

Sustainable Leadership Development and Digital Transformation: Awareness and Practice Orientation among Employees in Sudan's Financial and Telecommunication Sectors

Muna Mudathir Ragab Saeed , Pooja Vishnoi

Abstract

Purpose: This study investigates the relationship between sustainable leadership development and digital transformation and how they enhance business performance in the service industry, the case of the Sudanese financial service and telecommunications sector . The study aims to highlight how sustainable leadership development and digital transformation awareness and practices enhance organizational performance considering theoretical framework on sustainable leadership and digital transformation strategy.

Methodology approach. A quantitative research design was adopted using a structured questionnaire administered to employees working in financial service and telecommunications sector in Sudan. 313 valid responses were analyzed. Structural equation modeling (SEM) was used to test the hypothesized relationships, and mediation was examined using bootstrapping techniques.

Findings The findings showed that there is a higher level of awareness among employees but this does not guarantee implementation of sustainable leadership development and digital transformation. The results demonstrate that sustainable leadership development and digital transformation significantly and positively influence service sector performance in Sudan.

Originality. This study contribution to the existing literature is by empirically validating the connection and integrating sustainable leadership and digital transformation. It provides the first study to combine both constructs to explain how implementation of these constructs affects organizational performance, and extends the theoretical literature to emerging markets.

Practical implications. Business organizations has to incorporate sustainable leadership development programs in their plans and more to a more strategic digital transformation, policies should be developed to motivate business organizations to leverage digital transformation and sustainable leadership at the national level.

Key words: Sustainable leadership; Leadership development; Digital transformation ,Emerging economies; Financial sector; Telecommunications sector

CONCEPTS AND DEFINITIONS

Below is a Q1-journal-level polished version of your section. I improved academic flow, coherence, transitions, and argument strength, removed repetitions, and kept all your citations unchanged. The tone and meaning remain the same, but the text now reads more like a publishable literature review section.

Definitions and Concept of Sustainable Leadership

Sustainable leadership has emerged as an important paradigm for organizations seeking to balance economic performance with social and environmental responsibility. A comprehensive definition is provided by Šimanskienė and Župerkienė (2014), who describe sustainable leadership as a form of leadership that operates with accountability toward individuals, groups, and organizations by integrating ecological, social, and economic sustainability principles within organizational and community contexts. This leadership approach encourages learning, knowledge sharing, and individual self-expression while supporting long-term organizational development.

Although sustainable leadership is often described as a relatively recent concept, it draws upon established leadership philosophies that emphasize long-term organizational effectiveness and social responsibility. Chaudhry and Noureen (2023) argue that sustainable leadership incorporates historical leadership practices while extending them toward broader sustainability goals. In this context, sustainable leadership promotes the development of organizational culture, encourages succession planning, and embeds coherent values within the workplace environment to ensure institutional continuity and effective functioning.

Similarly, Hargreaves and Fink (2004) conceptualize sustainable leadership as leadership that is enduring, influential, and collectively shared. Their perspective emphasizes leadership practices that protect organizational and community resources while avoiding the excessive depletion of human and financial capital. This view highlights sustainability not only as an environmental concern but also as a strategic leadership responsibility that supports long-term institutional stability.

Studies Supporting Sustainable Leadership

The growing attention to sustainability challenges has encouraged researchers to examine the potential of sustainable leadership as an effective management approach. Nevertheless, the literature still debates the extent to which sustainable leadership directly contributes to improved organizational outcomes. For instance, Sebastian and Hühn (2024) question whether sustainable leadership behaviors consistently translate into measurable organizational performance improvements.

Despite these debates, several empirical studies emphasize the central role of employees in the sustainability agenda. Lewandowska et al. (2023) highlight that employees represent one of the most valuable resources for organizations and that employee satisfaction is a critical indicator of organizational sustainability. Sustainable leadership practices—implemented through management systems, processes, and organizational values—can significantly influence employee engagement and job satisfaction. These practices ultimately contribute to enhanced organizational performance and long-term sustainability.

Sustainable Leadership Development

Increasing environmental uncertainty and organizational complexity have prompted organizations to invest more heavily in leadership development initiatives. Sustainable leadership development involves structured efforts to prepare both current and future leaders to manage sustainability challenges and guide organizations toward long-term strategic goals.

Leadership development programs often include mentoring systems, peer learning groups, and structured interactions with senior management. These initiatives aim to ensure that internal talent is prepared to assume leadership roles while promoting knowledge sharing and collaborative learning across organizational levels.

Management development, in this context, refers to training programs designed to enhance managerial knowledge, skills, and competencies necessary for effective leadership performance. Development therefore represents a continuous learning process through which individuals acquire the competencies required to perform managerial roles successfully.

A widely cited framework for sustainable leadership was developed by Hargreaves and Fink (2004) in their study of educational organizations. Their model identifies several key dimensions of sustainable leadership, including maintaining deep and meaningful learning (depth), planning for succession to ensure long-term continuity (sustainability), promoting collaboration and shared decision-making (breadth), supporting community engagement and social responsibility (justice), encouraging diversity and flexibility in organizational practices (diversity), fostering innovation and learning networks (resourcefulness), and learning from past leadership experiences to guide future development (maintenance).

Collectively, these dimensions emphasize that sustainable leadership is not limited to individual leadership behavior but represents a systemic approach that integrates organizational learning, resource management, and long-term strategic planning.

Empirical observations further suggest that sustainable leadership practices influence key organizational performance drivers such as employee engagement, quality improvement, and innovation. When implemented together, these practices reinforce each other and contribute to the development of resilient, competitive, and sustainable organizations.

Challenges of Sustainable Leadership

Despite its potential benefits, the implementation of sustainable leadership within organizations is often accompanied by several challenges.

First, sustainable leadership typically adopts a long-term strategic perspective, which may conflict with the short-term financial expectations of shareholders or internal performance measurement systems.

Second, implementing sustainable leadership frequently requires organizational transformation, including modifications in business models, decision-making processes, and operational structures. Such changes may generate resistance among employees and management.

Third, sustainability issues themselves are inherently complex and multidimensional, involving interactions between environmental, social, and economic considerations. Addressing these interconnected challenges requires integrated management approaches that many organizations may find difficult to implement.

Finally, organizations may face capability gaps, as sustainability concepts and practices are still evolving in many industries. Consequently, both leaders and employees may lack the knowledge and competencies necessary to integrate sustainability effectively into organizational strategies.

