

The Impact of Digital Transformation on Improving Strategic Performance: A Case Study of the Sider El Hadjar Complex – Annaba

Salah Guerrouf¹ / Badji Mokhtar-annaba University, Algeria,

Salah.guerrouf@univ-annaba.dz

Received: 25-03-2026

Accepted: 10-05-2026

Published 08-06-2026

Abstract:

The present study examines the impact of digital transformation on strategic performance at the Sider El Hadjar Complex in Annaba, focusing on the use of modern digital technologies and their contribution to enhancing organizational performance. To achieve this objective, a questionnaire was distributed to a random sample of 60 employees from different functional levels within the organization.

After analyzing the collected data using SPSS (Version 25) and adopting both descriptive and analytical approaches, the study identified several key findings, most notably a significant effect of digital transformation dimensions on improving the strategic performance of the Sider El Hadjar Complex – Annaba.

The study also provides a set of recommendations aimed at strengthening digital culture and promoting its adoption as a strategic orientation to support performance, particularly through awareness campaigns and continuous training programs.

Keywords: Digital transformation; Strategic performance; Sider El Hadjar Complex–Annaba.

Jel Classification Codes : M15; L25; O33.

Résumé:

La présente étude examine l'impact de la transformation numérique sur la performance stratégique du Complexe Sider El Hadjar à Annaba, en mettant l'accent sur l'utilisation des technologies numériques modernes et leur contribution à l'amélioration de la performance organisationnelle. Pour atteindre cet objectif, un questionnaire a été administré à un échantillon aléatoire de 60 employés issus de différents niveaux fonctionnels au sein de l'organisation.

Après l'analyse des données collectées à l'aide du logiciel SPSS (version 25), en adoptant des approches descriptives et analytiques, l'étude a mis en évidence plusieurs résultats clés, notamment l'existence d'un effet significatif des dimensions de la transformation numérique sur l'amélioration de la performance stratégique du Complexe Sider El Hadjar – Annaba.

L'étude propose également un ensemble de recommandations visant à renforcer la culture numérique et à promouvoir son adoption comme orientation stratégique au service de la performance, notamment à travers des actions de sensibilisation et des programmes de formation continue.

Mots clés: Transformation numérique; Performance stratégique; Complexe Sider El Hadjar – Annaba.

Jel Classification Codes : M15 ; L25 ; O33.

¹. Corresponding author: Salah Guerrouf, Salah.guerrouf@univ-annaba.dz

I. Introduction

The world is currently witnessing rapid technological development, which has made organizations increasingly required to adapt to digital transformations in order to enhance their competitiveness and achieve their strategic objectives. Digital transformation is not limited to merely updating technologies; rather, it goes beyond that to bring about radical changes in business models, internal processes, and service delivery methods through the adoption of the latest digital technologies based on artificial intelligence, cloud computing, and big data analytics. This transformation requires a supportive infrastructure, along with a clear digital vision and a digital strategy that fosters continuous change, in addition to the adoption of a digital culture within the organization and the availability of the necessary digital skills and capabilities.

Through this orientation, organizations seek to improve the quality of their services and enhance strategic performance by simplifying procedures, increasing efficiency, and translating vision into actionable objectives, thereby contributing to the creation of a more flexible environment capable of responding to future challenges.

Based on the above, the following research problem is formulated: **Is there an impact of digital transformation on improving strategic performance at the Sider El Hadjar Complex– Annaba?**

Within this main problem, several research questions arise, including:

- Is there an impact of the digital infrastructure dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba?
- Is there an impact of the digital strategy dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba?
- Is there an impact of the digital culture dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba?
- Is there an impact of the digital leadership dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba?

Study Hypotheses

To address the research problem, the following hypotheses were formulated and tested:

Main Hypothesis:

- There is no statistically significant effect of digital transformation on improving strategic performance at the Sider El Hadjar Complex – Annaba at the significance level ($\alpha \leq 0.05$).

Sub-Hypotheses:

- There is no statistically significant effect of the digital infrastructure dimension on improving strategic performance at the Sider El Hadjar Complex– Annaba at the significance level ($\alpha \leq 0.05$).

- There is no statistically significant effect of the digital strategy dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba at the significance level ($\alpha \leq 0.05$).
- There is no statistically significant effect of the digital culture dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba at the significance level ($\alpha \leq 0.05$).
- There is no statistically significant effect of the digital leadership dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba at the significance level ($\alpha \leq 0.05$).

Study Objectives

This study aims to:

- Provide a theoretical framework that defines the concept of digital transformation and its various dimensions.
- Identify the concept of strategic performance.
- Examine the impact of digital transformation on improving strategic performance.

