sustainability

MDPI

Article

Antecedents of Big Data Analytic Adoption and Impacts on Performance: Contingent Effect

Abdalwali Lutfi [1,*], Akif Lutfi Al-Khasawneh [2,3,*], Mohammed Amin Almaiah [4,5,6], Ahmad Farhan Alshira'h [7], Malek Hamed Alshirah [8], Adi Alsyouf [9], Mahmaod Alrawad [10,11], Ahmad Al-Khasawneh [12], Mohamed Saad [1] and Rommel Al Ali [13]

1 Department of Accounting, College of Business, King Faisal University, Al-Ahsa 31982, Saudi Arabia
2 Financial and Administrative Sciences Department, AL-Balqa' Applied University, Irbid University College, Irbid 1293, Jordan
3 Financial and Administrative Sciences Department, Institute of Public Administration, Al-Riyadh 11141, Saudi Arabia
4 Department of Computer Networks, College of Computer Sciences and Information Technology, King Faisal University, Al-Ahsa 31982, Saudi Arabia
5 Faculty of Information Technology, Applied Science Private University, Amman 11931, Jordan
6 Department of Computer Science, King Abdullah the II IT School, The University of Jordan, Amman 11942, Jordan
7 Accounting Department, Faculty of Administrative and Financial Sciences, Irbid National University, Irbid 21110, Jordan
8 Department of Accounting, Faculty of Economics and Administrative Sciences, Al Al-Bayt University, Al-Mafraq 25113, Jordan
9 Department of Managing Health Services and Hospitals, Faculty of Business Rabigh, College of Business (COB), King Abdulaziz University, Jeddah 21991, Saudi Arabia
10 Quantitative Method Department, College of Business Administration, King Faisal University, Al Ahsa 31982, Saudi Arabia
11 Department of Accounting, Finance and Banking, College of Business Administration and Economics, Al-Hussein Bin Talal University, Ma'an 71111, Jordan
12 Department of Cyber Security, Irbid National University, Irbid 21110, Jordan
13 The National Research Center for Creativity and Giftness, King Faisal University, Al Hofuf 31982, Saudi Arabia
* Correspondence: aalkhassawneh@kfu.edu.sa (A.L.); akef.khasawneh@bau.edu.jo (A.L.A.-K.)

check for updates

Citation: Lutfi, A.; Al-Khasawneh, A.L.; Almaiah, M.A.; Alshira'h, A.F.; Alshirah, M.H.; Alsyouf, A.; Alrawad, M.; Al-Khasawneh, A.; Saad, M.; Ali, R.A. Antecedents of Big Data Analytic Adoption and Impacts on Performance: Contingent Effect. *Sustainability* **2022**, *14*, 15516. https://doi.org/10.3390/su142315516

Academic Editors: Himanshu Shee, Rakesh Raut, Kamalakanta Muduli, Balkrishna Eknath Narkhede and Jun (Justin) Li

Received: 2 October 2022
Accepted: 21 November 2022
Published: 22 November 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Abstract: The adoption of big data analytics (BDA) is increasing pace both in practice and in theory, owing to the prospects and its potential advantages. Numerous researchers believe that BDA could provide significant advantages, despite constant battles with the constraints that limit its implementation. Here, we suggest an incorporated model to investigate the drivers and impacts of BDA adoption in the Jordanian hotel industry based on the technology–organisation–environment framework and the resource-based view theory. The suggested model incorporates both the adoption and performance components of BDA into a single model. For data collection, in this study, we used an online questionnaire survey. The research model was verified based on responses from 119 Jordanian hotels. This study yielded two significant findings. First, we discovered that relative advantage, organizational readiness, top management support, and government regulations have a major impact on BDA adoption. The study results also reveal a strong and favourable association between BDA adoption and firm performance. Finally, information sharing was found to have a moderating effect on the association between BDA adoption and firm performance. The data revealed how businesses might increase their BDA adoption for improved firm performance. The present study adds to the limited but growing body of literature investigating the drivers and consequences of technology acceptance. The findings of this study can serve as a resource for scholars and practitioners interested in big data adoption in emerging nations.

Keywords: big data analytics (BDA); information sharing; hotels; TOE framework; RBV theory

1. Introduction

Business competition has changed dramatically as a result of big data analytics (BDA), a revolutionary approach to extracting patterns from a raw datasets, contributing to improved judgments, increased productivity, upgrading of innovation, and knowledge development [1,2]. BDA are often regarded as a key corporate asset, with decision makers focusing on obtaining timely insights and generating a high level of income [3–5]. Big data represent the interactions between employees and consumers recorded in an organisation's system, providing actionable, predictive, descriptive, and prescriptive results [6]. Owing to the large amount of big data in a state of high rapidity and the diversity of information assets, extracting meaningful information and knowledge remains challenging [7,8].

BD is one of the most often used technologies/services for businesses to establish and maintain a competitive advantage. Big data are described broadly as "a collection of subject-oriented data comprising information from a specific time period that assists the management decision-making process" [9]. As per International Data Corporation (IDC) [10], the worldwide market for big data was valued at USD 66 billion in 2020 and is expected to increase at an average annual rate of USD 157 until 2026. Many firms believe that big data adoption is critical and has significant potential. Despite the theoretical benefits of BDA deployment, multiple studies have revealed that not all firms are embracing big data. For instance, Choi et al. [11] reported that a suspicious notion exists that 80% of organisations will face failure when tapping into big data if they proceed with no well-defined strategic objectives. Big data usage has recently been comparatively lower in most firms [1,12]. Many firms have not progressed past the early adoption stage [13]. Although big data adoption is gaining popularity as an effective tool, including the formation of new business sectors and business optimisation, only some firms have implemented it and attained the desired results [14,15].

Previous research on the issue indicates that organisations benefit from using big data as a strong foundation to improve their performance [14,16]. Most report a favourable big data success–business impact relation [17]. Large corporations have used big data to achieve a variety of objectives, including but not limited to predicting new market trends and reviewing consumer behaviour and experience to discover possibilities for improvement [18]. Hotel enterprises, despite being key contributors to the national economy, lag considerably behind with respect to big data implementation, owing to a lack of resources and awareness of the fundamental hurdles that inhibit big data acceptance and utilisation [14,15]. A literature review revealed that research on the adoption of big data among the hotel sector is still limited [1,13,19,20]. Thus, in the current study, we adopt a technological, organisational, and environmental (TOE) paradigm to investigate factors affecting big data adoption in the hotel industry. The TOE model is useful in this scenario owing to its flexibility to assist in understanding the degrees of technology adoption across firms [13,21,22].

The concept of big data is widely documented as one of the cornerstones of future technology/service, providing organisations with tremendous business value [16]. Although BDA offers numerous advantages, few studies have been conducted on how businesses may embrace it and derive commercial value from it. Hence, there is a misunderstanding about how organisations deal with the process of BDA adoption and value creation [1,9]. Extensive previous research has also suggested that many firms will be unable to capitalise on the prospects that BDA may provide for their businesses. Several researchers have rejected the notion that corporations can improve their performance through BDA [1,9]. Hence, there may be a lack of knowledge and conflicting opinions with respect to how firms might employ BDA and profit from this form of investment. Additionally, enterprises such as hotels have not sufficiently explored the prospects of BDA [1,9]. In this study, we explore how hotels can benefit from BDA adoption. Therefore, additional research is required to identify the possibilities and difficulties of BDA adoption with respect to company performance in the hotel industry [13].

Although various attempts have been made to research BDA adoption during the initiation (preadoption) and official adoption stages [20,22], relatively limited attention has been paid to post-adoption difficulties and impact, specifically in the context of emerging economies [1,3,13,17,22]. A full-scale deployment during the post-adoption stage and its influence on firm performance, specifically in a growing country such as Jordan, represent a substantial and relevant issue for study as part of an attempt to comprehensively consider the effect of BDA adoption on hotels.

Besides examining the post-adoption stage of BDA, in the current research, we explore the contingent influence of information sharing, which is expected to modify the link between IS or IT usage and impact, as proposed by Ali [23]. In the digital age, the continuous exchange of information among business partners, particularly customers and suppliers, is advancing as a result of firms embracing big data in their operations to increase efficiency and enhance performance [24,25]. A considerable volume of data is routinely employed to satisfy the expectations of consumers [26]. Firms aim for speed in their operations to ensure timely production and delivery of services and goods in order to optimally serve their clients. Thus, an extraordinary advancement in technology, such as the usage of big data, forces managers to implement agility in their supply chain operations in order to meet the expectations of their consumers [27].

