



DATA ANALYTICAL ADOPTION AS A STRATEGIC MECHANISM LINKING INNOVATIVE LEADERSHIP TO ORGANIZATIONAL AGILITY IN TOURISM SMEs

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Abstract

This study examines the effect of innovative leadership on organizational agility through the mediating role of data analytical adoption among tourism SMEs in Indonesia. The study is motivated by the increasing pressure on tourism SMEs to respond quickly to changing tourist preferences, service digitalization, and intensifying market dynamics in the post-pandemic tourism environment. Drawing on DCT, this research argues that OA is shaped not only by leadership capability, but also by the organization's ability to adopt data-driven digital practices that support adaptive decision-making. A quantitative approach was employed using a cross-sectional survey design, and data were collected from 112 employees working in Indonesian tourism SMEs. The data were analyzed using PLS-SEM. The findings show that IL has a positive effect on DAA and OA. In addition, data analytical adoption positively influences OA

and partially mediates the relationship between IL and OA. These results suggest that IL remains the primary driver of OA, while data analytical adoption strengthens this relationship by translating leadership orientation into data-based organizational responses. The study contributes to the application of DCT by clarifying the role of data analytical adoption as a strategic mechanism through which IL enhances OA in tourism SMEs. Practically, the findings highlight the importance of integrating leadership development with data analytics capability building to strengthen the adaptability and competitiveness of tourism SMEs in dynamic business environments.

Keywords: Innovative Leadership; Data Analytical Adoption; Organizational Agility; Tourism SMEs; Dynamic Capabilities Theory

INTRODUCTION

Global tourism has re-entered a strong growth trajectory following the prolonged disruption caused by the pandemic. UN Tourism reported that international tourist arrivals reached approximately 1.4 billion in 2024, representing an almost complete recovery to pre-pandemic levels. In Indonesia, the tourism sector has likewise experienced a significant rebound, as reflected in the recovery of international arrivals and the resurgence of domestic travel, both of which remain vital to the national economy (Aryanti & Tjokrosaputro, 2024). However, this recovery has created not only new opportunities but also greater pressure for tourism small and medium-sized enterprises (SMEs) to become faster, more digitalized, and more responsive to changing tourist preferences (Lestari et al., 2024). Despite the sector's considerable economic potential, scholarly understanding of how tourism SMEs build organizational agility through leadership and digital technology adoption remains limited.

In an increasingly digitalized tourism environment, SMEs can no longer rely solely on destination attractiveness, local relationships, or conventional customer experience. They are now expected to manage customer information, interpret demand patterns, respond to digital reviews, utilize online booking platforms, and make decisions based on real-time data (Yaiprasert & Hidayanto, 2026). Within this context, innovative leadership becomes particularly important, as leaders in SMEs often act directly as strategic decision-makers, service innovation drivers, and initiators of technology adoption (Ahachmi et al., 2025). Nevertheless, while innovative leadership is widely recognized as an important enabler of organizational change, the relationships among innovative leadership (IL), data analytical adoption (DAA), and organizational agility (OA) have not yet been comprehensively explained in the context of tourism SMEs.

Prior studies have provided an important foundation for understanding the link between leadership, digital transformation, and organizational adaptability. Chang & Octoyuda (2024) demonstrated that leadership and strategic flexibility contribute to the success of digital transformation in SMEs. However, their study did not specifically address innovative leadership and did not examine data analytical adoption as a mediating mechanism in the formation of agility. Neupane et al., (2025) highlighted the importance of strategic flexibility and technological innovation capability in explaining tourism firm performance in resource-constrained environments. Yet, their work focused primarily on entrepreneurial leadership and organizational performance rather than organizational agility as the central outcome. Likewise, Hussein et al., (2024) showed that digital leadership impacts sustainable competitive advantage through green capacity and innovation; nevertheless, it did not explicitly assess the function of data analytics adoption in connecting leadership to organizational agility.

These prior limitations point to a more specific research gap. First, digital technology in many studies is still treated primarily as a technical or operational factor rather than as a strategic mechanism through which leadership can enhance the organization's adaptive capacity (Ciampi et al., 2022). Second, much of the literature on digital transformation and organizational agility continues to focus on large firms or selected sectors, whereas research on SMEs remains relatively limited, fragmented, and in need of deeper explanation regarding how digital technology, internal capabilities, and managerial support jointly shape agility (Morawiec & Sołtysik-Piorunkiewicz, 2023; Zhang et al., 2020). Third, although Chang and Octoyuda (2024) demonstrated the role of transformational leadership in encouraging digital innovation adoption, their study neither focused on tourism SMEs nor examined innovative leadership as a distinct leadership orientation. As such, it remains unclear whether the effect of innovative leadership on organizational agility occurs directly or is transmitted through digital technology adoption.

This study addresses this gap by developing a conceptual model that positions digital technology adoption as a mediating mechanism in the relationship between innovative leadership and organizational agility. The novelty of this research does not lie merely in re-examining the association between leadership and adaptability, but in explaining how innovative leadership enhances agility through SMEs' ability to adopt data-driven digital technologies. In the tourism SME context, data analytical adoption is particularly important because it enables firms to detect changing tourist preferences, evaluate digital reviews, monitor demand trends, and make service decisions more quickly and effectively. Therefore, this study offers a more specific explanation of how leadership and digital technology work jointly to shape organizational agility in tourism SMEs.

