Influence of Big Data Analytics Capability on Innovation and Performance in the Hotel Industry in Malaysia*

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Abstract

This study aims to address the literature gap by examining the direct relationship between big data analytics capability, marketing innovation, and organizational innovations. Additionally, this study would examine big data analytics capability as the antecedent for both innovation types and how these relationships influence firm performance. The research model is developed based on the integration of resource-based view and knowledge-based view theories. The quantitative method is used as the research methodology for this study. Based on a purposive sampling method, a total of 115 questionnaires were obtained from managers in star-rated hotels located in Malaysia. Partial least square structural equation modeling (PLS-SEM) is utilized for the data analysis. The result shows that big data analytics capability positively affects marketing and organizational innovations. The findings show that big data analytics capability and organizational innovation positively influence firm performance. Nonetheless, the result revealed that marketing innovation is not positively related to firm performance. The findings also indicate to hotel managers the importance of big data analytic capability and the resources required to build and develop this capability. The contributions from this study enrich the literature on big data and innovation, which is particularly limited in the hospitality and tourism context.

Keywords: Big Data Analytics Capability, Marketing Innovation, Organizational Innovation, Firm Performance, Hotel Industry

JEL Classification Code: L25, L83, O31

1. Introduction

Advancement in information technology has led firms to invest in big data analytics to be competitive in a rapidly changing environment. Firms are capitalizing on big data analytics to find innovative ways to distinguish themselves from their rival in the industry (Côrte-Real et al., 2017). Hotels use big data analytics to measure customer satisfaction based on online reviews and ratings (Zarezadeh et al., 2022). The insight generated from big data allows hoteliers to predict future bookings and improve their services (Shamim et al., 2021). Big data also enables hotels to improve their decision-making regarding revenue management by forecasting optimum occupancy and room rates (Yallop & Seraphin, 2020). Also, the emergence of big data analytics has spurred firms to become innovative by changing their business process and strategies to satisfy their client's needs and wants (Aydiner et al., 2019). Firms adopting big data analytics would foster innovation and improve business performance (Ghasemaghaei & Calic, 2020; Mikalef et al., 2020a).

The ability of a firm to innovate is crucial when an industry is facing an economic, financial, and health crisis (Zhang et al., 2022). Innovation can assist firms in enduring the challenges of operating under difficult economic conditions. Innovation relates to the introduction of a new or improved product, service, process, marketing method, or organizational practice (OECD & Eurostat, 2005). Previous studies have identified the importance of innovation capability in determining firm performance in

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the hotel industry (Alkhatib & Valeri, 2022; Nicolau & Santa-maría, 2013; Nieves & Diaz-Meneses, 2016). Thus far, much of the innovation research is predominantly focused on product and process innovation, with fewer studies on marketing and organizational innovations. Marketing innovation is a viable solution that provides a quick fix and cost-effective way for firms to improve their sales revenue, particularly in an economic crisis (Naidoo, 2010). Marketing innovation is a new marketing technique comprising improvements from current product design, placement, promotion, or pricing (Nieves & Diaz-Meneses, 2016). On the other hand, organizational innovation relates to introducing new workplace organizations or business practices in response to environmental changes (Camisón & Villar-López, 2014). Both marketing and organizational innovations are fundamental to improving firm performance (Chen et al., 2020; Kafetzopoulos et al., 2020). Nonetheless, many researchers argue that further studies on the antecedents of marketing and organizational innovations are needed to understand both (Prasad & Junni, 2016; Ramirez et al., 2018).

To date, there is still a lack of understanding of the relationship between big data analytics, innovation, and firm performance (Ghasemaghaei & Calic, 2020). Mikalef et al. (2020a) call for further studies on how firms can use big data analytics to improve innovation, which remains an underexplored part of the literature. Johnson et al. (2017) claimed that some firms that invest in and use big data fail to cultivate innovative performance in their organization. Given the adverse impact of the Covid-19 pandemic on the tourism sector (Nguyen et al., 2021), the study on the relationship between big data, innovation, and firm performance would assist industry players, particularly the hotel industry, to recover and thrive again. A case in point is that the Covid-19 pandemic has severely impacted the travel and tourism sector, which saw the percentage of global GDP by this sector drop from 10.4% in 2019 to 5.5% in 2020 (World Travel and Tourism Council, 2021). This negative impact is concerning as the tourism economy contributes towards the source of foreign exchange, generation of export revenue, and local employment (World Tourism Organization, 2018).

Based on the resource-based view (RBV) and knowledge-based view (KBV) theories, the present study aims to address the gaps in the literature by examining the direct relationship between big data analytics capability (BDAC) and marketing innovation together with the relationship between BDAC and organizational innovation. This study will also analyze the potential impact of marketing and organizational innovations on firm performance in the hotel industry. The result of this study would contribute to the existing literature in tourism and hospitality by demonstrating that BDAC is a crucial enabler to marketing and organizational innovation, which can subsequently enhance firm performance.

2. Literature Review

2.1. Big Data Analytics Capability (BDAC)

There are several definitions of the BDAC construct provided in the literature. One of them defined BDAC as the firm capacity to assemble and implement specific resources under big data analytics (Gupta & George, 2016). Mikalef et al. (2019) provide a more extended definition of BDAC as "the ability of a firm to capture and analyze data towards the generation of insight by effectively orchestrating and deploying its data, technology, and talent" (p. 274). Various empirical studies have conceptualized BDAC as a multidimensional and hierarchical construct. However, there is a prevalent theme among the big data studies (Ciampi et al., 2021; Jeble et al., 2018; Mikalef et al., 2020a), which categorized BDAC into three categories that comprise tangible, intangible, and human skill resources.

Tangible resources comprise data, technology, and basic resources. The availability of data, a core resource, can be further categorized into five characteristics: volume, velocity, variety, veracity, and value (Ferraris et al., 2019). Big data, which is large in quantity, originate from different sources, and appears in different formats, requires advanced technology and infrastructure to store, process, and analyze (Gupta & George, 2016). The big data infrastructure required comprises data lakes, a data repository, and a software framework capable of parallel processing these data (Gupta & Giri, 2018). Deriving meaningful and valuable insight from big data requires sufficient funding to invest in sophisticated technology and infrastructure (Vidgen et al., 2017). Apart from financial funding, firms must commit in terms of time as the investment in big data may not produce an instant result. Besides tangible resources, intangible resources such as data-driven culture and organizational learning are necessary to develop BDAC. A data-driven culture is defined as when employees across the firms primarily base their business decisions on data instead of experience (Gupta & George, 2016). Employees also must continuously learn as technology involving big data keeps evolving (Vidgen et al., 2017).