Firms can gain a competitive advantage and respond swiftly to uncontrolled developments in the digital market by adopting big data [28]. Information exchange, in particular, tends to affect technology (BDA adoption)–effect (firm performance) relationships [23,29,30]. As reported by Yang, Zheng, Xie, and Tian [31], the influence of technology on information exchange remains an existential question. Therefore, the mechanism by which knowledge sharing influences technology–impact interactions merits additional investigation. The findings of such an investigation would assist researchers in determining why numerous factors provide conflicting results with respect to the relationships among several independent latent variables and technology values [3,31].

As the BDA environment evolves, practitioners and scholars must understand how BDA provide value and effect to businesses. As a result, the aim of this research is to address this dilemma by presenting and evaluating a single and unified BDA adoption and effect model from the perspective of the hotel sector. Based on the above discussion, the following significant study objectives emerge:

1. To investigate the drivers of BDA adoption;
2. To identify the effect of BDA adoption on firm performance; and
3. To examine the moderating impact of information sharing on the association between BDA adoption and firm performance.

The present study provides various contributions to both academics and practitioners. We merged the technology–organisation–environment framework (TOE) and the resource-based view theory (RBV) in an effort to comprehend the antecedents of BDA adoption and its potential implications for firm performance. Furthermore, we evaluated the relevance of the suggested framework in the domain of BDA practises among hotels in emerging nations. The study results validate firm performance for organisations that undertake information sharing as key qualities that assist them in effectively and efficiently undertaking their everyday duties in order to achieve their objectives. Validation allowed us to discover the most relevant setting in terms of TOE and RBV for BDA implementation and effect in the hotel industry.

For practitioners, this study highlights critical elements that support increased BDA adoption and how it correlates with company effectiveness, which eventually translates into improved business performance. The study results can support hotel industry managers or owners in increasing their firms' capabilities, allowing firms to implement BDA in their operational processes to access leverage (such as by enhancing firm performance and competitiveness). The efficient application of BDA reduces the operating costs of firms, decreases operational risks, and allows SME hotels to generate creative goods in the current dynamic and competitive business climate.

2. Literature Review

2.1. BDA Adoption in the Hotel Industry

The hotel industry is considered to be among the fastest-developing sectors in the global economy. It is also reputed to be among the top employment-generating industry, owing to its labour-intensive nature, as well as its substantial influence on employment in other related industries [32]. In Jordan, the hotel industry is considerably dependent on tourist arrivals, as tourism is a principal export sector. The hotel industry is also a major player in the tourism and hospitality sector, which is associated significant foreign exchange earnings (SEE) [32]. As reported by the Jordanian Central Bank (JCB), the hotel and hospitality industry accounts for approximately 11% to the country's gross domestic product (GDP) [33]. Given the importance of hotels in any economy and their role in ensuring the competitive position of most developing nations, it is not surprising that virtually all nations worldwide place considerable emphasis on strengthening and supporting their SME hotels using a variety of supportive programs and institutions.

Owing to their size, SME hotels face typical resource constraints, particularly a lack of financial and technological experts as compared to other business sectors [34]. Such constraints make SME hotels unable to utilize their resources effectively. For example, the lack of financial resources is a major barrier for the strategic use of technologies in most businesses [35]. Additionally, the lack of competent experts forces business to outsource most technology-related projects. Ultimately, these constraints affect businesses readiness and create a risk-averse attitude with respect to technology adoption [34].

Technological application plays an integrated and extensive role in how business functions are executed [36]. The use of technologies in businesses in general and SME hotels in particular has been recognized as an effective way to increase and enhance performance. Appropriate adoption of technology ensures accurate and timely reports and other data to hotel managers pertaining to the impacts of their decision making and the results of their hotel's operations on performance. Given the increasing significance of hotels, their survival is an issue of continual concern, as they need to be increasingly aggressive to advance their competitive status and improve their performance. Concerning the aforementioned issue, the distinction between unsuccessful and successful SME hotel relates to how they adopt useful technology. Therefore, the use of sophisticated technology, such as BDA, guarantees the ability of hotels to pursue their goals in the most efficient and effective manner [34].

The adoption of BDA in combination with modern technologies can improve the experience of consumers and help them to make buying decisions. In the uncertain and highly competitive hotel industry, a growing number of hotels needs to implement BDA to generate customer value and impact and to attain distinction through customized services and products [34,37]. BDA allows hotels to explore the unexpected patterns of their businesses, customers, and markets, in addition to improving their understanding of customer behaviour, which is considered one of the key elements of competitiveness in the hotel and hospitality industry [34]. BDA assists hotels in understanding the main factors that contribute to customer satisfaction through BD text analysis of customer reviews on various websites [38]. In addition, BDA can help hotel managers in improving business performance in the hotel industry. Hotel managers realize that BDA can benefit their businesses by suggesting potential action plans, describing their business operations, generating information they may not have, and investigating why negative or positive actions occur. Business intelligence tools can assist businesses in conducting these types of analyses, monitoring key performance indicators, and producing accurate reports. Analysts can convert their insights into action by using these tools to communicate their findings to stakeholders. Furthermore, hotels occupancy trends, market position, guest demographics, and channel profitability can all be supervised. In summary, hotels managers can improve their business performance by adopting BDA at every size and stage.

2.2. Related Works

Various studies have focused on the use of BDA. For example, Park et al. [39] undertook a study in Korea to determine the important components of BDA acceptance. According to the findings of the study, the adoption variables were divided into three categories: environmental factors, organisational factors, and technology factors. Similarly, Skafi et al. [40] utilised the TOE and contextual theory to investigate the choice to implement BDA in Lebanese firms. The findings suggested that technological aspects such as security and complexity positively influenced BDA adoption. Furthermore, the findings revealed that organisational characteristics such as past IT expertise and manager endorsement played a significantly positive role in the choice to accept BDA. As a consequence, an absence of adequate governmental initiatives, as well as inadequate infrastructure hampered BDA implementation.

Ajimoko [41] examined the essential requirements for cloud-based BDA adoption using three models: DOI, TAM, and the TOE framework. The findings of the study divided the key adoption criteria into external and internal groups. The internal criteria encompassed technological and organisational elements important for BDA adoption. The external criteria comprised environmental factors that have less impact on BDA adoption. Parson [42] analysed decisions of IT specialists to use BDA in enterprises utilising the technology acceptance model (TAM) model in a study performed in the United States. According to the study findings, perceived usefulness and perceived ease of use had a substantial impact on BDA adoption.

Mangla et al. [43] used the SEM approach to investigate the influence of BD on project performance. Their study results suggested a framework for analysis of the impact of nine factors on collaboration, explorative learning, project complexity, project success, sustainability, and top management, including environmental technologies, green purchasing, project operational capabilities, project knowledge management focus, and social responsibility. According to the findings, using BDA can increase project performance and the nine factors in the manufacturing industry. Likewise, Nasrollahi et al. [44] investigated the impact of BDA on performance in Iranian businesses. The study findings demonstrated how to assist firms in developing nations in adopting BDA components to improve their performance. Furthermore, the study results revealed that 12 factors covering social, economic, and operational performance had a substantial impact on BDA adoption.

Maroufkhani et al. [45] investigated the crucial determinants of BDA adoption and the impact of BDA on business performance in Iran in a recent study. The researchers discovered that seven factors encompassing complexity, external support, observability, organisational readiness, trialability, top management support, uncertainty, and insecurity had a significant impact on BDA adoption in Iranian businesses. Furthermore, they discovered that the application of BD could effectively enhance the performance of these firms. In Malaysia, Loh et al. [46] concentrated on analysing BD adoption during the COVID-19 pandemic to aid firms in enhancing performance and overcoming obstacles during the lockdown period. The study highlighted the essential technological components that might aid Malaysian businesses in properly embracing and utilising BDA. Lastly, Mikaleef et al. [47] investigated the indirect impact of big data adoption on competitive performance through the mediating effect of dynamic skills among Norwegian organisations. According to the study findings, two types of operational capability, marketing and technology capabilities, had a beneficial impact.