Methodology

This study adopts both the descriptive and analytical approaches in an attempt to describe the phenomenon under investigation and explore its various aspects, as well as to answer the research questions. A questionnaire was used as the main data collection instrument, and the collected data were analyzed in order to test the hypotheses and derive the study findings.

II. Conceptual Framework of Digital Transformation

This section addresses the conceptual framework of digital transformation by presenting its definition and its main dimensions.

II.1. Definition of Digital Transformation

Several definitions of digital transformation have been proposed in the literature, including the following:

Digital transformation is defined as organizational change resulting from the use of digital technologies and innovative business models to improve performance. (Khalfallah hadjar, 2023)

Digital transformation is also defined as the use of computer-based technologies in an organization's strategies, processes, and products. Organizations invest in digital transformation in order to enhance their competitiveness and better serve their workforce and customers (Moulay bouabdellah, 2022).

Digital transformation refers to the use of digital technologies to improve operational processes, business models, and consumer experiences, thereby generating value and enhancing sales, productivity, profitability, stakeholder

satisfaction, and business growth (Rizana, 2025).

II.2. Dimensions of Digital Transformation

Digital transformation is based on four main dimensions, as follows:

- **Digital Infrastructure:** Refers to the availability of computers, internet connectivity, and the possibility of providing certain smart departments equipped with digital technology applications (Al tahrawi alaa abbas, 2024).
- **Digital Strategy:** Organizations seek to adopt new strategies based on digital technologies in order to increase revenues and create value. A digital transformation strategy also enables organizations to improve their operations, enhance data management, and strengthen communication among employees, suppliers, and customers (Rubio-Andrés, 2025).
- **Digital Culture:** Encompasses the shared values, norms, beliefs, and behaviors that are shaped through the adoption and integration of digital technologies in the workplace (Anas Ayoub Abed Alhameed, 2026). It is also defined as the set of shared expectations, behaviors, and experiences related to digital technologies among individuals associated with a particular organization (Nizar Abdulwahab Ali Al-Moaid, 2024).
- **Digital Leadership:** Digital leadership refers to doing the right things to achieve the strategic success of an organization's digital transformation (Ongena, 2024).

III. Conceptual Framework of Strategic Performance

This section presents the conceptual framework of strategic performance by addressing its definition and main dimensions.

III.1. Definition of Strategic Performance

Strategic performance is based on a firm's performance relative to its competitors in the market. It refers to the organization's ability to formulate strategies and achieve its strategic objectives effectively. In general, strategic performance denotes a firm's capability to accomplish its long-term strategic goals through an appropriate combination of internal and external resources and capabilities (Adila, 2023).

III.2. Dimensions of Strategic Performance

Strategic performance is commonly assessed through four main dimensions, as follows:

- **Financial Dimension:** The financial dimension is considered a fundamental element in evaluating an organization's overall performance, as it focuses on financial indicators such as revenues, net profit, and return on investment, which provide valuable insights into the organization's ability to generate value for shareholders (Ayyasy, 2025).

- **Customer Dimension:** This dimension relates to customer satisfaction, customer retention, and market share. It emphasizes several measures such as customer retention rates and market share percentage (Madsen, 2025).
- **Internal Processes Dimension:** The organization identifies the processes that contribute to value creation and seeks to improve them through automation, coordination among departments, and quality assurance in order to eliminate waste and increase operational efficiency (Munir, 2025).
- **Learning and Growth Dimension:** This dimension focuses on continuous improvement processes and value creation through organizational learning and development (Kumar, 2024).

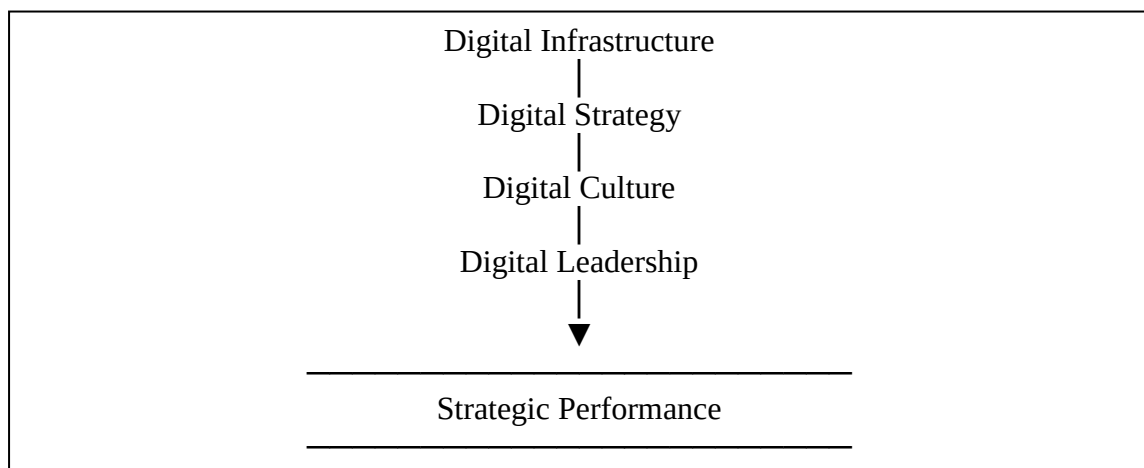
III.3. Theoretical Foundations and Conceptual Model of the Study

