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Impact of Leadership on Sales Performance Mediated by Digital Intellectuality and Innovation in Aceh Province, Indonesia

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Abstract

This study investigates how transformational and adaptive leadership influence sales performance in retail stores in Aceh Province, Indonesia, with digital intellectuality as a mediator and technological innovation as a moderator. Primary data were collected via a questionnaire distributed to 300 owners and employees of minimarkets, grocery stores, and cafes in North Aceh Regency, Bireuen Regency, and Lhokseumawe City. Using Structural Equation Modeling with Partial Least Squares (SEM-PLS) for analysis, the findings reveal that both leadership styles positively impact digital intellectuality, which enhances technological innovation and boosts sales performance. Transformational leadership significantly mediates the relationship between digital intellectuality and sales performance, while adaptive leadership indirectly influences sales performance through digital intellectuality and technological innovation, highlighting the critical role of leadership in optimizing sales outcomes.

Keywords: *Transformational Leadership, Adaptive Leadership, Digital Intellectuality, Technological Innovation, Sales Performance.*

Introduction

Transformational leadership inspires followers, while adaptive leadership adapts to changing environments (Khin & Ho, 2019). Both leadership styles enhance sales performance—transformational leadership by building trust and engagement (Schwepker & Good, 2013; Zéghal & Maaloul, 2010), and adaptive leadership by integrating sales skills and behaviors (Singh et al., 2017). These styles complement each other by improving subordinate relationships and cross-selling performance (Smith et al., 2012; Schmitz et al., 2014). Digital intellectuality, or the effective use of digital tools, mediates the relationship between leadership and sales performance (Chernenko et al., 2021; Kusuma, 2023). Technological innovation, meanwhile, moderates this relationship, enhancing sales processes and outcomes (Kusuma, 2023; Inyang et al., 2018). The integration of digital tools and innovation improves operational efficiency and customer experiences, leading to better sales performance (Arshad, 2023). While previous research highlights the impact of transformational leadership, there is limited understanding of its effects, alongside adaptive leadership, on sales performance through digital intellectuality and technological innovation. This study aims to explore these relationships, providing insights into how leadership, digital capabilities, and innovation collectively drive sales in retail stores in Aceh, Indonesia.

Hypotheses Development

Adaptive Leadership and Digital Intellectuality

Adaptive leadership is essential for organizations to navigate the complexities of the digital age and respond effectively to rapid technological advancements. It fosters agility, innovation, and resilience amidst digital disruptions (Abdullahi et al., 2020; Tutar & Güler, 2022). Key adaptive leadership behaviors, such as empowerment and intellectual stimulation, correlate positively with innovative staff behaviors, promoting creativity (Abdullahi et al., 2020). Furthermore, adaptive leadership supports digital initiatives and collaboration, enhancing digital capabilities and facilitating transformation (Mutsuddi & Sinha, 2021). By

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integrating these principles, organizations can navigate digital challenges, seize opportunities, and achieve sustainable growth and success, leading to the formulation of a hypothesis.

Hypothesis 1: *Adaptive Leadership has a positive and significant impact on digital intellectuality.*

Digital Intellectuality and Technological Innovation

Digital intellectuality is a key driver of technological innovation, enabling organizations to adapt to the digital era. Research emphasizes the significance of intellectual capital, knowledge management, and digital empowerment in enhancing innovation and organizational performance (Zhang et al., 2021; Castro et al., 2013). Human capital provides essential knowledge and skills, while the composition of intellectual assets influences product innovation (Zhang et al., 2021; Castro et al., 2013). Understanding stakeholder requirements is crucial for driving technological advancements (Makkonen & Komulainen, 2018). By leveraging digital intellectuality effectively, organizations can improve their innovation capabilities, respond to technological changes, and achieve sustainable growth, leading to the formulation of a hypothesis.

Hypothesis 2: *Digital intellectuality has a positive and significant impact on technological innovation.*

Transformational Leadership and Digital Intellectuality

Transformational leadership is crucial in promoting digital intellectuality and transformation by inspiring and motivating followers (Kudyba et al., 2020). Its key components—idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration—drive digital innovation and enhance employee performance (Šiber, 2023; Bajracharya, 2023). Studies demonstrate that transformational leadership significantly influences decision-making, creativity, job satisfaction, and overall organizational performance (Dvir et al., 2002; Jyoti & Dev, 2015). Additionally, it enhances self-efficacy and motivation across various sectors, fostering a conducive work environment. By understanding these dimensions, organizations can effectively navigate the complexities of the digital era, promoting sustainable growth and success. A hypothesis is proposed based on these findings.

Hypothesis 3: *Transformational leadership has a positive and significant impact on digital intellectuality.*

Digital Intellectuality and Sales Performance

Digital intellectuality significantly influences sales performance by enabling organizations to leverage digital technology for revenue growth. Research highlights the roles of intellectual capital, digital marketing strategies, and adaptive sales behaviors in enhancing sales performance and customer engagement (Conde & Prybutok, 2020; Heiens & Narayanaswamy, 2021). Digital social influence through platforms like Facebook and Instagram attracts customers, while adaptive sales strategies on social media improve outcomes (Praswati et al., 2020). Additionally, tools like live streaming and website optimization enhance sales performance by increasing customer engagement and online transactions (David et al., 2022; Yu, 2023). Effective integration of digital technology and intellectual capital drives sales success.