BDA has significant effect on businesses performance within diverse industries [48]. The majority of hotel industries have leveraged BDA to develop customer management systems. In the retailing sector, BDA is used to sustain businesses performance and has become a main facilitator for the management and improvement of supply chains [1]. In other industries, such as health care, BDA is likely to improve businesses value as it enables more accurate and correct medically related decisions [24,49–51]. Several studies have argued that BDA adoption influences business performance [1,26,45,48]. In the next section, we explain the theoretical foundations of this influence.

The adoption of BDA and its impact has become a critical topic for practitioners and academic scholars worldwide. Previous research has confirmed that many factors influence BDA adoption and effect. However, our literature review performed as part of the current study revealed a significant gap. Few studies have attempted to explain the influence of BDA adoption on firm performance by merging the TOE framework with RBV theory. As a result, it makes sense to investigate the determinants of BDA adoption and their influence on performance in the Jordanian hotel industry, as well as the moderating effects of information sharing on such a relation.

2.3. Theoretical Foundation

2.3.1. TOE Model

The TOE and the DOI serve as the theoretical basis for the current study. Numerous studies have revealed that integrating the TOE and DOI theories provides the best-fit criteria for technology adoption in the context of the hotel industry [36]. The DOI highlights technological aspects as drivers of technology diffusion and the process of disseminating technology adoption within firms. The TOE model encompasses both interior and exterior aspects that may impact technology adoption within a company, whereas the DOI model focuses primarily on technological elements [1,52]. According to Yoon et al. [53], examining technology implementation factors is critical in innovation adoption research.

Therefore, the DOI is generally considered, along with TOE, as an additional significant theoretical underpinning for model building. TOE appears to be congruent when applied in concert with Roger's DOI [53]. As postulated by this theory, the individual characteristics, as well as the organizational attributes, drive organization innovativeness. DOI has been applied to technology adoption research, and the similarities of its characteristics with the organizational context of the TOE have been widely reported [54]. Scholars of technological innovation tend to describe the factors of technological perspective as innovation attributes. However, a new and crucial component, the environmental context, is also included in the TOE [52], highlighting the opportunities and constraints associated with the adoption of technologies. Hence, the combination of the TOE with the DOI could enable improved description of intrafirm technology adoption.

Integration of the technological factors of DOI theory with the TOE can provide a complete study framework, improving the ability of Rogers' DOI theory to reveal the diffusion of intrafirm innovation [54]. In the present study, we provide a conceptual model (Figure 1) based on the TOE model and the DOI theory, drawing on the growing literature on BDA and TOE variables for technology adoption. A broad range of TOE characteristics has affected technology adoption. In this study, we investigate technological (relative advantage and compatibility), organisational (top management support and organisational preparedness), and environmental factors (government regulations) and provide supporting explanations for the hypotheses presented in the subsection that follows.

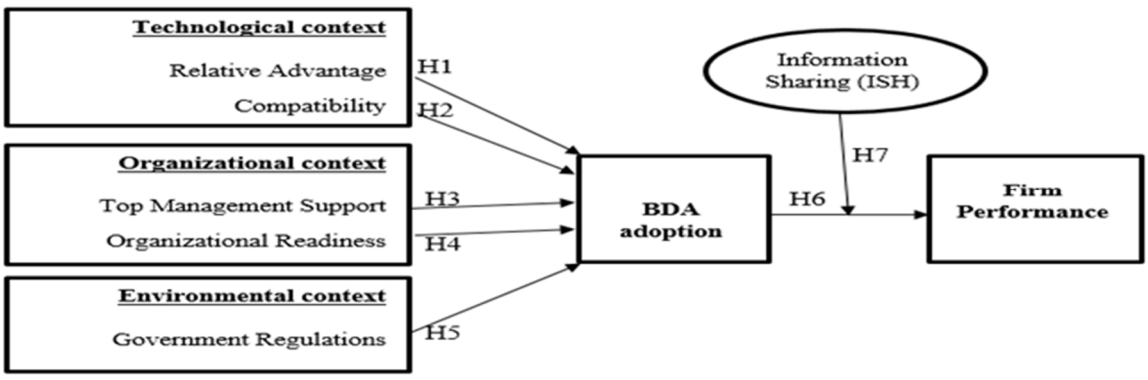

Figure 1. The proposed conceptual model.

2.3.2. RBV

According to the RBV, a firm's performance is defined by its primary resources [55]. Company resources might include both actual and intangible assets, including information, knowledge, and business procedures and routines [54]). Accordingly, precious, uncommon, unique, and non-substitutable resources can provide organisations with competitive advantages by creating value and enhancing firm performance [55]. These benefits can be maintained over long time periods so that the firm can protect itself from resource imitation, transfer, or substitution [56]. This hypothesis has been validated by empirical research [1,13,17].

According to Lutfi et al. [36], enterprises can increase the value of resources when other complementary resources are present, as the combined value of complementary resources is greater than the individual values of component resources. In the BDA context, data are increasingly seen as an important intangible resource that can be used to improve corporate performance [1,57,58]. According to RBV, the ability to process large data can provide a competitive advantage [15]. Firms with the ability to effectively utilise data have access to a valuable, uncommon, unique, and inimitable resource [58].

Empirical studies applying RBV have supported it relevance [22,45,47]. Bharadwaj, Bharadwaj, and Bendoly [59] argued that businesses can increase the impact (value) of their resources in combination with complementary resource, as the joint impact of complementary resource is greater than the total impact of each component resource. In the BDA context, data are viewed as intangible and vital resources that can be used to improve business performance [15,57]. According to RBV theory, the ability to process BDA can increase competitiveness [15]. Therefore, businesses that are capable of exploiting data have access to inimitable, rare, and valuable resources [58]. In the current research, we focused mainly on the impact of such critical business resource (BDA) in creating impact and value for hotels, as the ability to process such data enhances the capabilities of SME hotels, ultimately improving performance and outcomes.

BDA is considered a primary business capability that can improve and maximize performance [1]. This can be achieved by developing BDA capabilities and classifying the drivers that could significantly affect the building of such capabilities. Therefore, improved performance in a BDA-driven environment stems from a homogenous combination of all available resources, such as organization resources including BDA, human resource including analytics knowledge or skills, and physical resources including IT infrastructure, which should be inimitable and unique [22,45].

The focus of this work is primarily on the significance of essential firm resources in BDA adoption and producing value for companies, as the ability to analyse such data improves firm capabilities, ultimately enhancing results. The impact on firm performance was investigated by taking into account all relevant supplementary resources.

Despite the large amount of empirical research, conclusions about the influence of business resources on performance are sometimes conflicting in the data analytics context. Whereas some research has revealed a favourable relationship between big data use and business results [48,60], others contend that BD use is not always associated with improved business performance [1,57]. According to Akter et al. [26], investing in big data presents several hurdles, as many organisations that have engaged in the use of big data have yet to achieve enhanced performance. Considering the contradictory and occasionally conflicting outcomes, it is unknown whether a direct relationship exists between BD utilisation and a firm's overall performance [1].

In order to solve this issue, several studies have examined "firm capabilities" as a mediator between resources (including BDA) and firm performance [61–64]. Firm capabilities are specific firm characteristics that respond to managerial difficulties. These skills make it easier to utilise a firm's other critical resources in order to improve firm performance [65]. Nevertheless, information sharing is a key capability that allows firms to efficiently and effectively run their everyday operations to accomplish their aims; therefore, firm capabilities may promote the influence of BDA adoption on firm performance. Because the impact of

BDA on firm performance remains unclear [51,66], RBV was used to analyse the influence of BDA adoption on firm performance and the moderating role of information sharing in the influence of BDA adoption on business performance. These relationships are explained in the following section.

2.3.3. Integration of TOE and RBV

Previous IT research in this sector has investigated the topic from two perspectives: one emphasizing the variables affecting innovation usage decisions and the other exploring the drivers and impact of technology adoption.

