



The Impact of Artificial Intelligence Capabilities on Transformational Leadership and Organizational Innovation - Palestinian SMEs

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Abstract: Aim: To investigate the impact of AI capabilities on organizational innovation (OI) within Palestinian SMEs (Bethlehem, Ramallah, and Nablus), using transformational leadership (TL) as a mediating variable. The research used the Resource-Based View (RBV) theory to analyze the association between AI capabilities, TL, and OI. The RBV approach assists in the identification of strategic resources important in sustaining competitive advantage. **Method:** A quantitative research method was employed using a structured survey questionnaire administered to senior management employees who are directly involved in decision-making and strategy formulation within their organizations. The survey was conducted online, and respondents were contacted via email invitations distributed through the senior management of the sampled SMEs. Out of 150 distributed questionnaires, 110 valid responses were received. The data was analyzed using SPSS. **Results:** The results indicated that AI capabilities have a positive impact on OI. The results also revealed that AI capabilities have a significant and positive impact on TL. According to research findings, TL is a positive indicator of innovation levels within SMEs. Furthermore, TL acts as a mediator in the relationship between AI and OI, this means that TL supports an organization's ability to leverage AI's innovation potential. **Conclusion:** AI represents a strategic factor when suitably positioned by an organization's leadership to influence, enable and support timely, well-founded decision making to catalyze OI and improve business outcomes. Leaders who inspire, motivate, and develop employees' intellectual capabilities create an organizational environment that enables the effective use of AI technologies, thereby fostering creativity and initiative. **Recommendation:** It is important for SMEs to develop a new management culture that will embrace organizational flexibility, rapid decision-making and innovation is key to success in today's challenging business environment.

Keywords: Artificial Intelligence, Transformational Leadership, Organizational Innovation, SMEs, Palestine

أثر قدرات الذكاء الاصطناعي على قيادة التحول والابتكار التنظيمي - الشركات الفلسطينية الصغيرة والمتوسطة

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المخلص: الهدف: دراسة أثر قدرات الذكاء الاصطناعي على الابتكار التنظيمي في الشركات الفلسطينية الصغيرة والمتوسطة (بيت لحم، رام الله، ونابلس)، باستخدام القيادة التحويلية كمتغير وسيط. استخدم البحث نظرية منظور الموارد (RBV) لتحليل العلاقة بين قدرات الذكاء الاصطناعي، وقيادة التعلم، والابتكار المفتوح. يساعد نهج منظور الموارد في تحديد الموارد الاستراتيجية المهمة في الحفاظ على الميزة التنافسية. **المنهجية:** استخدمت منهجية بحث كمية من خلال استبيان منظم وزّع على كبار موظفي الإدارة الذين يشاركون بشكل مباشر في صنع القرار وصياغة الاستراتيجية داخل مؤسساتهم. أُجري الاستبيان إلكترونياً، وتم التواصل مع المستجيبين عبر دعوات بريد إلكتروني وزّعت من خلال الإدارة العليا للشركات الصغيرة والمتوسطة المختارة. من بين 150 استبياناً موزعاً، تم استلام 110 ردود صالحة. تم تحليل البيانات باستخدام برنامج SPSS. **النتائج:** أشارت النتائج إلى أن قدرات الذكاء الاصطناعي لها أثر إيجابي على الابتكار التنظيمي. كما كشفت النتائج أن لقدرات الذكاء الاصطناعي أثراً إيجابياً هاماً على القيادة التحويلية. ووفقاً لنتائج البحث، تُعد القيادة التحويلية مؤشراً إيجابياً لمستويات الابتكار في الشركات الصغيرة والمتوسطة. علاوة على ذلك، تعمل القيادة التحويلية كعامل وسيط في العلاقة بين الذكاء الاصطناعي والابتكار التنظيمي، وهذا يعني أن القيادة التحويلية تدعم قدرة المؤسسة على الاستفادة من إمكانات الابتكار في الذكاء الاصطناعي. **الاستنتاجات:** يُمثل الذكاء الاصطناعي عاملاً استراتيجياً عندما تُوظفه قيادة المؤسسة بالشكل الأمثل للتأثير على عملية اتخاذ القرارات في الوقت المناسب وبشكل مدروس، وتمكينها ودعمها، بما يُحفز الابتكار التنظيمي ويُحسن نتائج الأعمال. فالقادة الذين يلهمون موظفيهم ويُحفزونهم ويُؤمنون قدراتهم الفكرية يهيئون بيئة تنظيمية تُتيح الاستخدام الفعال لتقنيات الذكاء الاصطناعي، وبالتالي تعزيز الإبداع والمبادرة. التوصيات: من المهم للشركات الصغيرة والمتوسطة تطوير ثقافة إدارية جديدة تتبنى المرونة التنظيمية وسرعة اتخاذ القرارات والابتكار، وهو أمر أساسي للنجاح في بيئة الأعمال الصعبة اليوم.

الكلمات المفتاحية: الذكاء الاصطناعي، القيادة التحويلية، الابتكار التنظيمي، الشركات الصغيرة والمتوسطة، فلسطين

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Introduction

The business environment is continually changing, where the competitive pressures encourage organizations to seek ways of sustaining and improving their competitive advantage. One of the factors that have been the main cause of this transformation is the adoption of artificial intelligence (AI) in several aspects in business (Duan et al., 2019; Al-Rawashdeh, 2025). In this regard, Enshassi et al. (2025) stressed that AI represents one the most important key factors influencing the organizations' performance and competitiveness.