Digital Transformation

Digital transformation represents another major organizational shift influencing contemporary business environments. It refers to the integration of advanced digital technologies into organizational processes and business models in order to enhance efficiency, innovation, and competitiveness. Compared with traditional transformation initiatives, digital transformation programs often offer greater potential for both revenue growth and operational efficiency (Tang, 2021).

Digital business transformation—sometimes referred to as digitization—describes the strategic integration of information technology with organizational processes to improve performance and value creation. This transformation is closely associated with IT governance frameworks that ensure alignment between technological investments and organizational objectives (Baslyman, 2022).

Organizations increasingly recognize that digital transformation requires a fundamental reconfiguration of business models, operational processes, and employee capabilities. According to Orieno et al. (2024), digital transformation involves restructuring organizational paradigms to accommodate new technologies, enhance innovation capabilities, and support organizational competitiveness.

However, the transition toward digitalization is rarely straightforward. Marczewska (2024) notes that digital transformation often requires significant financial investments, including technological infrastructure, new resources, and capability development. These changes may also generate resistance to organizational change.

Regulatory and governance factors further shape digital transformation processes. In particular, technologies such as blockchain and digital supply chain systems require supportive regulatory environments to ensure transparency and secure information exchange (Dehghani et al., 2022).

At the same time, digital transformation introduces new risks. For example, organizations may face cybersecurity threats, digital fraud, and intellectual property vulnerabilities if digital technologies are not managed effectively (Elia et al., 2024). Nevertheless, digital technologies offer substantial benefits by improving operational efficiency, reducing costs, and enabling organizations to respond rapidly to market changes (Duraivelu, 2022).

Digital Transformation Infrastructure

The success of digital transformation largely depends on the availability of appropriate digital infrastructure. Digital infrastructure provides the technological foundation that enables data collection, storage, processing, and communication across organizational systems.

According to Li et al. (2022), digital infrastructure typically consists of three interconnected layers: network communication systems, computing and storage resources, and integrated application platforms. These technological layers collectively support data-driven decision-making and organizational innovation.

Leadership also plays a critical role in the successful implementation of digital transformation. Lin (2023) emphasizes that business leaders must develop a comprehensive understanding of

digital technologies in order to guide digital initiatives effectively. Continuous learning, participation in professional forums, and engagement with emerging technological trends are therefore essential for leaders seeking to support digital transformation.

Emerging Digital Technologies

Several digital technologies play a central role in enabling digital transformation.

The Internet of Things (IoT) refers to networks of interconnected devices equipped with sensors that collect and transmit data through the internet. These devices connect the physical and digital worlds and enable real-time data analysis and automated decision-making processes (IBM, 2024).

Similarly, blockchain technology represents a decentralized digital database that records transactions across multiple devices in a secure and immutable manner. By eliminating intermediaries and increasing transparency, blockchain technology improves transaction efficiency and strengthens trust in digital interactions (Pineda et al., 2024).

Cloud computing also serves as a key enabler of digital transformation by allowing organizations to access scalable computing resources while reducing infrastructure costs. Hybrid cloud models integrate both public and private cloud systems to enhance flexibility and operational agility (IBM, 2024).

Another important technological development is big data analytics, which enables organizations to process large volumes of structured and unstructured data to generate insights that support strategic decision-making. By analyzing data from sources such as customer interactions, social media platforms, and operational systems, organizations can improve service delivery, optimize pricing strategies, and enhance customer satisfaction (Sadiku et al., 2020).

Digital Transformation and Leadership

The presence of a digital transformation strategy alone does not guarantee successful implementation. Imran et al. (2021) emphasize that effective digital transformation requires strong leadership engagement.

Leaders must first promote digital transformation by creating awareness, encouraging collaboration, and fostering a culture that supports innovation and experimentation. In addition, leaders must develop competencies such as adaptability, communication, data-driven decision-making, and openness to technological change.

The increasing digitalization of organizational workspaces also requires employees to develop new technological capabilities. Cortellazzo et al. (2019) note that leaders must invest in employee skill development and support their adaptation to rapidly evolving technological environments.

Integration of Sustainable Leadership and Digital Transformation

The intersection between sustainable leadership and digital transformation represents a critical area of strategic importance for modern organizations. Sustainable leaders can facilitate digital

transformation by articulating a clear technological vision, fostering trust among stakeholders, and encouraging innovation within organizational cultures (Gaffley & Pelser, 2021).

At the same time, digital transformation can strengthen sustainable leadership outcomes by enhancing organizational transparency, operational efficiency, and evidence-based decision-making. The interaction between these two dimensions supports organizational resilience, adaptability, and long-term sustainable growth within dynamic business environments.

Research Methodology

Research Design

This study follows a quantitative, cross-sectional research design to examine the relationships between sustainable leadership development (SLD), digital transformation (DT), and organizational performance in Sudan's financial and telecommunication sectors.

A questionnaire was developed to collect data from employees to statistically test the relationships among constructs and affirm the proposed conceptual framework. The quantitative design supports hypothesis testing .

Population and Sample Size

The target population comprised employees working in financial service institutions and telecommunication companies operating in Sudan.

Sample Size

The researcher used convenience sampling technique to collect information from employees which was deemed appropriate considering the current situation of Sudan in reference to the current political conditions and business instability. Rasoft was used to determine the total number of sample size. Which were 370 based on the assumption that the total number for the two sector is around 20000 employee. The researcher was able to get access to 313 employees with a response rate of 85 % which is highly acceptable for statistical testing. Accordingly total of 313 valid responses were collected and used for analysis.

Sampling Technique

Inclusion Criteria:

Employed in financial or telecommunication sector in Sudan working in different business departments.

Instrument Development

Data were collected using a structured questionnaire. consisting of five sections:

- Sustainable Leadership Development (SLD).
- Digital Transformation (DT).
- Sustainable leadership and digital transformation obstacles.
- Sustainable leadership and digital transformation opportunities
- Organizational Performance

All constructs were measured using a 5-point Likert scale. The questionnaire was reviewed by academic experts.

Data Collection Procedure

Participation in the questionnaire was voluntary and unidentified. Ethical standards were sustained, and informed consent was obtained.

Conceptual Framework

The conceptual framework of this study illustrates the hypothesized relationship among sustainable leadership development, digital transformation, and organizational performance within Sudan's service sector.

Core Constructs

1. Sustainable Leadership Development (Independent Variable 1)
2. Digital Transformation (Independent Variable 2)
3. Organizational Performance (Dependent Variable)

Hypotheses

The researcher has developed a positive relationships to establish the relationship that exists between the variables. Testing hypotheses is a quality control method used in the scientific research method. It guarantees that research findings are backed by statistical investigation as opposed to only gut feeling or anecdotal evidence. Moreover the hypothesis must be well contracted and a well-conducted hypothesis testing improves the reliability and integrity of scientific discoveries by allowing other scientists to replicate their findings.