Regarding the first method, a review of the prior research reveals that the TOE framework provides a good starting point for the investigation of BDA adoption [1,13]. The TOE framework proposes three types of factors that impact how businesses employ technology. First, the technological context defines perceived innovation features, such as compatibility, complexity, trialability, observability, and relative advantage. According to a meta-analysis undertaken by Tornatzky et al. [67], the most prevalent relevant and significant positive factor to be evaluated in this study is relative advantage. Second, the organisational context implies the number of internally accessible slack resources. Top management support and organisational readiness have been determined to be most significant with respect to technology adoption, which is also addressed in the present study. Third, the "environmental context" implies "the arena in which a firm conducts its industry and business, rivals, and contacts with government". The approach is congruent with Rogers' approach [68], which stresses technological characteristics and organisational factors as drivers of technology/innovation diffusion.

Another study technique has expanded the TOE framework by considering the influence of technology utilisation. According to RBV rationale, businesses generate value and influence by integrating diverse resources that are either economically challenging to copy or valued across businesses [17,58]. Furthermore, the effect of resources is determined more by an organisation's capacity to leverage an invention than by the innovation alone [56]. Thus, the impact of innovation is determined by the extent to which an innovation/technology is applied in important operations of business value chains.

The more extensive the utilisation, the more likely a firm's invention will have a one-of-a-kind impact [36]. This strategy has resulted in a body of research focusing on the causes and effects of innovation adoption [1,17]. Nevertheless, very few studies in the area of DBA have adopted this concept. As a result, in the present study, we focus on the adoption and impacts of BDA, filling a gap in the literature. In summary, TOE is the primary paradigm that has influenced the majority of past studies in explaining the drivers of technology adoption. Similarly, the RBV has been used to predict the effects of technology adoption based on earlier research.

3. Research Framework and Hypotheses

The conceptual framework adopted in this study integrates the TOE and RBV, the most popular theories in the realm of IT, to investigate technological drivers and impact. Furthermore, we modified the theoretical lenses to assess the adoption and effect of BDA by hotel enterprises. Based on the literature review, in the present study, we explore the variables influencing BDA adoption by hotel enterprises in various circumstances and the impact of BDA adoption on performance. As a result of a study of previously examined factors, a conceptual framework (refer to Figure 1) was developed and utilized as a guideline during the research process. The three contexts of elements in the model presented in Figure 1 are technological, organisational, and environmental. These settings are explored in the following sections. Figure 1 highlights the proposed conceptual model.

In this research, the causality of the TOE model will be adapted to explain the antecedents of BDA adoption. Therefore, we developed a theoretical framework grounded in the TOE framework and RBV theory. The variables involved in this work were grouped into technological, organizational, and environmental contexts. Relative advantage and

compatibility are the technological characteristics (factors) that determine the degree of BDA relevance to the hotels. Organizational readiness and top management support are organizational characteristics (factors) that reflect a hotel's ability to adopt BDA. Furthermore, government supports represent an environmental characteristic (factor) indicating the extent to which hotels receive support as an external necessity for BDA adoption. Nonetheless, as an addition aim to this work is to explore the impact of BDA adoption on business performance, the causality of RBV theory will also be perused, as recommended in numerous previous studies [1,34]. Taking the aforementioned into consideration, the RBV theory is leveraged in this work to validate the existence of an association between BDA adoption and business performance. In accordance with the RBV, the more profound and extensive the adoption of BDA, the greater the possibility of a business creating an impact that is valuable, almost inimitable, and sustainable. Therefore, in the present work, we contend that a theoretical association exists between BDA adoption and business performance.

3.1. Technological Context

The technological domain describes the exogenous and endogenous characteristics of technology necessary for its acceptance. One such factor is relative advantage [1,13,53]. Organisational intention to adopt is considerably influenced by the perceived advantages of the new technologies with respect to specific organisational performance [45,69]. The degree to which the acceptance of technology perceived as outstanding relative to other forms of existing technology used in enterprises, as well as the advantages it brings to the firm, is termed relative advantage [68,70]. Youssef, Eid, and Agag [13] stated that businesses are willing to embrace technology if the advantages outweigh the benefits of the present technology. Thus, the following hypothesis is proposed:

H1. *The relative advantage of BDA has a significant positive effect on its adoption.*

Compatibility (CO) is the degree to which new systems/technologies are associated with an organisation's present systems/technologies [60]. Compatibility in technology adoption reflects the alignment of the technology with an organisation's business processes and cultures [1]. CO has been shown to be one of the top factors affecting technology adoption [68], and empirical research indicates that CO is one of the most important criteria in deciding on big data [45,71]. Organisations can increase the flexibility of their policies and procedures in this respect to support a beneficial compatibility–big data adoption relationship [54]. Thus, the hotel sector may be more likely to accept and use big data in various departments if they are satisfied that the implementation is coherent with their existing standards and processes. Thus, the following hypothesis is proposed:

H2. *The compatibility of big data has a positive relationship with its adoption.*

3.2. Organisational Context

In the present study, management support and organisational readiness were identified as factors influencing BDA adoption in the hotel industry. Top management support refers to the extent to which managers recognise and embrace the technological capabilities of a new system (BDA) [13]. According to Lutfi [72], decision makers in hotels tend to be part of the senior management team, and their endorsement is important for innovation adoption. Furthermore, they are the fundamental link between individual and organisational technology adoption, as adoption proclivity is associated with the innovativeness of senior managers or leaders. Prior research has shown that senior management support is a crucial predictor of effective innovation uptake [60,73]. Top managers in hotel were reported to be less reluctant to deploy new systems [13]. Consequently, the following hypothesis is proposed:

H3. *Top management support (TMS) is positively associated with the adoption of BDA.*

Organisational readiness refers to a company's competence and desire to adopt new technologies [1]. It indicates a firm's capacity to manage and invest in the adoption of

new technologies, comprising technical IT expertise and ability [13]. Academics agree that organisational preparedness is a necessity for BDA adoption in the field of business analytics and big data [45]. Youssef, Eid, and Agag [13] found that organisational readiness has a strong and favourable link with the adoption of new technologies in the setting of small firms and that one of the most significant factors or prerequisites for BDA adoption is organisational readiness. As a result, the following hypothesis is postulated:

H4. *Organisational readiness contributes positively to BDA adoption.*

3.3. Environmental Context

The factors in the environmental context are the components external to the organisation [36]. Environmental factors are present in the dynamic exterior environment of the organisation to which it is sensitive. The literature has shown that government plays a vital role in the technology adoption [1,67]. By implementing guidelines and providing financial assistance, policy makers can facilitate BDA adoption in businesses. Government can inspire and encourage BDA adoption by providing and promoting technical support, training, independent advice, and other incentives, and government can offer capital, legislation, and policies to ensure trust and security in new technologies.

According to the TOE, governmental restrictions are external components that have the capacity to influence big data adoption among hotel enterprises. More precisely, government laws may restrict or encourage enterprises to embrace innovative technology [67,74]. The acceptance of big data by firms may increase if government regulations (GRs), policies, legislation, and standards support and encourage the adoption of new technology [75]. According to previous research [13,75], organisations that face a high degree of government pressure and restrictions are more likely to use cloud technology [76]. According to an initial review of big data adoption research, government legislation in the form of incentives and assistance increases big data adoption and acceptability. As a result, we suggest that:

H5. *Government regulations have a significant association with big data adoption.*

3.4. BDA Adoption and Firm Performance

Quality insights from BDA may improve firm performance by improving supply chain management, supporting the development of applications and new goods, and maintaining customer relationships [1,45]. BDA adoption enables SME hotels to improve decision making about customers' necessities and desires by depending on analytical tools. Additionally, BDA can help these enterprises to enhance their competitive position [1]. SME hotels can derive impacts from big data with the support of BD service providers. Therefore, BDA adoption in SME hotels can be productive in undertaking the significant challenges and obstacles faced by businesses. The literature has shown that BDA can improve the ability of businesses to retain or attract customers, enhance profitability, and ultimately improve their overall performance [1,45].

Irrespective of the firm size, the key demand for technology innovation adoption is to create value and impact that can eventually lead to improved firm performance [17,77]. To illustrate, Božič and Dimovski [78] revealed that the availability of data, along with sophisticated tools (BDA) and techniques, could potentially enable businesses to generate value and impact and support businesses in recognizing their surrounding environment, internal process, and their customers' preferences and needs. Therefore, businesses could prioritize and emphasize creating and generating value and impact from their data. For example, hotel industry sectors can leverage data to improve sales via targeted marketing and management of their inventory, whereas manufacturing sectors can leverage data in order to improve delivery processes or optimize production [45,79]. For instance, RBV shows that analytics technology platforms cannot explain variance in business performance if they are easy or expensive to recreate [1,48]. Likewise, as the use of analytics increases, the asymmetric nature of information may offer a competitive advantage for multiple

functional units (such as marketing, operations, and human resources), reflecting the exclusivity and non-substitutability foundations of RBV.