Small and medium-sized enterprises (SMEs) are a vital pillar of the national economy, and therefore, these companies have turned to adopting AI to improve their operations and enhance their innovation. The mechanisms offered by AI contribute to strengthening management's ability to make informed decisions, deliver innovative products, and improve overall operational efficiency (Othman et al., 2025). Business intelligence through AI enables organizations to analyze its huge data, identify trends and make better decisions. Nevertheless, the possibilities of AI application are enormous, but its performance depends on the mindset of leaders in organizations, especially the use of transformational leadership (TL) to enhance innovation through the application of AI (Cheng et al., 2023). Thus, the shift of organizations towards using AI depends primarily on TL (Al-Ajlouni, 2020), and TL is considered a key indicator of organizational innovation (OI). TL is based on a future vision that enhances the level of acceptance of change and the degree of

initiative in taking risks (Eaton et al., 2024). However, there are numerous issues that companies encounter when applying AI in leadership and innovation. The findings of analysis carried out by AI need to be effectively translated into actionable strategies, and leadership has a critical role to play in this process (Jarrahi, 2018).

As SMEs strive to enhance their competitiveness, the urgent need arises to study the impact of AI capabilities on OI considering the massive digital transformation. However, the ability of companies to meet the needs of AI in its various applications requires TL capable of establishing the concept of change and encouraging continuous learning that leads to innovation. Accordingly, this research aims to analyze the impact of AI capabilities on OI in SMEs in Palestine, with a focus on the role of TL in mediating this relationship.

This research uses the Resource-Based View (RBV) theory to analyze the association between AI capabilities, TL, and OI. The RBV approach assists in the identification of strategic resources important in sustaining competitive advantage (Teece, 2007; Duan et al., 2019). From a resource-RBV perspective, AI capabilities are not merely technological tools, but strategic resources and organizational capabilities that enable companies to develop hard-to-imitate competencies and achieve a sustainable competitive advantage (Duan et al., 2019). TL and OI can be viewed as complementary organizational capabilities that contribute to transforming AI resources into tangible innovative outcomes by fostering learning,

change, and the adoption of creative practices within the organization.

In the context of this study, AI capability is viewed as a strategic organizational asset that has potential of enhancing innovation through enhanced decision making. When applied together, AI and leadership practices have the possibility of improving innovation, facilitating information exchange among employees, thereby enhancing organizational performance (Jarrahi, 2018; Cheng et al., 2023). Therefore, the RBV as a theoretical approach best explains how AI capabilities and leadership as resources jointly improve OI.

Despite growing interest in studying the capabilities of AI and OI, previous research has largely neglected to examine the organizational mechanisms that explain this relationship, particularly the mediating role of TL. This suggests the existence of under-explored mediating and contextual factors. Previous literature has been criticized for its heavy reliance on direct-impact models and its focus on advanced economies (Han et al., 2025; Hyiamang & Liu, 2025), while empirical evidence regarding mediation models in developing countries, especially Palestinian SMEs, remains extremely limited.

Based on that, the problem of the research stems from the limited empirical evidence that has addressed the mediating role of TL in explaining the relationship between AI capabilities and OI in Palestinian small and medium enterprises, which is what the research seeks to address based on the perspective of resource-based theory (RBV). This research integrates TL within the

framework of AI capabilities and OI to identify the mechanisms that explain the impact of AI adoption on OI in Palestinian SMEs. Therefore, this research contributes to bridging the empirical gap related to the impact of TL as a mediating variable in the relationship between AI and OI within the context of Palestinian SMEs. Moreover, this research contributes to advance the knowledge and real-world application of AI in organizations by investigating AI features and their relationship to leadership and innovation practices.

Research problem and questions

The study of SMEs in Palestine is of particular importance given their pivotal role in supporting the national economy, providing employment opportunities, and enhancing resilience in the face of the economic and political challenges confronting the Palestinian business environment. Furthermore, the ability of these enterprises to adopt AI technologies and develop innovative leadership practices is a key factor in enhancing their competitiveness and long-term sustainability (Alfoqahaa, 2017).

Although SMEs in Palestine are considered important pillars of the economy, due to their contribution to GDP, their provision of diverse employment opportunities, and their ability to stimulate trade and services remains constrained by several factors that limit their effectiveness (Mujahed et al., 2024). In the Palestinian context, SMEs face fundamental challenges, including weak technological infrastructure, economic instability, scarcity of financial and human resources, and limited digital

readiness (Demaïdi, 2025). These constraints include the weak management skills and the limited adoption of modern technology (Alfoqahaa, 2017; Mujahed et al., 2024). Mujahed et al. (2024) indicated that the adoption of digital technology in Palestine is still in its early stages, and the level of understanding and acceptance of its impact remains unclear, despite the need for it among SMEs given their limited budgets and human resources. In this area; Demaïdi (2025) indicated that the weak adoption of AI capabilities by SMEs hinders their ability to develop new and innovative products, make intelligent decisions, and improve overall operational efficiency.

In addition, previous literature has given considerable attention to the study of the relationship between AI capabilities and OI (Hamlin et al., 2023; Ismail & Karamanlioğlu, 2026). These studies have confirmed the existence of a strong positive link between AI technologies and OI (Fuller et al., 2022; Gao et al., 2025; Han et al., 2025; Hyiamang & Liu, 2025), but they have not explored the role of leaders in adopting AI and promoting innovative transformation. This highlights the scarcity of previous studies investigating how TL mediates the relationship between AI applications and OI, particularly within the context of SMEs in the Palestinian context. Thus, despite the positive findings of previous studies, they have largely focused on the direct impact of AI capabilities on innovation outputs, neglecting the organizational and leadership mechanisms that might explain how these capabilities are translated into tangible innovative results. Furthermore, most of

these studies were conducted in advanced or emerging economies outside the Palestinian context, limiting the generalizability of their findings to the Palestinian SME environment, which is characterized by different economic and institutional features.