Based on this gap, the study addresses four research questions: (1) To what degree does innovative leadership affect the adoption of digital technologies among tourism SMEs in Indonesia? (2) How does the deployment of digital technology influence organizational agility in adapting to evolving tourist behavior and the dynamics of digital tourism? (3) Does innovative leadership have a direct impact on organizational agility? (4) Does the deployment of digital technology mediate the relationship between innovative leadership and organizational agility? Accordingly, this study aims to examine the effect of innovative leadership on organizational agility through digital technology adoption in Indonesian tourism SMEs. By employing a PLS-SEM approach, this study seeks to extend the application of dynamic capabilities theory by explaining the role of digital technology adoption as a mechanism through which innovative leadership fosters organizational agility. Theoretically, the findings are expected to advance dynamic capabilities theory by clarifying how innovative leadership and digital technology adoption jointly shape organizational agility. Practically, the results may provide valuable guidance for SME practitioners and policymakers in designing leadership and digital transformation strategies that strengthen the adaptability and competitiveness of tourism SMEs.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Dynamic Capability in the Context of Digital SMEs Tourism

In the increasingly digitalized context of tourism SMEs, the ability of an organization to respond quickly is shaped not merely by the possession of resources, but by the capacity of leadership to direct change and strategically leverage digital technologies (Alnasser et al., 2025). Tourism SMEs face a distinctive set of pressures, including rapidly changing tourist preferences, reliance on online booking platforms, digital reviews, digital payment systems, and the need to understand demand patterns in real time (Yaiprasert & Hidayanto, 2026). Under such conditions, leaders become central actors in identifying emerging opportunities, making technology-related decisions, guiding service innovation, and shaping employees' readiness for change (Bolatan et al., 2022; Brunner et al., 2023; Hussein & Ghadi, 2025).

Drawing on Dynamic Capabilities Theory (DCT), this study argues that an organization's ability to survive and grow in a dynamic business environment depends not only on the resources it possesses, but also on its capacity to mobilize, integrate, and transform those resources into adaptive capabilities (Quansah et al., 2022). Within this perspective, innovative leadership is positioned as a strategic managerial capability that enables the organization to recognize opportunities for change, foster a data-driven decision-making orientation, and encourage openness toward digital transformation (Şen & Eren, 2012). In addition, data analytics adoption serves as a digital mechanism through which dispersed customer and market

information can be converted into actionable insights for both strategic and operational decisions. Through this mechanism, organizations are able to adjust their processes, respond more rapidly to environmental shifts, and enhance their flexibility under uncertainty. Accordingly, organizational agility is understood as a strategic outcome reflecting the organization's capacity to respond quickly, appropriately, and adaptively to market change, competitive pressure, and operational challenges.

Innovative Leadership and Data Analytical Adoption

In an increasingly digital business environment, an organization's ability to adopt digital technology is not determined solely by the availability of technological infrastructure, but also by the leader's capacity to articulate a clear vision, foster an innovation-oriented culture, and encourage acceptance of change. Innovative leadership refers to a leadership orientation characterized by creativity, flexibility, and adaptive decision-making aimed at generating novel and relevant solutions in response to changing business environments (Holtzhausen & Botha, 2019; Sultana & Rahman, 2012). Innovative leaders tend to encourage experimentation, create space for organizational learning, and facilitate the use of new technologies as part of decision-making processes. Such conditions accelerate organizational readiness to implement data analytics adoption in support of marketing activities, tourist behavior analysis, demand forecasting, and service quality improvement. In tourism SMEs, this role is particularly important because decisions regarding technology investment, customer data management, and service digitalization are often concentrated in the hands of owners or managers.

Previous empirical studies have shown that innovative forms of leadership are closely associated with the organization's ability to utilize technology. Mthabela, (2015) found that leaders with strong business knowledge and innovation orientation are more capable of driving business development through technology utilization. Pihie et al., (2014) similarly showed that leadership styles oriented toward innovation enhance the organization's ability to direct change. In the same vein, Lee et al., (2020) argued that innovative leadership enables organizations to adapt more quickly to developments in information technology, while Dingler & Enkel, (2016) emphasized that innovative leaders create work environments that support creativity, collaboration, and openness toward technological change. Chang & Octoyuda, (2024) also demonstrated that leadership is pivotal in enhancing the use of digital technology. In the realm of Indonesian tourist SMEs, innovative leadership is anticipated to significantly influence the integration of data analytics into the organization's strategic response to market dynamics. Based on this argument, the following hypothesis is proposed:

H1: Innovative leadership positively influences data analytical adoption.

Innovative Leadership and Organizational Agility

From the perspective of DCT, organizational agility denotes the capacity of an organization to consistently perceive, capitalize on, and reorganize in reaction to environmental changes. This capability is especially critical for tourism SMEs, as they must be able to detect shifts in tourist preferences, capture market opportunities, and adjust services and business processes quickly. In this regard, innovative leadership acts as a primary driver that enables the organization to build adaptive capacity through innovative vision, organizational learning, and flexible decision-making. Innovative leaders do not merely initiate change; they also create an environment that encourages experimentation, collaboration, and continuous renewal, thereby making the organization more prepared to face business turbulence (Mawlawi et al., 2019; Lee et al., 2020).