H 1. Sustainable leadership positively impact financial service and telecommunication companies' performance.

The first hypothesis is based on the assumption that sustainable leadership affect positively service industry performance, to accept this hypothesis several questions would address this area in regards to what sustainable leadership traits if effectively implemented will result in this positive relationship, and which aspect of the company performance would be affected mostly.

H 2. Digital transformation has significant effect on financial services and telecommunications companies' performance.

Second hypothesis. Reflects on digital transformation tools (by identifying which digital transformation tools are used to appreciate positively companies' performance, including moderation factors.

H3. There is a positive correlation between the level of awareness to sustainable leadership and digital transformation and the implementation of sustainable leadership and digital transformation planed change.

The degree of awareness at the different managerial levels in the company impact the implementation of sustainable leadership principles and characteristics, coupled with digital transformation activates and their prioritization in the company and top level management directions and initiatives to undertake such organizational changes which is necessitated by environmental and managerial direction.

DATA ANALYSIS AND FINDINGS

Descriptive Statistics

Descriptive statistics were computed to summarize the distribution of responses for the questionnaire items used in this study. The analysis included the mean, standard deviation, skewness, and kurtosis for each measurement item. These statistics provide insights into the central tendency, variability, and normality of the data distribution.

As shown in Table 1, the mean values for the items range from 3.32 to 4.31, indicating that respondents generally expressed moderate to high agreement with the statements measuring sustainable leadership development and digital transformation practices. The standard deviation values range between 0.827 and 1.251, suggesting an acceptable level of dispersion in the responses.

Furthermore, the skewness values fall within the acceptable range of -2 to $+2$, indicating that the data distribution does not significantly deviate from normality. Similarly, the kurtosis values are within the recommended threshold for SEM analysis, confirming that the dataset is suitable for further statistical testing.

Table 1. Descriptive Statistics

Descriptive Statistics							
	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q1	313	4.06	1.153	-1.388	.138	1.140	.275
Q2	313	4.05	1.251	-.991	.138	-.359	.275
Q3	313	3.74	1.151	-.819	.138	-.161	.275
Q4	313	3.64	1.065	-.688	.138	-.073	.275
Q5	313	3.45	1.064	-.528	.138	-.297	.275
Q6	313	3.32	1.160	-.534	.138	-.552	.275
Q7	313	3.76	1.128	-.947	.138	.202	.275
Q8	313	3.72	1.197	-.819	.138	-.231	.275
Q9	313	3.58	1.038	-.591	.138	-.177	.275
Q10	313	3.53	1.013	-.549	.138	-.200	.275
Q11	313	3.46	1.077	-.439	.138	-.514	.275
Q12	313	3.45	1.028	-.463	.138	-.451	.275
Q13	313	3.47	1.050	-.429	.138	-.470	.275
Q14	313	3.49	1.095	-.597	.138	-.246	.275
Q15	313	3.59	1.148	-.667	.138	-.332	.275
Q16	313	3.49	1.196	-.498	.138	-.671	.275
Q17	313	3.95	1.197	-1.074	.138	.159	.275
Q18	313	3.78	1.073	-.999	.138	.488	.275
Q19	313	3.74	1.139	-.927	.138	.270	.275
Q20	313	3.77	1.114	-.990	.138	.398	.275

Q21	313	3.53	1.157	-.631	.138	-.327	.275
Q22	313	3.59	1.171	-.715	.138	-.316	.275
Q23	313	3.59	1.077	-.702	.138	-.120	.275
Q24	313	3.64	1.098	-.641	.138	-.244	.275
Q25	313	3.58	1.101	-.616	.138	-.295	.275
Q26	313	3.61	1.122	-.614	.138	-.319	.275
Q27	313	3.75	1.210	-.878	.138	-.056	.275
Q28	313	3.93	1.219	-1.025	.138	.040	.275
Q29	313	4.31	.827	-1.084	.138	.867	.275

Source: Research Data

Response Rate

The response rate of the survey provides an indication of the adequacy and reliability of the collected data. A total of 370 questionnaires were distributed to employees working in financial services and telecommunications organizations. Out of these, 313 questionnaires were returned and considered valid for analysis.

As shown in Table 2, the response rate reached 82%, which is considered acceptable for empirical studies using survey-based data collection methods.

Table 2. Response Rate of Questionnaire

Total distributed questionnaires	370
Total questionnaires received from respondents	313
Valid questionnaires received from respondents	313
Invalid questionnaires	6
Questionnaires not received	0
response rate	82

Source: prepared by researcher from data (2025)

To ensure the robustness of the measurement model, reliability and validity tests were conducted before proceeding with structural analysis. The study employed Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to evaluate the measurement properties of the constructs.

Reliability Analysis

Reliability refers to the internal consistency of the measurement items used to represent the study constructs. One of the most widely used indicators of internal consistency is Cronbach's Alpha (Sekaran, 2000).

The results presented in Table 3 indicate that the Cronbach's Alpha value for the overall scale is 0.966, which exceeds the recommended the cutoff of 0.70, demonstrating excellent internal consistency among the measurement items.

Table 3. Reliability Statistics

Cronbach's Alpha	Number of Items
0.966	29

Source: Research data

The high reliability coefficient confirms that the items used in the questionnaire consistently measure the underlying constructs of sustainable leadership development, digital transformation, and organizational performance.