To better explain the relationship between digital transformation and strategic performance, this study is grounded in the Resource-Based View (RBV) (Barney, 1991) and the Dynamic Capabilities Theory (David Teece, 1998). These theories suggest that organizational performance is enhanced when firms effectively develop, integrate, and reconfigure their internal resources and dynamic capabilities in response to environmental changes.

Accordingly, digital transformation is not viewed as independent dimensions, but rather as an interconnected system of capabilities, including digital infrastructure, digital strategy, digital culture, and digital leadership, which collectively contribute to improving strategic performance.

Based on this theoretical background, the study proposes the following conceptual model:

Figure (01): Conceptual Model of the Study



Source: Developed by the author based on the Resource-Based View (Barney, 1991) and Dynamic Capabilities Theory (David Teece, 1998).

This model highlights the systemic and interactive nature of digital transformation, emphasizing that its dimensions operate in an integrated manner rather than in isolation.

IV. Field Study at the Sider El Hadjar Complex – Annaba

This section addresses the methodological procedures of the field study, including the study boundaries, the research instrument, and the statistical methods used for data analysis.

IV.1. Methodological Procedures of the Field Study

This subsection presents the study boundaries, the research instrument, and the statistical techniques employed in the analysis.

IV.1.1. Study Boundaries: The boundaries of the study are defined as follows:

- **Spatial Boundary:** The study was conducted at the Sider El Hadjar Complex in Annaba.
- **Temporal Boundary:** The study was carried out during the period of May–June 2025.
- **Human Boundary:** A questionnaire was distributed to 60 employees of the organization during the study period. A total of 57 questionnaires were retrieved, of which 49 were valid and suitable for statistical analysis.

IV.1.2. Research Instrument: A questionnaire was developed to measure the extent of the organization’s implementation of digital transformation and its impact on strategic performance. The questionnaire consisted of three main sections, as follows:

- **Section One:** Demographic characteristics of the respondents (gender, age, educational level, job level, and years of experience).
- **Section Two:** Digital transformation, comprising items (1–14), and including the following dimensions:
 - Digital infrastructure dimension: items (1–4).
 - Digital strategy dimension: items (5–7).
 - Digital culture dimension: items (8–10).
 - Digital leadership dimension: items (11–14).
- **Section Three:** Strategic performance, comprising items (15–27).

The weights of the questionnaire items were determined based on a five-point Likert scale, as shown in Table 1.

Table (01): Weights of Questionnaire Items

Response	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Assigned Weight	1	2	3	4	5

Source: (Zaid, 2010)

IV.1.3. Statistical Methods Used in the Analysis: In order to answer the research problem and test its hypotheses, the collected data were processed and analyzed using the Statistical Package for the Social Sciences (SPSS v25). Several appropriate statistical techniques were employed, including:

- Cronbach's Alpha coefficient to test the reliability of the measurement instrument;
- Descriptive statistics to determine the mean values of the responses of the study sample;
- Simple linear regression to examine the effect between the independent variable and the dependent variable.

With regard to interpreting the results of the first section, the analysis was not limited to using the mean and standard deviation values; rather, a criterion for the degree of availability within the organization was also adopted in order to determine the extent of digital transformation implementation in the organization under study. To clarify how the degree of availability was measured, the Likert scale was used, whereby responses were classified into five levels, on the basis of which the degree of application was judged as very low, low, moderate, high, or very high.

Table(02): Degree of Availability According to Respondents' Perceptions

Mean Value	1–1.79	1.80–2.59	2.60–3.39	3.40–4.19	4.20–5
Degree of Availability	Very Low	Low	Moderate	High	Very High

Source: (Al-Farra, 2008)

IV.2. Data Analysis and Hypotheses Testing

This section addresses the validity and reliability tests of the study instrument, in addition to testing the study hypotheses.

IV.2.1. Validity and Reliability of the Study Instrument: This subsection examines the validity and reliability of the questionnaire.