In a similar vein, Ahmed, Yusof, and Oroumchian [80] noted that obtaining business value from analytics is heavily reliant on developing strong internal skills that correlate insights with business results. In this study, "internal capabilities" are defined as the availability of qualified individuals capable of innovating and creating competitive advantages using approaches such as data visualisation and predictive and prescriptive modelling. According to the RBV, a firm's capacity to produce value and impact from data processing (BDA adoption) can have a major impact on its success [81]. BDA offer firms the opportunity to recognize suspicions regarding capacities, demand, and supply availability [82]. Furthermore, BDA supports information synthesis and interpretation from various sources for the purposes of decision making. As such, it can be recognized as a value and impact generator for firms in various industries. Hence, it can contribute significantly to generating value for many businesses, leading to customer satisfaction and, ultimately, improved performance. Therefore, we predict that:

H6. *BDA adoption has a significant positive impact on firm performance.*

3.5. The Moderating Effect of Information sharing on the association between BDA adoption and Firm Performance

Li et al. [83] described information sharing (ISH) as the timely, sufficient, and authentic sharing of quality information between supply chain allies. Additionally, ISH refers to the extent to which firms share information with their supply chains allies that is inclusive, pertinent, accurate, simple, and rapidly categorized [81]. When acquired information is presented to supply chain partners, superior decisions can be made with respect to collaborative prediction, ordering, capacity sharing, and production renewal. Hence, such practices could improve customer sensitivity and ensure dynamic optimization of supply chains [1,84].

ISH is an important tool used by businesses to reduce uncertainty and disruption, enhance two-way engagement, and gain competitive advantage [85]. Employee information sharing generates business prospects, concepts, and fresh ideas. For example, Tsaai [86] showed that employees are motivated when top and middle management proactively share information with them. Likewise, Jaaworski and Kohli [87] asserted that information sharing improves employee engagement and fosters mutual trust and commitment. According to Wei et al. [88], employees require a structured information-sharing mechanism that increases their understanding of the firm's goods, services, and rivals. Similarly, Yang et al. [89] emphasized that sharing valuable and valued information across the businesses enhances product quality, stimulates co-ordination, and enhances sustainability, leading to improved firm performance.

The sharing of valuable information plays a key role in improving co-ordination between businesses and enhancing product quality [23,90]. An efficient information exchange method also assists employees in identifying and managing dynamic company developments [91]. Additionally, the frequency with which information is shared plays an important role in promoting agility in business operations. The more related information is shared, the more the competitiveness is gained. Previous research has explored the amount of information exchange in companies. For instance, ISH (high versus low) increases the relationship between manufacturing operations and the productivity of the firm, and credit quality, is associated with network ties and business performance. Researchers concluded that sharing information assists hotel sector in acquiring quality credit and improving performance. Recently, Nath et al. [91] investigated the function of ISH as a buffer in the relationship between technological innovation and BDA and discovered that high and low levels of ISH increase the influence of big data use on technological innovation. In the same vein, Podrug et al. [92] conducted an empirical study and found that ISH is a primary factor that facilitates businesses in developing innovation capabilities. Sharing of information such as target market data, internal changes, concerns, proprietary information, and

core business processes by a hotel can help to develop efforts toward the implementation of the most recent technologies, improving the effectiveness of technology and business performance. Therefore, the following hypothesis is proposed:

H7. *Information sharing has a positive significant effect on the relationship between BDA adoption and firm performance.*

4. Methodology

A quantitative questionnaire was utilised to collect data in this investigation. The measuring items were adapted from previous research. In the present study, we used five-point Likert-type items, with responses ranging from one (strongly disagree) to five (strongly agree). The first questionnaire form was sent to five big data specialists in the sector and four academicians for review. Based on their input, the questionnaire items were changed as per requirements before being evaluated in a pilot study.

Because the respondents' primary language of communication was Arabic, the questionnaire was translated to Arabic by a language specialist and reviewed for mistakes by hotel specialists in Jordan. Five experts reviewed the translated version to ensure that all items accurately measured hotel variables. A back-to-back translation was used to retain the definitions of each item. Before data were collected from the study population, the translated questionnaire administered to a sample of 35 hotel managers to verify its clarity and construct reliability, as suggested by Dwivedi et al. [93]. The Cronbach's alpha (α) for all constructs surpassed 0.70, indicating a high level of dependability, as per Hair et al. [94].

The research hypotheses proposed in this study were derived from previous studies in the literature. In the TOE model, the exogenous factors were split into technological, organisational, and environmental characteristics variables, and the items evaluating big data adoption were adapted from Tu [95]. Two constructs were included in the technological factors: relative advantage and compatibility. The items were collected from [75,96]. In addition to the items mentioned above, the organisational elements of TMS and organisational readiness were assessed using items from [45]. In contrast, the environmental variables of government support were measured using items from [75]. Furthermore, information-sharing items were adopted from [97]. Finally, firm performance items were adopted from [98] as tested in the context of the hotel industry in [34], (refer to Appendix A).

As previously stated, study population represents Jordanian hotels. The respondents were small and medium hotel owners or managers, as they are the people who know the most about the research topic and are more likely to have accurate perceptions of BDA adoption in SME hotels because they usually play an important role in decision-making tasks. Therefore, in the present research, we applied the simple random sampling method based on prior studies in the hotel industry, as well as technology research [99–101]. Hence, all units in the study population had an equal chance to be chosen for sampling. We contacted the firms to describe the goal of the study and the definition of big data, following which the names and email addresses of possible respondents were acquired. The survey was delivered to the respondents via email. Each survey included a cover letter defining the study's aim and purpose, as well as a brief description of big data. Approximately 500 questionnaire surveys were distributed, and 127 were returned. Eight responses were declared incomplete or did not meet the inclusion criteria. Hence, only 119 questionnaires were usable, yielding a response rate of 24% (low response rates are common in most research involving SME hotel owners/managers as respondents [34]). The next step was to measure non-response bias by matching early and late replies using a t-test. Following the method described by King and He [102], no statistical differences appeared between the two responses at a significance level of 5%, indicating a lack of non-response bias.

5. Data Analysis

For hypothesis testing, the partial least square structural equation modelling (PLS-SEM) method was employed in this work. PLS is a multivariate statistical method that enables the estimation of numerous associations in a given model between one or more

exogenous factors and one or more endogenous factors. This modelling approach is also effective and enables the analysis of complicated models with contingent or even mediating relationship variables and moderately small sample sizes [103–105]. According to the explanations above, PLS-SEM methods were used to evaluate the proposed hypotheses and analyse the acquired data because this research model incorporates nine latent components, which add to the complexity of the suggested model. A total of 119 responses were received, which is less than the number required for alternative methodologies. This research is exploratory in nature and employs DOI, the TOE framework, and the RBV. Integration necessitates the employment of a path-modelling approach in response to the suggestion of various researchers that the PLS-SEM technique utilised in the study is an extension of an existing theory or prediction-oriented in nature [94]. This approach was used to validate the reliability and validity of the variables before analysing the structural model.

6. Results and Interpretation

6.1. Measurement Model Assessment

Assessment of measurement models is a precondition and the initial stage in producing findings in PLS-SEM. Assessment focuses on investigating the reliability and validity of measures. The assessment of the measurement model in PLS-SEM changes based on whether the measurement model contains formative or reflecting measurements. The reflecting measurement approach often assumes that the indicators originate from the concept (interchangeable) and that all indicators assess the same causal reality. In contrast, the formative measurement approach assumes that indicators generate a construct of interest. Thus, formative indications are not interchangeable and are discarded as variable indicators. Owing to these differences, each measurement model contains different criteria. The major issues associated with the reflective measurement paradigm are composite reliability, construct convergence, discriminant validity, and factor loadings.