According to that, the relationship between AI competencies, TL, and OI constitutes one of the significant and complex research domains. AI helps in improving the decision-making skills of the leaders as it provides accurate, timely, and appropriate information that helps in the process of OI. The Resource-Based View (RBV) places resources, exemplified by AI technologies, at the center of the acquisition and maintenance of competitive advantage (Gupta et al., 2023). In this respect, TL acts only as a mediator in the process of leveraging the benefits of AI (Barney, 1991).

This underscores a research gap in analyzing the impact of AI capabilities on OI within Palestinian SMEs, using TL as a mediating variable. Based on that, the following research questions are addressed:

1. How do AI capabilities influence OI among Palestinian SMEs?
2. How do AI capabilities influence TL among Palestinian SMEs?
3. How do TL influence OI among Palestinian SMEs?
4. How does TL mediate the relationship between AI capabilities and OI among Palestinian SMEs?

Literature review and hypothesis development

AI Capabilities

Over the last few years, AI has emerged as a critical element for organizations. AI can be described as an advanced computational process that emulates human thought and reasoning processes, which includes learning, reasoning and decision making (Gupta et al., 2023). AI within organizations refers to the various AI skills, such as machine learning and natural language processing which enable organizations to handle and analyze large amounts of data to obtain valuable insights (Borges et al., 2021; Mikalef & Gupta, 2021). AI technologies are also not just disrupting industries but also challenging organizations to what they can accomplish in terms of innovation and adaptability to market forces (Ren et al., 2023).

Business AI capacity is defined as AI options that enable an organization to use AI tools and technologies to meet strategic objectives (Krakowski et al., 2023). These options include the automation of activities, improving data analysis for better business solutions, improving interaction with customers, and improving processes.

AI Capabilities and OI

AI systems help enhance decision-making processes, organization's functioning, and analytical forecasting, enhancing overall innovation rates in companies (Choudhary et al., 2023). As a strategic resource, AI competencies are becoming as enablers of innovation and sources of competitive

advantage (Davenport & Ronanki, 2018). Dennehy et al. (2023) introduced strategic technology management as a fundamental concept through which organizational performance can be improved.

The literature distinguishes between three main types of organizational innovation: product innovation, which reflects the development or improvement of goods and services; process innovation, which relates to developing production and operating methods and increasing efficiency; and managerial innovation, which includes modernizing administrative structures and practices within the organization (Dorin, et al., 2019; Schork, 2025). In the context of AI capabilities, these capabilities can support all these types of innovation by improving decision-making, enhancing operational efficiency, and enabling management systems to shift towards more agile and innovative practices, thereby boosting organizational performance and competitiveness (Taherdoost, 2023).

Organizations that adopt AI systems demonstrate a higher capacity for innovation, linked to their enhanced ability to process big data, automate processes, and make strategic decisions based on predictive insights (Taherdoost, 2023; Chibunna et al., 2025). AI adoption in SMEs varies depending on company size and faces challenges in its integration into innovative strategies due to limited resources (Sánchez et al., 2025). Mohamed & Otman (2021) emphasized that adopting AI capabilities in SMEs contributes to improving their competitive position and enhancing their ability to integrate into

innovative processes. Based on that, the following hypothesis is developed:

H1: AI capabilities have a positive impact on OI.

AI Capabilities and TL

TL can be described as one kind of leadership that takes employees and encourages them to perform beyond their standard capacity (Davenport & Ronanki, 2018; ALkhawaldah et al., 2025). In this process, AI is instrumental in augmenting TL by offering relevant data pieces for decision-making creativity and strategy formulation (Wamba-Taguimdje et al., 2020). In a leadership context, AI can be used to facilitate better communication, enhance innovative practices as well as support an organizational culture of positive change and growth (Mikalef & Gupta, 2021). Based on that, the following hypothesis is developed:

H2: AI capabilities positively influence TL.

The Impact of TL on OI

TL is acknowledged to be one of the main predictors of innovative activity in the organization. Transformational behaviors are creative, which promote an organizational culture of risk-taking, experimenting, and learning (Mikalef & Gupta, 2021; Al Dwairi, 2025). Such leaders play a proactive role in encouraging people in the organization towards OI by challenging their cognitions on what is possible and what is not (Kitsios & Kamariotou, 2021). Establishing a clear vision, increasing employee decision-making power, and supporting them to experiment all help transformational leaders to play a great role in developing organizational culture of innovation (Jorzik et al., 2023). Based on that, the following hypothesis is developed:

H3: TL positively influences OI.

The Mediating Role of TL

TL appears to play a moderating role in the relationship between AI and OI (Gyanamurthy & Radhanath, 2023; Vayyavur, 2024). AI competencies offer technological means and knowledge crucial for innovation, and the leadership factor is instrumental in leveraging these competencies (Caner & Bhatti, 2020). Specifically, top executives are more likely to be effective users of AI tools for inspiring subordinates, supporting decision making, and creating a culture of innovation (Nasseef et al., 2022). Studies indicate that leadership that embraces the use of AI can make it easier to integrate organizational goals with innovative approaches to ensure that AI-derived knowledge is put into practice (Dhiman et al., 2023). Vayyavur (2024) found that the success of AI-driven innovation SMEs in Southeast Asia depends primarily on the level of leadership commitment. Moreover, Gyanamurthy & Radhanath (2020) found that companies led by TL shows a 35% higher AI-driven innovation. Therefore, when AI capabilities are combined with TL, there are even greater positive impacts on innovation.

