

# Driving Sustainable Tourism in Kuching Through Digital Entrepreneurship and Innovation

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## ABSTRACT

The Rapid Digital Transformation Of The Global Tourism Industry Has Positioned Digital Entrepreneurship Defined As The Strategic Deployment Of Digital Technologies To Generate Value As A Key Driver Of Organizational Innovation And Competitiveness (Nambisan Et Al., 2023). However, The Relationship Between Digital Entrepreneurship And Sustained Innovation Remains Underexamined, Especially In Regional Tourism Contexts Where Businesses Face Resource Constraints And Rapidly Evolving Technologies (Zhao & Lucas, 2024). Innovation Sustainability Which Involves An Organization's Capacity To Consistently Develop, Implement And Refine Innovations Across Products, Services, Processes And Business Models (Chen & Kumar, 2025) Integrates Human Expertise And Technological Assets To Enable Ongoing Innovation (Rodriguez Et Al., 2024). In Tourism, Such Continuity Is Crucial For Adapting To Environmental Shifts, Enhancing Competitiveness, And Ensuring Long-Term Resilience (Harsono Et Al., 2024). Kuching, Sarawak Offers A Relevant Case As The Sarawak Digital Economy Blueprint 2030 (Sarawak Multimedia Authority, 2020) Encourages Tourism Businesses To Embrace Digital Entrepreneurship For Sustainable Innovation. While Digital Technologies Can Lower Operational Costs And Improve Customer Engagement (Nambisan Et Al., 2019), Persistent Challenges Such As Limited Infrastructure And Uneven Digital Adoption Continue To Impede Progress (Fuerst Et Al., 2023).

Keywords: Digital Entrepreneurship, Innovation Sustainability, Technology Adoption, Digital Capability, Tourism Sector, Pls-Sem

## INTRODUCTION

### Research Background

The global tourism industry is undergoing rapid digital transformation wherein digital entrepreneurship using digital technologies strategically to create value has emerged as a key driver of organizational innovation and competitiveness (Nambisan et al., 2023). However, despite its growing relevance, the link between digital entrepreneurship and sustained innovation outcomes remains underexplored especially in regional tourism settings where businesses typically contend with limited resources and rapidly evolving technologies (Zhao & Lucas, 2024). Innovation sustainability denotes an organization's capacity to consistently generate, implement and enhance innovations across products, services, processes and business models (Chen & Kumar, 2025), integrating human knowledge and skills with technological resources to support ongoing innovation (Rodriguez et al., 2024). Within the tourism industry, such continuity is critical for adapting to environmental changes, strengthening competitive advantage and ensuring long-term resilience (Harsono et al., 2024). Kuching, Sarawak offers a suitable context for investigating these dynamics, as initiatives like the Sarawak Digital Economy

Blueprint 2030 (Sarawak Multimedia Authority, 2020) encourage local tourism businesses to adopt digital entrepreneurship for sustainable innovation. Although digital technologies can lower operational costs and improve customer engagement (Nambisan et al., 2019), persistent challenges including limited infrastructure and uneven digital adoption continue to impede progress (Fuerst et al., 2023).

## Problem Statement

Innovation sustainability in Kuching's tourism sector is still hampered by a number of interconnected issues such as a comparatively slow adoption of cutting-edge digital tools like artificial intelligence and data analytics compounded by low digital literacy among industry stakeholders (Fuerst et al., 2023; Xu et al., 2022), a lack of digital skills necessary for successful digital transformation despite government efforts (Fernandes et al., 2023), flaws in digital infrastructure such as unreliable internet connectivity that limit the expansion of digital operations (Fuerst et al., 2023) and a persistent reliance on traditional business models that reduce flexibility in an increasingly digital marketplace (Buhalis & Law, 2018). Due to rapidly shifting consumer preferences, technological disruptions and changing global tourism trends, tourism enterprises are under increasing pressure to achieve innovation sustainability which is defined as an organization's capacity to continuously generate and implement innovations that enhance long-term competitiveness and resilience (Bernal-Torres et al., 2021).