Another main resource that firms require to possess to form BDAC is human skills, divided into technical and managerial skills. Both technical and managerial skills are required to obtain meaningful value from big data investment (Wamba et al., 2017). Technical skill relates to the competency or know-how of employees in utilizing data and technology to provide meaningful insight (Gupta & George, 2016). These technical employees should be skilled in R, Python, Hadoop, or other analytical tools (Rialti et al., 2019). Similarly, managers should be skilled in data analytics so that they would be able to understand the insight generated and make the optimal business decision-making for their

organization (Mikalef et al., 2020b). Managerial skills also include coordination with other employees, customers, and suppliers to implement big data-related initiatives (Gupta et al., 2019).

2.2. Innovation

Various definitions of innovation are provided by different studies, depending on the research's purpose and theoretical perspectives. According to Damanpour and Evan (1984), innovation is described as "the implementation of an internally generated or a borrowed idea whether pertaining to a product, device, system, process, policy, program or service that was new to the organization at the time of adoption" (p. 393). There are also different types of innovation mentioned in the literature. Based on the Oslo Manual published by OECD and Eurostat (2005), there are four types of classification for innovation: product innovation, process innovation, process innovation, and organizational innovation. These four types of innovations have been regularly applied in prior empirical studies in innovation literature (Kafetzopoulos et al., 2020; Medrano & Olarte-Pascual, 2016; Ramirez et al., 2018). Nonetheless, this study would focus on marketing and organizational innovation as there is much less attention in the literature on this type of innovation, even though both innovations can assist firms in boosting their performance.

Marketing innovation is defined as a new marketing technique comprising improvements from current product design, placement, promotion, or pricing (Nieves & Diaz-Meneses, 2016). These marketing-related changes aim to increase the firm market share by either satisfying client needs, venturing into new territory, or repositioning their product or services in the market (OECD & Eurostat, 2005). Examples of marketing innovation in product placement include establishing new distribution to sell goods or services to clients (Nieves & Diaz-Meneses, 2016). Also, promoting new products through placement in movies or television programs or introducing a new brand symbol is part of marketing innovation (OECD & Eurostat, 2005). In the hotel industry, advancements in information technology have led hoteliers to rely more on online travel agencies rather than tour operators to increase sales by direct channel (Romero & Tejada, 2020).

Regarding organizational innovation, this innovation is defined as the creation and adoption of a new company's process, practices, and structure (Lam, 2005; OECD & Eurostat, 2005). Organizational innovation in terms of company structure involves decision-making and the distribution of tasks and responsibilities within the company (Mumford et al., 2002). Meanwhile, organizational innovation in company processes revolves around adopting new routines and procedures to conduct work (OECD & Eurostat, 2005).

Prasad and Junni (2016) claim that organizational innovation can be used to achieve organizational goals through the executive actions of revamping and refining a company's structure, practice, and process. Top management support is crucial in realizing organizational innovation in firms (Cinar et al., 2020). According to Nieves and Segarra-Ciprés (2015), employee knowledge and skill are key enablers for organizational innovation based on the study of the hotel industry in Spain.

2.3. Firm Performance

There is a growing interest in studying BDAC's influence on firm performance. This relationship can be seen in previous empirical studies by Bahrami and Shokouhyar (2022), Jeble et al. (2018), and Rialti et al. (2019). Nonetheless, the studies on the relationship between BDAC and firm performance in tourism and hospitality literature are still limited. To fully measure firm performance, this study considers that firm performance is measured by two distinct components, market performance and operational performance, as discussed in the previous studies (Gupta & George, 2016; Gupta et al., 2019). In these studies, market performance emphasizes market share, the success rate of new products/services, and the ability to find a new market. On the other hand, operational performance is gauged based on productivity, profitability, return on investment, and sales revenue. Similarly, many studies have also measured firm performance as a multidimensional construct based on financial and non-financial indicators (Ghasemaghaei & Calic, 2020; Gupta et al., 2020; Wamba et al., 2017).

2.4. Research Model and Hypothesis Development

As shown in Figure 1, the research model builds on past empirical studies and is grounded in RBV and KBV theories. Both theories are interrelated and are selected to support the model's hypotheses development. The research model consists of eight hypotheses examining the direct relationship between BDAC, firm performance, marketing innovation, and organizational innovation.

2.4.1. BDAC and Firm Performance

Through big data analytics, insight and patterns can be generated through statistical tools and techniques, which provide valuable information for business-related decisions (Gupta et al., 2019). Consequently, improved business decision-making would improve firm performance. Jeble et al. (2018) argue that utilizing big data analytics would improve decision-making, particularly in making operational decisions and predictions. The insight and pattern generated by big data analytics can eliminate any guesswork in decision-making
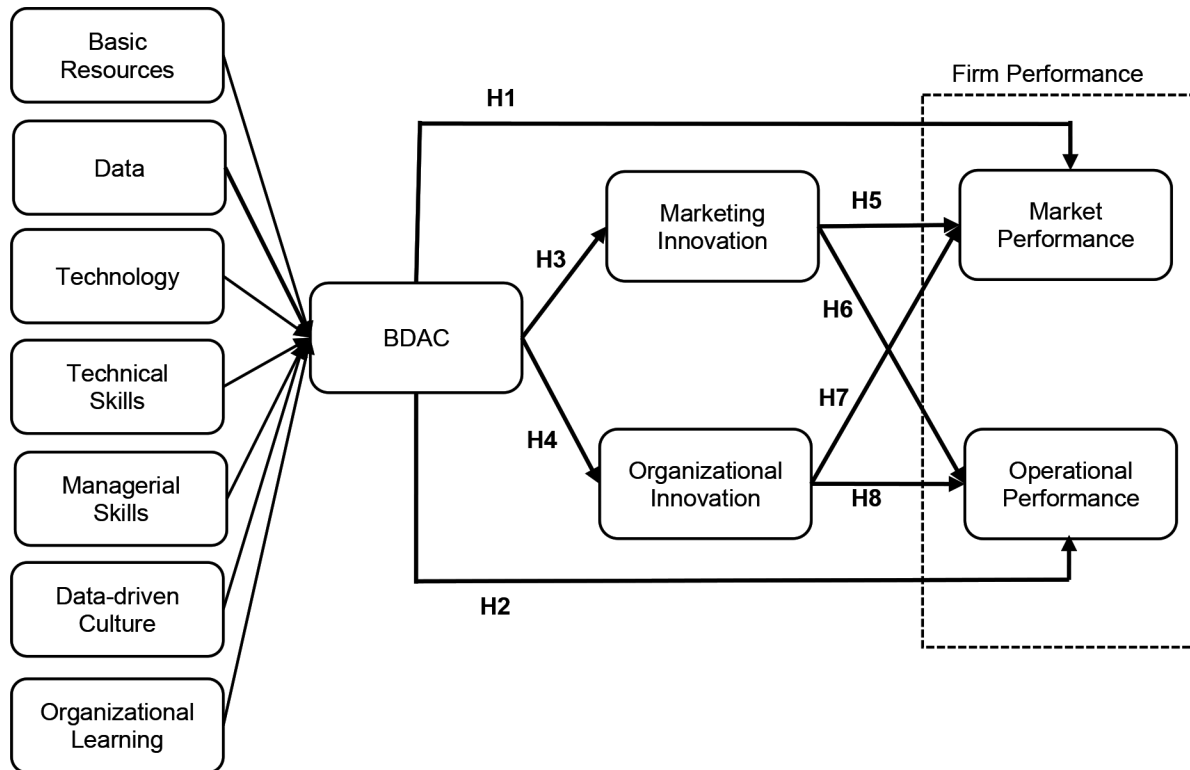
Figure 1: Research Model

and assist company executives in streamlining operations and planning future direction (Mikalef et al., 2020a).