Prior research supports this relationship. Dingler & Enkel (2016), Bodolica et al., (2020), Yang et al., (2021), and Comtet & Johannessen (2021) collectively suggest that innovative leadership enhances organizational adaptability by strengthening vision, creativity, and flexibility. However, most of these studies focus on large organizations or the hotel industry, whereas empirical evidence from tourism SMEs in Indonesia remains limited. Therefore, this study argues that innovative leadership constitutes an initial managerial capability that directly strengthens organizational agility in dynamic business environments. Based on this reasoning, the study proposes below hypotheses:

H2: Innovative leadership positively influences organizational agility

Data Analytical Adoption and Organizational Agility

Within DCT, an organization's ability to adapt to change depends heavily on its capacity to acquire, interpret, and utilize strategic information (Wu et al., 2023). In the context of tourism SMEs, data analytics adoption enables organizations to generate market intelligence from various sources, including tourist behavior, digital reviews, online booking platforms, and market demand trends (Theodorakopoulos et al., 2025). Such information strengthens the sensing process by helping firms identify environmental changes, supports seizing through data-driven decision-making, and facilitates reconfiguration by allowing firms to adjust resources and processes more effectively. In this sense, data analytics adoption should be regarded not only as an operational technology, but as a strategic tool that promotes organizational agility.

Several studies support this argument. Studi (Hyun et al., 2023) showed that data analytics capability enhances organizational agility by enabling more accurate information use in decision-making and risk management in dynamic environments. Likewise, Haverila & Haverila

(2024), found that data analytics capability generates market insights that enable organizations to identify changes in customer needs and exploit new business opportunities. However, most of these studies have been conducted in large firms and have not specifically examined tourism SMEs in developing countries, where resource constraints coexist with high market volatility. Accordingly, this study argues that data analytics adoption constitutes a dynamic capability that directly strengthens organizational agility among Indonesian tourism SMEs. Based on this argument, the following hypothesis is proposed:

H3: Digital analytical adoption positively influence organizational agility

The Mediating Role of Data Analytical Adoption

Dynamic Capabilities Theory suggests that adaptive advantage is not determined by leadership or technology in isolation, but by the organization's ability to integrate both into capabilities that create value (Abdeen et al., 2025). In the context of tourism SMEs, innovative leadership helps establish vision, an innovation-oriented culture, and a data-driven decision-making orientation. However, these leadership qualities do not automatically result in organizational agility. Innovative leadership must be translated into the organization's ability to gather, analyze, and utilize information as the basis for responding to market change (Aman-Ullah et al., 2022). In this regard, data analytics adoption functions as the mechanism that connects sensing, seizing, and reconfiguring, enabling organizations to detect changes in tourist behavior, make faster decisions, and continuously adjust their business strategies.

This argument is supported by Chang & Octoyuda, (2024) who demonstrated that leadership encourages the adoption of digital technology innovation, as well as by studies showing that data analytics capability enhances organizational agility through market intelligence and data-driven decision-making. Nevertheless, prior studies have tended to treat digital technology as an operational factor or have tested these relationships primarily in large organizations and the hospitality industry. Therefore, this study contends that, in Indonesian tourism SMEs, data analytics adoption operates as a dynamic capability that mediates the effect of innovative leadership on organizational agility. In other words, the organization's adaptive capacity emerges through the transformation of innovative leadership into data-driven decision-making practices. Based on this reasoning, the following hypothesis is proposed:

H4: Data analytical adoption positively mediate the relationship between innovative leadership and organizational agility

METHODOLOGY

Research Design

This study employed a quantitative research methodology using a cross-sectional survey design to examine the influence of innovative leadership on organizational agility through data analytics adoption among tourism SMEs in Indonesia. A cross-sectional approach was considered appropriate because it enables the examination of relationships among the study constructs based on data collected at a single point in time, which aligns with the objective of testing the proposed conceptual model using PLS-SEM.

Measurement model development

The measurement instrument was developed by adapting previously validated scales from established studies to ensure the content validity and conceptual consistency of each construct. Innovative leadership was measured using six items adapted from Emiliani (2003), data analytics adoption was measured using five items adapted from Ritz et al. (2019), and organizational agility was measured using nine items adapted from Chang & Octoyuda (2024). To ensure contextual relevance, the original measurement items were carefully reworded to reflect the operational characteristics of tourism SMEs in Indonesia and the application of data analytics as a digital technology capability, while preserving the conceptual meaning of the original constructs. All items were evaluated using a five-point Likert scale, with 1 indicating "strongly disagree" and 5 indicating "strongly agree."

Data collection

Study population consisted of employees working in tourism SMEs in Indonesia. Respondents were selected using purposive sampling based on the following criteria: they were employed in tourism SMEs and possessed sufficient understanding of leadership practices, digital technology use, and organizational adaptation processes within their workplace. The tourism SME context was considered appropriate because firms in this sector face intense market change, service digitalization, shifting tourist behavior, and the need to respond quickly to dynamic business conditions. These characteristics make tourism SMEs a relevant setting for examining the roles of innovative leadership and data analytics adoption in strengthening organizational agility.