Empirical research on how digital entrepreneurship contributes to innovation sustainability is still lacking especially in regional tourism contexts where many small and medium-sized businesses face obstacles related to digital skills, infrastructure constraints and organizational capabilities that may impede digital transformation (Zhang et al., 2025). However, organizations that successfully integrate digital technologies into their operations are better positioned to sustain innovation and adapt to environmental changes. To promote digital transformation across industries including tourism, the Sarawak government introduced the Sarawak Digital Economy Blueprint 2030. However, tourism businesses still face obstacles like uneven digital adoption, low digital literacy and infrastructure issues. Therefore, it is important for practitioners and policymakers to examine the relationship between digital entrepreneurship and innovation sustainability within this regional tourism ecosystem.

## Research Objectives

1. To identify the key dimensions of digital entrepreneurship.
2. To examine how the dimensions of digital entrepreneurship relate to innovation sustainability.
3. To prioritize the digital entrepreneurship dimensions based on their significance for innovation sustainability.

## LITERATURE REVIEW

### Theoretical Foundations

Two theoretical perspectives underpin the understanding of digital entrepreneurship in the tourism industry. The first is Technology Adoption and Diffusion Theory (Rogers, 1961) which explains how individuals and organizations adopt new technologies based on perceived attributes such as relative advantage, compatibility, complexity, trialability and observability. This theory is especially useful for explaining digital technology behavior, as the way organizations adopt and integrate technologies determines whether those technologies foster sustained innovation and improvement (Scuotto et al., 2024). Firms that move beyond simple adoption to effectively embed digital technologies into their operations tend to achieve stronger innovation outcomes. The theory also describes how innovations spread through social systems and how perceived benefits shape adoption decisions among tourism businesses. The second perspective is digital capability theory by Teece (2007) which focuses on the organizational competencies needed to leverage digital technologies for competitive advantage. This view underscores that digital literacy, strategic digital management and the ability to integrate digital tools into operational processes are key drivers of innovation and sustainable organizational performance (Xu et al., 2022). Through such capabilities, firms can identify digital opportunities, reorganize resources, respond to

shifting market conditions, enhance customer engagement, improve operational efficiency and develop innovative services that support long-term sustainability.

### Innovation Sustainability (IS)

Organizational procedures that promote ongoing development and sustained performance improvement are referred to as innovation sustainability (Bernal-Torres et al., 2021). To remain competitive in a changing market, tourism organizations and destinations must continuously enhance their offerings. To fulfil the evolving requirements and expectations, it is possible to accomplish continuous progress in innovation by using new technologies, updating tourism products on a regular basis and streamlining operational procedures. Tourism organizations can promote continuous innovation and improve service quality and customer happiness by enhancing organizational procedures, knowledge systems and day-to-day operations (Sesar, 2024). These enhancements assist the long-term sustainability of tourist places, enable tourism businesses to stay adaptable and boost their competitiveness.

### Digital Entrepreneurship (DE)

Digital Technology Behavior (DTB) involves the proactive use of digital tools to boost operational performance and improve customer engagement (Nambisan, 2023; Fuerst et al., 2023). Digital Entrepreneurship Capability (DEC) refers to an organization’s ability to identify and seize digital opportunities through skills like digital literacy, strategic thinking and effective resource coordination (Xu et al., 2022; Fernandes et al., 2023). Digital Infrastructure (DI) provides the technological backbone for digital operations, including high-speed internet, cloud computing and digital payment systems (Fuerst et al., 2023). Finally, Digital Business Model (DBM) describes how organizations reshape their value creation and delivery using digital technologies which involve changes to value propositions, revenue models and customer interaction methods (Veit et al., 2022; Riasanow et al., 2022).

### Digital Transformation in Tourism

With technologies like digital booking platforms, artificial intelligence, social media marketing and data analytics dramatically changing tourism operations and customer interactions by enabling businesses to increase operational efficiency, personalize services and expand market reach through digital platforms, digital transformation has emerged as a key driver of innovation within the tourism industry (Zhang et al., 2025). Studies have demonstrated that digital technologies can boost tourism competitiveness by enhancing customer experience, lowering operational costs and enabling innovative service delivery. Additionally, the adoption of these digital technologies has facilitated the emergence of digital tourism ecosystems where businesses, customers and digital platforms interact to create value (Sharma & Sharma, 2023). As a result, digital transformation is now a crucial element affecting the competitiveness and sustainability of tourism businesses.