Hypothesis 4: *Digital intellectuality has a positive and significant impact on sales performance.*

Technology Innovation and Sales Performance

Technology innovation is vital for enhancing sales performance, enabling organizations to adapt to market dynamics and gain competitive advantages. Literature demonstrates that technology innovation positively impacts sales growth, customer engagement, and overall business performance (Liu & Jiang, 2016; Martín-Ríos & Ciobanu, 2019). Factors such as ownership structure, branding strategies, and technology integration into sales processes are linked to improved revenue generation (Rubera & Dröge, 2013). Moreover, aligning IT with open innovation strategies boosts sales growth (Cui et al., 2015). Recent studies emphasize innovation's role in product competitiveness and market expansion, underscoring its importance for sustainable sales success (Matras-Bolibok & Kijek, 2018; Caputo et al., 2016).

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Hypothesis 5: *Technological innovation has a positive and significant impact on sales performance.*

The Role of Innovative Technology as A Mediator in The Relationship Between Digital Intellectuality and Sales Performance

The role of innovative technology as a mediator between digital intellectuality and sales performance in supermarkets warrants further investigation. While research highlights the impact of digital capabilities and technological innovation on sales outcomes, understanding how innovative technology specifically mediates this relationship in the supermarket sector remains underexplored. Integrating innovative technology into supermarket operations can enhance customer experience, operational efficiency, and sales revenue (Ahmed & Amiri, 2022). Additionally, the strategic adoption of technology influences consumer behavior and purchasing patterns (Budur & Poturak, 2021). Empirical studies are essential to elucidate these mechanisms, ultimately optimizing sales performance and driving growth in the competitive supermarket sector. Based on theoretical and empirical literature studies, the following hypothesis is formulated:

Hypothesis 6: *Technological innovation mediates the influence of digital intellectuality on sales performance.*

The Role of Technological Innovation as A Moderator in the Relationship Between Digital Intellectuality and Sales Performance

The role of technological innovation as a moderator in the relationship between digital intellectuality and sales performance is a vital area of study in today's business landscape. Research emphasizes the importance of digital capabilities and innovation strategies in enhancing sales outcomes (Khin & Ho, 2019; Mallinguh et al., 2020). Integrating innovative technology in supermarkets can improve customer experience and operational efficiency, leading to increased sales revenue (Winkler et al., 2016). However, there remains a gap in understanding how innovative technology moderates the impact of digital intellectuality on sales performance specifically in the supermarket sector. Empirical investigations are needed to explore these dynamics further.Based on theoretical and empirical evidence from the literature, the following hypothesis is formulated:

Hypothesis 7: *Technological innovation moderates the influence of digital intellectuality on sales performance.*

Materials and Methods

The measurement of key constructs in the study includes Transformational Leadership, assessed via the Multifactor Leadership Questionnaire (MLQ) developed by Bass and Avolio (1995), focusing on idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Adaptive Leadership is evaluated using the Adaptive Performance Scale (APS) developed by Pulakos et al. (2000), encompassing handling uncertainty, learning new tasks and technologies, cultural adaptability, and stress management. Digital Intellectuality is measured by the Digital Literacy Assessment (DLA) developed by Eshet-Alkalai (2004), assessing critical thinking, information navigation, and socio-emotional skills. Technology Innovation is gauged through the Community Innovation Survey (CIS) (Schilling, 2017; Rogers, 2003), covering product, process, and organizational innovations. Lastly, Sales Performance is measured based on a methodology developed by Verbeke et al. (2011), focusing on sales presentation, knowledge utilization, target achievement, and sales revenue.

This study employs Structural Equation Modeling (SEM) using SmartPLS software to analyze complex relationships among variables. This method effectively models the interactions between transformational leadership, adaptive leadership, digital intellectuality, technological innovation, and sales performance. It enhances the robustness of the findings in the retail context of Aceh Province, Indonesia.

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Context of Study, Population, and Sample Size

In this study, the population includes all business operators of small and medium enterprises, particularly owners and employee of minimarkets, grocery stores, and cafes located in North Aceh Regency, Bireuen Regency, and Lhokseumawe City. The table presents data on various attributes of companies, employees, and locations. It shows the distribution of company sizes, with the majority having 5-20 employees (50%), followed by 21-50 employees (30%), 51-100 employees (12%), and more than 100 employees (8%). Gender distribution indicates a higher percentage of male employees (55%) compared to female employees (45%). Regarding educational levels, most employees hold a Bachelor's degree (62%), followed by high school graduates (21%), diploma holders (13%), and those with a Master's degree (5%). The data also highlights the geographic distribution of employees, with 31% located in Lhokseumawe, 33% in Bireuen, and 36% in North Aceh. (Table 1)