To determine the minimum sample size, Hair et al. (2017) suggest using G*Power analysis. The analysis was based on an effect size of 0.15, an alpha level of 0.05, a statistical power of 0.95, and two predictors. The results indicated that a minimum of 107 respondents was required. Data collection was conducted over a one-month period in May 2026 using an

online questionnaire distributed through Google Forms, email, WhatsApp, and social media platforms. A total of 112 valid responses were obtained and included in the final analysis. Thus, the responses were considered valid because they met the purposive sampling criteria and showed no inappropriate response patterns.

Data analysis

Data were analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4. PLS-SEM was deemed suitable for this investigation due to the predictive-explanatory nature of the proposed model, its inclusion of mediating interactions, and its effectiveness in managing complex models where data normality cannot be consistently assumed and sample sizes are comparatively constrained. The investigation comprised two primary phases: assessment of the measurement model and evaluation of the structural model.

The measuring model was assessed before hypothesis testing to confirm the validity and reliability of the constructs. Indicator reliability was evaluated by outer loadings, with values exceeding 0.60 being acceptable, signifying that the indicators sufficiently represent their corresponding constructs (Hair et al., 2017). Indicators with loadings over this criterion were preserved since they continued to exhibit adequate contribution to the construct and did not undermine the overall integrity of the measurement model. Internal consistency dependability was assessed by Cronbach's Alpha and Composite dependability, with values over 0.70 signifying acceptable reliability (Hair et al., 2017). Convergent validity was evaluated using the Average variation Extracted (AVE), where Additionally, discriminant validity was assessed by the HTMT ratio, where values below 0.85 signify that each construct is empirically distinct from the others, discriminant validity was evaluated using the HTMT ratio, with values below 0.85 indicating that each construct is empirically distinct from the others (Hair et al., 2017). The findings indicate that the preserved indicators and constructs attained an adequate level of reliability and validity for the following evaluation of the structural model.

Subsequently, multicollinearity was evaluated utilizing the complete collinearity Variance Inflation Factor (VIF). VIF values under 3.3 suggest that the model is devoid of significant multicollinearity issues (Kock, 2015). Upon confirming that the measurement model met the necessary reliability and validity standards, the structural model was assessed by analyzing the path coefficients, t-statistics, p-values, R^2 values, and the Standardized Root Mean Square Residual (SRMR). The importance of the proposed correlations was evaluated by a bootstrapping method utilizing 5,000 subsamples. The analyses aimed to evaluate the direct impact of innovative leadership on organizational agility, the influence of innovative leadership on the adoption of data analytics, the effect of data analytics adoption on organizational agility,

and the mediating role of data analytics adoption in the relationship between innovative leadership and organizational agility.

RESULTS AND DISCUSSION

Respondents Profile

Table 1 presents the demographic and professional profile of the respondents. In terms of gender, the sample was dominated by female respondents (70.5%), while male respondents accounted for 29.5%. Regarding employment level, most respondents were positioned at the lower management level (42.0%), followed by middle-level management (38.4%) and top-level management (19.6%). This distribution indicates that the sample largely represents employees at operational and middle managerial levels, who are likely to be directly involved in the adoption and implementation of organizational practices. With respect to organizational tenure, the majority of respondents had worked in their current company for less than two years (60.7%), followed by those with two to five years of experience (32.1%), while only a small proportion had more than five years of tenure (7.1%). In terms of digital adoption experience, most respondents reported that their organizations had been using digital technology for one to three years (46.6%), followed by less than one year (34.8%). A smaller proportion indicated three to six years of digital adoption experience (8.0%) and more than six years (10.7%). Overall, these findings suggest that the sample is characterized by relatively recent organizational tenure and early-to-moderate stages of digital adoption experience.

Table 1. Respondent Profile

Characteristic	Item	Frequencies	Percentage
Gender	Male	33	29.5
	Female	79	70.5
Level of Employment	Top Level Management	22	19.6
	Middle Level Management	43	38.4
	Low Level Management	47	42.0
Organizational Tenure in Current Company	< 2 years	68	60.7
	2 – 5 years	36	32.1
	> 5 years	8	7.1
Digital Adoption Experience	< 1 year	39	34.8
	1 – 3 years	52	46.6
	3 – 6 years	9	8.0
	> 6 years	12	10.7

Measurement Model Evaluation

Prior to examining the structural relationship among the constructs, the measuring model was assessed to confirm that all indicators met the necessary validity and reliability standards.

Table 2 indicates that the research model consists of three primary constructs: innovative leadership, data analytical adoption, and organizational agility, encompassing a total of 20 indicators. The findings indicate that the outside loadings varied from 0.658 to 0.872, all surpassing the suggested minimum of 0.60. This signifies that each indicator shown sufficient dependability in reflecting its respective construct.