Thus, the mediating role of TL is a key element in explaining the relationship between AI capabilities and OI. Advanced technologies alone do not lead to innovative outcomes unless they are guided and leveraged through effective leadership. A company's possession of AI capabilities does not automatically guarantee innovation; rather, it requires TL capable of motivating employees, fostering a culture of learning and

experimentation, and directing technological resources toward innovative opportunities. Accordingly, TL acts as an organizational mechanism that transforms technological potential into tangible innovative outputs by enhancing the interaction between people and technology within the organization. Therefore, the following hypothesis is developed:

H4: TL mediates the relationship between AI capabilities and OI.

Based on what has been explained above, the following figure represents the current research model and the integrated relationships that will be empirically verified.

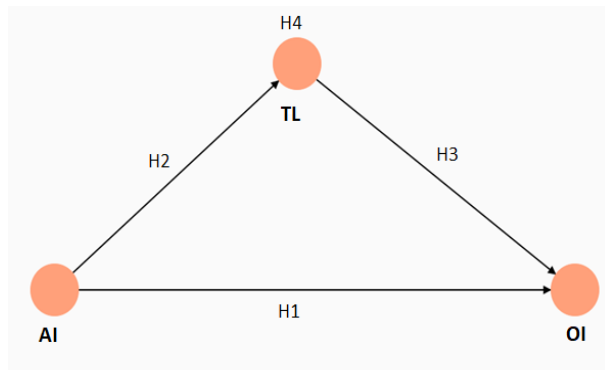


Figure (1): Research Model

Method

To examine the level of AI capabilities and explore the relation between AI and TL and OI in SMEs in Palestine in the districts of Bethlehem, Ramallah, and Nablus; the quantitative method using a structured survey questionnaires was employed. The quantitative methodology is the most suitable for achieving the objectives of this study, given the nature of the research, which seeks to test relationships between variables and verify hypotheses empirically. A questionnaire was used as the data collection tool because it is suitable for measuring the

participants' perceptions of AI capabilities, TL, and OI in a measurable and statistically analyzable manner.

The study was conducted amongst companies' senior management employees who are directly involved in decision making and strategy formulation in their organizations. Before the actual survey, a pilot test of the research questionnaire was carried out to check its validity and reliability. Such feedback came handy in adapting this survey in response to SMEs in Palestine where some questions were amended to fit the intended SME respondents.

The list of officially registered SMEs in the targeted areas was adopted as a sampling frame, and companies were selected in a simple random manner from this frame to ensure a balanced representation of the study population. Accordingly, 150 SMEs from the three regions were randomly selected. To minimize potential bias in data collection, a set of methodological procedures was followed. These included selecting the sample from a formal sampling frame using random sampling, and focusing on senior management in the target companies to ensure responses from individuals with direct knowledge of the study topic. To avoid getting responses from companies which may not have implemented or are yet to consider implementing AI; the survey was conducted on companies that had between 10 and 250 employees. Any company with fewer than 10 or more than 250 employees was excluded. The data collection tool (an electronic questionnaire) was standardized and sent in the same format to all participants, with

assurances of confidentiality and that responses would only be used for scientific research purposes. This contributes to reducing response bias and enhancing data reliability.

The survey was carried out online and respondents were contacted via email invitations distributed through the senior management of the sampled SMEs. The data collection period took four weeks, and in between the middle of the data collection period, a reminder email was sent to the participants who have not yet responded to the survey. The email contained a link to the survey and brief message describing the study and the anonymity of the answer. The data collection period took four weeks, and in between the middle of the data collection period, a reminder email was sent to the participants who have not yet responded to the survey. Out of 150 distributed questionnaires, 110 valid responses were received, yielding a response rate of approximately 73.3%. The reason why the response rate can be considered relatively high is the focus on senior management as the target audience interested in AI and innovation strategies. Furthermore, this rate is considered suitable for survey-based research and supports the cautious generalization of the results to the study population within the selected regions, and is consistent with methodological standards in similar empirical research.

Variable Measurement

Measurement items were modified from previously approved scales to guarantee construct validity. To measure the AI

Capabilities, a three-construct scale measuring tangible, human skills, and intangible dimensions was used (Mikalef & Gupta, 2021). To measure the TL variable, a four-item scale assessing idealised influence, inspirational motivation, intellectual stimulation, and individualised consideration was used (Al Ahmad et al., 2019). To measure OI variable, a three items scale assessing product innovation, process innovation, and administrative innovation, was used (Alshams et al., 2020).

The questionnaire consisted of two main parts. The first part included demographic information about the study sample. The second part included three dimensions, each measuring one of the study variables. The first dimension measured AI capabilities, the second measured TL, and the third measured OI. A five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) was used for measurement. The questionnaire size (74 items) was statistically handled in accordance with the requirements of multivariate analysis without compromising the requirements of statistical power.

Questionnaire Validity and Reliability

To ensure the content validity of the research tool, it was reviewed by ten highly qualified and experienced experts specializing in AI, transformation leadership and OI. whom provided valuable feedback and recommendations regarding the clarity, relevance, and alignment of the questionnaire items with the study objectives. The review ensured the suitability of the statements to the Palestinian context in SMEs. Based on this, the content validity of the questionnaire was confirmed.

