ISSN 1648-0627 / eISSN 1822-4202

VILNIUS TECH
Vilnius Gediminas Technical University

BUSINESS: THEORY & PRACTICE

2026
Volume 27
Issue 1
Pages 156–167
https://doi.org/10.3846/btp.2026.25652

THE ROLE OF STRATEGIC MANAGEMENT ACCOUNTING IN DIGITAL CAPABILITIES AND COMPETITIVE ADVANTAGE IN THE TOURISM INDUSTRY

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Article History:
- received 25 December 2025
- accepted 31 March 2026

Abstract. This research investigates the extent to which the essential aspects of digital capabilities like Big Data Analytics (BDA), Digital Competence (DCT), and Quality of Information Technology (QIT) influence Strategic Management Accounting (SMA) and Competitive Advantage (CA) in Vietnamese tourism businesses. Data were gathered from 474 tourism businesses in Ho Chi Minh City, Vietnam, and analyzed using PLS-SEM. The results indicate, the three elements of digital capability have significant positive impacts on both SMA and CA, while SMA itself exerts a strong positive impact on CA. Furthermore, DCT serves as the strongest determinant of SMA. Additionally, mediating analyses indicate, SMA mediates the relationships between digital capabilities and CA, suggesting digital capabilities are a greater source of competitive returns when they are integrated into SMA. The results underline SMA as an important process for turning digital capability into better performance. This research contributes to the current literature by integrating digital capabilities and SMA in an investigation of the tourism industry. It presents a capability-to-advantage chain from BDA/DCT/QIT → SMA → CA. In practical terms, the results suggest that Vietnamese tourism businesses should invest in BDA, DCT, and IT infrastructure and institutionalize SMA routines to sustain CA in an increasingly digitized era.

Keywords: competitive advantage, digital capabilities, big data analytics, digital competence, quality of information technology, strategic management accounting, Vietnamese tourism.

JEL Classification: M41, M15, L83, O33.

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1. Introduction

With the fast improvement of digital technologies, digital capabilities such as BDA, DCT, and QIT are essential driving forces of growth, especially in the tourism field. The ability to obtain data, enhance digital abilities, and develop high-performing information technology (IT) infrastructure is crucial to prepare tourism businesses for responding to customer fluctuations amid a fast-changing business environment (Ghasemaghaei et al., 2018; Schönherr et al., 2023). Digital capabilities are altering the way of doing business in tourism; they also strengthen the efficiency of business operation and the agility of business (Schönherr et al., 2023). Furthermore, investment in digital capabilities is positively associated with business performance, leading to the optimal enhancement of operational excellence and the improvement of competitive position of business (Liu et al., 2024; Schönherr et al., 2023).

BDA has emerged as a critical strategic capability used by businesses to understand large, diverse and complex data sets (Yallop & Seraphin, 2020). In tourism business, BDA is utilized to enhance demand forecasting, improve efficiency, and implement evidence-based strategic decision-making (Gunasekaran et al., 2017; Wamba et al., 2015). In management accounting, BDA is relevant because it can lead to enhancements in SMA since it extends the data availability, timeliness, and predictive power of intelligence that supports decision-making for some strategic purpose (Abdelhalim, 2024; Thanasas & Kampiotis, 2024). Results from tourism businesses suggest the positive influence of BDA on business performance, and CA (Mariani & Baggio, 2022; Yallop & Seraphin, 2020).

DCT is defined as the capacity of a business and workforce to utilize digital technologies that enhance business productivity and customer service. Furthermore, DCT play a major role in enabling businesses to improve analytical ability, the quality of managerial information and responses to market pressures (Falloon, 2020; Perifanis & Kitsios, 2023). Other empirical studies also reported, DCT enhances management accounting competence and competitive results in the tourism industry (Huu, 2023; Kraus et al., 2022).

QIT is a foundational technological framework for the effective use of analytical tools, integration of different types of data, and strategic management (Law et al., 2009). High QIT systems that are reliable, secure, and integrated reduce information inconsistency, help to manage processes efficiently and also help the management of market fluctuation (Alkhabbas et al., 2025). With tourism involving different data flows and customer interactions becoming ever more digital, QIT facilitates real-time analysis and decision-making in this sector.

SMA provides a bridge, linking BDA, DCT, and QIT insights. SMA is converting financial and non-financial data related to customers, competitors, and market trends into forward-looking, outward-looking information that aids long-term planning, performance evaluations, and strategic decisions (Ditkaew, 2023). The increasing dependence of tourism businesses on big datasets and modern IT systems, ensures that SMA contribution to digital capabilities by operationalization at sustainable CA level of tourism businesses into practicable strategies is indeed critical (Ditkaew, 2023).

While the strategic implications of BDA, DCT and QIT are established, very little empirical research has been conducted on how the combination of these three capabilities influences SMA, and thus also CA, particularly in emerging economies. The tourism industry in Vietnam that has grown rapidly, accelerated digitalization and faced challenges related to digital capacity and IT systems, is a sound scenario to investigate these relationships. Taking into account the scenario, the aims of this research are to: 1) evaluate the impact of BDA, DCT, and QIT on SMA and CA in Vietnamese tourism institutions; 2) analyze the mediating role of SMA in transforming digital abilities to competitive benefits; and 3) provide managerial implications for businesses in tourism to ensure optimized digital strategies and effective investment in IT infrastructure for SMA.

The study makes a theoretical contribution by illustrating how BDA, DCT, and QIT, when taken together, improve SMA and strategic significance in an emergent economy, elucidating a mediating mechanism of SMA's conversion of digital capabilities into sustainable CA and providing useful insights for policy-makers and tourism industries to speed up digital transformation and improve the effectiveness of strategic management. This study contributes intellectually by demonstrating how BDA, DCT, and QIT cooperate to enhance SMA and its strategic significance in emergent industries, sheds light on the mediational mechanism of SMA translation from digital capabilities into sustainable CA, making a significant contribution to the policy-makers' and tourism industries' agenda to accelerate digital transformation and boost the effectiveness of strategic management.