Nevertheless, the nature of the measures for all variables in the current study is reflective. All study factors (variables) were approximated using reflective measurements derived from previous similar studies and handled as individual items. Thus, the internal reliability values of the scales were examined applying composite reliability, along with Cronbach alpha values. The values of Cronbach alpha ranged between 0.720 and 0.849 (Table 1), indicating adequate convergent validity [94]. The discriminant validity was further assessed utilising the Fornell–Larcker criteria [103], and the interconstruct correlations were found to be less than the squared AVEs (Table 2). This finding indicates that the measurement model fits the data well [106].

Table 1. Reliability statistics.

Construct	Cronbach's Alpha	Composite Reliability	AVE
	>0.7	>0.7	>0.5
Firm performance (FP)	0.837	0.879	0.553
BDA adoption (BDA A)	0.720	0.826	0.545
Relative advantage	0.829	0.874	0.541
Compatibility	0.721	0.835	0.631
Top management support	0.849	0.894	0.627
Organisational readiness	0.851	0.893	0.628
Information sharing	0.772	0.845	0.538
Government regulations	0.809	0.866	0.523

Note: AVE—average variance extracted.

Table 2. Correlation matrix (AVE square roots).

	FP	BDAA	RA	CP	CO	GS	TMS	OR
Firm performance	0.753							
BDA adoption (BDA A)	0.383	0.748						
Relative advantage (RA)	0.451	0.347	0.784					
Information sharing (ISH)	0.288	0.386	0.317	0.743				
Compatibility (CO)	0.261	0.371	0.211	0.305	0.838			
Government regulations (GRs)	0.146	0.160	0.196	0.025	0.128	0.733		
TMS	0.372	0.306	0.247	0.659	0.280	0.088	0.842	
Organisational readiness (OR)	0.086	0.277	0.165	0.425	0.603	0.061	0.293	0.783

6.2. Assessment of the Structural Model

Following the study of the measurement model, the structural model was evaluated in the PLS-SEM analysis. Similarly, the nature of the impacts between the dependent and independent variable relationships vary between models with and without moderator effects [94]. Because the aim of this study is to assess the significance of the main effects of BDA adoption on firm performance, partial least square (PLS) analysis should be performed by excluding the moderator first. Subsequently, the interaction effects can be investigated in another model [94]. Therefore, two distinct sets of models were tested: (1) the direct association models and (2) the moderation association models.

6.2.1. Direct Associations Models

The hypothesized associations were evaluated using the PLS-SEM approach. The findings presented in Table 3 indicate that the effect of BDA adoption on firm performance ($\beta = 0.383$, $p < 0.01$) was the most significant. Thus, H6 is supported. The results also indicate that relative benefits ($\beta = 0.096$, $p < 0.10$), TMS ($\beta = 0.194$, $p < 0.05$), organisational readiness ($\beta = 0.128$, $p < 0.05$), and GRs ($\beta = 0.205$, $p < 0.01$) are significantly correlated with BDA adoption. Therefore, H1, H3, H4, and H5 are supported. However, compatibility ($\beta = 0.009$, t = 0.110) is not significantly associated with BDA adoption. Therefore, H2 was rejected. However, the findings of this empirical analysis indicate that TMS is the strongest driver of BDA adoption. All these variables explained a significant amount of variance in BDA adoption (R2 = 0.80, e = 0.12).

Table 3. PLS-SEM results (the direct relationships model).

Hypothesis	Relationship	Path Coefficient	T-Value	*p*-Value	Decision
H1	Relative advantage → BDA A	0.096	1.460	0.089 *	Supported
H2	Compatibility → BDA A	0.009	0.110	0.457	Rejected
H3	Top management support → BDA A	0.194	2.588	0.013 **	Supported
H4	Organisational readiness → BDA A	0.128	1.826	0.047 **	Supported
H5	Government regulations → BDA A	0.205	2.131	0.031 **	Supported
H6	BDA adoption → firm performance	0.383	6.977	0.000 ***	Supported

Note: Significant at * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$ (one-tailed test).

6.2.2. The Moderation Association Model

The interaction latent components of BDA adoption * information sharing were investigated using a 5000 resample bootstrapping approach. The *p*-value was determined based on the significant results, and a judgement was made as to whether a moderating influence occurred. According to the results presented in Table 4, H7 was accepted ($\beta = 0.088$, t = 1.395, $p < 0.10$), indicating that information sharing moderates the relationship between BDA adoption and firm performance postulated in this study.

Table 4. PLS-SEM results (moderation association model).

Hyp No.	Relation	Path Coeffi	T-Value	*p*-Value	Result
H7	BDA * ISH → FP	0.088	1.395	0.092	Supported

Note: Significant at * $p < 0.10$.

7. Discussion and Conclusions

Considering that BDA currently lacks a theoretical foundation from an organisational standpoint, one of the goals of this study was to examine the effect of BDA adoption on company performance (perceived antecedents and impact) from an organisational standpoint. Therefore, we proposed an integrated model based on the TOE to outline BDA adoption and the theory of RBV to explore the influence of BDA adoption on perceived impacts. Based on the findings of the statistical analysis, we identified relative advantages, TMS, organisational readiness, competitive pressure, and GRs as major antecedents of BDA adoption among the TOE factors.

Technological factor data showed that relative advantage significantly drives BDA adoption, whereas compatibility had an insignificant effect. Thus, the major influence of relative advantage on big data adoption is aligned that reported in prior research indicating a strong effect of relative advantage. Because the benefits of big data are the primary motivators or drivers for hotel to embrace BDA, they tend to have a significant impact on its adoption. In other words, even if hotels face financial challenges, IT infrastructure constraints, and a shortage of trained workers, awareness of the benefits of big data is sufficient to justify its adoption. The most significant element associated with the approval and deployment of systems/services is relative advantage [1]. However, the negligible influence of compatibility on big data adoption contradicts previous findings by Lutfi et al. [1] and Park et al. [39]. This study finding seems to be consistent with studies by Maroufkhani et al. [45] and Youssef, Eid, and Agag [13], which indicated that compatibility has an insignificant effect on BDA adoption. This limited influence might be described by the adaptability level of hotel processes and practices, which may be easier for SME hotels than for large firms. As SME hotels are adaptable, compatibility between their practices and the BDA system is not an issue encountered in the decisions-making process.

The outcomes of this study reveal the significance of top management support and organisational readiness variables with respect to big data adoption. Prior research has repeatedly shown that top management support is a key component of hotels adopting various types of technology [1]. Given the decision-making role of owners and managers in small hotels, they must create a supporting ecosystem to ensure adoption success. Managers promote organisational changes through value communication and vision clarity to subordinates. In summary, top management support may facilitate technology/service learning and dissemination throughout the firm and plays an important role in the stages of adoption. Furthermore, research dedicated to technology adoption in the hotel industry [13] has consistently substantiated the important the association between organisational readiness and big data adoption. Deficiencies in IT infrastructure, talented human resources, and financial properties are all impediments to big data adoption in the hotel industry. As a result, firms with insufficient competencies and resources may be unable to embrace BDA.

In terms of the environment, GRs were found to have a substantial impact on big data adoption in hotels. The relationship between government support and big data adoption discovered in this study aligns with previous research [1,13]. In particular, Lutfi [1] argued that acknowledgement of government assistance and incentives by chief executive officers (CEOs) plays a critical part in supporting technology/service implementation in firms and leads to their quick acceptance/adoption. Similarly, government regulatory assistance and financial assistance can help enterprises overcome inadequate technical and financial

capabilities for big data adoption. Government legislation makes it easier for hotels to make adoption decisions, especially when firms lack resources.

Results of our empirical analysis provide stimulating evidence with respect to the significant role of BDA acceptance, which was found to significantly affect business performance. The findings reveal that the breadth of BDA implementation is associated with an increased influence on business performance. This finding is consistent with RBV theory predictions and various actual investigations with respect to other types of technologies and applications in which intense use of a technology/service leads to an increased degree of impact and value [17,45].

Lastly, the interaction model was evaluated in order to examine the proposed hypotheses. As expected, the minor influence of information sharing on BDA adoption and business performance was verified. This discovery is related to previous research by Ali et al. [25], who discovered that enterprises with extensive information sharing can obtain more credit through their social relationships. Saleem et al. [106] observed that sharing information moderates the relationship between big data utilisation and technological innovation. In addition, ISH mediates the relationship between manufacturing activity and organisational production, indicating that information sharing assists hotels in obtaining additional credit through their social links [88].