Table 3 .Reliability Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q1	313	4.06	1.153	-1.388	.138	1.140	.275
Q2	313	4.05	1.251	-.991	.138	-.359	.275
Q3	313	3.74	1.151	-.819	.138	-.161	.275
Q4	313	3.64	1.065	-.688	.138	-.073	.275
Q5	313	3.45	1.064	-.528	.138	-.297	.275
Q6	313	3.32	1.160	-.534	.138	-.552	.275
Q7	313	3.76	1.128	-.947	.138	.202	.275
Q8	313	3.72	1.197	-.819	.138	-.231	.275
Q9	313	3.58	1.038	-.591	.138	-.177	.275
Q10	313	3.53	1.013	-.549	.138	-.200	.275
Q11	313	3.46	1.077	-.439	.138	-.514	.275
Q12	313	3.45	1.028	-.463	.138	-.451	.275
Q13	313	3.47	1.050	-.429	.138	-.470	.275
Q14	313	3.49	1.095	-.597	.138	-.246	.275
Q15	313	3.59	1.148	-.667	.138	-.332	.275
Q16	313	3.49	1.196	-.498	.138	-.671	.275
Q17	313	3.95	1.197	-1.074	.138	.159	.275
Q18	313	3.78	1.073	-.999	.138	.488	.275
Q19	313	3.74	1.139	-.927	.138	.270	.275
Q20	313	3.77	1.114	-.990	.138	.398	.275
Q21	313	3.53	1.157	-.631	.138	-.327	.275
Q22	313	3.59	1.171	-.715	.138	-.316	.275
Q23	313	3.59	1.077	-.702	.138	-.120	.275
Q24	313	3.64	1.098	-.641	.138	-.244	.275
Q25	313	3.58	1.101	-.616	.138	-.295	.275
Q26	313	3.61	1.122	-.614	.138	-.319	.275
Q27	313	3.75	1.210	-.878	.138	-.056	.275
Q28	313	3.93	1.219	-1.025	.138	.040	.275
Q29	313	4.31	.827	-1.084	.138	.867	.275

Source: Research data

Validity

Construct validity was assessed using Confirmatory Factor Analysis (CFA). Several goodness-of-fit indices were used to evaluate the adequacy of the measurement model. The criteria adopted for model evaluation are presented in Table 4.

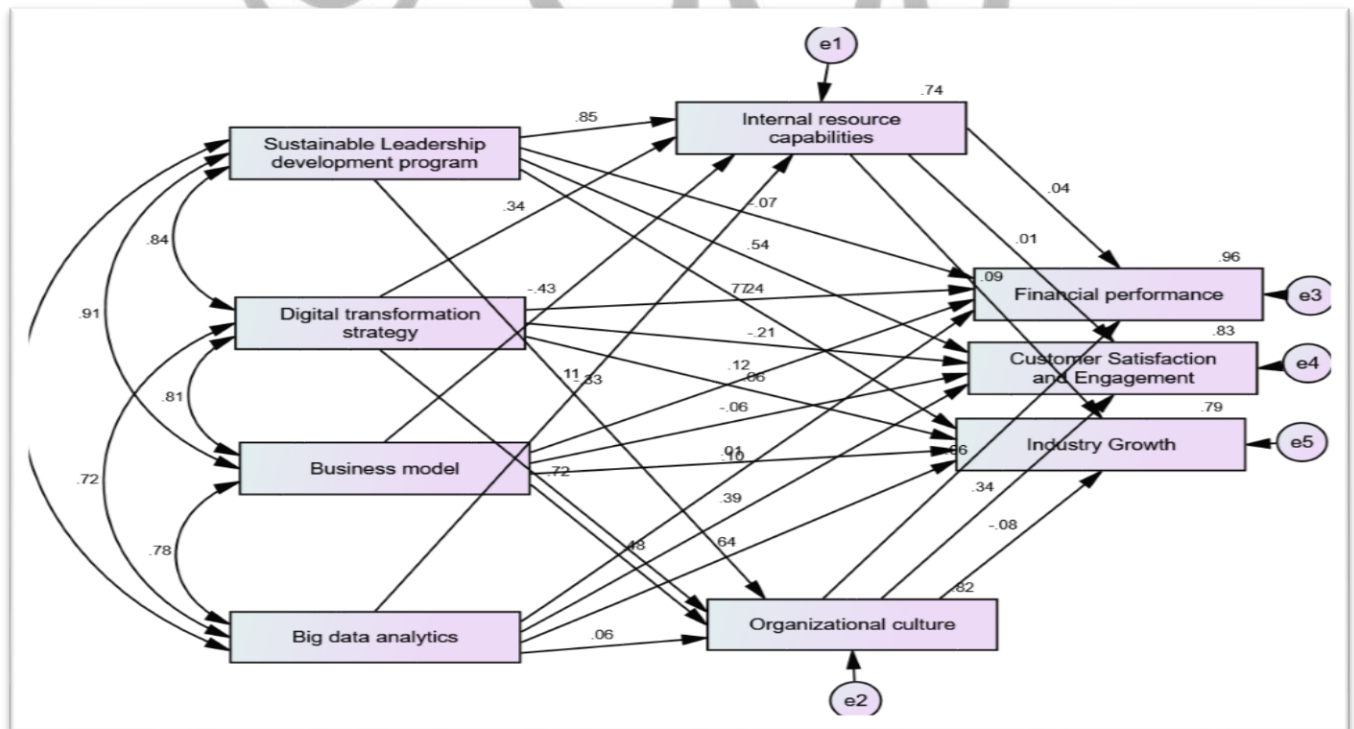
Table 4 Criteria

S. No.	Parameter	Criteria
1	Normed Chi-square (ratio of Chi-square to degrees of freedom)	Less than 3
2	Goodness-of-Fit Index (GFI)	At least .90
3	Adjusted Goodness-of-Fit Index (AGFI)	At least .90
4	Normed Fit Index (NFI)	At least .90
5	Comparative Fit Index (CFI)	At least .90
6	Root Mean Square Residual (RMR)	Less than .10
7	Root Mean Square Error of Approximation (RMSEA)	Less than .08
8	Standardized Residuals	Less than 2.5
9	Standardized factor loadings (SFL)	At least .50
10	Average Variance Extracted (AVE)	At least .50
11	Composite Reliability (CR)	At least .70

Source: (Hair et al., 2019; Kline, 2016; Fornell & Larcker, 1981).

The evaluation criteria for model fit and construct validity presented in Table 4 are based on established guidelines in the SEM literature (Hair et al., 2019; Kline, 2016; Fornell & Larcker, 1981).

Figure 1. Correlation between the different research constructs



Source: Research data.

Correlation Analysis

Correlation analysis was conducted to examine the relationships between the variables included in the study and to identify potential multicollinearity issues.

The Pearson correlation coefficient measures the strength and direction of the linear relationship between two variables. Coefficients close to +1 or -1 indicate strong relationships, while values close to 0 indicate weak relationships.

According to Sekaran (2000), correlation analysis is also useful for detecting multicollinearity issues prior to conducting structural modeling.