### Conceptual Framework

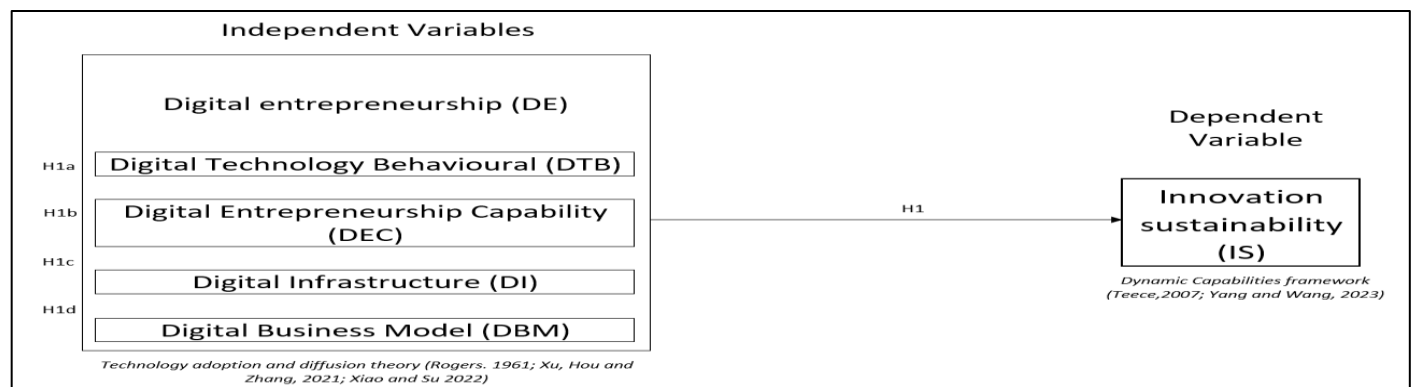


Figure 1: Conceptual framework of independent variables on dependent variable

## RESEARCH METHODOLOGY

This study adopted a quantitative cross-sectional research design, targeting tourism enterprises across nine subsectors in Kuching. A purposive sampling technique was applied based on three criteria which are active use of digital entrepreneurship practices, a minimum operational history of two years and respondent status in managerial or ownership roles. While a prior statistical power analysis indicated a minimum required sample of 150 respondents, a total of 486 valid responses were collected to enhance reliability and analytical robustness. Data were gathered using a structured electronic questionnaire with validated scales measured on a 5-point Likert scale. The analysis employed Partial Least Squares Structural Equation Modelling (PLS-SEM) following a two-step approach encompassing measurement model assessment (evaluating reliability, convergent validity and discriminant validity).

## RESULTS AND FINDINGS

### Respondent Profile

The 486 respondents comprised 247 males (50.8%) and 239 females (49.2%) representing balanced gender representation. Age distribution was diverse from 18-28 years (21.6%), 29-39 years (18.7%), 40-50 years (22.2%), 51-61 years (19.3%) and 62+ years (18.1%). Respondents occupied various roles are from department managers (34.8%), business owners (33.1%) and others (32.1%). Experience levels ranged from less than 3 years (22.4%) to more than 15 years (16.5%) with balanced representation across experience categories.

### Measurement Model Assessment

#### Internal Consistency Reliability

Items	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Digital Business Model (DBM)	0.821	0.906	0.854	0.500
Digital Entrepreneurship Capability (DEC)	0.899	0.977	0.911	0.634
Digital Infrastructure (DI)	0.827	0.868	0.871	0.539
Digital Technology Behavior (DTB)	0.883	0.887	0.913	0.639
Innovation Sustainability (IS)	0.779	0.855	0.85	0.593

Table 1: Cronbach's alpha, composite reliability, and AVE

#### Convergent Validity

Average Variance Extracted (AVE) values for all constructs exceeded the minimum threshold of 0.50, confirming adequate convergent validity (Fornell & Larcker, 1981). DI demonstrated the highest AVE (0.683), followed by DTB (0.639), DEC (0.627), IS (0.591) and DBM (0.547).