Table 1. Respondents' Information

Description	Category	Frequency	Percentage
Company Size	5-20 Employees	190	50
	21-50 Employees	114	30
	51-100 Employees	46	12
	>100 Employees	30	8
Gender	Male	210	55
	Female	170	45
Education Level	High School	78	21
	Diploma	50	13
	Bachelor	234	62
	Master's	18	5
City	Lhokseumawe	118	31
	Bireuen	125	33
	North Aceh	137	36

The Figure 1. illustrates the relationships between several variables in the context of sales performance. "Transformational Leadership" and "Adaptive Leadership" influence "Digital Intellectuality," which acts as a mediating variable. This means that the effect of transformational and adaptive leadership on sales performance occurs through digital intellectuality. Additionally, "Technology Innovation" serves as a moderating variable, affecting the relationship between digital intellectuality and sales performance, as well as having a direct relationship with sales performance. Thus, technology innovation can strengthen or weaken the impact of digital intellectuality on sales performance.

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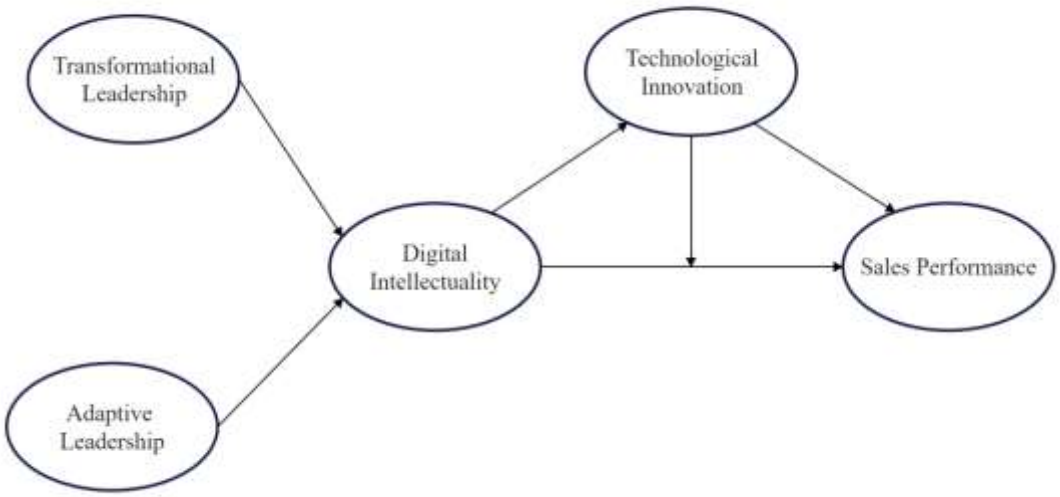

Figure 1. Conceptual Framework.

Data Analysis

Data analysis will utilize Partial Least Squares Structural Equation Modeling (PLS-SEM) with Smart-PLS software, chosen for its effectiveness with complex models and smaller sample sizes. The analysis involves evaluating the measurement model for reliability and validity using composite reliability (CR), average variance extracted (AVE), and factor loadings. The structural model will test hypothesized relationships, including path coefficients, t-values, and model fit (R^2). Mediation analysis will assess the role of digital intellectuality, while moderation analysis will examine technological innovation's impact.

The study's implementation plan includes questionnaire development, pre-testing, and data collection in Aceh, followed by Smart-PLS analysis. Ethical considerations ensure informed consent, confidentiality, and respondent anonymity. This methodology provides a robust framework to explore how leadership styles influence sales performance, highlighting the roles of digital intellectuality and technological innovation. Findings aim to contribute valuable insights to academic literature and practical implications for leadership and sales strategies in the retail sector.

Results

This study aims to examine the influence of transformational and adaptive leadership on sales performance, with digital intellectuality as a mediating variable and technological innovation as a moderating variable. The analysis was conducted using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with Smart PLS.