Table 5. Pearson Correlation Coefficient for All Variables

Correlations		IRC	OC	SLD P	DTS	BM	BDA	FP	CSE	IG
IR C	Pearson Correlation	1	.673*	.829*	.792*	.703*	.624*	.785*	.712*	.688*
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000
	N	313	313	313	313	313	313	313	313	313
OC	Pearson Correlation	.673*	1	.758*	.877*	.813*	.723*	.884*	.797*	.687*
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000
	N	313	313	313	313	313	313	313	313	313
SL DP	Pearson Correlation	.829*	.758*	1	.842*	.905*	.707*	.843*	.841*	.765*
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000
	N	313	313	313	313	313	313	313	313	313
DT S	Pearson Correlation	.792*	.877*	.842*	1	.805*	.718*	.970*	.774*	.731*
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000
	N	313	313	313	313	313	313	313	313	313
B M	Pearson Correlation	.703*	.813*	.905*	.805*	1	.779*	.838*	.838*	.772*
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000

	N	313	313	313	313	313	313	313	313	313
BD A	Pearson Correlation	.624*	.723*	.707*	.718*	.779*	1	.771*	.819*	.860*
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000
	N	313	313	313	313	313	313	313	313	313
FP	Pearson Correlation	.785*	.884*	.843*	.970*	.838*	.771*	1	.828*	.757*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000
	N	313	313	313	313	313	313	313	313	313
CS E	Pearson Correlation	.712*	.797*	.841*	.774*	.838*	.819*	.828*	1	.739*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000
	N	313	313	313	313	313	313	313	313	313
IG	Pearson Correlation	.688*	.687*	.765*	.731*	.772*	.860*	.757*	.739*	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	
	N	313	313	313	313	313	313	313	313	313

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Research Data

As illustrated in Table 5, all correlations are positive and statistically significant at the 0.01 level. The correlation coefficients range between 0.624 and 0.970, indicating moderate to strong relationships among the study variables.

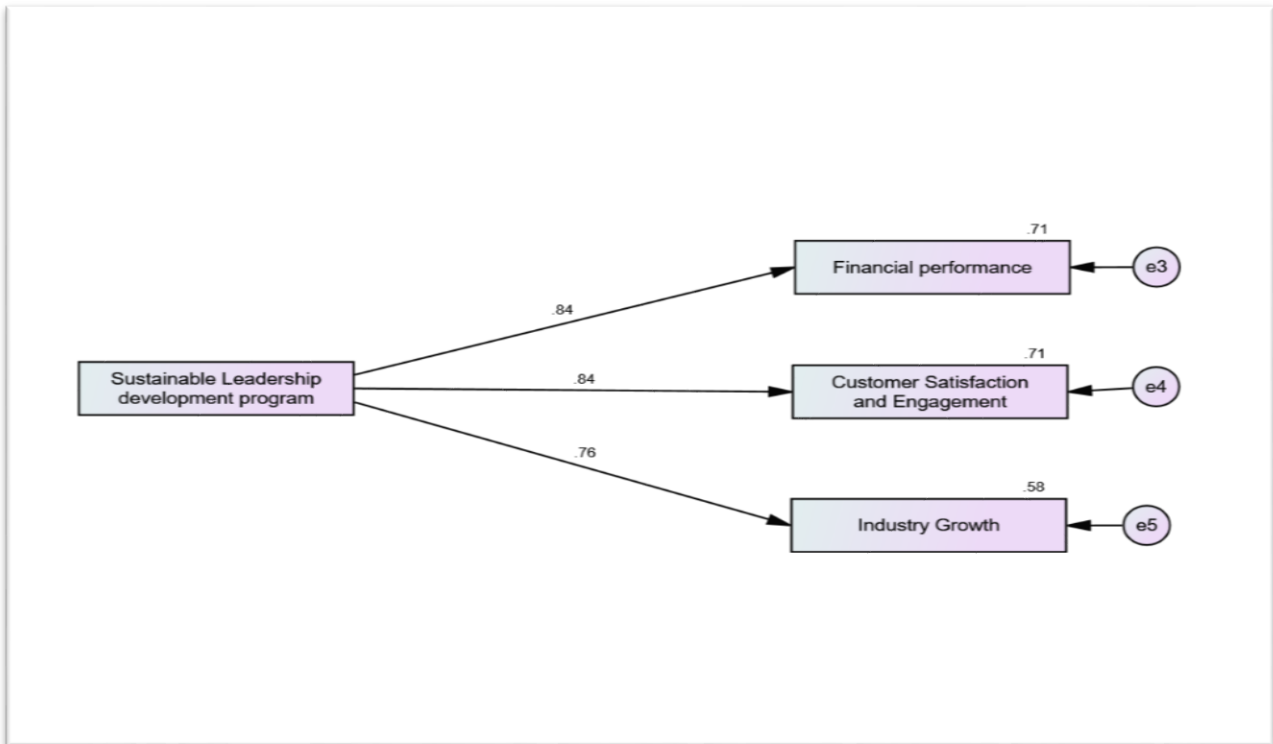
Importantly, none of the correlation coefficients exceed the critical threshold of 0.90, which suggests that multicollinearity is not a serious concern in this dataset. Therefore, the data are considered appropriate for further analysis using Structural Equation Modeling (SEM).

In addition, the performance-related variables—including Financial Performance (FP), Customer Satisfaction and Engagement (CSE), and Industry Growth (IG)—exhibit strong interrelationships, highlighting the interconnected nature of organizational performance indicators. Therefore it is concluded that there is a significant positive relationship and correlation which exists among the study variables, which therefore provide a sound realistic basis for proceeding with the structural equation modeling and hypothesis testing

H.1 Sustainable leadership positively impacts the performance of financial services and telecommunications companies.

To test this hypothesis, Structural Equation Modeling (SEM) was employed using AMOS. The structural model examined the direct relationship between Sustainable Leadership Development Programs (SLDP) and organizational performance indicators, including Financial Performance (FP), Customer Satisfaction and Engagement (CSE), and Industry Growth (IG).

Figure 1. Structural Model for Sustainable Leadership and Organizational Performance



Source: Research Data

The results indicate that Sustainable Leadership Development Programs (SLDP) have a significant positive effect on organizational performance.

Specifically:

- SLDP → Financial Performance ($\beta = 0.916$, C.R. = 27.683, $p < 0.001$)
- SLDP → Customer Satisfaction and Engagement ($\beta = 0.855$, C.R. = 27.497, $p < 0.001$)
- SLDP → Industry Growth ($\beta = 0.851$, C.R. = 20.966, $p < 0.001$)

These findings indicate that organizations that invest in sustainable leadership development are more likely to achieve stronger financial outcomes, higher customer satisfaction levels, and improved industry growth.

Overall, the findings provide strong empirical support for Hypothesis 1, confirming that sustainable leadership positively influences the performance of financial services and telecommunications organizations.