The internal consistency reliability was additionally evaluated by Cronbach's Alpha and Composite Reliability. The Cronbach's Alpha coefficients for innovative leadership, data analytical adoption, and organizational agility were 0.872, 0.898, and 0.907, respectively, with corresponding Composite Reliability coefficients of 0.885, 0.903, and 0.910. All values above the suggested threshold of 0.70, indicating that the constructions demonstrate excellent internal consistency dependability. Convergent validity was confirmed, indicated by Average Variance Extracted (AVE) values of 0.612 for innovative leadership, 0.712 for data analytical adoption, and 0.575 for organizational agility. All AVE values above 0.50, indicating that each construct accounts for over half of the variance of its indicators. The VIF values varied from 1.485 to 2.841, remaining far below the crucial threshold of 3.33, therefore showing no substantial multicollinearity issues. The findings in Table 2 indicate that the measurement model attained an adequate degree of reliability and validity for the evaluation of the subsequent structural model.

Table 2. Construct Validity and Reliability

Construct	Code	Outer Loading	Cronbach Alpha	CR	AVE
Innovative Leadership	IL1	0.797	0.872	0.885	0.612
	IL2	0.849			
	IL3	0.854			
	IL4	0.658			
	IL5	0.745			
	IL6	0.774			
Data Analytical Adoption	DAA1	0.752	0.898	0.903	0.712
	DAA2	0.872			
	DAA3	0.859			
	DAA4	0.868			
	DAA5	0.862			
Organizational Agility	OA1	0.712	0.907	0.910	0.575
	OA2	0.752			
	OA3	0.708			
	OA4	0.774			
	OA5	0.818			
	OA6	0.748			
	OA7	0.773			
	OA8	0.754			
	OA9	0.778			

Discriminant Validity and Structural Model Evaluation

Discriminant validity was evaluated by the Heterotrait–Monotrait Ratio (HTMT) to confirm that each construct represented a conceptually separate entity. Table 3 indicates that all HTMT values were below the stringent criterion of 0.85, demonstrating adequate discriminant validity among the constructs (Hair et al., 2017). This research indicates that innovative leadership, data analytics adoption, and organizational agility are empirically distinct and do not demonstrate significant conceptual overlap. The measurement model results validate that the constructs satisfied the necessary validity and reliability standards, thereby endorsing the model's suitability for further structural model assessment.

HTMT was chosen as the principal criterion for evaluating discriminant validity due to prior methodological research indicating its superior sensitivity and reliability in identifying discriminant validity issues compared to traditional methods like the Fornell–Larcker criterion and cross-loadings (Hair et al., 2017). The Fornell–Larcker criterion and cross-loading analysis are frequently referenced; nonetheless, both methods have faced criticism for their inadequate capacity to detect a deficiency in discriminant validity, especially when constructs are conceptually interconnected. Conversely, HTMT offers a more stringent evaluation of construct distinctiveness by directly calculating the ratio of inter-construct correlations to intra-construct correlations. Consequently, the application of HTMT in this study establishes a more compelling and rigorous foundation for asserting that the constructs are empirically distinct.

Table 3. HTMT

	IL	DAA	OA
IL	--		
DAA	0.801	--	
OA	0.844	0.795	--

Next, the structural model evaluation began by examining model fit and explanatory power. The SRMR value of 0.061 was below the recommended cut-off of 0.08, indicating an acceptable level of model fit. Although the NFI value of 0.821 did not reach the ideal benchmark of 0.90, it remains acceptable within the context of PLS-SEM, which places greater emphasis on predictive accuracy than on global goodness-of-fit indices. In terms of explanatory power, the R^2 value for data analytical adoption was 0.272, indicating that 27.2% of the variance in data analytical adoption was explained by innovative leadership. Meanwhile, organizational agility achieved an R^2 value of 0.717, suggesting that 71.7% of its variance was jointly explained by innovative leadership and data analytical adoption.

These results indicate that the model demonstrates substantial explanatory power, particularly in accounting for the development of organizational agility among tourism SMEs.

Hypothesis Testing

As reported in Table 4, hypothesis testing was performed using the bootstrapping procedure in SmartPLS 4 to examine the significance of both direct and indirect relationships. The results indicate that all proposed hypotheses were supported. Innovative leadership was found to have a positive and significant effect on data analytical adoption ($\beta = 0.722$, $t = 14.685$, $p < 0.000$), supporting H1. This finding suggests that innovative leaders play a critical role in fostering the organization's capability to adopt data analytics as a foundation for more evidence-based and informed decision-making. Innovative leadership also showed a positive and significant effect on organizational agility ($\beta = 0.501$, $t = 5.872$, $p < 0.000$), thereby supporting H2. This path represents the strongest direct effect in the model, underscoring the central role of innovative leadership in enhancing the organization's adaptive capacity. Furthermore, data analytical adoption had a positive and significant effect on organizational agility ($\beta = 0.360$, $t = 3.986$, $p < 0.000$), supporting H3. This result indicates that data analytical adoption serves as an important dynamic capability through which organizations can convert market and operational information into faster and more effective strategic responses, thereby strengthening organizational agility.

The mediating role of data analytical adoption was further examined through the indirect effect analysis. As shown in Table 4, the indirect effect of innovative leadership on organizational agility via data analytical adoption was positive and significant ($\beta = 0.260$, $t = 3.645$, $p < 0.000$), thus supporting H4. Given that both the direct and indirect effects were positive and statistically significant, the mediation can be classified as partial mediation. In addition, the Variance Accounted For (VAF) value of 34.17% suggests a moderate mediating effect, meaning that data analytical adoption explains a meaningful portion of the relationship between innovative leadership and organizational agility, while innovative leadership remains the dominant driver.