- **Instrument Validity:** The validity of the instrument was established through expert judgment. The questionnaire was reviewed by a panel of academic experts with relevant specialization and experience in the field of the study. They were asked to evaluate the clarity, relevance, and adequacy of the questionnaire items and dimensions, and to suggest deletions, modifications, or additions where necessary. Based on their feedback, the instrument was revised and finalized, resulting in a questionnaire consisting of 27 items.
- **Instrument Reliability:** Reliability refers to the consistency and stability of results when the instrument is administered repeatedly to the same sample under similar conditions over a certain period. Reliability was assessed using Cronbach's Alpha coefficient, which ranges between 0 and 1, with 0.60

considered the minimum acceptable value. The results indicate that the instrument demonstrates a high level of reliability, as all coefficients exceed the acceptable threshold, as shown in Table 3.

Table (03): Reliability Test of the Measurement Instrument

Dimension	Number of Items	Cronbach's Alpha	Reliability
Digital Transformation Variable	14	0.949	0.900
Strategic Performance Variable	13	0.938	0.879
Overall Questionnaire	27	0.966	0.933

Source: Prepared by the researcher based on SPSS v25 outputs.

IV.2.2. Assessment of Digital Transformation Implementation at the Sider El Hadjar Complex– Annaba: A descriptive analysis was conducted on the responses of the study sample regarding the diagnosis of the current state of digital transformation in the organization. The results are presented in Table 4.

Table (04): Means and Degree of Availability of Digital Transformation Items

No	Statement	Mean	Degree of Availability	Rank
01	The organization possesses modern information and communication technology equipment and devices.	3.22	Moderate	1
02	The organization's technological communication networks are characterized by high speed.	3.18	Moderate	2
03	Clear technologies for information security and protection are available.	3.18	Moderate	3
04	The organization is concerned with improving Internet network flow.	3.08	Moderate	4
First Dimension: Digital Infrastructure		3.16	Moderate	First
05	The organization has a clear vision and strategy for digital transformation.	3.00	Moderate	1
06	The organization seeks to develop and improve digital communication channels with service recipients.	2.98	Moderate	2
07	The organization uses new and innovative methods in digitization.	2.80	Moderate	3
Second Dimension: Digital Strategy		2.92	Moderate	Third
08	The organization informs employees about the course of its transformation toward digitization.	2.69	Moderate	3
09	The organization seeks to promote digitization.	2.96	Moderate	1
10	The organization allocates awareness campaigns on the importance of digitization.	2.80	Moderate	2
Third Dimension: Digital Culture		2.81	Moderate	Fourth
11	Management is concerned with	2.88	Moderate	3

	achieving a balance between employees' capabilities and their level of technological understanding.			
12	Management seeks to integrate modern technology with the organization's services.	2.82	Moderate	4
13	Management supports the use of technology in performing tasks.	3.02	Moderate	2
14	Management works to develop employees' capabilities and benefit from them.	3.14	Moderate	1
Fourth Dimension: Digital Leadership		2.96	Moderate	Second
Digital Transformation Implementation Variable		2.98	Moderate	—

Source: Based on SPSS v25 outputs.

The results indicate that respondents' perceptions of digital transformation implementation are at a moderate level, with an overall mean of 2.98. All dimensions of digital transformation also recorded moderate levels of availability. The digital infrastructure dimension achieved the highest mean (3.16), followed by digital leadership (2.96), digital strategy (2.92), while digital culture ranked last with a mean of 2.81. Overall, these findings suggest a moderate level of application of digital transformation dimensions at the Sider El Hadjar Complex – Annaba. However, several areas require further improvement, particularly internet quality, strengthening digital infrastructure with advanced technologies, broader adoption of a comprehensive digital strategy, enhancement of digital culture, deeper integration of technology into operational processes, and consideration of individual differences in employees' digital readiness.

IV.2.3. Measurement of Strategic Performance at the Sider El Hadjar Complex– Annaba: To assess the level of strategic performance at the Sider El Hadjar Complex – Annaba, the third section of the questionnaire was analyzed. The results are presented in Table 5.

Table (05): Means and Degree of Availability of Strategic Performance Items

No	Statement	Mean	Degree of Availability	Rank
15	The organization utilizes its assets effectively.	2.80	Moderate	11
16	The organization is characterized by high revenue levels.	2.82	Moderate	10
17	The organization continuously seeks to reduce costs.	3.59	High	1
18	The organization achieves profits commensurate with the size of its investments.	2.71	Moderate	12
19	The organization is keen to retain its	3.18	Moderate	6

	customers.			
20	The organization seeks to achieve customer satisfaction.	3.39	Moderate	2
21	The organization provides high-quality services to satisfy customers.	3.18	Moderate	5
22	The organization seeks to deliver services on time.	3.20	Moderate	4
23	The organization seeks to improve its production.	3.27	Moderate	3
24	The organization demonstrates efficiency in continuously evaluating employee performance.	2.90	Moderate	8
25	The organization seeks to train and properly prepare employees.	2.96	Moderate	7
26	The organization seeks to retain outstanding employees.	2.88	Moderate	9
27	The organization motivates its employees.	2.59	Low	13
	Strategic Performance Variable	3.03	Moderate	—

Source: Based on SPSS v25 outputs.