			Estimate	S.E.	C.R.	P	Results
FP		SLDP	.916	.033	27.683		Supported
CSE		SLDP	.855	.031	27.497		Supported
IG		SLDP	.851	.041	20.966		Supported

Source: Research Data

Path Coefficients, Observed T- Statistics, Significant Level for some Hypothesized Paths under 0.05 P value or 1.96 T Statistics.

The findings reveal that the Sustainable Leadership Development Program (SLDP) has a significant positive impact on the performance of the service industry in general. To be more specific, the findings reveal that the SLDP has a positive influence on the Financial Performance of the service industry ($\beta = 0.916$, C.R. = 27.683, $p < 0.001$), suggesting that the more an organization is committed to the development of its leadership capability, the more likely it is to achieve financial success.

Moreover, the findings reveal that the SLDP has a positive influence on Customer Satisfaction and Engagement in the service industry ($\beta = 0.855$, C.R. = 27.497, $p < 0.001$), suggesting that the more an organization is committed to the development of its leadership capability, the more likely it is to achieve customer satisfaction and engagement in the service industry. In addition, the findings reveal that the SLDP has a positive influence on Industry Growth in the service industry ($\beta = 0.851$, C.R. = 20.966, $p < 0.001$), suggesting that the more an organization is committed to the development of its leadership capability, the more likely it is to achieve industry

Overall, the findings provide strong empirical support for Hypothesis 1, confirming that sustainable leadership positively and significantly impacts the performance of financial services and telecommunications companies.

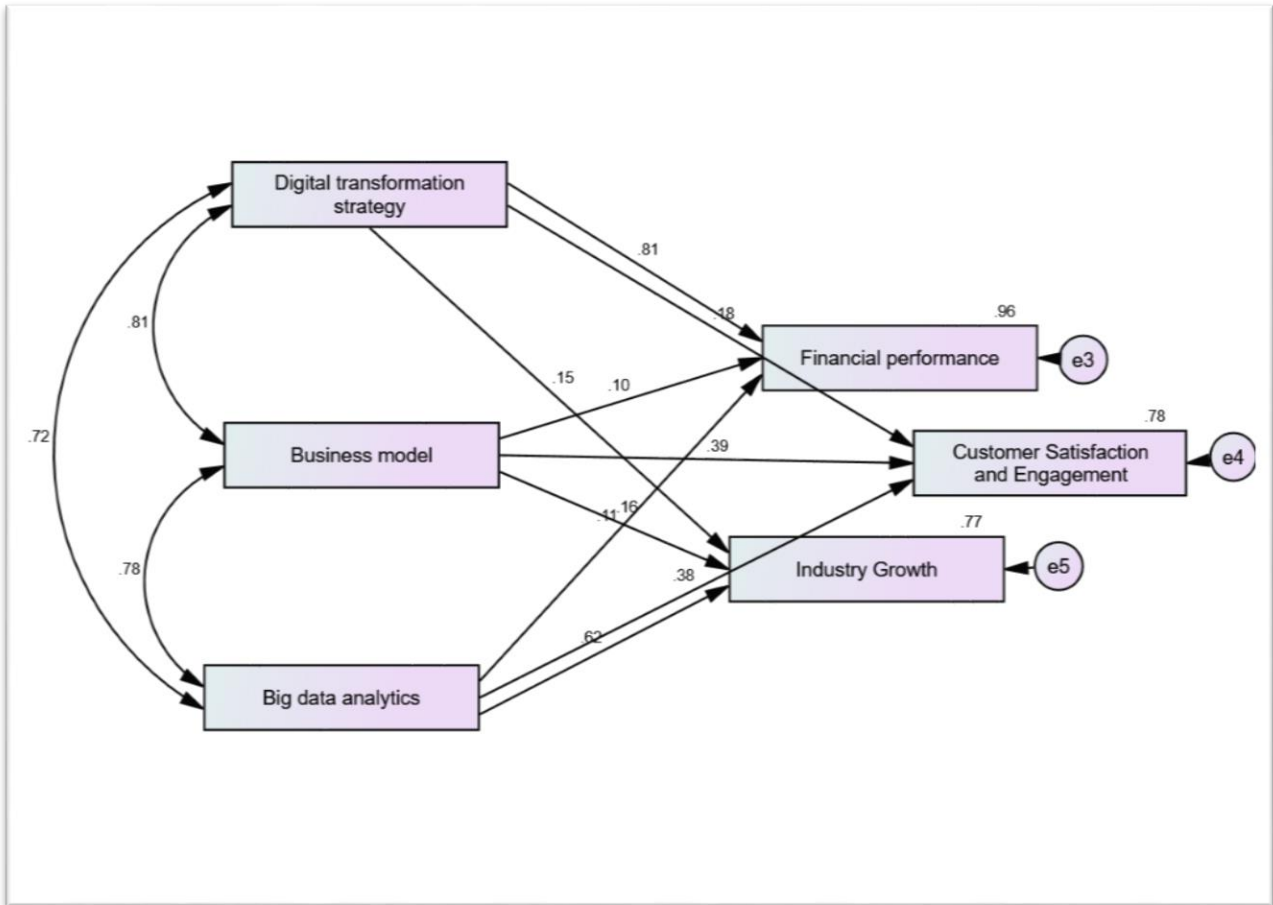
H. 2 Digital transformation has significant effect on financial services and telecommunications companies' performance.

To examine the effect of digital transformation on the performance of financial services and telecommunications companies, Structural Equation Modeling (SEM) was employed. Digital transformation was operationalized through three key dimensions—Digital Transformation Strategy (DTS), Business Model Innovation (BM), and Big Data Analytics (BDA)—while organizational performance was measured through Financial Performance (FP), Customer Satisfaction and Engagement (CSE), and Industry Growth (IG), as defined in Chapter One.

Figure 3 presents the structural model estimation illustrating the relationship between digital transformation and organizational performance. The corresponding path coefficients are summarized in Table 8. The structural model demonstrates acceptable goodness-of-fit indices consistent with those obtained for the measurement model, confirming the adequacy of the proposed theoretical framework. The coefficient of determination (R^2) values range between 0.50

and 0.80, indicating that the digital transformation constructs explain a substantial proportion of variance in service sector performance outcomes.