Overall, the results presented in the Table 4 reinforce the view that innovative leadership is the primary predictor of organizational agility, whereas data analytical adoption complements this influence by translating leadership orientation into data-driven decision-making capability.

Table 4. Hypothesis Results

Causal Relationship	Path Coefficient	t-value	p-value	Conclusion
<i>Direct Relationship</i>				
H1. IL → DAA	0.722	14.685	0.000	Accepted
H2. IL → OA	0.501	5.872	0.000	Accepted
H3. DAA → OA	0.360	3.986	0.000	Accepted
<i>Indirect Relationship</i>				
H4. IL → OA → DAA	0.260	3.645	0.000	Partial Mediation

Discussion

This study examined the effect of innovative leadership on organizational agility through the mediating role of data analytical adoption among tourism SMEs in Indonesia. The empirical results show that all proposed hypotheses were supported, providing evidence that innovative leadership is a key driver of both data analytical adoption and organizational agility, while data analytical adoption also contributes positively to the development of organizational agility.

First, the analysis shows that innovative leadership has a positive effect on data analytical adoption. This finding suggests that innovative leaders do not merely direct change, but also encourage organizations to use data as a basis for decision-making. From the perspective of Dynamic Capabilities Theory, this result may reflect the role of leadership in strengthening the organization's sensing capability, namely its ability to recognize market changes through relevant information and data. This finding is consistent with Bag et al., (2024), who argue that innovative leadership can strengthen the use of data analytics capabilities within organizations.

Second, the results reveal that innovative leadership is the strongest predictor of organizational agility. This suggests that, in tourism SMEs, organizational agility depends heavily on the leader's ability to build an innovative vision, promote flexibility, and foster rapid organizational responses to environmental change. This finding supports Jasim et al., (2024), who explain that leadership, from a dynamic capabilities perspective, can strengthen organizational agility, particularly in tourism and hospitality settings. The result also reinforces the view that organizational agility is not shaped solely by digital capability, but also by the managerial capacity to orchestrate organizational adaptation.

Furthermore, this study shows that data analytical adoption positively influences organizational agility. In practical terms, this means that SMEs' ability to utilize data analytics helps them detect changes in tourist demand, better understand customer behavior, and formulate faster and more effective strategic responses. This finding is consistent with Khalil et al., (2021), who demonstrate that big data analytics plays an important role in enhancing

organizational agility in the hospitality industry. Within the present study, data analytical adoption can therefore be understood as a data-driven capability that strengthens the adaptive responses of tourism SMEs to market change.

The mediation analysis further shows that data analytical adoption partially mediates the relationship between innovative leadership and organizational agility. This indicates that the effect of innovative leadership on organizational agility occurs not only directly, but also indirectly through the organization's ability to transform data into adaptive decision-making capability. This finding is theoretically important because it clarifies the mechanism through which leadership contributes to agility. Rather than affecting agility only through general strategic direction, innovative leadership also strengthens organizational adaptation by encouraging the development of data-based practices that support faster and more effective responses to environmental change.

CONCLUDING REMARKS

Conclusion

This study aimed to examine the effect of innovative leadership on organizational agility through the mediating role of data analytical adoption among tourism SMEs in Indonesia. The findings demonstrate that innovative leadership is the primary determinant of organizational agility, both directly and indirectly through data analytical adoption. These results suggest that an organization's adaptive capacity is shaped not only by its use of digital technology, but also by leadership that is capable of fostering an innovation-oriented culture and encouraging data-driven decision-making. The study therefore provides evidence that data analytical adoption functions as an important mechanism through which leadership is translated into organizational adaptability.

Theoretical Implications

This study offers several contributions to the application of Dynamic Capabilities Theory. First, it extends the use of the theory by showing that organizational agility in tourism SMEs is influenced not only by digital capability, but also by the capacity of innovative leadership to initiate change and support adaptive responses. This finding strengthens the argument that sensing, seizing, and reconfiguring are not determined solely by organizational resources, but are also influenced by leadership quality in directing digital transformation.

Second, this study addresses the research gap concerning the mechanism linking innovative leadership and organizational agility. In contrast to many previous studies that often treat digital technology as an operational resource, this study shows that data analytical

adoption operates as a capability that connects innovative leadership to enhanced organizational agility. This finding enriches the digital transformation literature by suggesting that data analytics should not be viewed merely as a technological implementation, but as a strategic mechanism through which leadership vision is translated into adaptive organizational capability.

Third, this study contributes empirical evidence from the relatively underexplored context of tourism SMEs in Indonesia. Much of the prior literature has focused on large firms, manufacturing industries, or hospitality organizations in developed economies. By providing evidence from tourism SMEs in a developing country context, this study shows that the relationships among innovative leadership, data analytical adoption, and organizational agility remain relevant even under conditions of resource constraints. In this way, the study broadens the empirical applicability of Dynamic Capabilities Theory to SMEs operating in highly dynamic and digitalized business environments.

Practical Implications

This study offers several contributions to the application of Dynamic Capabilities Theory. First, it extends the use of the theory by showing that organizational agility in tourism SMEs is influenced not only by digital capability, but also by the capacity of innovative leadership to initiate change and support adaptive responses. This finding strengthens the argument that sensing, seizing, and reconfiguring are not determined solely by organizational resources, but are also influenced by leadership quality in directing digital transformation.