## Structural Model Assessment

### Direct Relationships

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation	P Values
IS ← DBM	0.515	0.519	0.019	0.000
IS ← DEC	0.368	0.374	0.026	0.000
IS ← DI	0.526	0.530	0.024	0.000
IS ← DTB	0.599	0.601	0.023	0.000

Table 2: Direct relationships bootstrapping results

Digital Technology Behavior (DTB) demonstrated the strongest direct effect on Innovation Sustainability ( $\beta = 0.599$ ,  $p < 0.001$ ), followed by Digital Infrastructure (DI:  $\beta = 0.526$ ,  $p < 0.001$ ), Digital Business Model (DBM:  $\beta = 0.515$ ,  $p < 0.001$ ) and Digital Entrepreneurship Capability (DEC:  $\beta = 0.368$ ,  $p < 0.001$ ).

### Explanatory Power ( $R^2$ )

The  $R^2$  value for Innovation Sustainability was 0.603, indicating that the model explains 60.3% of the variance in the dependent variable. This exceeds the threshold of 0.50 for moderate explanatory power and approaches the substantial range (Hair et al., 2022).

### Effect Sizes ( $f^2$ )

Path	$f^2$	Effect Size
DEC → IS	0.35	Large
DBM → IS	0.22	Medium
DTB → IS	0.20	Medium
DI → IS	0.12	Small

Table 3: f-squared effect sizes

### Summary of Hypotheses Testing

Hypothesis	Path	Result
H1a	DTB → IS	Supported
H1b	DEC → IS	Supported
H1c	DI → IS	Supported
H1d	DBM → IS	Supported

Table 4: Summary of hypotheses results

### Ranking of Digital Entrepreneurship Dimensions for Innovation Sustainability

Digital Entrepreneurship Dimensions	Coefficient	Rank
Digital Business Model (DBM)	0.415	1

Digital Infrastructure (DI)	0.283	2
Digital Entrepreneurship Capability (DEC)	0.185	3
Digital Technology Behaviour (DTB)	0.114	4

Table 5: Standardized Coefficients and Ranking of Digital Entrepreneurship Dimensions for Innovation Sustainability

## DISCUSSION

The results show that digital entrepreneurship significantly supports innovation sustainability in tourism enterprises with Digital Technology Behavior emerging as the strongest predictor, indicating that sustained innovation depends on effectively integrating digital technologies into daily operations rather than mere adoption. This finding supports Technology Adoption and Diffusion Theory and aligns with Dynamic Capabilities Theory as digital technology behavior reflects an organization’s ability to sense and respond strategically to change. Digital Infrastructure also exhibits a strong influence by enabling reliable systems like online booking and digital payments. Digital Business Model innovation further enhances sustainability by redesigning value creation and service delivery while Digital Entrepreneurship Capability plays a supporting role in strengthening managerial coordination of digital resources. Overall, digital entrepreneurship is a multidimensional construct whose components contribute to innovation sustainability through distinct mechanisms.

The findings offer several practical implications for tourism businesses and policymakers. Tourism enterprises should actively integrate digital technologies into daily operations to boost innovation capacity and invest in digital infrastructure to support transformation initiatives. They should also redesign business models to leverage digital platforms for service delivery and customer engagement. Meanwhile, policymakers should continue supporting digital transformation efforts like the Sarawak Digital Economy Blueprint by providing training programs, digital infrastructure investments and financial support for tourism enterprises.

This study has several limitations. First, cross-sectional design limits examination of long-term causal relationships between digital entrepreneurship and innovation sustainability, future studies could adopt longitudinal approaches. Reliance on self-reported survey data may introduce response bias and future research could incorporate multiple data sources such as interviews or organizational performance data.

## CONCLUSION

This study investigates how digital entrepreneurship contributes to innovation sustainability in Kuching’s tourism sector. The results indicate that all four dimensions are Digital Technology Behavior (DTB), Digital Entrepreneurship Capability (DEC), Digital Infrastructure (DI) and Digital Business Model (DBM) significantly affect innovation sustainability. DTB was the strongest predictor, followed by DI and DBM, while DEC showed a moderate influence. The model explains a large portion of the variance in innovation sustainability demonstrating strong explanatory power. Theoretically, the study extends existing frameworks by highlighting the need to integrate digital technologies into organizational practices, supported by robust infrastructure and business model innovation. Practically, tourism businesses should focus on strategic digital adoption, strengthening infrastructure and developing innovative business models. Policymakers should continue to promote digital development initiatives and offer capacity-building programs to support digital transformation in tourism. Ultimately, achieving innovation sustainability requires a coordinated approach that blends digital capabilities, technological infrastructure and supportive organizational practices.

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