In addition to expert validation, the questionnaire was administered to a pilot sample of 30 individuals from the study population, who were subsequently excluded from the final study sample. Statistical validation was conducted using SPSS. Construct validity was examined by

Table (1): Pearson's correlation coefficients for study instrument

Variables	AI capability instrument	TL	OI	Overall instrument
AI capability instrument	1	.701**	.434**	.960**
TL		1	.657**	.860**
OI			1	.434**
Overall instrument				1

Table (1) shows the Pearson's correlation coefficients between the study variables and the overall instrument. The results indicate that all correlation coefficients are statistically significant at the 0.01 level ($p < 0.01$), indicating a high degree of internal consistency among the questionnaire items.

To ensure the validity of the research tool, Cronbach's Alpha was calculated to evaluate the internal consistency of the measurement instrument. Cronbach's Alpha coefficient ranges from 0 to 1, with higher values, indicating greater reliability. Table (2) show the result.

Table (2): Reliability results

Variables name	Items Num.	Reliability	Status
AI capability instrument	46	.980	
TL	16	.935	Reliable
OI	12	.945	Reliable
Overall instrument	74	.977	Reliable

calculating Pearson's correlation coefficients between each item and its corresponding domain. Table (1) presents the correlation coefficients, confirming the strength of the relationships between the study dimensions and the overall structure of the tool

As shown in table (2), the study reliability values (all above 0.93) show exceptional internal consistency. This means that the items within each variable are measuring their respective concepts very consistently.

Assumptions of Regression Analysis

To ensure the validity of the regression models used in this study, a series of diagnostic tests were conducted to verify the basic statistical assumptions. These included assessing the normality assumption using the Kolmogorov-Smirnov test with Liliforce correction ($p > 0.05$) and visually inspecting the Q-Q plots, which confirmed that the residuals were normally distributed. Linearity was verified by examining the scatter plots of the standardized residuals against the expected standardized values, which showed a random distribution without any curved patterns. Homogeneity of variance was confirmed by visually inspecting the residual plots against the expected values, which showed consistent variance across all levels of the independent

variables. Multicollinearity was assessed using the Variance Inflation Factor (VIF), where the values were well below the threshold of 10 (VIF = 1.97 for both predictors), indicating no concerns regarding multicollinearity. Finally, the presence of influential outliers was examined using Cook's distance, where all values were below the critical threshold 1 (observed maximum value = 0.08), confirming that no condition unduly influenced the regression estimates. Taken together, these diagnoses confirm that the regression and mediation analyses meet the necessary assumptions, ensuring the reliability and robustness of the results.

Results

Participants' Demographic Profile

Table (3) which present the demographics characteristics of the research sample.

Table (3): The demographic characteristics of the participants.

Demographic	Frequency	Percent
Gender		
Male	70	63.6
Female	40	36.4
Experience Period		
1-Less than 5 year	36	32.7
5-10 years	55	50
More than 10 years	19	17
Level of Education		
High school or equivalent	14	12.7
Diploma	10	9.1
Bachelor's degree	64	58.2
Master's degree	12	10.9
Doctorate	10	9.1
Industry Sector		
Manufacturing	13	11.8
Retail	10	9.1
Technology	16	14.5
Finance	21	19.1

Healthcare	33	30
Education	17	15.5
Type of SMEs		
Small	68	61.8
Medium	42	38.2

The demographic characteristics of the participants provide important insights into the composition of the study sample. The gender distribution indicates a predominance of males (63.6%), which may reflect broader patterns within the SME workforce. Regarding experience, half of the participants (50%) reported having between five and ten years of professional experience, indicating that the majority are mid-level professionals. As for the educational level of the sample, 58.2% hold a bachelor's degree, while 20% hold postgraduate qualifications (master's or doctorate)

In terms of industry sector, healthcare (30%) and finance (19.1%) were the most represented, followed by education (15.5%) and technology (14.5%), while manufacturing and retail were less represented. Finally, the distribution of SME types shows that small enterprises (61.8%) constitute most of the sample, which aligns with global trends where small enterprises dominate the SME sector.

Descriptive Statistic of Research Variables

Table (4): Descriptive statistic of the research variables

Variables	Domain	Indicators	Mean (Sd)	Levels
AI Capability (Independent Variable)			3.65(.52)	High
	Tangible		3.42(.75)	High
		data	3.51(.83)	High
		Technology	3.40(.76)	High
		Basic Resources	3.30(.71)	Moderate
	Human skills		3.47(.68)	High
		Technical Skills	3.46(.76)	High
		Business Skills	3.48(.76)	High
	Intangible		3.81(.48)	High
		Inter- Departmental Coordination	3.84(.51)	High
		Organizational Change Capacity	3.84(.51)	High
		Risk Proclivity	3.66(.51)	High
TL dependent Variable)			3.52(.50)	High
	Idealized Influence		3.56(.57)	High
	Inspirational Motivation		3.70(.47)	High
	Intellectual Stimulation		3.31(.65)	Moderate
	Individualized Consideration		3.56(.56)	High
OI dependent Variable)			3.53(.52)	High
	Product Innovation		3.66(.55)	High
	Process Innovation		3.57(.55)	High
	Administrative Innovation		3.44(.61)	High

The descriptive statistics in table (4) showed high levels across the study variables. AI capabilities achieved a high average score ($M = 3.65$, standard deviation

$= 0.52$), reflecting strong organizational readiness in both tangible and intangible technological resources. Data and basic resources were also highly rated, indicating

only moderate constraints. Human skills, consistently represented by high technical and business expertise, and intangible resources such as interdepartmental coordination and organizational change capacity emerged as the strongest dimensions, underscoring adaptability. TL also scored highly ($M = 3.52$, standard deviation = 0.50), with a relative gap in inspirational motivation and individual attention, although intellectual motivation was moderate, suggesting a relative gap in critical thinking. OI also scored highly ($M = 3.53$, standard deviation = 0.52), with a stronger emphasis on product and process innovation than on managerial innovation, which was relatively lower. Collectively, these results in the sample demonstrate