The results shown in Table (05) indicate that the statement “The organization continuously seeks to reduce costs” ranked first in terms of importance, with a mean value of (3.59) and a high degree of availability. This was followed by the statement “The organization seeks to achieve customer satisfaction” with a mean value of (3.39) and a moderate degree of availability. In contrast, the statement “The organization motivates its employees” ranked last, with a mean value of (2.59) and a low degree of availability.

Furthermore, the strategic performance variable recorded an overall mean of (3.03) and a moderate degree of availability. Accordingly, it can be concluded that the level of strategic performance perceived by the surveyed employees at the Sider El Hadjar Complex – Annaba is moderate. The organization places noticeable emphasis on financial aspects, particularly through its continuous efforts to reduce costs, which obtained the highest level of agreement among respondents. This reflects a clear orientation toward operational efficiency and enhanced profitability. The results also reveal a moderate focus on customer satisfaction and service quality. Conversely, the findings highlight clear weaknesses in human resource management, especially with regard to employee motivation and training.

IV.2.4. Hypotheses Testing

- **The first sub-hypothesis** states that “**There is no statistically significant effect of the digital infrastructure dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba at a significance level of $\alpha \leq 0.05$.**” This hypothesis was tested using simple linear regression

analysis, where the null hypothesis is rejected if the significance level is less than or equal to 0.05.

Table (06): Simple Linear Regression Results for the Effect of Digital Infrastructure on Strategic Performance

Variable	Correlation Coefficient (R)	Coefficient of Determination (R ²)	Regression Coefficient (β)	F-value	Significance Level (p)
Digital Infrastructure	0.668	0.447	0.597	37.933	0.000

Source: Based on SPSS v25 outputs.

The table shows that the correlation coefficient (R) equals 0.668, indicating a moderate positive relationship between digital infrastructure and strategic performance. The coefficient of determination (R²) is 0.447, meaning that 44.7% of the variance in strategic performance is explained by digital infrastructure. The significance level (p = 0.000) confirms the statistical significance of this effect. Moreover, the calculated F-value (37.933) exceeds the critical F-value and is significant at $\alpha \leq 0.05$.

These results confirm the rejection of the null hypothesis and the acceptance of the alternative hypothesis. In other words, digital infrastructure has a statistically significant effect on improving strategic performance at the Sider El Hadjar Complex – Annaba at $\alpha \leq 0.05$.

This can be interpreted as indicating that investment in developing digital infrastructure—such as technological equipment, network speed, and information security—is a crucial factor in supporting and enhancing strategic performance. It contributes to improving operational efficiency, service quality, and the overall competitiveness of the organization.

- **The second sub-hypothesis** states that “**There is no statistically significant effect of the digital strategy dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba at a significance level of $\alpha \leq 0.05$.**” This hypothesis was tested using simple linear regression analysis, where the null hypothesis is rejected if the significance level is less than or equal to 0.05.

Table (07): Simple Linear Regression Results for the Effect of Digital Strategy on Strategic Performance

Variable	Correlation Coefficient (R)	Coefficient of Determination (R ²)	Regression Coefficient (β)	F-value	Significance Level (p)
Digital Strategy	0.723	0.523	0.568	51.539	0.000

Source: Based on SPSS v25 outputs.

As shown in the table, the correlation coefficient (R) equals 0.723, indicating a strong positive relationship between digital strategy and strategic performance. The coefficient of determination (R^2) is 0.523, meaning that 52.3% of the variance in strategic performance is explained by digital strategy. The significance level ($p = 0.000$) confirms the statistical significance of this effect. Additionally, the calculated F-value (51.539) exceeds the critical F-value and is significant at $\alpha \leq 0.05$.

These results confirm the rejection of the null hypothesis and the acceptance of the alternative hypothesis. In other words, digital strategy has a statistically significant effect on improving strategic performance at the Sider El Hadjar Complex – Annaba at $\alpha \leq 0.05$.

This can be interpreted as indicating that digital strategy is one of the strongest factors influencing the improvement of strategic performance at the Sider El Hadjar Complex – Annaba. The clearer, more integrated, and technologically supported the digital strategy is, the greater the organization's ability to achieve its strategic objectives and enhance its operational efficiency and effectiveness.

- **The third sub-hypothesis** states that “**There is no statistically significant effect of the digital culture dimension on improving strategic performance at the Sider El Hadjar Complex– Annaba at a significance level of $\alpha \leq 0.05$.**” This hypothesis was tested using simple linear regression analysis, where the null hypothesis is rejected if the significance level is less than or equal to 0.05.