BDAC is grounded on the RBV theory, which states that firms can achieve a competitive advantage by managing their resources and capability (Barney, 1991). The RBV theory is based on two fundamental assumptions: firms' resources are immobile and heterogeneous. Several studies have provided empirical evidence to prove the positive relationship between BDAC and firm performance (Bahrami & Shokouhyar, 2022; Wamba et al., 2019; Raguseo et al., 2020). It is reported in these studies that BDAC has resulted in increased market share, revenues, profitability, and productivity in firms. According to Gupta et al. (2019), BDA positively impacts firm performance in terms of market and operational performance. Also, Ferraris et al. (2019) reported that firm performance increases as the firm's BDAC becomes superior. Based on the preceding discussion, we hypothesize that:

H1: Big data analytics capability has a positive effect on market performance.
H2: Big data analytics capability has a positive effect on operational performance.

2.4.2. BDAC as an Enabler of Innovation

The growth of the digital economy has led to the availability of data and knowledge regarding customers, rivals, and new products and services (Lee, 2021). Knowledge about the business environment would help firms reposition themselves based on customer demand and market (OECD & Eurostat, 2005). Knowledge resources are a significant influence on marketing innovation in firms. Ghasemaghaei and Calic (2020) claimed that firms' capability in using big data analytics enables them to innovate, as firms can rapidly take advantage of new information to apply new ideas or initiatives. For instance, big data analytics can influence firm innovation by improving products and services and better repositioning and distributing these products and services.

Knowledge-driven organizations are prone to implement organizational innovations to improve administrative efficiency and employee satisfaction. These innovative actions require knowledge from in-house expertise and external information (Kim & Lui, 2015; Ramirez et al., 2018). Marshall et al. (2015) stated that firms could improve their operating efficiency and revenue growth compared to their rivals if they apply big data analytics in their

business process. Besides, an appropriate organizational structure can facilitate a quick response to market changes and other external conditions (Medrano & Olarte-Pascual, 2016). Firms must collect, process, and analyze information regarding clients, suppliers, and competitors to keep pace with external changes.

The relationship between BDAC towards marketing and organizational innovations is grounded on the KBV theory. This theory states that an organization can create productive results through the knowledge resources they possess, which are unique and imitable (Grant, 1996). KBV theory is an extension of RBV theory, but it focuses on the firm's knowledge resources to determine its competitive advantage (Côrte-Real et al., 2020). In terms of empirical studies, there have been limited studies on the relationship between BDAC, marketing innovation, and organizational innovation. Nonetheless, a related empirical study demonstrated that the usage of big data positively affects innovation capability (Wibowo et al., 2021). Based on the preceding discussion, we hypothesize that:

H3: Big data analytics capability has a positive effect on marketing innovation.
H4: Big data analytics capability has a positive effect on organizational innovation.

2.4.3. Marketing Innovation and Firm Performance

Firms can increase their sales revenue through marketing innovation by either repositioning their product or services in a market, meeting client demands, or venturing into new territory (OECD & Eurostat, 2005). Medrano and Olarte-Pascual (2016) identified that firms undertaking marketing innovation do not necessarily need to invest large capital to achieve a competitive advantage. For instance, a firm can innovate by creating new pricing strategies for products and services based on customer demand. Thus, marketing innovation appeals to firms to stem revenue decline without investing too much money. In addition, marketing innovation is in line with RBV theory, commonly used to explain how an organization's resources and capabilities shape its competitive advantage (Barney, 1991). Several studies have reported that marketing innovation is positively related to firm performance (Kafetzopoulos et al., 2020; Naidoo, 2010). The rationale behind this relationship is that marketing innovation can meet the changing needs of consumers in terms of both financial and non-financial benefits. Thus, an organization will likely gain a competitive advantage when it satisfies customer needs and wants.

In the hospitality context, Nieves and Diaz-Meneses (2016) demonstrated a positive relationship between marketing innovation and financial performance. Likewise, Nicolau and Santa-maría (2013) examine the relationship between several types of innovation and hotel market value. The study result demonstrates that marketing innovation is positively related to the market value of hotels. One study by Hussain et al. (2020) also showed that marketing innovation positively influences market performance based on emerging markets in Pakistan. Based on these findings, the proposed hypotheses are:

H5: Marketing innovation is positively related to market performance.
H6: Marketing innovation is positively related to operational performance.

2.4.4. Organizational Innovation and Firm Performance

Organizational innovation would increase firm performance by implementing new approaches or systems to enhance administrative and operational efficiency. This assertion is supported by several empirical studies that reported that organizational innovation positively influences firm performance (Camisón & Villar-López, 2014; Cinar et al., 2020; Eidizadeh et al., 2017). Innovative organizations have a competitive edge over non-innovative organizations as the former could react rapidly to environmental challenges and maximize any opportunities in the industry. Based on RBV theory, organizational innovation will lead to competitive advantage and consequently increase firm performance (Camisón & Villar-López, 2014). This assumption is based on the firm's capability to create organizational routines or practices using a combination of resources that the firm possesses to accomplish strategic goals (Makadok, 2001).

Furthermore, OECD and Eurostat (2005) stated that organizational innovation could increase employee satisfaction and decrease administrative and supplies expenditures. Examples of organizational innovation include the implementation of new routines to boost learning and knowledge sharing across the organization (Prasad & Junni, 2016). According to Chen et al. (2020), organizational innovation positively impacts firm performance based on empirical data from 265 manufacturing companies in the Pearl River Delta region in China. Therefore, based on past studies and arguments, this study proposes the following hypothesis:

H7: Organizational innovation is positively related to market performance.
H8: Organizational innovation is positively related to operational performance.

3. Methodology

Based on the positivist approach, this study used quantitative data analysis to answer the research objectives. Quantitative studies are used to examine theory deductively and to assess the relationship among constructs in the research framework (Bougie & Sekaran, 2019).