Table (5): Simple linear regression analysis

Dependent variables	Model summary			ANOVA			
	R	R ²	Adjusted R ²	Error of the estimate	df	F	sig
OI	0.811	0.657	0.654	0.29854	1	206.819	0.000

The results of table (5) indicated that there is a strong and positive correlation between AI capabilities and OI, where the value of the correlation coefficient was $R=0.811$). As can be seen from the table, the calculated F value was (206.819) and the significance level was ($SigF = 0.000$), which is less than 0.05. This indicates that there is a statistically significant effect of AI capabilities and OI at the level of Significance ($\alpha \leq 0.05$).

The results demonstrate a large effect size, with AI capabilities explaining 65.7% of the variance in organizational innovation ($R^2 = 0.657$). According to Cohen's (1988) guidelines, this represents a substantial practical significance, as R^2 values above

strong AI capabilities, and suggest that SMEs have strong innovation and effective leadership ability, while highlighting areas, such as core resources and intellectual stimulation, may require further development to maintain long-term competitiveness.

AI capabilities' influence on OI among Palestinian SMEs

To examine the relationship between AI capabilities and OI, simple linear regression analysis was used. Table (5) shows the results.

0.26 are considered large effects. The adjusted R^2 value (0.654) confirms the stability of the model, indicating that the predictive power would remain strong even when accounting for sample characteristics. Furthermore, the standardized beta coefficient ($\beta = 0.811$) indicates that a one standard deviation increase in AI capabilities is associated with a 0.811 standard deviation increase in organizational innovation, demonstrating a strong positive relationship.

Based on these findings, hypothesis H1 which stated 'AI capabilities have a positive impact on OI' is accepted, as the evidence

demonstrates that AI capabilities have a significant and positive impact on OI.

AI capabilities' influence TL among Palestinian SMEs

Table (6): Simple linear regression analysis

Dependent variables	Model summary			ANOVA			
	R	R ²	Adjusted R ²	Error of the estimate	df	F	sig
TL	0.567	0.331	0.325	0.43081	1	53.513	0.000

According to table (6), the correlation coefficient was ($R = 0.567$) indicates a strong and positive correlation between AI capabilities and TL. The value of was ($\text{SigF} = 0.000$), which is less than 0.05, indicates a statistically significant effect of AI capabilities and TL at the level of Significance ($\alpha \leq 0.05$).

The analysis reveals a moderate to large effect size, as AI capabilities explain 33.1% of the variance in transformational leadership ($R^2 = 0.331$). According to Cohen's (1988) guidelines, this R^2 value exceeds the threshold for a large effect (> 0.26), indicating meaningful practical significance. The adjusted R^2 value (0.325) confirms the model's robustness. The standardized beta coefficient ($\beta = 0.567$) suggests that AI

To examine the relationship between AI capabilities and TL, simple linear regression analysis was used. Table (6) shows the results.

capabilities have a moderate to strong positive influence on transformational leadership, with a one standard deviation increase in AI capabilities associated with a 0.567 standard deviation increase in transformational leadership

Based on these findings, hypothesis H2 which stated 'AI capabilities positively influence TL' is accepted, as the evidence demonstrates that AI capabilities have a significant and positive impact on TL.

TL influence on OI among Palestinian SMEs

To examine how do TL influence OI, simple linear regression analysis was used. Table (7) shows the results.

Table (7): Simple linear regression analysis

Dependent variables	Model summary			ANOVA			
	R	R ²	Adjusted R ²	Error of the estimate	df	F	sig
OI	0.849	0.720	0.717	0.26971	1	277.727	0.000

The simple linear regression analysis revealed a very strong and positive correlation between TL and OI ($R = 0.849$).

The coefficient of determination ($R^2 = 0.720$) indicated that TL explains 72% of the variance in OI, which represents a high

explanatory power. Furthermore, the F-value ($F = 277.727$) was statistically significant at $p < 0.05$, confirming the validity of the model.

The results reveal a very large effect size, with transformational leadership explaining 72.0% of the variance in organizational innovation ($R^2 = 0.720$). This R^2 value substantially exceeds the conventional threshold for a large effect (0.26), indicating exceptional practical significance. The adjusted R^2 (0.717) confirms the model's stability and generalizability. The standardized beta coefficient ($\beta = 0.849$) represents a very strong positive relationship, indicating that a one standard deviation increase in transformational leadership is associated with a 0.849 standard deviation

increase in organizational innovation. This demonstrates that transformational leadership is a powerful predictor of innovation outcomes in Palestinian SMEs.

Based on these findings, hypothesis H3 which stated 'TL positively influences OI' is accepted, as the evidence demonstrates that TL has a significant and positive impact on OI in Palestinian SMEs.

The mediating role of TL in the relationship between AI capabilities and OI among Palestinian SMEs

A regression analysis was conducted to investigate the mediating role of TL in the relationship between AI capabilities and OI among Palestinian SMEs. Table (8) shows the results.