Figure 3. the structural model estimation illustrating the relationship between digital transformation and organizational performance



Source: Research Data

Table 8. Structural Path Estimates for the Effect of Digital Transformation on Organizational Performance

Dependent Variable	Independent Variable	Estimate	S.E.	C.R.	p-value	Result
FP	DTS	0.779	0.020	38.902	<0.001	Supported
FP	BM	0.100	0.024	4.185	<0.001	Supported
FP	BDA	0.104	0.018	5.670	<0.001	Supported
CSE	DTS	0.165	0.041	4.025	<0.001	Supported
IG	DTS	0.149	0.04	3.242	0.001	Supported

Dependent Variable	Independent Variable	Estimate	S.E.	C.R.	p-value	Result
			6			
CSE	BM	0.379	0.049	7.749	<0.001	Supported
IG	BM	0.173	0.055	3.155	0.002	Supported
CSE	BDA	0.328	0.038	8.739	<0.001	Supported
IG	BDA	0.590	0.042	14.032	<0.001	Supported

Source: Research Data

The results indicate that Digital Transformation Strategy (DTS) has a strong and positive effect on Financial Performance ($\beta = 0.779$, C.R. = 38.902, $p < 0.001$), suggesting that organizations implementing comprehensive digital strategies are more likely to achieve superior financial outcomes. DTS also exerts a significant positive influence on Customer Satisfaction and Engagement ($\beta = 0.165$, C.R. = 4.025, $p < 0.001$) and Industry Growth ($\beta = 0.149$, C.R. = 3.242, $p = 0.001$), highlighting the importance of strategic digital initiatives in improving customer relationships and supporting organizational expansion.

Similarly, Business Model Innovation (BM) demonstrates a statistically significant positive relationship with all performance indicators. Specifically, BM positively influences Financial Performance ($\beta = 0.100$, C.R. = 4.185, $p < 0.001$), Customer Satisfaction and Engagement ($\beta = 0.379$, C.R. = 7.749, $p < 0.001$), and Industry Growth ($\beta = 0.173$, C.R. = 3.155, $p = 0.002$). These findings suggest that digitally enabled transformations in business models contribute meaningfully to both market-oriented outcomes and long-term organizational growth.

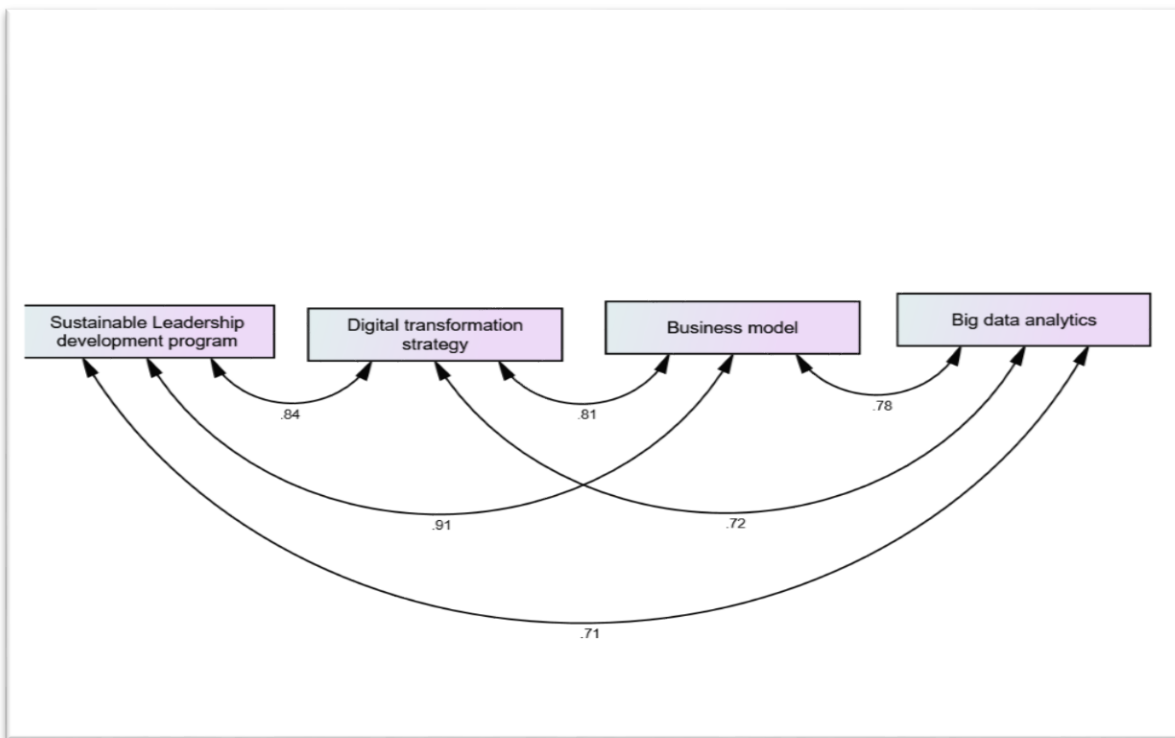
Furthermore, Big Data Analytics (BDA) demonstrates a strong and statistically significant influence across all performance outcomes. BDA positively affects Financial Performance ($\beta = 0.104$, C.R. = 5.670, $p < 0.001$), Customer Satisfaction and Engagement ($\beta = 0.328$, C.R. = 8.739, $p < 0.001$), and Industry Growth ($\beta = 0.590$, C.R. = 14.032, $p < 0.001$). Among the digital transformation dimensions, BDA exhibits the strongest effect on Industry Growth, underscoring the strategic importance of data-driven decision-making in enhancing organizational competitiveness and supporting sustainable development. This indicates the nature of the industry which is customer centric.

Overall, the findings provide strong empirical support for Hypothesis 2, confirming that digital transformation has a significant and positive effect on the performance of financial services and telecommunications companies in Sudan. Accordingly, Hypothesis 2 is accepted.

H.3 There is a positive correlation between the level of awareness to sustainable leadership and digital transformation and the implementation of sustainable leadership and digital transformation planed change.

To assess the positive correlation between the level of awareness of sustainable leadership and digital transformation and the implementation of planned sustainable leadership and digital transformation change initiatives, Structural Equation Modeling (SEM) was employed. The

analysis focused on examining the interrelationships among the key constructs representing awareness and implementation dimensions, namely Digital Transformation Strategy (DTS), Business Model innovation (BM), Big Data Analytics (BDA), and Sustainable Leadership Development Programs (SLDP).



Figures 4 Structural model estimation for assess the positive correlation between the level of awareness to sustainable leadership and digital transformation and the implementation of sustainable leadership and digital transformation planned change.