2. Theoretical framework

Dynamic Capabilities Theory recommends that sustainable competitive advantage is derived not only from the possession of valuable resources at the firm level (Teece et al., 1997), but also from integrating, building, and restructuring internal and external resources to meet the demands of the rapidly changing environment. Based on the Resource-Based View, Dynamic Capabilities Theory suggests that the main basis of a business's competitive advantage is its management and organizational processes, which allow businesses to recognize environmental changes, grab new opportunities, and restructure their resource base accordingly (Teece, 2007, 2014). From this perspective, resources and technologies only create strategic value when they are effectively coordinated through dynamic management processes (Otley, 2016).

In a digitally intensive context, digital capabilities are seen as foundational or supporting capabilities. The strategic value of these capabilities depends on how they are managed and deployed within the organization. Digital capabilities do not inherently constitute dynamic capabilities. Instead, they enhance the information processing capacity and technological readiness of the enterprise. These capabilities need to be leveraged through appropriate organizational mechanisms to support strategic adaptation (Teece, 2014; Warner & Wäger, 2019).

In this study, SMA is conceptualized as a dynamic management capability, which functions as an organizational mechanism for transforming DCT into strategic decisions and coordinated actions. Through the integration of financial and non-financial information, SMA supports processes of identifying, capturing, and restructuring resources, consistent with the core logic of Dynamic Capabilities Theory (Helfat & Martin, 2015; Teece, 2007).

2.1. The effects of big data analytics

Dynamic Capabilities Theory posits that sustainable competitive advantage stems not only from a company's possession of advanced resources or technology, but more importantly from its ability to integrate, coordinate, and restructure those resources to adapt to a changing business environment (Teece, 2007; Teece et al., 1997). In this context, BDA is considered a fundamental capability, enabling businesses to expand their ability to collect, process, and analyze large volumes of heterogeneous data from various sources.

BDA creates timely information and precise signals from the business context, thus increasing the capability of managers to early recognize customer preferences, market trends, and competitor actions (Mikalef et al., 2019, 2020). For tourism and other related industries, demand is seasonally and digitally driven, and business analysis assists with better demand prediction and decisions made in a timely manner. Various empirical studies demonstrated that BDA promotes operational efficiency, fosters creativity, and facilitates adaptive business policies (Ghasemaghaei et al., 2018; Rialti et al., 2019; Kraus et al., 2022).

However, the results obtained from data analysis do not automatically translate into superior performance or competitive advantage. The strategic value of BDA

depends on whether these analytical results are integrated into management decision-making processes to guide and coordinate the strategic actions of the business (Teece, 2007; Mikalef et al., 2020). Therefore, BDA only truly creates value when operated through organizational mechanisms that allow information to be transformed into concrete decisions and actions.

Furthermore, SMA serves as an organizational mechanism through which insights generated by BDA are incorporated into strategic planning, performance evaluation, and resource allocation. Rather than creating value independently, BDA enhances decision quality when its analytical outputs are embedded within SMA processes that align market, customer, and competitor information with strategic objectives (Cadez & Guilding, 2008).

In the context of the tourism industry, SMA, supported by BDA, helps businesses improve strategic planning, profit analysis and customer segmentation, competitor comparison, and real-time performance monitoring, thereby supporting the adjustment and restructuring of organizational resource utilization (Abdelhalim, 2024; Franke & Hiebl, 2023; Leitner-Hanetseder et al., 2021). Furthermore, integrating BDA into management accounting practices can enhance the analytical capabilities of accountants and promote the transition from traditional management accounting to a more outward-oriented and long-term strategic management accounting (Moll & Yigitbasioglu, 2019).

Thus, BDA is not a direct source of competitive advantage, but rather a foundational capability that needs to be operated through dynamic management processes. In this study, SMA is conceptualized as a mechanism that allows the transformation of insights gained from BDA into strategic decisions and actions, thereby contributing to enhancing the competitive advantage of tourism businesses. Overall, the current study suggests the following hypotheses:

H1: BDA positively affects SMA in the tourism industry.

H2: BDA positively affects CA in the tourism industry.

2.2. The effects of digital competence

DCT reflects the ability of businesses and human resources to understand, use, and effectively leverage digital technologies, data, and digital tools to support business operations and strategic decisions. DCT is not limited to technological infrastructure but also includes digital knowledge, analytical thinking, data processing and interpretation skills, as well as the ability to create, evaluate, and use information through digital tools to interact with the market and meet customer needs (Porter & Heppelmann, 2014; Abdelhalim, 2024; Busulwa et al., 2025). Within the framework of Dynamic Capabilities Theory, DCT is considered a fundamental digital capability, reflecting a company's readiness to adopt and utilize digital technology; however, it does not inherently constitute a dynamic capability.

In the evolving digital business environment, DCT enables businesses to enhance their ability to sense and seize the opportunities of the digital space by optimally utilizing digital platforms, online channels, and real-time information. For Vietnamese tourism organizations, which are highly seasonally sensitive, face frequent demand changes, and are constantly turning into more connected Internet and social media platforms, DCT enables accurate demand forecasting, dynamic pricing of seasonally based products, optimal use of capacity, and improvement of customer experience across various digital touchpoints (Amirulloh et al., 2024; Kane et al., 2015; Porter & Heppelmann, 2014). Digital capabilities (DCT), alongside, also supports automation in reservation systems, distribution channel management, and supply chain coordination, manage cost and improve operational efficiency (Sungthong et al., 2025).