3.1. Measurement Properties

All the measurement items in the questionnaire were adapted from established literature with favorable psychometric properties. The items in the BDAC construct were adapted from Jeble et al. (2018) and Mikalef et al. (2019). This construct had seven sub-dimensions: data, basic resources, technology, technical skills, management skills, organizational learning, and data-driven. The BDAC construct was operationalized as a second-order hierarchical construct and considered a reflective-formative type. Marketing innovation was based on Nieves and Diaz-Meneses (2016), while organizational innovation was adapted from Prasad and Junni (2016). As for firm performance, this construct was represented by two separate components, market performance and operational performance, adapted from Gupta and George (2016) and Gupta et al. (2019). Constructs such as BDAC, marketing innovation, and organizational innovation were measured using a 5-point Likert scale, while market and operational performances used a 7-point Likert scale. Using two different scales in the survey reduces common method bias, as Hulland et al. (2018) recommended. Furthermore, the developed questionnaire had to undergo a pre-test with respondents in academics and the hotel industry before the data collection. Based on the feedback from the pre-test, amendments were made to the questions' wording, layout, and format.

3.2. Population and Sample

This study's unit of analysis is at the organizational level in hotel firms. This unit of analysis is in line with the research objective of this study to examine the impact of BDAC and innovation on firm performance in the hotel industry. The survey was based on a single respondent, and the targeted respondents came from higher hotel management, including hotel managers and general managers. They are selected because of their familiarity with big data and overall hotel performance. Also, the hotel industry was chosen as the study's population to better comprehend the industry's approaches to dealing with the impact of the Covid-19 pandemic. Before the pandemic, the accommodation sector was the second biggest contributor in Malaysia in terms of inbound tourist expenditure for 2019, amounting to around RM 20.67 billion (My Tourism Data, 2021). Malaysia was also ranked second behind Thailand for Southeast Asia's highest international tourist arrivals, with 26.1 million tourists in 2019 (World Tourism Organization, 2021).

This study applied a purposive sampling technique since the study focuses on star-rated hotels in Malaysia. The database of the star-rated hotels was obtained from the Ministry of Tourism, Arts and Culture Malaysia's website, which had 442 registered hotels in the year 2020. Specifically, this study targeted hotels with 3-star, 4-star, and 5-star ratings based on disproportionate quota sampling. Hotels with a higher star rating were chosen as they are likely to have more professional and qualified staff and more inclined to innovative activities in their daily operation (Nieves et al., 2014). The data collection was conducted using self-administered questionnaire from September 2021 to February 2022 to about 200 hotels. All self-administered questionnaires received were checked during the data collection to ensure all questions were filled. The data collection process ended with 115 usable surveys, yielding a 57.5 % response rate. Among the hotels that participated, 76 respondents (66%) came from 5-star hotels, followed by 33 respondents (29%) from 4-star hotels and six respondents from 3-star hotels (5%).

The sample size collected was comparable to other hotel firm-based studies by Nieves and Diaz-Meneses (2016) and Diffley et al. (2018). In addition, according to Hair et al. (2017), statistical power analyses should be used to calculate the minimum sample size based on the largest predictor in the model. The model's largest predictor is seven, directed to the BDAC construct. Based on Green's (1991) table, the minimum sample size is 103 for seven predictors at medium effect size and a power of 0.8, as Gefen et al. (2011) recommended. Thus, since the total number of surveys collected was higher than the minimum sample size, it was sufficient to test the hypotheses in the research model.

4. Results

The partial least squares structural equation modeling (PLS-SEM) technique was adopted for data analysis. PLS-SEM is an alternative method to the covariance-based approach (CB-SEM). The core difference is that CB-SEM focuses on reproducing the theoretical covariance matrix, and PLS-SEM focuses on explaining the variance of a particular construct (Hair et al., 2017). The current study aimed to predict the effects of BDAC on innovation and firm performance, and the proposed framework had both formative and reflective variables. Therefore, PLS-SEM was chosen instead of CB-SEM. Specifically, SmartPLS version 4, as a software package, was used to analyze the collected data.

4.1. Measurement Model Assessment

The reflective measurement model was assessed based on two main criteria (i.e., convergent and discriminant validity). Factor loadings, composite reliability (CR), and average variance extracted (AVE) were checked to examine the convergent validity. Table 1 shows no loading, AVE values below 0.5, and all CR values above 0.7. Therefore, the convergent validity of the research was confirmed. Furthermore, Henseler et al. (2015) state that the Heterotrait-Monotrait of correlations (HTMT) is a better approach to detecting discriminant validity in everyday research situations. The discriminant validity results are summarized in Table 2. All the HTMT values were lower than the cut-off threshold at 0.90, so the discriminant validity of the research was confirmed (Franke & Sarstedt, 2019).

BDAC was measured as a type II reflective-formative hierarchical component model. The formative measurement model requires different criteria for assessment. This study follows the three-step procedure suggested by Hair et al. (2019). First, redundancy analysis was performed to examine convergent validity. Based on redundancy analysis, the path coefficient was 0.874, much higher than the threshold value of 0.70 (Hair et al., 2017). Then, the variance inflation factor (VIF) was checked to assess potential collinearity issues. No VIF values of BDAC's dimensions were higher than the suggested threshold at five, as shown in Table 3. Thus, the formative measurement model of the research was not likely to have a collinearity problem (Hair et al., 2019). Third, BDAC's outer weight significance was examined to assess the formative variable's importance and the relevance of its dimensions/indicators. As depicted in Table 3, the outer weights of data, technology, managerial skills, and organizational learning were insignificant. Nevertheless, all four dimensions' outer loadings were significant and higher than the threshold value of 0.5. Given that the results of the three-step procedure meet all the criteria, the formative measurement model was confirmed.

4.2. Structural Model Assessment

As a prerequisite to assessing the structural model, it is crucial to rule out any multi-collinearity issue in the model. The inner VIF was summarized in Table 4, and it can be seen that no VIF values were higher than the threshold value of 3.3 (Diamantopoulos & Siguaw, 2006). Thus, this research ruled out any multi-collinearity issue. Then, a bootstrapping technique with 5000 resamples was performed to test the significance and relevance of the structural model relationships based on their t-value, p-value, and confidence intervals bias corrected. A hypothesis is considered supported when the t-value is larger or the same as 1.65 (one-tailed test), the p-value is smaller than 0.05, and when the confidence interval does indicate any intervals straddling a 0 between the lower limit (LL) and upper limit (UL) (Hair et al., 2017). Table 4 shows the analysis of this study's hypothesis testing.