Table 7. Correlations:

Relationship			Estimate(coorelation)
DTS	<-->	BDA	.718
BDA	<-->	BM	.779
DTS	<-->	BM	.805
BDA	<-->	SLDP	.707
BM	<-->	SLDP	.905
DTS	<-->	SLDP	.842

The correlation results indicate strong and positive relationships among all examined constructs. Specifically, Digital Transformation Strategy (DTS) is strongly correlated with Business Model innovation (BM) ($r = 0.805$) and Big Data Analytics (BDA) ($r = 0.718$), suggesting that higher levels of strategic digital awareness are closely associated with the adoption of data-driven practices and innovative business models. In addition, DTS exhibits a strong positive correlation with Sustainable Leadership Development Programs (SLDP) ($r = 0.842$), indicating that organizations with greater awareness of digital transformation are more likely to implement sustainable leadership initiatives.

Overall, the findings provide strong empirical support for Hypothesis 3, confirming the existence of a significant and positive correlation between awareness of sustainable leadership and digital transformation and the implementation of planned sustainable leadership and digital transformation change initiatives. Accordingly, the hypothesis is accepted.

DISCUSSION OF FINDINGS

Theoretical Implications

The findings of this study contribute to the existing literature in several important ways.

First, the research extends sustainable leadership theory into an emerging market context, providing empirical evidence from the Sudanese financial services and telecommunications sectors. Previous studies have largely focused on developed economies, leaving emerging markets relatively underexplored.

Second, the study demonstrates a clear empirical linkage between leadership development and organizational performance outcomes, reinforcing the strategic importance of leadership capability development in service-based industries.

Third, the research contributes to the literature by integrating digital transformation dimensions into sustainable leadership frameworks, highlighting the complementary relationship between leadership capability development and technological transformation.

Finally, the findings confirm the mediating role of internal resource capabilities, supporting the Resource-Based View (RBV) perspective that organizational capabilities serve as a key mechanism through which leadership and technology initiatives influence organizational performance.

Practical Implications

The findings provide several important managerial implications for organizations operating in financial services and telecommunications sectors.

Managers should:

- Invest in formal sustainable leadership development programs to strengthen leadership capabilities and strategic alignment.
- Align digital transformation strategies with leadership development initiatives to ensure effective implementation of technological innovation.
- Strengthen internal resource capabilities before launching large-scale digital transformation initiatives.
- Prioritize big data analytics as a strategic capability for long-term growth and competitive advantage.
- Develop clear sustainability implementation roadmaps rather than relying solely on awareness initiatives.

Such strategic alignment between leadership capability development and digital transformation can enhance organizational resilience and long-term competitiveness.

Conclusion

The results of this study demonstrate that sustainable leadership development and digital transformation significantly and positively influence service sector performance in Sudan.

The study confirms that organizations integrating leadership capability development with strategic digital transformation initiatives are better positioned to achieve:

- Financial stability
- Customer engagement
- Long-term industry growth

The main conclusions of the study are summarized as follows:

1. Sustainable leadership and digital transformation function as complementary strategic drivers of organizational performance within the Sudanese service sector.
2. Leadership capability development enhances organizational resilience and supports long-term performance outcomes.
3. Digital transformation enables service sector organizations to improve operational efficiency, customer engagement, and industry competitiveness.

Overall, the study highlights the importance of integrating leadership development, digital transformation strategies, and organizational capabilities in order to achieve sustainable performance in emerging market environments.

References

1. Baslyman, M. (2022). Digital business transformation and IT governance integration. *Journal of Digital Business*, 5(2), 45–59.
2. Chaudhry, M. J., & Noureen, S. (2023). Sustainable leadership and organizational development: Emerging perspectives. *Sustainability*, 15(8), 6784.
3. Cortellazzo, L., Bruni, E., & Zampieri, R. (2019). The role of leadership in a digitalized world: A review. *Frontiers in Psychology*, 10, 1938.
4. Dehghani, M., Popova, I., & Gheitanchi, S. (2022). Blockchain technology adoption in supply chains. *Technological Forecasting and Social Change*, 174, 121233.
5. Duraivelu, S. (2022). Digital transformation and operational efficiency in industrial organizations. *International Journal of Industrial Engineering*, 29(4), 456–468.
6. Elia, G., Margherita, A., & Passiante, G. (2024). Sustainability-oriented leadership and value creation in digital transformation. *Business Strategy and the Environment*, 33(2), 1123–1138.
7. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
8. Gaffley, G., & Pelsler, T. (2021). Developing a digital transformation model to enhance organizational performance. *South African Journal of Business Management*, 52(1), 1–13.

9. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
10. Hargreaves, A., & Fink, D. (2004). The seven principles of sustainable leadership. *Educational Leadership, 61*(7), 8–13.
11. IBM. (2024). *What is the Internet of Things (IoT)?* IBM Corporation.
12. Imran, F., Shahzad, K., Butt, A., & Kantola, J. (2021). Digital transformation and leadership competencies. *Journal of Business Research, 128*, 123–134.
13. Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.
14. Lewandowska, A., Szymańska, K., & Krot, K. (2023). Sustainable leadership and employee satisfaction. *Journal of Business Research, 156*, 113456.
15. Li, X., Wang, Y., & Zhang, H. (2022). Digital infrastructure development and economic growth. *Information Economics and Policy, 60*, 100972.
16. Lin, H. (2023). Leadership capabilities in digital transformation. *Journal of Organizational Change Management, 36*(4), 567–582.
17. Marczevska, M. (2024). Challenges of digital transformation in modern organizations. *Technological Forecasting and Social Change, 194*, 122876.
18. Orieno, J., Wanjiku, M., & Otieno, P. (2024). Digital reconstruction and organizational transformation. *Journal of Information Systems Management, 41*(1), 21–33.
19. Pineda, L., Jabba, D., & Nieto-Bernal, W. (2024). Blockchain adoption in the digital economy. *Journal of Business Research, 170*, 114353.
20. Sadiku, M. N. O., Shadare, A. E., Musa, S. M., & Akujuobi, C. M. (2020). Big data: A primer. *International Journal of Scientific Advances, 1*(2), 124–128.
21. Sebastian, I., & Hühn, M. (2024). Sustainable leadership and organizational performance: A critical perspective. *Sustainability, 16*(3), 1450.
22. Sekaran, U. (2000). *Research methods for business: A skill-building approach* (3rd ed.). John Wiley & Sons.
23. Šimanskienė, L., & Župerkienė, E. (2014). Sustainable leadership: The new challenge for organizations. *Forum Scientiae Oeconomia, 2*(1), 81–93.
24. Tang, H. (2021). Digital transformation and business innovation. *Technological Forecasting and Social Change, 173*, 121084.