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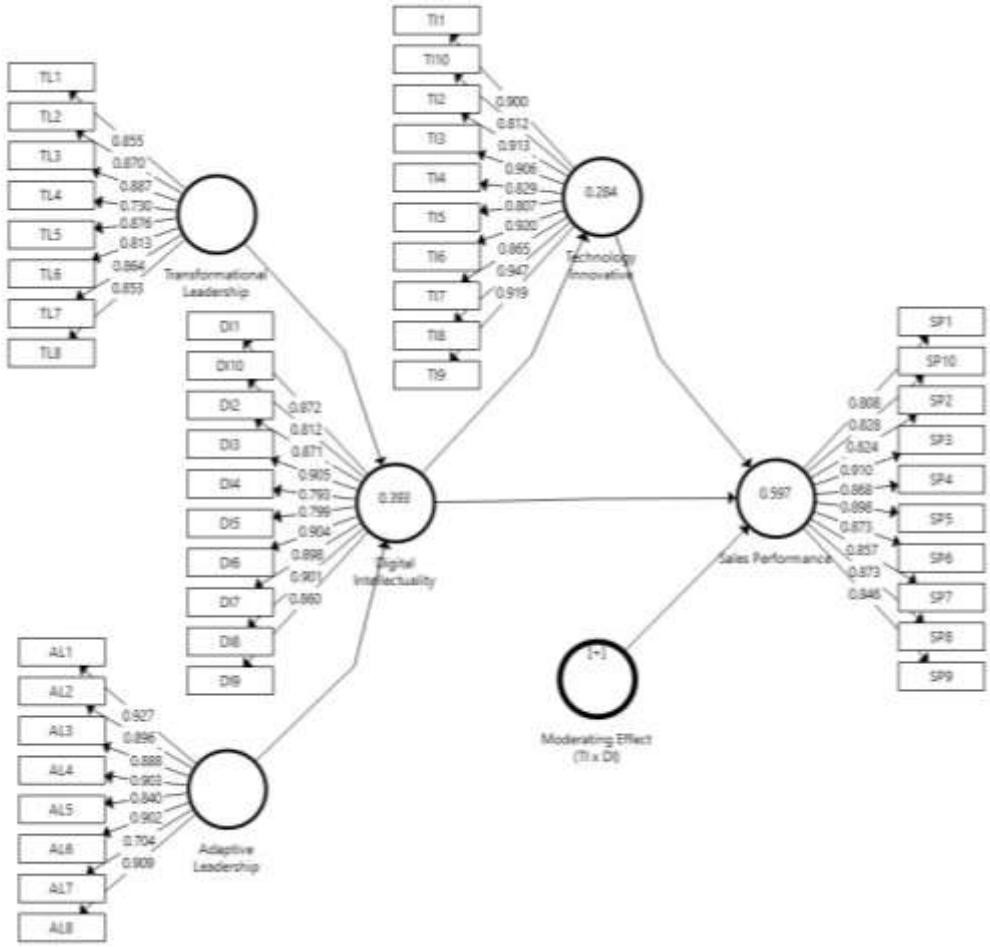

Figure 2. Measurement Model (Outer Model)

Data Screening and Common Method Bias

The data (Table 2) presents descriptive statistics for the main constructs: Transformational Leadership, Adaptive Leadership, Digital Intellectuality, Technology Innovation, and Sales Performance. The mean values for these constructs range from 3.668 to 3.907, with Adaptive Leadership having the highest mean (3.907) and Digital Intellectuality the lowest (3.668). The standard deviations range from 0.362 to 0.501, indicating relatively low variability in the responses. Skewness values suggest that most constructs have left-skewed distributions, with Transformational Leadership (-0.952) and Technology Innovation (-0.854) being the most skewed. Kurtosis values indicate that Technology Innovation has a higher peak (2.747), suggesting a leptokurtic distribution, while the other constructs have values closer to normal distribution. These values suggest that the data is fairly normally distributed and suitable for further analysis.

Table 2. Descriptive Statistic

Main Constructs	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis
	Statistic	Statistic	Statistic	Statistic	Statistic
Transformational Leadership	3,779	0,420	-0,952	0,125	0,626
Adaptive Leadership	3,907	0,362	-0,681	0,125	1,489
Digital Intellectuality	3,668	0,453	-0,065	0,125	0,811
Technology Innovation	3,797	0,477	-0,854	0,125	2,747

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Sales Performance	3,735	0,501	-0,125	0,125	1,624

Measurement Model (Outer Model)

Convergent Validity

Based on the convergent validity results (Table 3), all constructs show strong outer loadings for their respective items, indicating high levels of internal consistency and validity. Adaptive Leadership (AL) items range from 0.704 to 0.927, with most above the 0.80 threshold. Transformational Leadership (TL) items range from 0.730 to 0.887, demonstrating reliable loadings, though TL4 is slightly lower. Digital Intellectuality (DI) items exhibit robust loadings between 0.793 and 0.905. Sales Performance (SP) items range from 0.808 to 0.910, indicating strong measurement reliability. Finally, Technology Innovative (TI) items range from 0.807 to 0.947, further confirming their validity. Overall, the results suggest that the measurement model exhibits satisfactory convergent validity across all constructs.

Table 3. Convergent Validity

Adaptive Leadership		Transformational Leadership		Digital Intellectuality		Sales Performance		Technology Innovative	
Item	Outer Loading	Item	Outer Loading	Item	Outer Loading	Item	Outer Loading	Item	Outer Loading
AL1	0,927	TL1	0,855	DI1	0,872	SP1	0,808	TI1	0,900
AL2	0,896	TL2	0,870	DI2	0,871	SP2	0,824	TI2	0,913
AL3	0,888	TL3	0,887	DI3	0,905	SP3	0,910	TI3	0,906
AL4	0,903	TL4	0,730	DI4	0,793	SP4	0,868	TI4	0,829
AL5	0,840	TL5	0,876	DI5	0,799	SP5	0,898	TI5	0,807
AL6	0,902	TL6	0,813	DI6	0,904	SP6	0,873	TI6	0,920
AL7	0,704	TL7	0,864	DI7	0,898	SP7	0,857	TI7	0,865
AL8	0,909	TL8	0,853	DI8	0,901	SP8	0,873	TI8	0,947
				DI9	0,860	SP9	0,846	TI9	0,919
				DI10	0,812	SP10	0,828	TI10	0,812