Table (8): Regression analysis examining the mediating role of TL between AI capabilities and OI among Palestinian SMEs

variable / Statistic	B (Unstandardized)	SE	β (Standardized)	t	Sig	Boot LLCI	Boot LLCI
Constant	-0.350	0.221	—	-1.587	0.115		
AI Capabilities	0.368	0.035	0.470	10.431			
TL	0.726	0.053	0.774	13.612			
Indirect effect	0.193					.108**	.287**
R	.891	—	—	—	—		
R ²	.794	—	—	—	—		
Adjusted R ²	.788	—	—	—	—		
Std Error of Estimate	.184	—	—	—	—		
F(3,106)	135.966	—	—	—			

Table (8) indicates that transformational leadership plays a mediating role in the relationship between AI capabilities and innovation within Palestinian SMEs. While AI capabilities significantly enhance innovation by providing technological readiness and advanced data-driven tools ($\beta = 0.470$, $p < 0.001$), their impact is amplified when combined with transformational leadership. Leaders who inspire, motivate, and develop employees' intellectual capabilities create an organizational environment that enables the effective use of AI technologies, thereby fostering creativity and initiative. The mediating effect ($\beta = 0.193$) with a 95% bootstrap confidence interval [0.108, 0.287] suggests that transformational leadership partially explains how AI capabilities translate into innovative outcomes. This underscores that the transition from AI capabilities to organizational innovation is explained by leadership behaviors, suggesting that technological readiness alone is insufficient without visionary leadership to guide its strategic implementation.

This indicates that approximately 34.4% of the total effect of AI capabilities on organizational innovation is transmitted through transformational leadership, representing a meaningful mediation effect. According to Cohen's (1988) guidelines for f^2 effect sizes in multiple regression, the overall model $f^2 = R^2/(1-R^2) = 0.794/(1-0.794) = 3.86$, which substantially exceeds the threshold for a large effect ($f^2 > 0.35$). These findings confirm both the statistical and practical significance of the mediation model.

Accordingly, the hypothesis **H4 which stated** '*TL mediates the relationship between AI capabilities and OI*' is accepted, asserting that TL directs the potential of AI capabilities toward fostering OI.

Discussion

According to the results of this research, AI capabilities have a positive impact on OI. AI improves decision-making and innovation, assists in gaining insights into business processes, and helps leaders gain overview of the business environment (Gao et al., 2025; Han et al., 2025). This is in line with the concept of strategic technology management advanced in the literature as a way of optimally improving organizational performance (Dennehy et al., 2023). Organizations must, therefore, pay attention to how to align AI capabilities with their business goals so that AI not only supports functions but also the leadership and the organization's ability to innovate. Moreover, AI empowers companies to optimize their systems and develop their processes through automation, thereby supporting managers' ability to make strategic decisions that guide innovative processes (Taherdoost, 2023; Chibunna et al., 2025). This finding aligns with Choudhary et al. (2023), which indicated that AI systems are a key contributor to improving decision-making processes and enhancing organizations' analytical and predictive capabilities, thereby supporting organizational performance and leading to increased innovation rates. The adoption of AI systems and applications by SMEs enhances their integration into innovation processes, thereby improving their competitiveness within the competitive environment (Mohamed & Otman, 2021). This result confirms that SMEs' investment in AI capabilities strengthens their ability to achieve innovative returns and, consequently, enhances their capacity to respond to various changes and developments.

The results also revealed that AI capabilities have a significant and positive impact on TL. AI systems are a crucial element in providing leaders with vital information that enhances their ability to make effective strategic

decisions (Wamba-Taguimdje et al., 2020). TL is a key element in an organization's shift towards adopting AI applications (Al-Ajlouni, 2020). This finding aligns with Wamba-Taguimdje et al. (2020) and Jarrahi (2018), who emphasized the diverse areas in which AI technologies can be employed. AI technologies can be used as a methodology to promote innovative practices, this, in turn, supports an organization's ability to achieve positive change and leadership growth. The vision of transformational leaders includes facilitating information exchange among employees, sharing ideas, and enhancing teamwork, and AI technologies can achieve these elements (Jarrahi, 2018; Cheng et al., 2023). This finding supports the necessity for SMEs to adopt AI technologies in various processes to improve the level of company performance in the technical, communication, and administrative fields.

According to research findings, TL is a positive indicator of innovation levels within organizations. TL is linked to high levels with creativity, which in turn supports an organization's willingness to experiment and innovate (Mikalef & Gupta, 2021). This finding aligns with Kitsios & Kamariotou (2021), who emphasized that transformational leaders encourage OI and clarify for employees what is possible and what is not. Clarifying these elements supports employees' ability to take risks and be creative (Mikalef & Gupta, 2021), and it also enhances their ability to take a pivotal role in OI (Jorzik et al., 2023). Therefore, TL is a key indicator of an organization's capacity for innovation (Al-Ajlouni, 2020). TL enhances employees' receptiveness to change, thus supporting their willingness to take risks and be creative. This finding necessarily supports the idea that TL encourages employees to innovate and think outside the box. It also fosters a willingness among employees to try new areas and

overcome the fear of failure. Furthermore, this result underscores that the role of transformational leaders is not limited to guidance; it also involves cultivating an organizational culture based on mutual trust that supports continuous innovation. This finding also highlights the need for organizations to develop leadership development programs that focus on TL concepts, recognizing them as a fundamental means of supporting OI.

Furthermore, TL acts as a mediator in the relationship between AI and OI. TTL supports an organization's ability to leverage AI's innovation potential. This finding aligns with Caner & Bhatti (2020), who emphasized that AI provides numerous capabilities and essential knowledge for innovation, and that TL is crucial in enabling organizations to capitalize on these capabilities. This results also supports Nasseef et al. (2022), who affirmed that leadership is a key factor in motivating employees and fostering a culture of innovation within the organization. Leadership that supports the adoption of AI systems finds it easier to integrate these technologies into innovative processes (Nasseef et al., 2022). This necessarily enhances the organization's ability to achieve the desired competitive position. It is expected that companies led by TL will support the organization's move towards implementing AI, thereby strengthening its desire for innovation (Gyanamurthy & Radhanath, 2020). This finding indicates that employing AI to achieve innovation must be supported by TL practices that guide employees towards the importance of change and support their acceptance of any changes that may occur at the organizational level. In practical terms, this finding supports the necessity for organizations to focus on developing transformational leaders in parallel with investing in AI technologies. Digital transformation is not merely a technical or

sensory aspect; rather, it is an organized process that requires creative leadership capable of creating an environment that supports effective innovation.