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the empirical applicability of Dynamic Capabilities Theory to SMEs operating in highly dynamic and digitalized business environments.

Limitations and Future Research

This study possesses multiple limitations that must be considered when evaluating the results. The cross-sectional design restricts the capacity to observe the temporal evolution of organizational agility and the adoption of data analytics. Subsequent research should utilize longitudinal designs to enhance comprehension of the dynamic interactions between leadership, digital competence, and organizational adaptation.

Second, the study relied on self-reported questionnaire data, which may raise the possibility of common method bias, even though the measurement model demonstrated acceptable validity and reliability. Future research could improve robustness by combining perceptual data with objective indicators, such as operational performance, digital usage records, or firm-level metrics.

Third, this study focused specifically on data analytical adoption as the digital mechanism linking innovative leadership to organizational agility. Future research may expand the model by incorporating other digital capabilities, such as ERP systems, cloud computing, artificial intelligence, or the Internet of Things. In addition, future studies could examine whether organizational agility leads to broader outcomes such as business performance, innovation performance, or organizational resilience. Finally, the generalizability of the findings could be strengthened by testing the model in other sectors characterized by high levels of digital turbulence, such as creative industries, retail, manufacturing, logistics, or healthcare.

REFERENCES

- Ahachmi, M., Brédart, X., & Lahfidi, A. (2025). Financial Determinants of Firm Survival in the Belgian Tourism Sector: Insights for Sustainable and Resilient Futures. In W. Leal Filho, L. Safaa, D. Perkumienė, & M. A. P. Dinis (Eds.), *Tourism and Heritage: Shaping Sustainable and Innovative Futures* (pp. 585–612). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-81485-3_24
- Alnasser, E. M., Alkhozaim, S. M., Alshiha, A. A., Al-Romeedy, B. S., & Khairy, H. A. (2025). Intellectual capital and organisational resilience in tourism and hotel businesses: Do organisational agility and innovation matter? *Current Issues in Tourism*, 28(16), 2649–2669. <https://doi.org/10.1080/13683500.2024.2378970>
- Aryanti, R., & Tjokrosaputro, M. (2024). Faktor yang memengaruhi booking intention pada jaringan hotel berbintang lima di Indonesia. *Jurnal Manajemen Bisnis Dan Kewirausahaan*, 8(4), 921–934. <https://doi.org/10.24912/jmbk.v8i4.31643>
- Bag, S., Gupta, S., Choi, T.-M., & Kumar, A. (2024). Roles of Innovation Leadership on Using Big Data Analytics to Establish Resilient Healthcare Supply Chains to Combat the COVID-19 Pandemic: A Multimethodological Study. *IEEE Transactions on Engineering Management*, 71, 13213–13226. <https://doi.org/10.1109/TEM.2021.3101590>
- Bodolica, V., Spraggon, M., & Saleh, N. (2020). Innovative leadership in leisure and entertainment industry: The case of the UAE as a global tourism hub. *International Journal of Islamic and Middle Eastern Finance and Management*, 13(2), 323–337. <https://doi.org/10.1108/IMEFM-12-2019-0521>