Discriminant Validity

Discriminant validity testing aims to assess whether indicators of a construct variable are valid or not. According to the Fornell-Larcker criteria, if the square root of the Average Variance Extracted (AVE) is greater than the highest correlation value of a variable with other variables, then the variable exhibits good discriminant validity

Table 4. Discriminant Validity

Construct	Adaptive Leadership	Digital Intellectuality	Sales Performance	Technology Innovative	Transformational Leadership
Adaptive Leadership	0,874				
Digital Intellectuality	0,484	0,862			
Sales Performance	0,593	0,643	0,859		
Technology Innovative	0,483	0,533	0,656	0,883	
Transformational Leadership	0,530	0,595	0,697	0,591	0,845

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The results of discriminant validity (Table 4) indicate that each construct has a square root of AVE (diagonal values) higher than the correlations between constructs (off-diagonal values), suggesting that each construct is well distinguished from the others. The square root of AVE values for Adaptive Leadership (0.874), Digital Intellectuality (0.862), Sales Performance (0.859), Technology Innovative (0.883), and Transformational Leadership (0.845) are all greater than the inter-construct correlations, confirming adequate discriminant validity in this model.

Construct Reliability and Validity

The construct reliability and validity (Table 5) results show that all constructs have high reliability and validity. Cronbach's Alpha values for all constructs are above 0.9, indicating excellent internal consistency. The rho_A and Composite Reliability values are also above 0.9, confirming the reliability of the constructs.

Table 5. Construct Reliability and Validity

Construct	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Adaptive Leadership	0,955	0,962	0,963	0,764
Digital Intellectuality	0,962	0,965	0,967	0,744
Sales Performance	0,961	0,964	0,966	0,738
Technology Innovative	0,968	0,969	0,972	0,780
Transformational Leadership	0,942	0,946	0,952	0,714

Additionally, the Average Variance Extracted (AVE) values for all constructs are above 0.7, indicating good convergent validity. Specifically, Adaptive Leadership has AVE of 0.764, Digital Intellectuality has AVE of 0.744, Sales Performance has AVE of 0.738, Technology Innovative has AVE of 0.780, and Transformational Leadership has AVE of 0.714. These results affirm that the constructs are both reliable and valid.

Heterotrait-Monotrait Ratio (HTMT)

Based on Table 6, the Heterotrait-Monotrait Ratio (HTMT) results indicate that the values for all constructs are below the threshold of 0.85, suggesting good discriminant validity. Specifically, the highest HTMT value is 0.730 between Sales Performance and Transformational Leadership, which is within acceptable limits. This confirms that the constructs are distinct from each other, further supporting the discriminant validity of the model.

Table 6. Heterotrait-Monotrait Ratio (HTMT)

Construct	Adaptive Leadership	Digital Intellectuality	Moderating Effect (TI x DI)	Sales Performance	Technology Innovative
Digital Intellectuality	0,499				
Sales Performance	0,618	0,662	0,588		
Technology Innovative	0,499	0,549	0,529	0,672	
Transformational Leadership	0,558	0,622	0,501	0,730	0,614

Structural Model (Inner Model)

The structural model, also referred to as the inner model, is a fundamental element in research methodologies, especially in fields like organizational behavior and structural equation modeling. It plays a

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critical role in establishing the expected relationships among various study variables or components (Iqbal, 2024).