However, consistent with the core logic of Dynamic Capabilities Theory, digital capabilities do not automatically translate into sustainable competitive advantages. The strategic value of DCT depends on the ability of businesses to transform digital skills, knowledge, and information into effectively coordinated strategic decisions and actions at the organizational level (Helfat & Martin, 2015). Without appropriate governance mechanisms, DCT remains merely a supporting capability, struggling to create long-term strategic impact.

Within this framework, SMA provides the structural platform through which DCT is translated into effective strategic analysis and coordinated managerial actions. By integrating digital knowledge and operational data with financial information, SMA enhances the business's ability to adjust strategies, improve resource allocation, and fully leverage digital skills across functional areas (Chotia et al., 2025; Imjai et al., 2023). This process clearly reflects the mechanism of resource integration and restructuring, which is the theoretical foundation of Dynamic Capabilities Theory.

Thus, DCT is not a direct source of competitive advantage but rather a fundamental digital capability that needs to be operated through dynamic management processes. In this study, SMA is considered a mechanism that allows the transformation of digital competence into strategic decisions and actions, thereby contributing to enhancing the competitive advantage of Vietnamese tourism businesses. Based on the preceding theoretical arguments, the study proposes the following hypotheses:

H3: DCT has a positive effect on SMA in the tourism industry.

H4: DCT will positively affect CA in the tourism industry.

2.3. The effects of quality of information technology

QIT is one of the crucial abilities, which reflects the reliability, integration, and accessibility of information systems for business operations and strategic activities (Melville et al., 2004). QIT extends to more than the technical facility; it

also covers the accuracy, timeliness, and consistency of information that the business provides to the management at all levels.

High QIT facilitates the efficient gathering, integration, analysis, and recall of internal and external data, enhancing the quality of decision-making and reactiveness to market changes. In the tourism industry, where the operations are highly dependent on integrated booking, pricing, and customer management programs, QIT offers its potential as a technology for achieving real-time information consistency and accuracy (Ahmad & Mohamed Zabri, 2015). As Cadez and Guilding (2012) argued, a good IT system is an essential condition for businesses to efficiently implement advanced strategic management accounting practices.

However, similar to other digital capabilities, QIT does not inherently create a sustainable competitive advantage. The strategic value of QIT depends on whether it is integrated into management processes that allow businesses to coordinate and restructure resources (Teece, 2014). Without appropriate management capabilities and organizational mechanisms, the benefits gained from QIT are unlikely to be sustained in the long term (Bhatt & Grover, 2005).

Similarly, SMA enables firms to capitalize on the Quality of Information Technology (QIT) by embedding reliable, timely, and integrated information into forecasting, planning, and control processes. Through SMA, high-quality IT systems contribute to improved strategic responsiveness and more effective resource reconfiguration, reflecting the resource integration logic of Dynamic Capabilities Theory (Hyvönen, 2007). Thus, QIT supports competitive advantage not directly, but through SMA as a coordinating mechanism that transforms technological infrastructure into actionable strategic outcomes. Accordingly, the study proposes the following hypotheses:

H5: QIT enhances SMA in the tourism industry.

H6: QIT strengthens CA in the tourism industry.

2.4. The effects of strategic management accounting

Within the framework of Dynamic Capabilities Theory, SMA is conceptualized as a dynamic management capability, enabling businesses to continuously adjust strategic decisions and restructure resources to adapt to changes in the business environment. Unlike traditional management accounting, which primarily focuses on short-term performance, SMA emphasizes long-term orientation by integrating financial and non-financial information related to operations, markets, customers, and competitors (Cadez & Guilding, 2008; Oyewo, 2022).

From this theoretical perspective, SMA supports the identification of strategic information from internal and external environments by systematically collecting and analyzing it, helping managers to promptly detect changes in market demand and the competitive environment. Simultaneously, SMA supports seizing opportunities by providing an information base for strategic planning, forecasting, valuation, and evaluation of investment decisions.

In addition, SMA is more critical than any other approach for restructuring because it helps to reallocate resources as well as reformulate management processes to ensure strategic alignment in a volatile environment. SMA also plays a significant role in strengthening risk management practices and enhancing organizational resilience, particularly under conditions of uncertainty and crisis (Eichholz et al., 2024; Kalogiannidis et al., 2024). In Vietnam's tourism industry, which is characterized by high seasonality of activities, high variability in demand, and a high level of competition, SMA is particularly important. SMA practices contribute to the improvement of decision-making quality, risk management and strategic flexibility among businesses, supporting sustainable performance and competitive advantage (Hiebl, 2024; Oyewo, 2022). Therefore, in this study, SMA is not approached only as an accounting information system, but as a functional organizational mechanism through which strategic information is transformed into management decisions and operations relevant to a changing business environment. Thus, the current study posits the following hypothesis:

H7: SMA is positively associated with CA in the tourism industry.

2.5. The mediation of strategic management accounting

According to Dynamic Capabilities Theory, digital capabilities do not automatically create strategic value or sustainable competitive advantage if they exist only as individual technological tools or systems. The value of these capabilities is only realized when businesses are able to integrate, coordinate, and restructure resources through appropriate management processes to adapt to a changing business environment (Teece, 2007, 2014; Teece et al., 1997). Therefore, possessing digital capabilities such as BDA, DCT, and QIT is a necessary but not sufficient condition for creating a competitive advantage in tourism businesses.

Building on Dynamic Capabilities Theory, SMA acts as a mediating mechanism through which digital capabilities are transformed into competitive advantage. By integrating digital inputs with strategic analysis and coordinated decision-making processes, SMA enables businesses to convert technological and informational resources into structured strategic responses. Accordingly, digital capabilities enhance competitive advantage to a greater extent when they are embedded within SMA processes that facilitate opportunity identification, strategic selection, and resource reconfiguration (Cadez & Guilding, 2008; Oyewo, 2022).