Six proposed hypotheses were supported, and another two hypotheses were not supported. Specifically, BDAC had a positive effect on market performance ($\beta = 0.343$, $p < 0.01$), operational performance ($\beta = 0.331$, $p < 0.01$), marketing innovation ($\beta = 0.726$, $p < 0.01$), and organizational innovation $\beta = 0.720$, $p < 0.01$), thus supporting H1, H2, H3, and H4. Organizational innovation was positively related to market performance ($\beta = 0.436$, $p < 0.01$) and operational performance ($\beta = 0.413$, $p < 0.01$), hence supporting H7 and H8. As for the two unsupported hypotheses, marketing innovation did not positively affect either market performance ($\beta = 0.031$, $p = 0.389$) or operational performance ($\beta = -0.081$, $p = 0.256$). Thus, H5 and H6 were unsupported.

5. Discussion

This study examines the relationship between BDAC, marketing innovation, and organizational innovations based in a tourism setting. This study also tests the relationship between marketing and organizational innovations toward firm performance, represented by market and operational performance. Specifically, the context of the study is based on the Malaysian hotel industry, which is a major revenue contributor to the local tourism market (Tourism Malaysia, 2021). Nonetheless, the Covid-19 pandemic severely affected this industry in Malaysia and worldwide.

Our finding shows that BDAC has a positive effect on firm performance. This result confirms previous studies by Bahrami and Shokouhyar (2022), Ferraris et al. (2019), and Raguseo et al. (2020). Big data analytics could generate information and insight that allow firms to recognize new opportunities and threats (Rialti et al., 2019). Consequently, this would improve firm decision-making in adapting to the new situation and performance. In the hotel industry, big data analytics is utilized in the revenue management system to support managers in setting key measures such as average daily rate, revenue per room, and average occupancy rate (Egan & Haynes, 2019). In addition, BDAC is found to have a positive influence on both marketing and organizational innovation. There are limited empirical studies on the relationship between BDAC, marketing, and organizational innovations.

Nevertheless, Erevelles et al. (2016) highlighted that through big data analytics, firms can gain new information about their customers and develop new marketing strategies, leading to marketing innovation. Ghasemaghaei (2020) also argues that firms can rapidly use new knowledge to execute new ideas through big data analytics. This knowledge would also enable knowledge sharing within the firm and consequently improve organizational innovation (Eidizadeh et al., 2017).

Table 1: Convergent Validity

Construct	Items	Loadings	CR	AVE
Basic Resources	BR1	0.976	0.974	0.950
	BR2	0.974		
Data	DA1	0.941	0.944	0.895
	DA2	0.951		
Technology	TE1	0.915	0.953	0.836
	TE2	0.936		
	TE3	0.895		
	TE4	0.912		
Technical Skills	TS1	0.855	0.968	0.885
	TS2	0.974		
	TS3	0.970		
	TS4	0.958		
Managerial Skills	MS1	0.962	0.978	0.918
	MS2	0.970		
	MS3	0.972		
	MS4	0.927		
Data-driven Culture	DC1	0.847	0.919	0.739
	DC2	0.841		
	DC3	0.897		
	DC4	0.851		
Organizational Learning	OL1	0.851	0.950	0.827
	OL2	0.933		
	OL3	0.930		
	OL4	0.920		
Marketing Innovation	MI1	0.795	0.941	0.761
	MI2	0.901		
	MI3	0.881		
	MI4	0.876		
	MI5	0.903		
Organizational Innovation	OI1	0.886	0.956	0.811
	OI2	0.912		
	OI3	0.938		
	OI4	0.880		
	OI5	0.887		
Market Performance	MP1	0.945	0.964	0.870
	MP2	0.929		
	MP3	0.959		
	MP4	0.898		
Operational Performance	OP1	0.945	0.973	0.898
	OP2	0.954		
	OP3	0.944		
	OP4	0.948		

Item DA3 was deleted to get better discriminant validity.

Table 2: Discriminant Validity (HTMT)

Construct	1	2	3	4	5	6	7	8	9	10	11
1. Basic Resources											
2. Data	0.891										
3. Data-Driven Culture	0.602	0.714									
4. Managerial Skills	0.793	0.706	0.588								
5. Market Performance	0.691	0.601	0.559	0.559							
6. Marketing Innovation	0.610	0.473	0.684	0.633	0.610						
7. Operational Performance	0.596	0.560	0.464	0.449	0.782	0.463					
8. Organizational Innovation	0.631	0.572	0.710	0.595	0.743	0.723	0.623				
9. Organizational Learning	0.315	0.426	0.661	0.463	0.285	0.525	0.251	0.415			
10. Technical Skills	0.833	0.756	0.564	0.823	0.636	0.630	0.529	0.623	0.266		
11. Technology	0.779	0.891	0.679	0.755	0.597	0.552	0.522	0.588	0.453	0.789	

Table 3: Discriminant Validity for Formative Higher-order Construct

Construct Higher-order	Lower Order	Convergent Validity	VIF	Weight	Significance	Loading	Significance
Big Data Analytics Capability (BDAC)	Basic Resources	0.874	4.684	0.579	0.002	0.881	0.000
	Data		4.610	−0.325	0.087	0.739	0.000
	Technology		4.023	0.092	0.282	0.816	0.000
	Technical Skills		4.075	0.332	0.014	0.850	0.000
	Managerial Skills		3.743	−0.054	0.368	0.795	0.000
	Data-Driven Culture		2.299	0.440	0.000	0.823	0.000
	Organizational Learning		1.797	0.108	0.169	0.517	0.000

Table 4: Hypothesis Testing

Hypothesis	Relationship	Beta	Se	*t*-value	*p*-value	LL	UL	VIF	Result
H1	BDAC → Market Performance	0.343	0.126	2.723	0.003	0.121	0.507	2.655	Supported
H2	BDAC → Operational Performance	0.331	0.149	2.223	0.000	0.050	0.514	2.655	Supported
H3	BDAC → Marketing Innovation	0.726	0.044	16.417	0.000	0.635	0.786	1.000	Supported
H4	BDAC → Organizational Innovation	0.720	0.051	14.130	0.000	0.604	0.785	1.000	Supported
H5	Marketing Innovation → Market Performance	0.031	0.111	0.282	0.389	−0.136	0.228	2.368	Not Supported
H6	Marketing Innovation → Operational Performance	−0.081	0.124	0.655	0.256	−0.266	0.142	2.368	Not Supported
H7	Organizational Innovation → Market Performance	0.436	0.108	4.040	0.000	0.287	0.639	2.327	Supported
H8	Organizational Innovation → Operational Performance	0.413	0.123	3.360	0.000	0.242	0.640	2.327	Supported

Surprisingly, the result indicates that marketing innovation does not positively affect firm performance. This finding contradicts past studies that reported the positive effect of marketing innovation on firm performance (Hussain et al., 2020; Nieves & Diaz-Meneses, 2016). A possible explanation might be that hotel firms may maintain current marketing methods and channels to promote their services instead of developing new ones. This action is understandable as the hotel industry is severely financially affected by the Covid-19 pandemic (Chen & Chen, 2021). Hence, hotels might want to reduce operation and marketing costs to survive. Also, future research should look into environmental uncertainty as a possible moderator in the relationship between marketing innovation and firm performance. According to a study by Kafetzopoulos et al. (2020), the finding shows that the relationship between marketing innovation and firm performance becomes stronger when there is high environmental uncertainty. As for organizational innovation, this study shows that organizational innovation has a positive effect on firm performance. This result matches the previous studies by Cinar et al. (2020) and Chen et al. (2020). This result also indicates that revamping and major changes in organizational structure and practice in hotel firms have led to better firm performance. The changes in organizational structure and practice could have been attributed to the response to the Covid-19 pandemic.