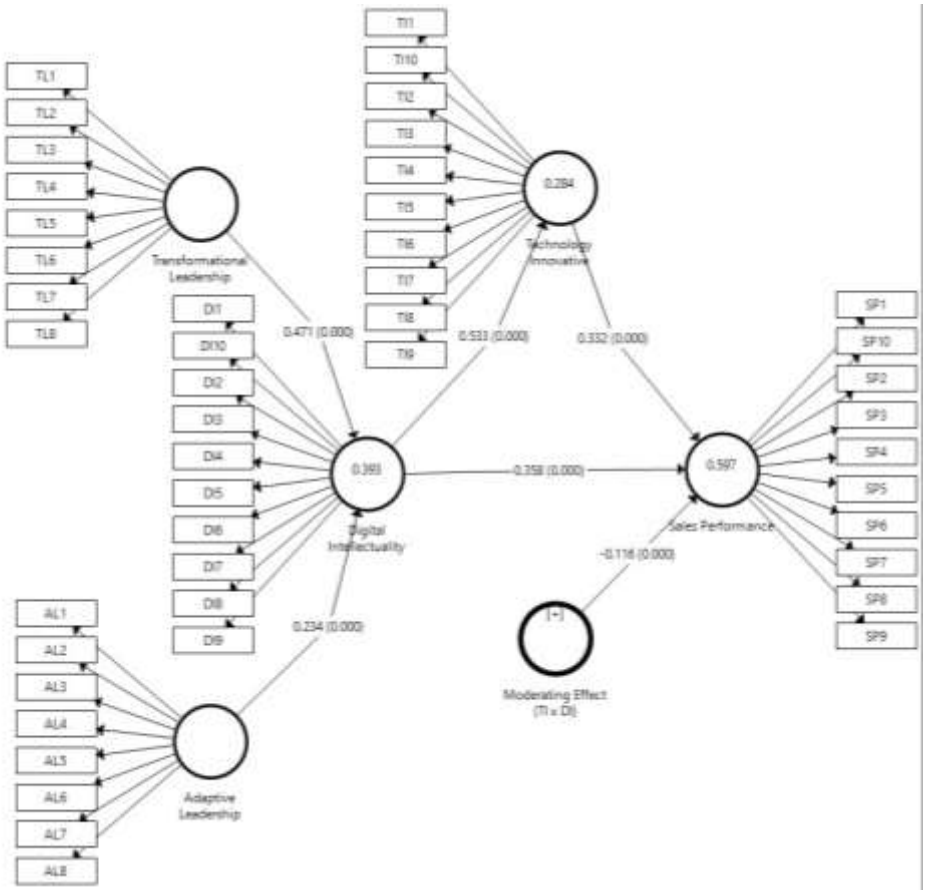

Figure 3. Structural Model (Inner Model)

Path Coefficients

Table 7. Path Coefficients

Direct Effect	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Adaptive Leadership -> Digital Intellectuality	0,234	4,041	0,000
Digital Intellectuality -> Technology Innovative	0,533	8,260	0,000
Transformational Leadership -> Digital Intellectuality	0,471	7,697	0,000
Digital Intellectuality -> Sales Performance	0,358	6,584	0,000
Technology Innovative -> Sales Performance	0,332	8,333	0,000
Moderating Effect (TI x DI) -> Sales Performance	-0,116	5,734	0,000
Specific Indirect Effects			
Digital Intellectuality -> Technology Innovative -> Sales Performance	0,177	5,956	0,000

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R-Square, Adjusted R-Square and f Square

Based on Table 8, the R-Square values indicate that Digital Intellectuality explains 39.3% of the variance, Sales Performance explains 59.7%, and Technology Innovative explains 28.4%. The Adjusted R-Square values confirm similar significance levels for Digital Intellectuality (39.0%), Sales Performance (59.4%), and Technology Innovative (28.2%).

Table 8. R-Sq uare, Adjusted R-Square and f Square

R Square	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Digital Intellectuality	0,393	5,233	0,000
Sales Performance	0,597	7,907	0,000
Technology Innovative	0,284	4,171	0,000
R Square Adjusted			
Digital Intellectuality	0,390	5,163	0,000
Sales Performance	0,594	7,802	0,000
Technology Innovative	0,282	4,133	0,000
f Square			
Adaptive Leadership -> Digital Intellectuality	0,065	1,755	0,080
Digital Intellectuality -> Sales Performance	0,218	2,884	0,004
Digital Intellectuality -> Technology Innovative	0,396	2,765	0,006
Moderating Effect (TI x DI) -> Sales Performance	0,115	2,596	0,010
Technology Innovative -> Sales Performance	0,167	3,863	0,000
Transformational Leadership -> Digital Intellectuality	0,263	2,946	0,003

The f Square analysis shows varying contributions of predictors to each construct: Adaptive Leadership -> Digital Intellectuality (f^2 = 0.065), Digital Intellectuality -> Sales Performance (f^2 = 0.218), Digital Intellectuality -> Technology Innovative (f^2 = 0.396), Moderating Effect (TI x DI) -> Sales Performance (f^2 = 0.115), Technology Innovative -> Sales Performance (f^2 = 0.167), and Transformational Leadership -> Digital Intellectuality (f^2 = 0.263), indicating significant influences within the model.

Predictive Relevance (Q^2)

Based on Table 9, the Predictive Relevance (Q^2) values indicate the predictive power of each construct. Sales Performance has the highest Q^2 value at 0.429, followed by Digital Intellectuality at 0.288, and then Technology Innovative at 0.216. These values suggest that Sales Performance, Digital Intellectuality, and Technology Innovative constructs have substantial predictive relevance in the model, indicating their ability to explain variance and predict outcomes effectively.

Table 9. Predictive Relevance (Q^2)

Construct	SSO	SSE	Q^2 (=1-SSE/SSO)
Adaptive Leadership	3040,000	3040,000	
Digital Intellectuality	3800,000	2704,711	0,288
Moderating Effect (TI x DI)	380,000	380,000	
Sales Performance	3800,000	2169,630	0,429

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Technology Innovative	3800,000	2979,865	0,216
Transformational Leadership	3040,000	3040,000	

Model Fit Indices

Based on Table 10, the model fit indices indicate the goodness of fit for the estimated model compared to the saturated model. The SRMR (Standardized Root Mean Square Residual) is 0.130 for the estimated model, suggesting reasonable model fit as it is below the commonly accepted threshold of 0.08. However, other indices such as d_ULS (degrees of freedom for the Unweighted Least Squares estimator), d_G (degrees of freedom for the Geomin estimator), Chi-Square values, and NFI (Normed Fit Index) show some discrepancies compared to the saturated model. The NFI is 0.741 for the estimated model, indicating moderate fit. Overall, while the SRMR suggests reasonable fit, other indices suggest potential areas for model improvement or reconsideration.