Specifically, digital capabilities expand the scope, quality, and timeliness of information used in SMA practices. BDA enhances forecasting capabilities, customer analysis, and competitor monitoring, thereby supporting the identification and evaluation of strategic opportunities

(Mikalef et al., 2019; Rialti et al., 2019). Digital capabilities strengthen the ability of managers and accountants to interpret and apply digital information to strategic analysis and management decision-making (Porter & Heppelmann, 2014; Kane et al., 2015). Simultaneously, QIT ensures the reliability, integration, and real-time access to information, facilitating the consistent and effective implementation of advanced SMA practices (Melville et al., 2004; Cadez & Guilding, 2012).

However, only when these digital inputs are systematically integrated through SMA are they translated into coordinated strategic decisions and corrective actions at the organizational level. Following this logic, SMA acts as an intermediary mechanism, transmitting the impact of digital capabilities on competitive advantage. This argument is consistent with previous research in the fields of management accounting and information systems, showing that investment in technology only creates sustainable value when linked to management capabilities that enable businesses to flexibly coordinate and restructure resources (Bhatt & Grover, 2005; Moll & Yigitbasioglu, 2019). Therefore, SMA is expected to indirectly transform the impact of BDA, digital capabilities, and QIT into a competitive advantage in tourism businesses. Building on the above theoretical arguments, the study proposes the following intermediate hypotheses:

H8a: SMA mediates between BDA and CA in the tourism industry.

H8b: SMA mediates between DCT and CA in the tourism industry.

H8c: SMA mediates between QIT and CA in the tourism industry.

2.6. Research model

Overall, these propositions indicate that digital capabilities not only add directly to CA but also contribute to SMA-related effects. In this regard, the pre-established hypotheses laid a theoretical basis for the research model. Based on the literature that has been considered, given the theory developed, the next research model could be generated (Figure 1).

3. Methodology

3.1. Data collection

This study uses a quantitative design to empirically test the proposed model, analyzing the impact of BDA, DCT, and QIT on the adoption of SMA and CA in the context of the Vietnamese tourism industry. According to the research framework, SMA is assumed to act as an intermediary between digital competencies and the competitive advantage of businesses. Primary data were collected from tourism businesses operating in Ho Chi Minh City, including travel agencies, hotels, restaurants, and other tourism service providers. The survey subjects were middle and senior managers, including directors, department heads, and individuals directly involved in management and strategic decision-making within the businesses. The selection of research subjects aimed to ensure that respondents possessed a comprehensive understanding of technology systems, strategic management accounting practices, and the competitive position of the business at the organizational level. The study employed purposive and convenience sampling to reach managers who were suitable for the research objectives and willing to participate in the survey. The questionnaire was distributed online via Google Forms and sent to respondents via email and official business contact channels within the tourism industry. Data collection was conducted between May 2024 and December 2024. A total of 474 valid questionnaires were collected and used for data analysis. This sample size exceeds the minimum recommended for PLS-SEM analysis and ensures sufficient statistical power for testing direct and mediating relationships in the research model (Hair et al., 2021). The study was conducted in full compliance with ethical principles in scientific research. Respondent participation was entirely voluntary, information was kept confidential, and participants were clearly informed of their right to withdraw from the study at any time.

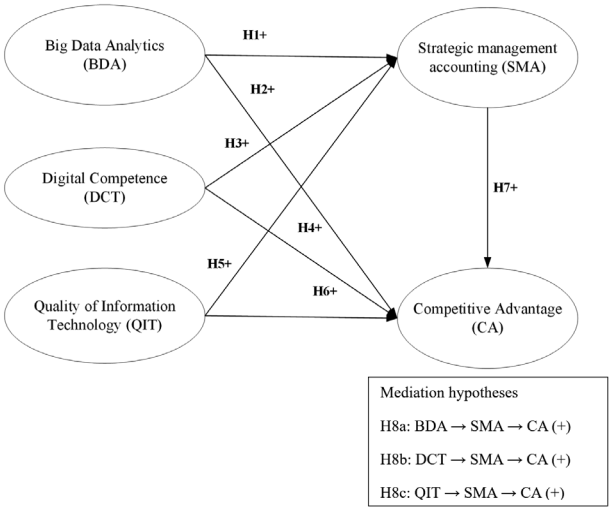

Figure 1. Research model

3.2. Measurement instruments

Before official implementation, the questionnaire was reviewed and preliminarily tested by academic experts to ensure clarity and relevance to the Vietnamese tourism context. The survey tool was developed and adapted based on existing scales in the literature, while also being culturally adapted to the Vietnamese tourism context. Specifically, (1) Big Data Analytics (BDA) is measured by 5 items (BDA1–BDA5) adapted from Ciampi et al. (2021); (2) Digital Technology Competence (DCT) is measured by 6 items (DCT1–DCT6) modeled after Imjai et al. (2023); (3) Quality of Information Technology (QIT) consists of 4 items (QIT1–QIT4); (4) Strategic Management Accounting (SMA) is measured by 8 items

(SMA1–SMA8) according to Oyewo (2022); and (5) Competitive Advantage (CA) is measured by 5 items (CA1–CA5) modeled after Ditkaew (2023). All constructs are operated as reflection scales, using a 5-point Likert scale from 1 ("strongly disagree") to 5 ("strongly agree"). The operational definitions of the constructs, along with their corresponding sources, are presented in Table 1.