5.1. Theoretical Implications

This study integrates both RBV and KBV theories to provide explanations of the relation between BDAC, marketing innovation, organizational innovation, and firm performance. Previous studies on big data and innovation mostly use one of the two theories to support the hypotheses development in their research model. Thus, this study further enriches the literature on big data studies and innovation in terms of theoretical context. In addition, there are limited studies on the relationship between BDAC and firm performance in the tourism and hospitality literature. This research contributes further to theory-based studies of big data in tourism and hospitality literature, particularly in the backdrop of the Covid-19 pandemic. In terms of conceptual contribution, this study introduces marketing and organizational innovations between the relationship of BDAC and firm performance in the research model. The empirical result shows that BDAC positively affects both marketing and organizational innovations. These two theoretical linkages have rarely been tested in the literature. The findings also revealed that marketing innovation does not positively influence firm performance, which contradicts most previous findings and warrants further research on this relationship.

5.2. Managerial Implications

This study reveals the factors that build and develop big data analytics capability in organizations. It emphasizes to hotel managers the importance of organizational culture and human skills besides the technical resources, such as the availability of data and technology, to successfully implement BDAC. Consequently, organizations can boost their performance by implementing a holistic perspective of firms' resources to achieve a strategic goal. Furthermore, this study indicates that BDAC influences organizational innovations and increases firm performance. Hence, hotel managers should foster innovation-oriented culture and encourage knowledge sharing within the hotels, facilitated by big data analytics. Hotels that can improve their process, practices, and structure could boost their competitive advantage. The result of the study also shows that BDAC can amplify marketing innovations even in challenging and turbulent periods. Hotel managers should take advantage of the information and insight from big data analytics and differentiate themselves from their competitors to become more competitive. This differentiation could take the form of improvement in pricing, placement, or promotion of products and services.

6. Conclusion

This study expands the literature on big data, innovation, and firm performance based on tourism settings. It seeks to address the gap between big data and innovation, particularly in marketing and organizational innovations, which remain underexplored in the literature. The empirical analysis is based on the hotel industry as this sector is a major contributor to the tourism economy and is severely affected by the Covid-19 pandemic. The study integrates both RBV and KBV theories to conceptualize the theoretical model. The empirical result shows that BDAC and organizational innovation directly affect firm performance, represented by market and operational performance in this study. BDAC also positively affects both marketing and organizational innovations. The hypothesized relationship between marketing innovation and firm performance is not supported, which warrants further research on this relationship. The study's findings add further to theory-based studies on big data, innovation, and firm performance in tourism and hospitality literature. The result also signifies to the hotelier the resources needed to develop their BDAC, which can enhance marketing and organizational innovation in hotel firms.

Despite the contributions of this study, it has several limitations that need to be highlighted. Firstly, this study focuses on a developing country (Malaysia) to test the relationship between BDAC, marketing innovation,

organizational innovation, and firm performance. Future research should replicate this research model in other countries or developed economies to increase generalizability. Secondly, the data collection of this study is based on a single respondent and single source, which may be subject to common method bias. Although the present study has taken procedural and statistical steps to control common method bias, future research should collect responses from multiple participants or use secondary data as a separate data source to eliminate any biases. Thirdly, this study tested the direct relationship between BDAC with marketing and organizational innovations. Future studies can enrich the literature by examining other innovations, such as products and process innovations, together with BDAC.

References

Alkhatib, A. W., & Valeri, M. (2022). Can intellectual capital promote the competitive advantage? Service innovation and big data analytics capabilities in a moderated mediation model. *European Journal of Innovation Management, 6,* 112–126. https://doi.org/10.1108/EJIM-04-2022-0186

Aydiner, A. S., Tatoglu, E., Bayraktar, E., Zaim, S., & Delen, D. (2019). Business analytics and firm performance: The mediating role of business process performance. *Journal of Business Research*, *96*, 228–237. https://doi.org/10.1016/j.jbusres.2018.11.028

Bahrami, M., & Shokouhyar, S. (2022). The role of big data analytics capabilities in bolstering supply chain resilience and firm performance: A dynamic capability view. *Information Technology and People*, *35*(5), 1621–1651. https://doi.org/10.1108/ITP-01-2021-0048

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Bougie, R., & Sekaran, U. (2019). *Research methods for business: A skill building approach* (8th ed). NJ: John Wiley & Sons, Inc.

Camisón, C., & Villar-López, A. (2014). Organizational innovation as an enabler of technological innovation capabilities and firm performance. *Journal of Business Research*, *67*(1), 2891–2902. https://doi.org/10.1016/j.jbusres.2012.06.004

Chen, C. L., & Chen, M. H. (2021). Hospitality industry employees' intention to stay in their job after the Covid-19 pandemic. *Administrative Sciences*, *11*(4), 144. https://doi.org/10.3390/admsci11040144

Chen, Q., Wang, C. H., & Huang, S. Z. (2020). Effects of organizational innovation and technological innovation capabilities on firm performance: Evidence from firms in China's Pearl River Delta. *Asia Pacific Business Review*, *26*(1), 72–96. https://doi.org/10.1080/13602381.2019.1592339

Ciampi, F., Demi, S., Magrini, A., Marzi, G., & Papa, A. (2021). Exploring the impact of big data analytics capabilities on business model innovation: The mediating role of

entrepreneurial orientation. *Journal of Business Research*, *123*, 1–13. https://doi.org/10.1016/j.jbusres.2020.09.023

Cinar, O., Altuntas, S., & Alan, M. A. (2020). Technology transfer and its impact on innovation and firm performance: Empirical evidence from Turkish export companies. *Kybernetes*, *50*(7), 2179–2207. https://doi.org/10.1108/K-12-2019-0828

Côrte-Real, N., Oliveira, T., & Ruivo, P. (2017). Assessing business value of Big Data Analytics in European firms. *Journal of Business Research*, *70*, 379–390. https://doi.org/10.1016/j.jbusres.2016.08.011

Côrte-Real, N., Ruivo, P., & Oliveira, T. (2020). Leveraging the internet of things and big data analytics initiatives in European and American firms: Is data quality a way to extract business value? *Information and Management*, *57*(1), 103141. https://doi.org/10.1016/j.im.2019.01.003