Table 10. Model Fit Indices

Criteria	Saturated Model	Estimated Model
SRMR	0,057	0,130
d_ULS	3,502	18,268
d_G	3,212	3,684
Chi-Square	5821,942	6125,101
NFI	0,753	0,741

Discussion

The Impact of Adaptive Leadership on Digital Intellectuality

Path coefficients from Adaptive Leadership to Digital Intellectuality (0.234) indicate a positive direct effect, suggesting that adaptive leadership practices contribute significantly to the development of digital intellectuality within organizations. This finding is supported by Karaköse et al. (2021) and Mihardjo et al. (2019), who explored the influence of digital leadership on innovation management, emphasizing its direct and indirect impacts in fostering innovation. Amelda et al. (2021) conducted a study on the alignment of digital marketing capabilities in Indonesian banks with digital leadership and technology capabilities, highlighting how digital leadership enhances technological and marketing capabilities, thereby impacting company performance positively. Schiuma et al. (2021) discussed transformative leadership competencies essential for digital transformation entrepreneurship, emphasizing digital vision, knowledge, empowerment, team management, and agile decision-making as critical for driving impactful digital transformations. Additionally, Çekmecelioğlu & Özbağ (2019) examined transformational leadership's role in fostering psychological empowerment among employees, illustrating the pathways from leadership behaviors to empowerment. Abdullahi et al. (2020) studied visionary leadership and innovative behavior among staff in Nigerian colleges of education, finding significant correlations between leadership empowerment, intellectual stimulation, adaptiveness, and innovative behavior among staff. These studies collectively underscore the profound influence of leadership styles and practices on organizational capabilities and innovation dynamics in diverse contexts.

The Impact of Digital Intellectuality on Technological Innovation

The path coefficient of 0.533 from Digital Intellectuality to Technology Innovation underscores its significant role in driving technological innovation within organizations. This finding is supported by Dost et al. (2016), who discuss how intellectual capital accelerates innovation processes by facilitating the generation and adoption of new ideas and technologies. Švarc et al. (2020) contribute by examining the integration of digital technology and its impact on innovation within EU countries, highlighting digital capabilities as pivotal for technological advancements. Chernenko et al. (2021) delve into the digital

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intellectual capital of Russian companies, emphasizing investments in intellectual capital and digitalization technologies to enhance innovative performance at various levels. Chen (2022) explores the impact of intellectual property protection on the digital economy and entrepreneurial activity, stressing its role in fostering competitive advantage and entrepreneurial performance through innovation. Lastly, Duodu & Rowlinson (2019) provide insights into how intellectual capital drives both exploratory and exploitative innovation across industries, emphasizing its critical role in innovation generation and adoption. These studies collectively illustrate how digital intellectuality and intellectual capital contribute to advancing technological innovation and fostering a culture of innovation within organizations and across national contexts.

The Impact of Transformational Leadership on Digital Intellectuality

The path coefficient from Transformational Leadership to Digital Intellectuality (0.471) highlights the significant impact of transformational leadership on fostering digital intellectuality within organizations. This finding is supported by several studies. Schwartz et al. (2011) demonstrated the positive effects of transformational leadership on job satisfaction and commitment among nurses. Araujo et al. (2021) emphasized the role of digital leadership in utilizing digital assets for achieving business objectives. Nurtjahjani et al. (2020) revealed the positive impact of transformational leadership on employee job satisfaction in higher education settings. Tutar & Güler (2022) stressed the importance of directing human resources towards digitalization goals for successful digital leadership. Veiseh et al. (2014) highlighted the mediating role of organizational creativity in enhancing organizational agility through transformational leadership. These studies collectively support the crucial role of transformational leadership in fostering digital intellectuality and driving organizational success.

The Influence of Digital Intellectuality on Sales Performance

The path coefficient of 0.358 from Digital Intellectuality to Sales Performance indicates a positive relationship between these variables. This finding is reinforced by Mihardjo et al. (2019), who underscored the impacts of digital leadership on customer experience orientation and business model innovation, highlighting its pivotal role in organizational success. Erhan et al. (2022) further explored the shift from conventional to digital leadership, illustrating how digitally skilled leaders stimulate innovative approaches among employees, enhancing motivation and performance. Öngel (2023) emphasized digital leadership's role in fostering individual creativity and performance, supporting the notion that digital intellectuality enhances sales performance by boosting employee engagement and creativity. Additionally, Zhou et al. (2021) discussed how enterprise intellectualization influences leadership potential, stressing the importance of digital mindset and skills in guiding organizations through digital transformations. Ding (2023) investigated platform leadership's predictive effect on employee performance, affirming that digital intellectuality enhances sales performance by improving leadership effectiveness and cultivating an innovative organizational culture.