Table (08): Simple Linear Regression Results for the Effect of Digital Culture on Strategic Performance

Variable	Correlation Coefficient (R)	Coefficient of Determination (R^2)	Regression Coefficient (β)	F-value	Significance Level (p)
Digital Culture	0.682	0.465	0.521	40.797	0.000

Source: Based on SPSS v25 outputs.

As shown in the table, the correlation coefficient (R) equals 0.682, indicating a moderate positive relationship between digital culture and strategic performance. The coefficient of determination (R^2) is 0.465, which means that 46.5% of the variance in strategic performance is explained by digital culture. The significance level ($p = 0.000$) confirms the statistical significance of this effect. Additionally, the calculated F-value (40.797) exceeds the critical F-value and is significant at $\alpha \leq 0.05$.

These results confirm the rejection of the null hypothesis and the acceptance of the alternative hypothesis. In other words, digital culture has a statistically significant effect on improving strategic performance at the Sider El Hadjar Complex – Annaba at $\alpha \leq 0.05$.

This can be interpreted as indicating that digital culture plays a significant role in enhancing strategic performance. The presence of shared digital values and behaviors among employees, the adoption of digital learning practices, and the encouragement of innovation in a digital work environment all contribute substantially to improving operational efficiency and achieving the organization's strategic objectives.

➤ **The fourth sub-hypothesis** states that “**There is no statistically significant effect of the digital leadership dimension on improving strategic performance at the Sider El Hadjar Complex – Annaba at a significance level of $\alpha \leq 0.05$.**” This hypothesis was tested using simple linear regression analysis, where the null hypothesis is rejected if the significance level is less than or equal to 0.05.

Table (09): Simple Linear Regression Results for the Effect of Digital Leadership on Strategic Performance

Variable	Correlation Coefficient (R)	Coefficient of Determination (R ²)	Regression Coefficient (β)	F-value	Significance Level (p)
Digital Leadership	0.806	0.649	0.703	87.008	0.000

Source: Based on SPSS v25 outputs.

As shown in the table, the correlation coefficient (R) equals 0.806, indicating a strong positive relationship between digital leadership and strategic performance. The coefficient of determination (R²) is 0.649, meaning that 64.9% of the variance in strategic performance is explained by digital leadership. The significance level ($p = 0.000$) confirms the statistical significance of this effect. Additionally, the calculated F-value (87.008) exceeds the critical F-value and is significant at $\alpha \leq 0.05$.

These results confirm the rejection of the null hypothesis and the acceptance of the alternative hypothesis. In other words, digital leadership has a statistically significant effect on improving strategic performance at the Sider El Hadjar Complex– Annaba at $\alpha \leq 0.05$.

These findings can be interpreted to indicate that digital leadership represents the most influential dimension in enhancing strategic performance compared to other dimensions of digital transformation at the Sider El Hadjar Complex– Annaba. An effective digital leadership, capable of integrating modern

technology, motivating employees toward digital innovation, and intelligently directing digital operations, substantially contributes to improving operational efficiency and achieving the organization's strategic objectives.

- **The main hypothesis** states that “**There is no statistically significant effect of digital transformation on improving strategic performance at the Sider El Hadjar Complex– Annaba at a significance level of $\alpha \leq 0.05$.**” This hypothesis was tested using simple linear regression analysis, where the null hypothesis is rejected if the significance level is less than or equal to 0.05.

Table (10): Simple Linear Regression Results for the Effect of Digital Transformation on Strategic Performance

Variable	Correlation Coefficient (R)	Coefficient of Determination (R^2)	Regression Coefficient (β)	F-value	Significance Level (p)
Digital Transformation	0.798	0.638	0.736	82.661	0.000

Source: Based on SPSS v25 outputs.

As shown in the table, the correlation coefficient (R) is 0.798, indicating a strong positive relationship between digital transformation and strategic performance. The coefficient of determination (R^2) equals 0.638, meaning that 63.8% of the variance in strategic performance is explained by digital transformation. The significance level ($p = 0.000$) confirms the statistical significance of this effect. Additionally, the calculated F-value (82.661) exceeds the critical F-value and is significant at $\alpha \leq 0.05$.

These results confirm the rejection of the null hypothesis and the acceptance of the alternative hypothesis. In other words, digital transformation has a statistically significant effect on improving strategic performance at the Sider El Hadjar Complex – Annaba at $\alpha \leq 0.05$.

These findings indicate that digital transformation is a crucial and decisive factor in enhancing strategic performance at the Sider El Hadjar Complex – Annaba. The adoption of digital technologies, implementation of digital strategies, fostering an appropriate digital culture, and effective digital leadership collectively contribute to significantly improving operational efficiency and achieving the organization's strategic objectives.