Damanpour, F., & Evan, W. M. (1984). Organizational and performance. *Administrative Science Quarterly*, *29*(3), 392–409. https://doi.org/10.2307/2393031

Diamantopoulos, A., & Siguaw, J. A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British Journal of Management*, *17*(4), 263–282. https://doi.org/10.1111/j.1467-8551.2006.00500.x

Diffley, S., McCole, P., & Carvajal-Trujillo, E. (2018). Examining social customer relationship management among Irish hotels. *International Journal of Contemporary Hospitality Management*, *30*(2), 1072–1091. https://doi.org/10.1108/IJCHM-08-2016-0415

Egan, D., & Haynes, N. C. (2019). Manager perceptions of big data reliability in hotel revenue management decision making. *International Journal of Quality and Reliability Management*, *36*(1), 25–39. https://doi.org/10.1108/IJQRM-02-2018-0056

Eidizadeh, R., Salehzadeh, R., & Chitsaz Esfahani, A. (2017). Analysing the role of business intelligence, knowledge sharing and organisational innovation on gaining competitive advantage. *Journal of Workplace Learning*, *29*(4), 250–267. https://doi.org/10.1108/JWL-07-2016-0070

Erevelles, S., Fukawa, N., & Swayne, L. (2016). Big Data consumer analytics and the transformation of marketing. *Journal of Business Research*, *69*(2), 897–904. https://doi.org/10.1016/j.jbusres.2015.07.001

Ferraris, A., Mazzoleni, A., Devalle, A., & Couturier, J. (2019). Big data analytics capabilities and knowledge management: Impact on firm performance. *Management Decision*, *57*(8), 1923–1936. https://doi.org/10.1108/MD-07-2018-0825

Franke, G., & Sarstedt, M. (2019). Heuristics versus statistics in discriminant validity testing: A comparison of four procedures. *Internet Research*, *29*(3), 430–447. https://doi.org/10.1108/IntR-12-2017-0515

Gefen, D., Rigdon, E. E., & Straub, D. (2011). Editor's comments: An update and extension to SEM guidelines for administrative and social science Research. *MIS Quarterly*, *35*(2), iii–xiv. https://doi.org/10.2307/23044042

Ghasemaghaei, M. (2020). The role of positive and negative valence factors on the impact of bigness of data on big data analytics usage. *International Journal of Information Management*, *50*, 395–404. https://doi.org/10.1016/j.ijinfomgt.2018.12.011

Ghasemaghaei, M., & Calic, G. (2020). Assessing the impact of big data on firm innovation performance: Big data is not always better data. *Journal of Business Research*, *108*, 147–162. https://doi.org/10.1016/j.jbusres.2019.09.062

Grant, R. M. (1996). Prospering in dynamically competitive environments: Organizational capability as knowledge integration. *Organization Science*, *7*(4), 375–387. https://doi.org/10.1287/orsc.7.4.375

Green, S. B. (1991). How many subjects does it take to do A regression analysis? *Multivariate Behavioral Research*, *26*(3), 499–510. https://doi.org/10.1207/s15327906mbr2603_7

Gupta, M., & George, J. F. (2016). Toward the development of a big data analytics capability. *Information and Management*, *53*(8), 1049–1064. https://doi.org/10.1016/j.im.2016.07.004

Gupta, S., Drave, V. A., Dwivedi, Y. K., Baabdullah, A. M., & Ismagilova, E. (2020). Achieving superior organizational performance via big data predictive analytics: A dynamic capability view. *Industrial Marketing Management*, *90*, 581–592. https://doi.org/10.1016/j.indmarman.2019.11.009

Gupta, S., & Giri, V. (2018). *Practical enterprise data lake insights: Handle data-driven challenges in an enterprise big data lake*. Apress.

Gupta, S., Qian, X., Bhushan, B., & Luo, Z. (2019). Role of cloud ERP and big data on firm performance: A dynamic capability view theory perspective. *Management Decision*, *57*(8), 1857–1882. https://doi.org/10.1108/MD-06-2018-0633

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modelling (PLS-SEM)* (2nd ed). NJ: SAGE Publication, Inc.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Hulland, J., Baumgartner, H., & Smith, K. M. (2018). Marketing survey research best practices: Evidence and recommendations from a review of JAMS articles. *Journal of the Academy of Marketing Science*, *46*(1), 92–108. https://doi.org/10.1007/s11747-017-0532-y

Hussain, I., Mu, S., Mohiuddin, M., Danish, R. Q., & Sair, S. A. (2020). Effects of sustainable brand equity and marketing innovation on market performance in hospitality industry: Mediating effects of sustainable competitive advantage. *Sustainability*, *12*(7), 2939. https://doi.org/10.3390/su12072939

Jeble, S., Dubey, R., Childe, S. J., Papadopoulos, T., Roubaud, D., & Prakash, A. (2018). Impact of big data and predictive analytics capability on supply chain sustainability. *International Journal of Logistics Management*, *29*(2), 513–538. https://doi.org/10.1108/IJLM-05-2017-0134

Johnson, J. S., Friend, S. B., & Lee, H. S. (2017). Big data facilitation, utilization, and monetization: Exploring the 3Vs in a new product development process. *Journal of Product Innovation Management*, *34*(5), 640–658. https://doi.org/10.1111/jpim.12397

Kafetzopoulos, D., Psomas, E., & Skalkos, D. (2019). Innovation dimensions and business performance under environmental uncertainty. *European Journal of Innovation Management*, *23*(5), 856–876. https://doi.org/10.1108/EJIM-07-2019-0197

Kim, Y., & Lui, S. S. (2015). The impacts of external network and business group on innovation: Do the types of innovation matter? *Journal of Business Research*, *68*(9), 1964–1973. https://doi.org/10.1016/j.jbusres.2015.01.006

Lam, A. (2005). Organizational innovation. In J. Fagerberg, D. C. Mowery & R. R. Nelson (Eds.), *Handbook of innovation* (pp. 115–147). Oxford: Oxford University Press.