- Bolatan, G. I. S., Golgeci, I., Arslan, A., Tatoglu, E., Zaim, S., & Gozlu, S. (2022). Unlocking the relationships between strategic planning, leadership and technology transfer competence: The mediating role of strategic quality management. *Journal of Knowledge Management*, 26(11), 89–113. <https://doi.org/10.1108/JKM-12-2020-0897>
- Brunner, T. J. J., Schuster, T., & Lehmann, C. (2023). Leadership's long arm: The positive influence of digital leadership on managing technology-driven change over a strengthened service innovation capacity. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.988808>
- Chang, C.-L., & Octoyuda, E. (2024). Driving Digital Transformation: How Transformational Leadership Bridges Learning Agility and Digital Technology Adoption in MSMEs. *Emerging Science Journal*, 8(4), 1583–1601. <https://doi.org/10.28991/ESJ-2024-08-04-020>
- Ciampi, F., Faraoni, M., Ballerini, J., & Meli, F. (2022). The co-evolutionary relationship between digitalization and organizational agility: Ongoing debates, theoretical developments and future research perspectives. *Technological Forecasting and Social Change*, 176, 121383. <https://doi.org/10.1016/j.techfore.2021.121383>
- Comtet, H. E., & Johannessen, K.-A. (2021). The Moderating Role of Pro-Innovative Leadership and Gender as an Enabler for Future Drone Transports in Healthcare Systems. *International Journal of Environmental Research and Public Health*, 18(5). <https://doi.org/10.3390/ijerph18052637>
- Dingler, A., & Enkel, E. (2016). Socialization and innovation: Insights from collaboration across industry boundaries. *Technological Forecasting and Social Change*, 109, 50–60. <https://doi.org/10.1016/j.techfore.2016.05.017>
- Holtzhausen, M. M., & Botha, P. (2019). Combining interventions: An innovative leadership development program. *Journal of Management Development*, 40(3), 240–252. <https://doi.org/10.1108/JMD-06-2019-0280>
- Hussein, H. A., & Ghadi, M. Y. (2025). The impact of innovative leadership and modern technology applications on leadership competencies: The mediating role of technological knowledge. *Industrial and Commercial Training*, 57(4), 456–474. <https://doi.org/10.1108/ICT-09-2024-0095>
- Hussein, H., Albadry, O. M., Mathew, V., Al-Romeedy, B. S., Alsetoohy, O., Kamar, M. A., & Khairy, H. A. (2024). Digital Leadership and Sustainable Competitive Advantage: Leveraging Green Absorptive Capability and Eco-Innovation in Tourism and Hospitality Businesses. *Sustainability*, 16(13). <https://doi.org/10.3390/su16135371>
- Jasim, T. A., Khairy, H. A., Fayyad, S., & Al-Romeedy, B. S. (2024). Digital Leadership And Creative Performance In Tourism And Hotel Enterprises: Leveraging Strategic Agility And Organizational Learning Culture. *GeoJournal of Tourism & Geosites*, 54, 872. <https://doi.org/10.30892/gtg.542spl11-1262>
- Khalil, M. A., Khalil, M. K., & Khalil, R. (2021). Passive but defiant: The role of innovative capabilities in knowledge management and corporate entrepreneurship. *Journal of Entrepreneurship in Emerging Economies*, 14(3), 422–448. <https://doi.org/10.1108/JEEE-08-2020-0300>
- Lee, A., Legood, A., Hughes, D., Tian, A. W., Newman, A., & Knight, C. (2020). Leadership, creativity and innovation: A meta-analytic review. *European Journal of Work and Organizational Psychology*, 29(1), 1–35. <https://doi.org/10.1080/1359432X.2019.1661837>
- Lestari, A. E., Utomo, S. H., Mukhlis, I., & Nugroho, A. (2024). Digital Enabler Promotion Strategy for Tourism Development in Malang City. *Proceeding of International Conference on Finance Business and Banking*. <https://proceeding.uinmataram.ac.id/index.php/icfbb/article/view/42>
- Mawlawi, A., El Fawal, A., & Maaliky, B. (2019). How Employees' Performance in The Lebanese Banking Sector is impacted by Innovative Leaders' Characteristics. *World*, 10(1), 1-12.
- Morawiec, P., & Softysik-Piorunkiewicz, A. (2023). ERP System Development for Business Agility in Industry 4.0—A Literature Review Based on the TOE Framework. *Sustainability*, 15(5). <https://doi.org/10.3390/su15054646>
- Mthabela, T. E. (2015). *Assessing the causal failures of emerging manufacturing SMEs in Johannesburg*. <http://hdl.handle.net/10539/18581>
- Neupane, B. P., Zielinski, S., & Milanes, C. B. (2025). Startup Success in Hospitality & Tourism SMEs in Emerging Economies: How Innovation and Growth Are Driven by Entrepreneurial Orientation, Networking Strategy, Leadership, and Flexibility. *Sustainability*, 17(8). <https://doi.org/10.3390/su17083485>
- Pihie, Z. A. L., Asimiran, S., & Bagheri, A. (2014). Entrepreneurial leadership practices and school innovativeness. *South African Journal of Education*, 34(1), 1–11. <https://doi.org/10.10520/EJC148678>
- Quansah, E., Moghaddam, K., Solansky, S., & Wang, Y. (2022). Strategic leadership in SMEs: The mediating role of dynamic capabilities. *Leadership & Organization Development Journal*, 43(8), 1308–1320. <https://doi.org/10.1108/LODJ-05-2021-0229>

Şen, A., & Eren, E. (2012). Innovative Leadership for the Twenty-First Century. *Procedia - Social and Behavioral Sciences, The First International Conference on Leadership, Technology and Innovation Management*, 41, 1–14. <https://doi.org/10.1016/j.sbspro.2012.04.001>

Sultana, N., & Rahman, M. A. (2012). *Innovative Leadership (People)* (SSRN Scholarly Paper No. 2370863). Social Science Research Network. <https://papers.ssrn.com/abstract=2370863>

Verawati, D. M., Suharnomo, S., & Djastuti, I. (2023). The Role Of Organizational Innovation: A Study Of Tourism Villages In Magelang, Indonesia. *Jurnal Manajemen*, 27(3), 471–492. <https://doi.org/10.24912/jm.v27i3.1403>

Yaiprasert, C., & Hidayanto, A. N. (2026). Interpretable artificial intelligence for travel small and medium-sized enterprises: A threshold-based framework for personalized tourism in Thailand. *International Journal of Information Management Data Insights*, 6(1), 100400. <https://doi.org/10.1016/j.jjimei.2026.100400>

Yang, M., Luu, T. T., & Qian, D. X. (2021). Linking transformational leadership to team service innovation in the hospitality industry: A team-level mediation and moderation investigation. *Journal of Hospitality and Tourism Management*, 49, 558–569. <https://doi.org/10.1016/j.jhtm.2021.11.011>

Zhang, G., Fu, L., & Liang, Y. (2020). The Impact of Cloud Computing Infrastructure Capability on Enterprise Agility: Based on the Perspective of IT Business Alignment. *Proceedings of the 2020 3rd International Conference on Signal Processing and Machine Learning, SPML '20*, 48–55. <https://doi.org/10.1145/3432291.3433642>