IV. Discussion of Findings

The findings of this study provide strong empirical evidence supporting the significant impact of digital transformation on strategic performance at the Sider El Hadjar Complex – Annaba. Overall, the results are consistent with the majority of prior studies that emphasize the positive role of digital transformation in improving organizational efficiency, effectiveness, and competitiveness.

In particular, the results of this study align with the findings of (Kane, 2015) who confirmed that digital transformation significantly enhances organizational performance through the reconfiguration of processes, capabilities, and organizational structures. Similarly, the findings are consistent with (Peter Verhoef, 2021), who highlighted that digital transformation improves performance when organizations successfully integrate digital technologies into their strategic and operational models.

However, some partial differences appear when compared with (Christian Matt, 2015), particularly regarding the role of digital culture. While previous studies emphasized digital culture as a central driver of transformation success, the present study found it to be the least influential dimension in the Algerian industrial context. This divergence may be explained by the persistence of traditional organizational values, limited digital awareness among employees, and the gradual pace of cultural change within public and semi-industrial institutions in developing economies.

The strong influence of digital leadership observed in this study is consistent with (Omar El Sawy, 2016), who argue that digital leadership plays a decisive role in orchestrating digital initiatives, aligning stakeholders, and ensuring the successful adoption of digital technologies. In the context of the Sider El Hadjar Complex, this can be explained by the central role of management in driving transformation initiatives and facilitating technological adoption across departments.

On the other hand, the relatively weaker role of digital culture highlights an important contextual insight. Unlike studies conducted in highly digitized environments such as those (Liang Li, 2018), where digital culture acts as a key enabler of innovation and adaptability, the present findings suggest that cultural transformation remains incomplete and constrained by organizational rigidity and limited employee digital readiness.

Moreover, the results reinforce the idea that digital transformation should not be interpreted as isolated dimensions, but rather as an integrated and interdependent system of capabilities. Digital infrastructure, strategy, culture, and leadership collectively interact to shape strategic performance outcomes. This systemic perspective is strongly supported by the Dynamic Capabilities Theory (Teece, 1998), which emphasizes the importance of integrating and reconfiguring organizational capabilities in response to environmental change.

Finally, the Algerian industrial context plays a crucial role in interpreting these results. The moderate level of digital transformation and strategic performance reflects structural constraints, including traditional administrative systems, uneven technological readiness, and resistance to organizational change. These contextual factors help explain why certain dimensions, particularly digital culture, exhibit weaker effects compared to findings reported in more digitally mature environments.

Importantly, this study goes beyond merely confirming prior research by providing a context-specific and integrated analysis of digital transformation within an Algerian industrial organization. Unlike many previous studies that examined digital transformation dimensions in isolation, the present research

demonstrates that these dimensions operate as an interdependent system of capabilities, with varying levels of influence depending on organizational context.

Furthermore, the study offers a novel empirical insight by identifying digital leadership as the most influential driver of strategic performance, while digital culture remains comparatively underdeveloped—an outcome that contrasts with findings reported in more digitally mature environments. This highlights the critical role of contextual factors, particularly in emerging economies, where structural constraints, cultural resistance, and limited digital readiness shape the effectiveness of digital transformation initiatives.

Therefore, this study contributes to the literature not only by validating existing theoretical assumptions, but also by refining them through contextualization, offering a more nuanced understanding of how digital transformation affects strategic performance in developing industrial settings.

V. Conclusion

In conclusion, digital transformation is considered a fundamental factor supporting the improvement of strategic performance in economic organizations. The findings of this study confirm that the dimensions of digital transformation (digital infrastructure, digital strategy, digital culture, and digital leadership) significantly contribute to enhancing strategic performance at the Sider El Hadjar Complex – Annaba.

The results further indicate that the level of digital transformation implementation within the organization is moderate, reflecting the existence of digital initiatives; however, these efforts remain insufficient to achieve a full digital transformation. Similarly, the level of strategic performance is also moderate, with a clear emphasis on financial performance, particularly cost reduction, while weaknesses are observed in human resource motivation and development.

The following summarizes the main empirical findings derived from hypothesis testing and statistical analysis.

Summary of Results

Based on the empirical analysis and hypothesis testing, the study reached the following results:

Main Hypothesis: The null hypothesis was rejected, confirming a statistically significant effect of digital transformation on strategic performance at the Sider El Hadjar Complex – Annaba ($\alpha \leq 0.05$).

Sub-Hypotheses:

- Digital infrastructure has a statistically significant positive effect on strategic performance.
- Digital strategy has a strong and statistically significant effect on strategic performance.