Lee, J. W. (2021). The data sharing economy and open governance of big data as public good. *Journal of Asian Finance, Economics and Business*, *8*(11), 87–96. https://doi.org/10.13106/jafeb.2021.vol8.no11.0087

Nicolau, J. L., & Santa-María, M. J. (2013). The effect of innovation on hotel market value. *International Journal of Hospitality Management*, *32*, 71–79. https://doi.org/10.1016/j.ijhm.2012.04.005

Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strategic Management Journal*, *22*(5), 387–401. https://doi.org/10.1002/smj.158

Marshall, A., Mueck, S., & Shockley, R. (2015). How leading organizations use big data and analytics to innovate. *Strategy and Leadership*, *43*(5), 32–39. https://doi.org/10.1108/SL-06-2015-0054

Medrano, N., & Olarte-Pascual, C. (2016). The effects of the crisis on marketing innovation: An application for Spain. *Journal of Business and Industrial Marketing*, *31*(3), 404–417. https://doi.org/10.1108/JBIM-02-2013-0048

Mikalef, P., Boura, M., Lekakos, G., & Krogstie, J. (2019). Big data analytics capabilities and innovation: The mediating role of dynamic capabilities and moderating effect of the environment. *British Journal of Management*, *30*(2), 272–298. https://doi.org/10.1111/1467-8551.12343

Mikalef, P., Boura, M., Lekakos, G., & Krogstie, J. (2020a). The role of information governance in big data analytics driven innovation. *Information and Management*, *57*(7), 103361. https://doi.org/10.1016/j.im.2020.103361

Mikalef, P., Krogstie, J., Pappas, I. O., & Pavlou, P. (2020b). Exploring the relationship between big data analytics capability and competitive performance: The mediating roles of dynamic and operational capabilities. *Information and Management*, *57*(2), 103169. https://doi.org/10.1016/j.im.2019.05.004

Mumford, M. D., Scott, G. M., Gaddis, B., & Strange, J. M. (2002). Leading creative people: Orchestrating expertise and relationships. *Leadership Quarterly*, *13*(6), 705–750. https://doi.org/10.1016/S1048-9843(02)00158-3

My Tourism Data. (2021). Tourist arrivals. *Tourism Malaysia*. http://mytourismdata.tourism.gov.my/?page_id=14#!from=2019&to=2020

Naidoo, V. (2010). Firm survival through a crisis: The influence of market orientation, marketing innovation, and business strategy. *Industrial Marketing Management*, *39*(8), 1311–1320. https://doi.org/10.1016/j.indmarman.2010.02.005

Nguyen, N., Pham, M. Q., & Pham, M. (2021). Public's Travel Intention Following COVID-19 Pandemic Constrained: A Case Study in Vietnam. *Journal of Asian Finance, Economics, and Business*, *8*(8), 181–0189. https://doi.org/10.13106/jafeb.2021.vol8.no8.0181

Nieves, J., & Diaz-Meneses, G. (2016). Antecedents and outcomes of marketing innovation: An empirical analysis in the hotel industry. *International Journal of Contemporary Hospitality Management*, *28*(8), 1554–1576. https://doi.org/10.1108/IJCHM-11-2014-0589

Nieves, J., Quintana, A., & Osorio, J. (2014). Knowledge-based resources and innovation in the hotel industry. *International Journal of Hospitality Management*, *38*, 65–73. https://doi.org/10.1016/j.ijhm.2014.01.001

Nieves, J., & Segarra-Ciprés, M. (2015). Management innovation in the hotel industry. *Tourism Management*, *46*, 51–58. https://doi.org/10.1016/j.tourman.2014.06.002

Organization for Economic Co-operation and Development (OECD) & Eurostat. (2005). *Oslo manual: Guidelines for collecting and interpreting innovation data* (3rd ed). Paris: OECD.

Prasad, B., & Junni, P. (2016). CEO transformational and transactional leadership and organizational innovation: The moderating role of environmental dynamism. *Management Decision*, *54*(7), 1542–1568. https://doi.org/10.1108/MD-11-2014-0651

Raguseo, E., Vitari, C., & Pigni, F. (2020). Profiting from big data analytics: The moderating roles of industry concentration and firm size. *International Journal of Production Economics*, *229*, 107758. https://doi.org/10.1016/j.ijpe.2020.107758

Ramirez, F. J., Parra-Requena, G., Ruiz-Ortega, M. J., & Garcia-Villaverde, P. M. (2018). From external information to marketing innovation: The mediating role of product and organizational innovation. *Journal of Business and Industrial Marketing*, *33*(5), 693–705. https://doi.org/10.1108/JBIM-12-2016-0291

Rialti, R., Zollo, L., Ferraris, A., & Alon, I. (2019). Big data analytics capabilities and performance: Evidence from a moderated multi-mediation model. *Technological Forecasting and Social Change*, *149*, 119781. https://doi.org/10.1016/j.techfore.2019.119781

Romero, I., & Tejada, P. (2020). Tourism intermediaries and innovation in the hotel industry. *Current Issues in Tourism*, *23*(5), 641–653. https://doi.org/10.1080/13683500.2019.1572717

Shamim, S., Yang, Y., Zia, N. U., & Shah, M. H. (2021). Big data management capabilities in the hospitality sector: Service innovation and customer generated online quality ratings. *Computers in Human Behavior*, *121*, 106777. https://doi.org/10.1016/j.chb.2021.106777

Tourism Malaysia. (2021). *Malaysia tourism: Key performance indicators 2019*. http://mytourismdata.tourism.gov.my/?page_id=860

Vidgen, R., Shaw, S., & Grant, D. B. (2017). Management challenges in creating value from business analytics. *European Journal of Operational Research*, *261*(2), 626–639. https://doi.org/10.1016/j.ejor.2017.02.023

Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J., Dubey, R., & Childe, S. J. (2017) Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research*, *70*(January), 356–365. https://doi.org/10.1016/j.jbusres.2016.08.009

Wamba, S.F., Akter, S., & de Bourmont, M. (2019). Quality dominant logic in big data analytics and firm performance. *Business Process Management Journal*, *25*(3), 512–532. https://doi.org/10.1108/BPMJ-08-2017-0218

Wibowo, S., Suryana, Y., Sari, D., & Kaltum, U. (2021). Marketing performance and big data use during the COVID-19 pandemic: A case study of SMEs in Indonesia. *Journal of Asian Finance, Economics and Business*, *8*(7), 571–0578. https://doi.org/10.13106/jafeb.2021.vol8.no7.0571

World Tourism Organization. (2018). *Tourism for development – Volume 1: Key areas for action*. Madrid, Spain: UNWTO.

World Tourism Organization. (2021). *International tourism highlights: 2020 Edition*. Madrid, Spain: UNWTO.

World Travel and Tourism Council. (2021). *Global economic impact and trends 2021*. https://wttc.org/Portals/0/Documents/Reports/2021/Global

Yallop, A., & Seraphin, H. (2020). Big data and analytics in tourism and hospitality: Opportunities and risks. *Journal of Tourism Futures*, *6*(3), 257–262. https://doi.org/10.1108/JTF-10-2019-0108

Zarezadeh, Z. Z., Rastegar, R., & Xiang, Z. (2022). Big data analytics and hotel guest experience: A critical analysis of the literature. *International Journal of Contemporary Hospitality Management*, *34*(6), 2320–2336. https://doi.org/10.1108/IJCHM-10-2021-1293

Zhang, Z., Wang, X., & Chun, D. (2022). The effect of knowledge sharing on ambidextrous innovation: Triadic intellectual capital as a mediator. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(1), 25. https://doi.org/10.3390/joitmc8010025