In conclusion, the current study findings offer evidence of a moderating effect of information sharing on the relationship between BDA adoption and businesses performance. The results of this study also demonstrated that organizational (TMS, organisational readiness) and environmental (GRs) elements are the most significant antecedents of BDA adoption in the context of hotels. In addition, the results confirm that BDA adoption can enhance the performance of hotels.

8. Contributions

8.1. Theoretical Contribution

According to the literature, big data represents "the new frontier for competition and productivity", with the ability to provide value to businesses and enhance their performance. Nevertheless, the latest research contends that investing in big data is associated with several concerns and obstacles, as many organisations that have invested in big data utilisation have been unable to increase their performance [107,108]. The current study has emphasises anecdotal data indicating that BDA might boost firm values. To the best of our knowledge, no empirical study has examined the antecedents and impacts of BDA implementation on firm performance and, more importantly, the moderating influence of information sharing on such an association. As a result, the effect of BDA implementation on improving firm performance is not well studied. We examined this gap in the current study. In order to achieve the study goal, we used the TOE framework and RBV theory to investigate the causes of BDA adoption and their influence on firm performance. The present study makes various theoretical contributions, the most important of which is the resolution of problems regarding big data drivers in the hotel sector, as most studies dedicated to big data adoption have concentrated on large enterprises. This research incorporates the TOE framework and RBV theory in a single model to investigate the adoption and value of a specific type of technologies (BDA). As such, the study results confirm the applicability of the TOE and RBV for organizational-level research. This research thus supports the use of RBV theory as a theoretical foundation for research on the value or impact of BDA. Furthermore, it extends prior works on BDA that did not investigate beyond the adoption level (overall value).

As the disparities in resource availability and size between SME hotels and large firms have been highlighted by several previous studies, we investigated the TOE elements that might affect the implementation of big data among SME hotels. In the present study, we present a unique model of the impact of TOE variables on big data adoption. According to our findings, relative advantage, TMS, organisational readiness, and GRs play roles to play in persuading managers of SME hotels to embrace BDA. However, compatibility had

no such function due to its insignificant effects. Several of the study findings contradict previous findings because the latter have mostly focused on large businesses, serving to bolster the idea that factors motivating big data acceptance/adoption in SME hotels vary from those in larger firms.

The study results stress the necessity of using BDA as a crucial firm resource that may provide effect and value for firms from the standpoint of RBV. The data specifically demonstrate that BDA is critical in increasing firm value when used. The findings further contribute to the BDA literature by shedding light on the impact of relative advantages, TMS, organisational readiness, and GRs on BDA adoption. The findings suggest that each factor may have a distinct influence on BDA and therefore on adoption and firm outcomes. These findings add to the BDA literature by examining how each of the three primary TOE contexts influences adoption decision making.

8.2. Practical Contribution

The findings of the current research also provide numerous important implications for the managers of SME hotels, government agencies, BDA consultants or/and vendors, policy makers, and industry leaders who desire to understand how Jordanian SME hotels can benefit from the results provided in this study with respect to the use of BDA. The findings may also contribute to the effective practice of SME hotels because BD is the raw material for the decision-making process through all departments and across the entire value chain. BD knowledge can aid SME hotels by generating customer value to attain distinction through customized services and products, allowing hotels to explore the unexpected patterns of their businesses, customers, and markets and improve their understanding of customer behaviour.

The findings indicate that compatibility plays an insignificant role, whereas relative advantage was found to be an important influential factor with respect to the use of BDA. The findings suggest that BD compatibility should not be a foremost focus for BD developers. In order to facilitate the process of BD usage, BDA providers should provide the hotel industry with timely support with respect to the usage process. Relative advantage is related to BDA usage. Consequently, BD vendors are projected to highlight the exceptional benefits and characteristics of these technologies by developing clear guidelines on how BD can be implemented with existing business capital and capabilities to increase productivity and efficiency. Increasing awareness of the benefits of BD in the hotel industry will increase its prominence and generate a conducive environment for the target business, leading increased behavioural intention to use.

Additionally, the validated and developed model facilitates SME hotel managers in identifying the most important factors for the promotion of more extensive usage of BDA and how it impacts performance. The model can help managers them to concentrate on the potential value of BDA use in a firm that they may have previously overlooked. This can help them to evaluate the value and impact of BDA and provide decision-making support with respect to BDA technologies. According to our research results, top management support, organizational readiness, and government regulations are the three most important factors influencing BDA usage. Hotel managers and governments should prioritize these factors. Top management assistance takes the form of adequate financial and technical assistance; therefore, top management should hire appropriately trained personnel and provide the necessary training to present employees, search for skilled BD vendors, and allocate appropriate resources for BD implementation. Senior management must raise BD awareness as a strategic business objective and promote related activities to ensure that it is widely used within organisations. Suppliers might also exploit prior customers as success stories to boost the inclination and interest of decision makers (top management) with respect to big data adoption. A market penetration rate might be provided as part of such a presentation and clarification.

Top management commitment to all business operations serves as a proxy for BD adoption among in the SME hotel sector, ensuring high adoption and success rates. In this

context, governments can run awareness programmes for SME hotel management about the benefits of BD in order to encourage commitment and complete support. Accordingly, deficient financial resources, a lack of required professional personnel, competence, and IT infrastructure can all be impediments to big data adoption. Hence, these obstacles must be solved through partnerships between government and BD providers. A possible short-term approach is for BD providers to address the requirement for competent BD by delivering online activities to SME hotels, such as workforce training. Furthermore, governments can fund data analytics projects to address the same issue in the long run. BD providers can provide adequate technical assistance to firms, offering inexpensive solutions through competitively priced packages. Moreover, big data providers can provide technical assistance to operators in order to increase their usage skills and handle and solve difficult actions carried out through the system.

Finally, the results provide support the hypothesis that BD usage has a significant influence on performance of hotels. Despite the various discussions and investigations of the influence of BDA usage on the performance of large businesses, research on the association between BDA usage and impacts on SME hotel performance is relatively limited. SME hotels are reluctant to use and adopt BDA owing to a lack of knowledge about the drivers that may affect its successful implementation and uncertainties with respects to payoffs. The results of the current study confirm that investing in a technology such as BDA could represent an appropriate strategy to improve the performance of SME hotels.

9. Limitations and Future Studies

Like most empirical studies of this calibre, the present study is subject to drawbacks that may impact the generalisability of the reported conclusions. The first constraint is that the sample population is limited to the SME hotel industry. Compared to larger counterparts, this type of firm has different resources and structural flexibility. Hence, additional research on large firms is required. The second limitation of this study is the consequences of the COVID-19 pandemic in Jordan, which are acknowledged to impact market competitiveness and government authority to boost big data adoption among firms.

The third constraint is connected to cross-sectional nature of this study, i.e., the hypotheses were examined using questionnaire survey findings. Owing to the nature of this research, we were unable to undertake a comprehensive observation of the dynamical change in the implementation of big data; the adopted method limits the demonstrability of causality in the interactions between variables. Longitudinal research that tests correlations over a longer period can provide more thorough observations and more accurate outcomes. The fourth drawback is that in the current study, we examined data characteristics as key firm resources in the context of the influence of BDA on firm performance. Future research should consider the effects of additional data characteristics, such as data volume, data velocity, and data variety, on company performance.

In this study, we concentrated on the direct impact of TOE factors on BDA adoption. Future research should examine the contingent influence on such a relationship. Moreover, future studies can build on the framework proposed in the present study by including other possible factors, such as provision of support, peer influence, cost effectiveness, and organisational culture, or by incorporating and validating whether subsequent use of big data scores is insignificantly related to control variables, including sector, firm age, and firm size, among others. Finally, future studies can integrate the framework of the present study among SME hotels in other developed and developing countries besides Jordan.

Author Contributions: Conceptualization, A.L. and A.A.; Data curation, A.L.A.-K., M.A. and M.S.; Formal analysis, M.A.A.; Funding acquisition, A.L.; Investigation, M.H.A., A.A.-K. and M.S.; Methodology, A.L. and M.A.A.; Project administration, A.A.-K., M.A.A. and A.F.A.; Resources, A.F.A.; Software, M.H.A.; Supervision, M.A., A.L.A.-K. and M.S.; Validation, A.A. and R.A.A.; Writing—original draft, A.L. and A.A.; Writing—review and editing, A.L.A.-K., R.A.A. and A.F.A. All authors have read and agreed to the published version of the manuscript.