- Digital culture has a statistically significant effect on strategic performance, although it remains the least influential dimension.
- Digital leadership represents the most influential dimension affecting strategic performance compared to all other dimensions.

Additional Key Findings:

- The overall level of digital transformation implementation is moderate (Mean = 2.98).
- The overall level of strategic performance is moderate (Mean = 3.03).
- Digital leadership emerged as the most influential dimension in enhancing strategic performance.
- Digital culture recorded the weakest relative score among all digital transformation dimensions.
- There is a clear imbalance between financial performance orientation and human resource development practices.

Recommendations

Based on the findings, the study proposes the following recommendations:

At the Organizational Level:

- The organization should accelerate the modernization of its digital infrastructure by upgrading network systems, improving internet speed, and strengthening cybersecurity frameworks.
- It is advised to institutionalize a comprehensive and integrated digital strategy aligned with the organization's strategic objectives.
- There is a need to enhance digital leadership capabilities through structured training programs and the promotion of data-driven managerial practices.
- Digital technologies should be integrated across all operational and administrative processes to improve efficiency and reduce costs.

At the Human Resource Level:

- It is recommended to institutionalize digital culture among employees through continuous training and structured digital upskilling programs.
- Launch awareness campaigns emphasizing the strategic importance of digital transformation.
- It is recommended to implement performance-based incentive systems linked to digital innovation and employee engagement.

At the Organizational Governance Level:

- Rebalance organizational priorities between financial performance and human resource development to ensure sustainable performance improvement.
- Develop digital-based performance evaluation systems aligned with modern performance management practices.
- Encourage research and innovation activities as a strategic lever for sustaining digital transformation.

VI. References:

- Adila, N. (2023). Intellectual capital' effects on firms' strategic performance– An empirical study in Condor Electronics- Bordj Bou Arreridj. Doctoral thesis,, 38. University of mohamed khider- biskra.
- Al tahrawi alaa abbas, A. s. (2024). the impact of digital transformation on strategic performance :the mediating role of innovation at jordanian private universities. interational journal of academic research in business& social scienes, 14(5), 529.
- Al-Farra, W. (2008). Questionnaire Data Analysis Using SPSS,. 26. Department of Programs and External Affairs.
- Anas Ayoub Abed Alhameed, O. L. (2026). Strategic Digital Leadership for Sustainable Transformation: The Roles of Organizational Agility, Digitalization, and Culture in Driving Superior Performance. *Journal Sustainability*, 18(2), 6.
- Ayyasy, A. N. (2025). Application of balanced scorecard to enhance company performance: an economic perspective. *International Journal of economics development research*, 6(1), 180.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1).
- El Sawy, Kræmmergaard, Amsinck & Vinther (2016). How LEGO built the foundations and enterprise capabilities for digital leadership. *MIS Quarterly Executive*, 15(2).
- Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). *Strategy, not technology, drives digital transformation*. MIT Sloan Management Review.
- Khalfallah hadjar, b. k. (2023). The reality of digital transformation in algeria : an analysis of international indicators. *journal of economic & financial research*, 10(1), 779.
- Kumar, S. (2024). Balanced scorecard: trends, developments and future directions. *Review of managerial science*, 18, 2398.
- Li .L (2018). Digital transformation and organizational innovation. *Technological Forecasting and Social Change*.
- Madsen, D. Ø. (2025). Balanced scorecard: history, implementation and impact. *Journal Encyclopedia*, 5(39), 4.
- Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, 57(5).
- Moulay bouabdellah, h. b. (2022). Digital transformation challenges. *Algerian journal of economy and finance*, 9(2), 72.

- Munir, W. M. (2025). Strategi evaluasi kinerja perusahaan dengan pendekatan balanced scorecard company performance evaluation strategy with balanced scorecard approach. *Journal kelitbangan*, 13(1), 3.
- Nizar Abdulwahab Ali Al-Moaid, S. G. (2024). Developing dynamic capabilities for successful digital transformation projects: the mediating role of change management. *Journal of Innovation and Entrepreneurship*, 13(85), 18.
- Ongena, G. (2024). Digital leadership competency to enhance digital transformation. *International Journal of Innovation and Technology Management*, 21(6), 3.
- Rizana, A. F. (2025). Exploring Capabilities for Digital Transformation in the Business Context: Insight from a Systematic Literature Review. *Journal Sustainability*, 17(9), 4.
- Rubio-Andrés, M. (2025). Tackling digital transformation strategy: how it affects firm innovation and organizational effectiveness, . *The Journal of Technology Transfer*, 50, 1895.
- Teece, D. J., Pisano .G & Shuen .A (1998). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7).
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*.
- Zaid, M. K. (2010). Statistical data analysis using SPSS software (Version 15-16). Amman: Dar safaa and dar jarir for publishing and distribution.