Implications

Theoretical Implications

On the theoretical level, the arguments of this research enrich the Resource-Based View (RBV) theory, highlighting that the application of AI capabilities is a strategically relevant resource facilitating both TL and OI. This proves right the RBV theory which holds it that it is internal resources including technological capabilities that enables organizations gain competitive advantage (Teece, 2007). In the case of Palestinian SMEs, AI is a newly identified strategic asset that aligns the functional and strategic goals of the firms, as well as increases the companies' adaptability to the conditions of the rapidly evolving business landscape. Furthermore, this research extends the knowledge of AI enablers' impact on the TL and innovation in organizations. AI is an important facilitator in improving the leader's decision-making activities by analyzing activities and providing decision-support products as well as freeing up leaders' time to focus on longer-term, big-picture innovations.

Practical Implications

On the practical level, this research offers several significant contributions to the understanding of SMEs' experiences in Palestine and in other countries. First, it emphasizes the main importance of proactive positioning of AI solutions in the processes of enterprises, including with reference to the components of innovation and leadership. Companies are now encouraged to view AI as a critical resource rather than as a technology that needs to be implemented, as it can help revolutionize the process of OI when applied according to businesses' goals. This means that the organization should invest in the AI technologies that support the existing

organizational operations and that the use of these technologies will add value to the leadership practices and the innovation processes in the organization.

The research offers a range of important practical implications for decision-makers and managers of SMEs. The findings highlight the importance of enhancing AI capabilities not only as a technological tool but also as a strategic element requiring effective transformational leadership to ensure its realization as a genuine innovation.

This research also emphasizes on the practices that would help to cultivate the skills needed within the working force to maximize the use of AI. This complements the existing literature on human capital development which captures the viability of organizational success based on the employee's capability to decipher and apply AI insights. Adoption of AI technologies call for a workforce that not only understands the technologies, but also can apply that knowledge in a working environment where the technologies are used in decision making and problem-solving activities. It is thus important that training for deep learning includes both technical and strategic approaches for the realization of AI as an innovative tool to improve leadership performance.

Limitation

Some empirical limitations should be noted in relation to this study. First, the investigation involved only SMEs operating in Palestine, which may reduce the possibility of generalizing its results to other regions in the world. To fill this gap, future research could examine the relationship between AI competencies and leadership and innovation more broadly for various industries and countries, especially in the developed world where AI integration may be more progressive. Further research should attempt to use this study in other geographical settings as well as

other sectors, not only in relation to the additional mediators, but also any contextual factors, which moderate the link between AI competence, leadership, and innovation.

Moreover, due to the small sample size and questionnaire data, these results suffer from potential biases that future examinations could minimize through using a combination of qualitative and quantitative data or through prospective research designs.

The subsequent research can also explore the other mediating factors that can influence the relationship between the AI capabilities and innovation, including the organization's culture as well as the environment where the organization operates in. This means that by broadening the research focus, scholars can be able to understand the state and ways in which both AI and leadership contribute to advancing innovation within various structures.

Conclusion

This research identified the extent of AI advantage to transform leadership and innovation in the SMEs in Palestine, especially the districts of Bethlehem, Ramallah, and Nablus. The research finds evidence that AI capabilities are positively affecting leadership effectiveness and OI. Moreover, the research confirms the AI positioning as the strategic organizational resource in view of the RBV theoretical context. AI represents a strategic factor when suitably positioned by an organization's leadership to influence, enable and support timely, well-founded decision making to catalyze OI and improve business outcomes. This underscores that the transition from AI capabilities to OI is explained by leadership behaviors, suggesting that technological readiness alone is insufficient without visionary leadership to guide its strategic implementation.

As practical implications of the study, therefore, the paper underscores the importance for SMEs to adopt AI technologies and to

deploy such in their operations effectively. However, training and development activity that helps employees to develop their AI competencies are essential to ensure that the technologies are properly implemented. Last, it is recommended to develop a new management culture that will embrace organizational flexibility, rapid decision-making and innovation is key to success in today's challenging business environment.

Disclosure Statement

The author declares that they have no relevant or material financial interests that relate to the research described in this paper.

The author also declares that this study is an original research work. It has not been extracted from a master's thesis, doctoral dissertation, or any other academic work. The manuscript was developed specifically for publication purposes and has not been previously submitted or published elsewhere.

- **Ethical approval and consent to participate:** Ethical approval was obtained from Girne American University. An information sheet was provided to all participants, and written informed consent was obtained prior to data collection. Participants were informed about the aim of the study and were assured that they had the right to withdraw at any time without any penalty or consequences
- **Availability of data and materials:** The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.
- **Author contribution:** The author selected the study title, wrote the theoretical framework and reviewed previous studies, and carried out all aspects of the study, including its design, implementation, data collection, data analyses, and complete manuscript preparation.

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List of Abbreviations

AI: Artificial Intelligence

TL: Transformational Leadership

OI: Organizational Innovation

RBV: Resource-Based View

SMEs: Small and Medium-Sized Enterprises.

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