3.3. Data analysis technique

All data were subjected to the PLS-SEM, which is well suited for theory development, complex causal models, and data that fail to meet strict assumptions of normality. Analysis was conducted in two stages (Hair et al., 2021). The measurement model was assessed first through indicator loadings, internal consistency reliability (Cronbach's α and Composite Reliability), convergent validity (Average Variance Extracted, AVE), and discriminant validity with the Fornell–Larcker criterion and Heterotrait–Monotrait ratio (HTMT). Second, the structural model was evaluated quantitatively by multicollinearity (Variance Inflation Factor, VIF), path coefficients, coefficients of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2) using the blindfolding process. Predictive performance was even further analyzed with PLSpredict. Model fit was confirmed by reference to standardized root mean square residual (SRMR), and the normed fit index (NFI).

Hypotheses H1–H7 were tested theoretically with a large number of resamples using bootstrapping procedure to assess whether or not there was direct effect between BDA, DCT, QIT, SMA and CA. To test mediation hypotheses (H8a–H8c), SMA was established as a mediating variable in the connection between (i) BDA and CA, (ii) DCT and CA, and (iii) QIT and CA. The mediation effects were investigated following the recommendations by Sobel (1982) and Baron and Kenny (1986). This methodology allows for an examination of both direct and indirect effects, which generates greater understanding of the interplay between digital capabilities, SMA, and CA.

4. Results

4.1. Sample characteristics

The study used 474 complete survey responses from the managers of tourism businesses in Ho Chi Minh City, the largest centre of tourism and services in Vietnam. In the type of work done, 83.4% were limited liability businesses, 15.6% joint-stock businesses, 0.6% private businesses and 0.4% joint ventures, attesting to the predominant role played by the SMEs in the industry. Based on the investment capital size, 85.4 percent obtained charter capital under 50 billion VND and it reflects the limited resources characteristic of the majority of Vietnamese tourism businesses.

4.2. Model fit

The overall model fit shows that the proposed framework is suitable to explain digital capability–performance relationships under the Vietnamese tourism context. The SRMR = 0.044 is less than the proposed highest 0.08, indicating a closer fit to the obtained data and estimated correlations by the model. These support acceptable global model fit as d_ULS (0.784) & d_G (0.293). These findings indicate that the model has a predictable representation of how digital capabilities, SMA and CA interconnect in the dynamic and uncertain environment of Vietnam (Table 2).

Table 2. Goodness of fit (source: Authors, 2024)

	Saturated Model	Estimated Model	
SRMR	0.044	0.044	SRMR
d_ULS	0.784	0.784	d_ULS
d_G	0.293	0.293	d_G

Table 1. Operational definitions of constructs

Construct	Operational Definition	Source
Big Data Analytics (BDA)	Big Data Analytics is operationalized as the extent to which a firm uses advanced data analytics tools and techniques to collect, process, and analyze large volumes of data in order to support managerial and strategic decision-making.	Ciampi et al. (2021); Mikalef et al. (2019)
Digital Competence (DCT)	Digital Competence is operationalized as the extent to which a firm and its employees possess the knowledge, skills, and ability to understand, use, and effectively apply digital technologies and digital information to support managerial activities and strategic decisions.	Imjai et al. (2023); Kane et al. (2015); Porter and Heppelmann (2014)
Quality of Information Technology (QIT)	Quality of Information Technology is operationalized as the degree to which a firm's information technology systems are reliable, well-integrated, and provide timely and accurate information that supports managerial coordination and decision-making processes.	Melville et al. (2004); Bhatt and Grover (2005); Cadez and Guilding (2012)
Strategic Management Accounting (SMA)	Strategic Management Accounting is operationalized as the extent to which a firm systematically uses financial and non-financial accounting information related to customers, competitors, and internal operations for strategic planning, control, and decision-making.	Cadez and Guilding (2008); Oyewo (2022)
Competitive Advantage (CA)	Competitive Advantage is operationalized as managers' perceptions of their firm's relative superiority in performance, cost efficiency, and market responsiveness compared to key competitors.	Ditkaew (2023); Ravichandran et al. (2005)

4.3. Measurement model and factor analysis

The constructs' measurement properties were evaluated through factor analysis (Table 3). The loadings of items are between 0.741 and 0.870, significantly over the recommended threshold of 0.70 (Hair et al., 2021), confirming their good convergent validity. BDA items (BDA1–BDA5): 0.764–0.870, confirming high measurement reliability. DCT items (DCT1–DCT6): 0.746–0.860, indicating the reliability of the measurement of the digital transformation capabilities. QIT items (QIT1–QIT4): 0.816–0.851, reflecting robustness. SMA items (SMA1–SMA8): 0.741–0.831, complying with PLS-SEM standards. CA items (CA1–CA5): 0.784–0.837, consistent with reproducible measurements. All items are kept for subsequent structural analysis.

The high loadings for DCT items also indicate that DCT is a necessary skill in an industry where digital marketing channels play key roles. The high loadings of the QIT items confirm the significant contribution of IT systems for tourism data. Similarly, SMA items reflect high loadings, meaning Vietnamese tourism businesses are leaning toward strategic accounting practices to mitigate heavy competition and change in demand. The CA items represent excellent reliability within Vietnam's tourism market.

The results of construct validity and convergent validity using PLS-SEM were presented in Table 4. The Cronbach's alpha values of all constructs (BDA, DCT, QIT, SMA and CA) obtain above the cut off of 0.7 (0.858 and 0.910), showing acceptable internal consistency reliability. The Composite Reliability values (rho_a and rho_c) are both greater than 0.7, indicating a high level of consistency among the items of each construct. All constructs exhibit Average Variance Extracted (AVE) values greater than 0.5 (0.614 to 0.701), suggesting that greater than 50% of the variance in its indicators is explained by one construct. Taken together, such results attest to sufficient reliability and converging validity of the measurement scales and thus internal consistency and convergent validity. The results of Heterotrait–Monotrait Ratio (HTMT) are reported in Table 5. The HTMT values between the construct pairs and within each other are significantly lower than the 0.85 preferred threshold, recommended by Hair et al. (2021). This is significant for Vietnamese tourism, as digital prowess, accounting procedures, and CA in this context are also related. Hence, the measurement model possesses adequate discriminant validity.

