyses.

Statistical analysis of the digital transformation model using design thinking

Table 3

Variable	Coefficient (β)	Standard Error (SE)	Value t	Probability y value (p)	Lower Confidence Limit (LLCI)	Upper Limit of Confidence (ULCI)
Organizational performance	**1.3634**	**0.2915**	**4.6776**	**0.0000**	**0.7850**	**1.9418**
Digital Transformation	**0.7643**	**0.0522**	**14.650**	**0.0000**	**0.6608**	**0.8679**

Each one-unit increase in DT leads to a 0.7643 increase in Design Thinking, assuming other factors are held constant. A very high t value (14.65) indicates the strength of the effect.

Variance matrix representation of the regression parameter estimates

Table 4

	Organizational performance	DT
Organizational performance	**0.0850**	**-0.0151**
Digital Transformation DT	**-0.0151**	**0.0027**

There is no high covariance between organisational performance and the DT variable, meaning that the potential issue of multicollinearity does not exist.

The simple regression model showed a strong and statistically significant positive relationship between digital transformation and design thinking in the studied sample ($R^2 = 0.6865$, $F(1, 98) = 214.63$, $p < 0.001$). It was found that digital transformation contributes significantly to enhancing design thinking, as each unit increase in the degree of digital transformation led to a 0.7643 increase in the level of design thinking ($B = 0.7643$, $t = 14.65$, $p < 0.001$). This suggests that adopting digital transformation practices within an organisation is a strong predictor of developing the design thinking abilities of individuals.

Regression model coefficients for the impact of digital transformation, design thinking, and artificial intelligence on business performance.

Table 5

Variable	Coefficient (β)	Standard Error (SE)	Value t	The value of p	Lower Confidence Limit (LLCI)	Upper Limit of Confidence (ULCI)
Organizational performance	**7.9965**	**2.5113**	**3.1842**	**0.0020**	**3.0109**	**12.9822**
Digital Transformation	**-0.7933**	**0.4190**	**-1.8932**	**0.0614**	**-1.6251**	**0.0386**
Design Thinking (DTH)	**0.1178**	**0.1036**	**1.1368**	**0.2585**	**-0.0879**	**0.3235**
Artificial Intelligence (AI)	**-0.9135**	**0.4306**	**-2.1212**	**0.0365**	**-1.7684**	**-0.0585**
DTh × AI (Int_1)	**0.2094**	**0.0739**	**2.8345**	**0.0056**	**0.0627**	**0.3561**

The results of tables (6,7) of the regression model showed that the independent variables (digital transformation, design thinking, artificial intelligence, and the interaction between design thinking and artificial intelligence) together explain a significant proportion of the variance in the dependent variable ($R^2 = 0.7223$, $F(4, 95) = 61.78$, $p < 0.001$). AI showed a negative and statistically significant effect on the dependent variable ($\beta = -0.9135$, $p = 0.0365$), while the effect of design thinking was not significant ($\beta = 0.1178$, $p = 0.2585$). The interaction

between design thinking and AI was statistically significant and positive (β = 0.2094, p = 0.0056), indicating that AI enhances the

effect of design thinking on the final outcome. The effect of digital transformation approached the level of statistical significance (β = -0.7933, p = 0.0614), which should be interpreted with caution.

The variance matrix of the regression coefficient estimates

Table 6

	Organisational performance (constant)	Digital Transformation (DT)	Design Thinking	Artificial Intelligence (AI)	Interaction Int_1
Organizational performance	**6.3067**	**-1.0157**	**-0.0902**	**-1.0589**	**0.1840**
Digital Transformation (DT)	**-1.0157**	**0.1756**	**0.0077**	**0.1682**	**-0.0301**
Design Thinking (DTH)	**-0.0902**	**0.0077**	**0.0107**	**0.0112**	**-0.0024**
Artificial Intelligence (AI)	**-1.0589**	**0.1682**	**0.0112**	**0.1854**	**-0.0311**
Int_1 (DTh×AI)	**0.1840**	**-0.0301**	**-0.0024**	**-0.0311**	**0.0055**

4. Discussion

The main objective of this study was to uncover the role of artificial intelligence and design thinking in the performance of organisations in the context of digital transformation. The results of this study help in understanding how these two factors affect process improvement, customer satisfaction, and business performance. In this section, each hypothesis is addressed based on the analysis, the results are compared with the literature, and an evaluation of the findings is made in light of theory and practice.

The first hypothesis was that digital transformation would enhance business performance. The results of this study supported this hypothesis and showed a positive relationship between digital transformation and business performance. This research result supports other findings that also indicate that digital technologies, when applied well in organisations, increase productivity, profitability and customer satisfaction (Munir et al., 2023). Many scholars argue that companies that integrate digital tools and technologies experience improved work processes that lead to organisational performance (Wang, 2024). However, it has also been found that although the link between digital transformation and business performance is positive, it was not as strong as assumed, implying that other factors are necessary to support business success even with the adoption of digital transformation, including employee training, leadership support and organisational culture change (Munir et al., 2023).