The Impact of Technology Innovation on Sales Performance

The path coefficient from Technology Innovation to Sales Performance (0.332) signifies a positive direct effect, indicating that investments in technological advancements have a favorable impact on sales performance. This finding is corroborated by a study by (Raymond et al., 2019), which focused on the determinants and outcomes of IT governance in manufacturing SMEs, highlighting the importance of strategic IT management in enhancing IT performance. Furthermore, Nguyen et al. (2018) explored the relationship between ownership features and firm performance through corporate innovation performance, revealing a positive impact of innovation on sales growth and firm performance. Street et al. (2017) emphasized the significance of strategic alignment in SMEs, suggesting that SMEs can achieve and sustain alignment similar to larger firms, albeit with noticeable differences. Additionally, Gutierrez et al. (2009) conducted a comparative study on factors affecting IT and business alignment in SMEs and large organizations, ranking attributes such as communication, governance, and skills for enhancing alignment. Lastly, Oiku (2023) highlighted the importance of strategic diversity and organizational resilience among SMEs, emphasizing the critical role of resilience in navigating dynamic and challenging business

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environments. These studies collectively support the notion that strategic alignment, innovation, and resilience are crucial factors influencing the relationship between technology innovation and sales performance in SMEs.

The Role of Technological Innovation as a Moderator in the Relationship between Digital Intellectuality and Sales Performance

The interaction between Technology Innovation and Digital Intellectuality and Sales Performance shows a negative relationship (-0.116), reflecting a complex interplay between digital capabilities and organizational performance. Studies by Kalkan et al. (2014) emphasize the importance of innovation amidst competition, while Umboh & Aryanto (2023) highlight digital literacy's mediating role in SME performance through digital marketing. Pardiman et al. (2022) discuss how financial and social capital, along with business digitalization, contribute to SME sustainability. Rokhman et al. (2023) focus on innovation's role in MSME performance, and Tjahjadi et al. (2022) examine the impact of global market orientation on performance, reinforcing the significance of digital capabilities and innovation for competitiveness.

Mediating Role of Digital Intellectuality on Sales Performance through Technological Innovation

Digital intellectuality acts as a significant mediator in the relationship between technological innovation and sales performance (O = 0.177, P = 0.000). This finding indicates that an organization's ability to manage and utilize digital technology effectively can improve sales outcomes through innovation development. Theoretical Implications: The ability to manage and utilize digital technology effectively can improve sales outcomes through innovation development. Practical Implications: Organizations should invest in developing the digital intellectuality of their employees. This could include training in the use of the latest digital tools and technologies and ways to integrate technology into sales strategies.

Implication of This Study and Limitation

Implication of This Study

This research contributes to the development of knowledge by demonstrating that adaptive and transformational leadership significantly impact digital intellectuality and technological innovation within organizations. The positive path coefficients emphasize the importance of flexible and transformative leadership styles in promoting the development of digital capabilities and technological innovation, ultimately contributing to improved sales performance. These findings support and extend existing theories by providing empirical evidence that leadership capable of adapting and transforming organizations is crucial in addressing digital challenges and leveraging technology for competitive advantage. Furthermore, this research enriches the literature by reinforcing the link between leadership styles and organizational digital transformation, offering a robust framework for future studies.

Organizations should focus on developing adaptive and transformational leadership skills to enhance digital intellectuality and technological innovation. This can be achieved through training programs that emphasize adaptability, digital transformation, and strategic use of technology. Additionally, investing in the development of employees' digital capabilities and implementing technology strategies aligned with business objectives will help improve sales performance and maintain a competitive edge in dynamic markets.

Limitation and Future Direction

This research is limited to Aceh Province, Indonesia, affecting the generalizability of its findings. Validity relies on accurate responses from store leaders and employees, necessitating local validation of measurement methods. Future studies should consider additional control variables, adopt mixed-methods approaches, and explore longitudinal methods to capture trends and insights across different locations.

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Conclusion

Adaptive Leadership and Transformational Leadership play crucial roles in developing Digital Intellectuality, which drives technological innovation and enhances sales performance. Digital Intellectuality positively correlates with sales performance, fostering the adoption and development of new technologies. Investments in technological innovation have been shown to boost sales performance, with strategic alignment and organizational resilience being key factors. Transformational Leadership shapes Digital Intellectuality, facilitating digital transformation and innovation, while also strengthening the positive impact of Digital Intellectuality on sales performance and technological innovation. The interaction between technological innovation and an organization's digital capabilities affects overall performance, with technological adaptation being essential for competitiveness. This conclusion highlights the importance of adaptive and transformational leadership in advancing digital capabilities and technological innovation, ultimately improving sales performance and organizational competitiveness.

Credit Authorship Contribution Statement

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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