The multicollinearity and effect size analysis is tabulated in Table 6. All VIF values are under 5 (1.114–1.912), indicating no serious multicollinearity between the independent variables. The effect size analysis reveals that DCT → SMA (f^2 = 0.375) has the highest effect, highlighting the essential effect of digital skills on enhancing strategic accounting in Vietnamese tourism businesses. Other effects are less pronounced, but meaningful, and are consistent with the stepwise characteristic of a digital transformation in emerging economies.

Table 3. Indicator loadings of the measurement model (source: Authors, 2024)

Constructs	Indicator	Loading
BDA		0.827
	BDA1	0.870
	BDA2	0.839
	BDA3	0.843
	BDA4	0.764
	BDA5	0.817
DCT		0.831
	DCT1	0.851
	DCT2	0.860
	DCT3	0.850
	DCT4	0.844
	DCT5	0.833
	DCT6	0.746
QIT		0.837
	QIT1	0.851
	QIT2	0.840
	QIT3	0.816
	QIT4	0.842
SMA		0.783
	SMA1	0.741
	SMA2	0.776
	SMA3	0.746
	SMA4	0.762
	SMA5	0.799
	SMA6	0.815
	SMA7	0.795
	SMA8	0.831
CA		0.814
	CA1	0.796
	CA2	0.833
	CA3	0.784
	CA4	0.822
	CA5	0.837

Table 7 reports R^2 and adjusted R^2. The model explains 47.7% of the variance of SMA and 46.5% of the variance of CA, which suggests a moderate-to-strong level of explanatory power. In general, the independent variables explain the dependent variables to a large extent in accordance with the evaluation of the PLS-SEM model (Hair et al., 2021).

Table 8 presents the results of direct relationship analysis, using path coefficients (β), t-statistics, and p-values to test the causal hypotheses. All hypothesized causality is substantiated, i.e., significant impacts of BDA, DCT, and QIT on SMA and CA. H1: BDA → SMA — β = 0.232, t = 5.341, p < 1%. This supports the notion of how BDA improves SMA and emphasizes how data-informed insights facilitate

making strategic accounting decisions. H2: BDA → CA, β = 0.136, t = 3.374, p < 1%. The direct positive impact of firm-wide internal processes to firm performance is also stressed by the fact that BDA is significantly contributing.

4.4. Construct reliability and convergent validity

Table 4. Construct reliability and convergent validity (source: Authors, 2024)

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
BDA	0.885	0.893	0.915	0.684
DCT	0.910	0.912	0.931	0.692
QIT	0.858	0.858	0.904	0.701
SMA	0.910	0.910	0.927	0.614
CA	0.873	0.874	0.908	0.664

4.5. Discriminant validity

Table 5. HTMT Values (source: Authors, 2024)

Constructs		Heterotrait-Monotrait Ratio (HTMT)			
	BDA	DCT	QIT	SMA	CA
BDA					
DCT	0.294				
QIT	0.305	0.445			
SMA	0.454	0.683	0.488		
CA	0.531	0.435	0.691	0.597	

4.6. Multicollinearity and effect size

Table 6. VIF and effect size (source: Authors, 2024)

Relationship	VIF	f^2
BDA → SMA	1.217	0.093
DCT → SMA	1.684	0.375
QIT → SMA	1.282	0.049
BDA → CA	1.114	0.028
DCT → CA	1.225	0.046
QIT → CA	1.222	0.055
SMA → CA	1.912	0.120

H3: DCT → SMA — β = 0.490, t = 10.185, p < 1%. This is the strongest relation in the model. DCT significantly enhance SMA, so that the investment towards digital tools, workflows and analytical resources results in large gains in SMA practices. H4: DCT → CA — β = 0.203, t = 4.078, p < 1%. DCT is also directly correlating to CA, allowing for faster response time, higher cost effectiveness in time response time of the customer, cost reduction, saving efficiency, and better experience with the digital experiences. H5: QIT → SMA — β = 0.193, t = 4.056, p < 1%. The QIT such as system reliability, integration of information and user support, and QIT in general; these elements are positively associated with QIT positively influences the adoption of SMA. H6: QIT → CA — β = 0.177, t = 4.311, p < 1%. QIT also has positive impact on CA indicating that effective information systems can facilitate efficiencies of operation and better service delivery. H7: SMA → CA — β = 0.350, t = 6.982, p < 1%. SMA serves as a mediating mechanism that transmutes digital capabilities (BDA, DCT, QIT) into improved competitive capabilities. Businesses with stronger SMA practices perform better in the market. Overall, the strongest influence of DCT on SMA (β = 0.490) indicates that digital skills are more important on the Vietnamese tourism business. The impacts of BDA and QIT on CA further prove the benefits that BDA and QIT have on competitiveness in overcoming competitive challenges in the Vietnam tourism market.

As shown in Table 8, the impact of BDA, DCT, and QIT on CA is significantly direct at a level of 1%. Furthermore, DCT has the strongest overall associated effect with CA (β = 0.375, t = 7.471, p < 1%), as does QIT (β = 0.256, t = 5.443, p < 1%) and BDA (β = 0.217, t = 5.169, p < 1%). These results suggest that digital capabilities play a direct role in enabling stronger competitive positioning of tourism businesses.