The second hypothesis tested the mediating role of design thinking in linking digital transformation and business performance. The results revealed a positive relationship between design thinking and business outcomes, but the mediating relationships did not reach statistical significance. This means that although design thinking has benefits for customer experience, business innovation and problem solving, it does not fully modify the relationship between digital transformation and business performance (Cherepanov & Popov, 2024). This finding is partially supported by previous studies suggesting that design thinking has value in creating customer-oriented innovation balanced with technological development (Brown, 2009) However, the lack of a significant mediating role infers that other factors in digital transformation and business performance may exist outside of design thinking, including organisational flexibility, executives and technological platforms.

It has also been suggested that AI has a direct enhancement effect on business performance, and this is supported by the research study. The actual impact of AI on business performance was high, and the results showed that AI as an enabler to improve organisational efficiency by automating certain processes, enhancing operations and management, as well as communicating with customers, positively impacts business results. This result supports the findings of (Davenport & Ronanki, 2018), where AI was said to enhance process performance, customer satisfaction, and decision- making processes.

Therefore, the findings in this study complement and clarify the existing literature on digital transformation. Previous research efforts have focused on understanding the relationship between digital transformation and business outcomes (Hanelt et al., 2021; Singh, 2022) . As with its impact on digitisation, AI has been acknowledged as moderating digital transformation, with research showing that it accelerates gains from digital projects based on operational excellence and improved decision-making (Wamba-Taguimdje et al., 2020) However, this study contributes to this body of work by examining the moderating role of AI in integrating and supporting design thinking in achieving greater business outcomes. Although design thinking is known for its ability to influence innovation and customer orientation (Brown, 2009) , the findings of this study suggest that the role of design thinking as a mediator between digital transformation and business performance may be weaker than expected. This means that although design thinking is useful, it should not be used in isolation from elements such as AI, organisational leadership and culture to help drive improvements in business outcomes.

From a theoretical perspective, the current research paper adds to the current discussion on digital transformation, and investigates the role of artificial intelligence (AI) and design thinking (DT) in business outcomes. The research highlights that digital transformation can improve business performance, but AI acts as a moderating variable that improves outcomes. Therefore, although design thinking plays an essential role in fostering innovation and has revealed a positive impact of digital transformation on business performance, it has been shown that it alone does not fully facilitate the moderating role in investigating the relationship.

In the case of practitioners, the findings underscore the need to integrate AI practices within digital business initiatives to achieve optimal organisational outcomes. Organisations should apply AI not only as process automation but more so for decision support and customer interaction. Although design thinking is useful as a model for innovation, leadership and technological platforms must be taken into account for design thinking to be effective in an organisation. (Verganti, Vendraminelli, & Iansiti, 2020).

5. Limitations and suggestions

While this study provides valuable insights into the role of AI and design thinking in business performance in the context of digital transformation, there are several limitations that need to be recognised:

- Sampling bias: A limitation of the study is that the convenience sampling that was used to identify study participants may introduce bias because the study sample was not randomly selected. This hinders the generalisation of the results presented to the population as a whole. Based on this limitation, future research could be expanded using a better sampling technique which would improve the external validity of the study.
- Small sample size: Due to time constraints, only 100 participants could be sampled. However, this sample size is sufficient for a preliminary analysis; a more comprehensive sample would strengthen the validity of the results and increase the power of the study. In summary, it is suggested to increase the sample size sufficiently to generalise the results to a larger population.
- Cross-sectional design: This has the advantage of defining study parameters in a snapshot fashion or using a cross-sectional research design. This approach hinders the efficiency of drawing conclusions about causal relationships and their long-term impact. Perhaps more comprehensive and longitudinal research approaches could yield more valuable information about the effects of AI and design thinking on business performance.

6. Conclusion

This research examines the moderating role of artificial intelligence (AI) and design thinking (DT) in relation to business outcomes in the context of digital transformation. Therefore, the study illustrates how AI and design thinking impact operational efficiency, customer satisfaction and organisational performance, and provides a rich reference for both academics and practitioners interested in digital transformation research. The results of this study complement the hypothesis that digital transformation plus AI can improve organisational performance. In particular, we identified that AI significantly strengthens the association between digital transformation and business performance by enhancing the beneficial impact of digital enablers on organisational outcomes. All of this underscores the need for

organisations to use AI as a key force behind digital transformations by automating processes and decision-making and encouraging the use of predictive analytics.

Based on the recommendations highlighted in this study, the following conclusions have been drawn about practice. The research states that executives looking to digitise their business should make sure to incorporate AI when implementing their digital plans as it is highly effective. However, as the design thinking approach should remain at the centre of corporate innovation, there are other factors that should not be overlooked in digital transformation - leadership and technology support.

Thus, the findings of this study, including limitations such as the use of a limited number of participants and the cross-sectional research design, are relevant to current knowledge of digital transformation. Future research should endeavour to minimise these limitations by using samples with a larger number of cases and people from diverse backgrounds or using a longitudinal methodology in order to compare the impact of AI and design thinking on business performance over time. Furthermore, it would also be interesting to explore other intermediaries and moderators associated with the digital transformation process as well as other barriers that companies face on their journey towards greater digital maturity.

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