4.7. Multicollinearity and effect size

Table 7. R^2 and Adjusted R^2 (source: Authors' findings)

Dependent variable	R-square	R-square adjusted
CA	0.465	0.461
SMA	0.477	0.474

4.8. Direct effects

Table 8. Direct Effects (source: Authors' findings)

Hypotheses	Effect	Coefficients	S.E	t	P	Decision
H1	BDA -> SMA	0.232	0.044	5.341	< 1%	Supported
H2	BDA -> CA	0.136	0.040	3.374	< 1%	Supported
H3	DCT -> SMA	0.490	0.048	10.185	< 1%	Supported
H4	DCT -> CA	0.203	0.050	4.078	< 1%	Supported
H5	QIT -> SMA	0.193	0.044	4.056	< 1%	Supported
H6	QIT -> CA	0.177	0.045	4.311	< 1%	Supported
H7	SMA -> CA	0.350	0.050	6.982	< 1%	Supported

4.9. Mediating role of strategic management accounting

Table 9. Mediating analysis (source: Authors' findings)

Hypotheses	Mediators	Links	Coefficients	S.E.	t	P	Decision
H8a	1. SMA	BDA -> SMA -> CA					Supported
	Total effect		0.217	0.042	5.169	< 1%	
	Direct effect		0.136	0.040	3.374	< 1%	
	Indirect effect		0.081	0.021	3.947	< 1%	
H8b	2. SMA	DCT -> SMA -> CA					Supported
	Total effect		0.375	0.050	7.471	< 1%	
	Direct effect		0.203	0.050	4.078	< 1%	
	Indirect effect		0.172	0.030	5.720	< 1%	
H8c	3. SMA	QIT -> SMA -> CA					Supported
	Total effect		0.256	0.047	5.443	< 1%	
	Direct effect		0.177	0.045	4.311	< 1%	
	Indirect effect		0.062	0.018	3.517	< 1%	

In addition to the direct effects, SMA serves as an important mediating variable that links digital capabilities to CA. As shown in Table 9, and based on the mediation framework of Baron and Kenny (1986), BDA, DCT, and QIT impact CA directly and indirectly through SMA, suggesting a partial mediation. In fact, for BDA → SMA → CA, the indirect effect is $\beta = 0.081$, $t = 3.947$, $p < 1\%$. These findings indicate that competitive advantages of BDA are derived from their integration into SMA practices that provide benefits through planning, control, and decision-making functions. With DCT → SMA → CA, the indirect effect was $\beta = 0.172$, $t = 5.720$, $p < 1\%$, meaning, businesses with higher DCT do enable SMA tools to be utilized by increased responsiveness, efficiency, and service differentiation. For QIT → SMA → CA, the indirect effect is $\beta = 0.062$, $t = 3.517$, $p < 1\%$ and further means that if there is a high QIT infrastructure that strengthens SMA implementation, the businesses will be more effective about turning operational and market information into strategic inputs. The Sobel test (Sobel, 1982) confirmed that the same path mediating the three categories, (BDA → SMA → CA), (DCT → SMA → CA), and (QIT → SMA → CA), are statistically significant at the 1% level of significance. Crucially, while the presence of SMA lowers the influence of BDA, DCT, QIT on CA, the direct impacts here still reach a high size and extent, proving partial rather than full mediation. In general, it seems SMA partially mediates the associations between BDA, DCT, QIT and CA. It shows that digital capabilities don't always result in superior performance. These results provide strong empirical evidence for H8a, H8b, and H8c.

5. Discussion

5.1. Effects of Big Data analytics on strategic management accounting and competitive advantage

With regard to H1, the findings show that BDA has a positive and significant effect on SMA. BDA expands the quantity, variety, and speed of information available to managers, thereby requiring the adoption of sophisticated SMA methods which are capable of processing real-time data with multiple dimensions (Oyewo, 2022). In tourism industries, BDA can be used in strategic planning processes. These capabilities lead SMA to go beyond traditional cost reporting and take a more comprehensive perspective. The findings are also consistent with H2, which further confirms a positive direct correlation between BDA and CA. The use of BDA helps tourism businesses enhance forecast accuracy, optimize pricing strategies, minimize operational inefficiencies, and gain more profound customer insights, which supports differentiation strategies (Drury, 2013).

5.2. Effects of digital competency on strategic management accounting and competitive advantage

These findings show a positive and theoretically consistent relationship between DCT and SMA, with the highest path coefficient, highlighting DCT as an underpinning capability for successful enactment and advancement of SMA and thus consistent with H3. DCT involves not only technical capabilities but also analytical thinking, digital creativity, and skills to interpret data strategically (Ciampi et al., 2021; Mikalef et al., 2019). Digital skills play an important role in providing management information to tourism businesses that can be utilized for their accounting and control processes. This correlates with other literature noting how digitally enabled management accounting contribute to strategic decision-making, risk management, and long-term sustainability (Franke & Hiebl, 2023; Leitner-Hanetseder et al., 2021; Ma et al., 2022). Support for H4 further confirms a significant direct effect of DCT on CA. Similarly, tourism practitioners are better equipped to enhance operational efficiency, adapt quickly to market shifts, and create tailored customer experiences (Gunasekaran et al., 2017; Mariani & Baggio, 2022).

5.3. Effects of quality of information technology on strategic management accounting and competitive advantage

The findings also confirm that QIT substantially promotes SMA, reinforcing H5. The IT systems of high quality will be reliable, integrated, and flexible as well as provide the infrastructure of successful SMA application. These systems facilitate the harmonisation of internal cost data with external market and customer information and to support more sophisticated SMA approaches (Cadez & Guilding, 2012). Thus, QIT serves as a facilitatory infrastructure that enhances the efficacy of SMA practices, rather than acting as a strategic asset in itself. QIT has also a direct positive influence on CA as evidenced in support of H6. These integrated and dependable IT systems can help to minimize transaction costs, improve consistency of service, increase customer satisfaction (Melville et al., 2004), and are particularly important in platform-based and digitally mediated tourism services.

5.4. Effect of strategic management accounting on competitive advantage

Consistent with H7, SMA has a positive influence on CA. The SMA also plays a vital role in converting digital data and technology capacity into strategic decisions involving pricing, service development, channel management and business resource management to achieve this change. As this is for outside competitive angles; SMA adopts internal strategies and therefore SMA orientates towards cost or differentiation strategy because it keeps a competitive view from outside; thus maintaining existing competitive position in these businesses as part and parcel of them (Oyewo, 2022).

5.5. The mediating role of strategic management accounting

The mediation analyses provide persuasive evidence in favor of SMA as a mechanism for transforming strategic value. Instead of dividing BDA, DCT and QIT into their own technical competencies where there is no connection that can be made between them, SMA packages the different resources together into a common decision making framework that helps to induce CA and support for H8a, H8b and H8c. Such partial mediation among the related relationships implies digital capabilities will persist only as long as they are part of SMA systems so that digital capabilities present strategic benefit beyond digital capabilities at their level. In general, SMA is pivotal in creating sustainable CA among both BDA, DCT and QIT. Additionally, BDA merely improves business competitiveness independent of the internal performance, but their effect is considerably maximized when integrating BDA-driven insights in the SMA processes throughout the planning, control and performance evaluation processes (Cadez & Guilding, 2008; Hiebl, 2024). Consequently, BDA offers a higher strategic value when complemented by structured accounting practices that provide managerial input into organizational decisions.

While it has been empirically demonstrated that BDA, DCT, QIT, and SMA have a positive relation to competitive advantage for tourism businesses in Ho Chi Minh City, the results should be seen in relation to the extent of the digital gap among the establishments. The sample for the study is mostly a profile of those businesses that are prepared with respect to technology; however, it has been found that a number of small-scale tourism businesses, individual entrepreneurs, or family firms may not be adequately represented. Indeed, businesses have limitations in IT infrastructure, the capacity to deploy BDA, and a limited number of digitally skilled human resources that prevent them from adopting technology-based SMA. As such, the positive effects identified from the digital capabilities in this study indicate the possibility when businesses have enough organizational and technological capabilities, as opposed to the case for all in the industry. This highlights the role that policies toward digital transformation and the development of SMA capabilities have played in mitigating the digital divide for urban tourism.

6. Conclusions

This study provides persuasive empirical evidence on the transformation of digital capabilities to CA in Vietnamese tourism businesses based on the consecutive relationship among BDA, DCT, QIT, SMA and CA. The findings reveal a stable path of capability–performance, implying that digital resources deliver value primarily when integrated into SMA processes.

BDA delivers a critical capability up-front. The results show that BDA has a significant impact on SMA as well as CA. With the utilization of BDA solutions, managers in the Vietnamese tourism market are capable of extracting insights based on a great deal of customer, pricing and operational data in a highly competitive and season-sensitive industry with fierce rivalry in business. Nevertheless, the mediation findings reveal the enhanced competitive advantages of BDA are driven by the systematic integration of analytical insights in SMA routines that accompany strategic planning, control and performance monitoring.

DCT becomes the major player in the model. The results indicate that DCT has the highest direct effect on SMA and a significant direct impact on CA. It shows the significance of good management digital skills, analytical thought and critical understanding of data and the application thereof to tourism businesses. Moreover, within Vietnam's emerging-market tourism sector, where many businesses are small or medium sized and resource-poor, not only does DCT enable businesses to utilize analysis tools and information systems to inform SMA but also to practice, thus enhancing its level of competition.

QIT is supportive if also indispensable. The findings confirm a positive effect of a robust, integrated and user-friendly IT system on SMA, which considerably improves SMA and strongly affects CA. High QIT network provides timely integration of data across departments and platforms, helping to facilitate advanced SMA applications like profitability model analysis, budgeting, and performance measurement. However, the partial mediation effect of SMA also suggests that IT investments lead to more durable competitive advantages when they are complemented by strategic accounting practices that convert technological capabilities into managerial intuition.

SMA occupies a pivotal position in the capability–advantage link. The results indicate that SMA has a significant and positive impact on CA and acts partly mediating effect between BDA, DCT and QIT on CA. SMA serves as a strategic "value-conversion" to convert digital and technology inputs into value-based decisions in price, service differentiation, capacity and resource management (elements of performance) that are of particular relevance to the tourism industry.

Overall, competitive advantage in tourism emerges from the integration of digital capabilities and SMA. Tourism businesses able to efficiently combine BDA, DCT, high QIT, as well as strong SMA systems, are more likely to be successful in their operational efficiency, service quality and willingness to adapt to market change. The pathway

BDA/DCT/QIT → SMA → CA, emphasizes that digital transformation provides its best value by involving SMA, not just the technology.

From the practical perspective, these findings emphasize the need for coordinated capability development in Vietnamese tourism businesses. Managers should adopt BDA, build digital capabilities, secure IT quality and integration, institutionalize SMA routines that embed the use of information to power strategic decisions and implement it in an embedded or adaptive way. In theory, the present study helps to contribute to the literature on SMA and digital transformation with empirical evidence illustrating how digital capabilities can be translated into sustainable CA when mediating the relationship between SMA and CA, in emerging-market tourism. The results are highly useful in establishing a consistent connection between digital capabilities, strategic management strategies, and business performance along a linear trajectory, and in providing implications for both academic and the practitioners interested in the improvement of competitiveness in the digitalized transformation of service industries.

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