Funding: This study was funded by the Deanship of Scientific Research at King Faisal University (KFU) (grant no. [GRANT 36]).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The datasets used in the current study are available from the corresponding author upon reasonable request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Measurement Items	Source
BDA adoption	
Our business intends to adopt BD Our business intends to start using BD in regular bases in the future Our business would highly recommend BD for others to adopt.	[96]
Relative advantage	
BDA improves the quality of work. BDA makes works more efficient. BDA lowers costs. BDA improves customer service. BDA attracts new sales to new customers or new markets. BDA adoption identifies new product/service opportunities.	[96]
Top Management Support	
Our top management promotes the use of BDA in the business. Our top management creates support for BDA initiatives within the business. Our top management promotes BDA as a strategic priority within the business. Our top Management is interested in the news about BDA adoption.	[96]
Organizational Readiness	
Lacking capital/financial resources has prevented my business from fully exploit BDA. Lacking needed IT infrastructure has prevented my business from exploiting BDA. Lacking analytics capability prevent the business fully exploit BDA. Lacking skilled resources prevent the business fully exploit BDA.	[96]
Government Regulations	
The governmental policies encourage our business to adopt new ITs (e.g., BDA). The government provides incentives for adopting BD in government procurements and contracts such as offering technical support, training, and funding for BD adoption. Standards or laws support adoption of BD technologies. Adequate legal protection supports BD technology adoption. There are some business laws to deal with the security and privacy concerns over the BD technologies.	[75]
Compatibility	
Using BDA is consistent with our business practices. Using BDA fits our organizational culture. Overall, it is easy to incorporate BDA into our business.	[96]
Information Sharing	
Our partners share proprietary information with us. We provide information to our partner that might help our partner. We provide information to our partner frequently and informally, and not only according to the specific agreement.	[97]
Firm Performance	
I believe that BDA can provide us with more accurate data. I believe that BDA can increase the profitability of my hotel. I believe that BDA can increase our financial performance. I believe that BDA can increase my hotels operational performance.	[98]

References

1. Lutfi, A.; Alrawad, M.; Alsyouf, A.; Almaiah, M.A.; Al-Khasawneh, A.; Al-Khasawneh, A.L.; Alshira'H, A.F.; Alshirah, M.H.; Saad, M.; Ibrahim, N. Drivers and impact of big data analytic adoption in the retail industry: A quantitative investigation applying structural equation modeling. *J. Retail. Consum. Serv.* **2023**, *70*, 103129. [CrossRef]
2. Staegemann, D.; Volk, M.; Lautenschlager, E.; Pohl, M.; Abdallah, M.; Turowski, K. Applying Test Driven Development in the Big Data Domain–Lessons From the Literature. In Proceedings of the 2021 International Conference on Information Technology (ICIT), Amman, Jordan, 14–15 July 2021; pp. 511–516.
3. Jain, P.; Tambuskar, D.P.; Narwane, V. Identification of critical factors for big data analytics implementation in sustainable supply chain in emerging economies. *J. Eng. Des. Technol.* **2022**, *ahead-of-print*. [CrossRef]
4. Rayburn, S.W.; Anderson, S.T.; Zank, G.M.; McDonald, I. M-atmospherics: From the physical to the digital. *J. Retail. Consum. Serv.* **2022**, *64*, 102782. [CrossRef]
5. Wahab, S.N.; Hamzah, M.I.; Sayuti, N.M.; Lee, W.C.; Tan, S.Y. Big data analytics adoption: An empirical study in the Malaysian warehousing sector. *Int. J. Logist. Syst. Manag.* **2021**, *40*, 121–144. [CrossRef]
6. Baig, M.I.; Shuib, L.; Yadegaridehkordi, E. A Model for Decision-Makers' Adoption of Big Data in the Education Sector. *Sustainability* **2021**, *13*, 13995. [CrossRef]
7. Alsmadi, A.A.; Alzoubi, M. Green Economy: Bibliometric Analysis Approach. *Int. J. Energy Econ. Policy* **2022**, *12*, 282–289. [CrossRef]
8. Volk, M.; Staegemann, D.; Trifonova, I.; Bosse, S.; Turowski, K. Identifying Similarities of Big Data Projects–A Use Case Driven Approach. *IEEE Access* **2020**, *8*, 186599–186619. [CrossRef]
9. Mikalef, P.; Boura, M.; Lekakos, G.; Krogstie, J. Big data analytics and firm performance: Findings from a mixed-method approach. *J. Bus. Res.* **2019**, *98*, 261–276. [CrossRef]
10. International Data Corporation (IDC) (2020): Worldwide Big Data and Analytics Software Forecast, 2021–2026. Available online: https://www.reportlinker.com/p06166758/Big-Data-Business-Analytics-Market-Research-Report-by-Analytics-Tools-by-Component-by-Deployment-Mode-by-Application-by-End-User (accessed on 3 September 2022).
11. Choi, H.S.; Hung, S.Y.; Peng, C.Y.; Chen, C. Different Perspectives on BDA Usage by Management Levels. *J. Comput. Inf. Syst.* **2021**, *62*, 503–515. [CrossRef]
12. Nam, D.; Lee, J.; Lee, H. Business analytics adoption process: An innovation diffusion perspective. *Int. J. Inf. Manag.* **2019**, *49*, 411–423. [CrossRef]
13. Youssef MA, E.A.; Eid, R.; Agag, G. Cross-national differences in big data analytics adoption in the retail industry. *J. Retail. Consum. Serv.* **2022**, *64*, 102827. [CrossRef]
14. Aversa, J.; Hernandez, T.; Doherty, S. Incorporating big data within retail organizations: A case study approach. *J. Retail. Consum. Serv.* **2021**, *60*, 102447. [CrossRef]
15. Ghasemaghaei, M. Are firms ready to use big data analytics to create value? The role of structural and psychological readiness. *Enterp. Inf. Syst.* **2019**, *13*, 650–674. [CrossRef]
16. Raguseo, E.; Vitari, C. Investments in big data analytics and firm performance: An empirical investigation of direct and mediating effects. *Int. J. Prod. Res.* **2018**, *56*, 5206–5221. [CrossRef]
17. Perdana, A.; Lee, H.H.; Koh, S.; Arisandi, D. Data analytics in small and mid-size enterprises: Enablers and inhibitors for business value and firm performance. *Int. J. Account. Inf. Syst.* **2022**, *44*, 100547. [CrossRef]
18. Cabrera-Sánchez, J.P.; Villarejo-Ramos, Á.F. Acceptance and use of big data techniques in services companies. *J. Retail. Consum. Serv.* **2020**, *52*, 101888. [CrossRef]
19. Al-Sai, Z.A.; Abdullah, R.; Husin, M.H. Critical success factors for big data: A systematic literature review. *IEEE Access* **2020**, *8*, 118940–118956. [CrossRef]
20. Munawar, H.S.; Qayyum, S.; Ullah, F.; Sepasgozar, S. Big data and its applications in smart real estate and the disaster management life cycle: A systematic analysis. *Big Data Cogn. Comput.* **2020**, *4*, 4. [CrossRef]
21. Chandra, S.; Kumar, K.N. Exploring factors influencing organizational adoption of augmented reality in e-commerce: Empirical analysis using technology-organization- environment model. *J. Electron. Commer. Res.* **2018**, *19*, 237–265.
22. Maroufkhani, P.; Wagner, R.; Wan Ismail, W.K.; Baroto, M.B.; Nourani, M. Big data analytics and firm performance: A systematic review. *Information* **2019**, *10*, 226. [CrossRef]
23. Ali, Z. Investigating information processing paradigm to predict performance in emerging firms: The mediating role of technological innovation. *J. Bus. Ind. Mark.* **2022**, *ahead-of-print*. [CrossRef]
24. Lutfi, A.; Saad, M.; Almaiah, M.A.; Alsaad, A.; Al-Khasawneh, A.; Alrawad, M.; Alsyouf, A.; Al-Khasawneh, A.L. Actual use of mobile learning technologies during social distancing circumstances: Case study of King Faisal University students. *Sustainability* **2022**, *14*, 7323. [CrossRef]
25. Ali, Z.; Gongbing, B.; Mehreen, A. Supply chain network and information sharing effects of SMEs credit quality on firm performance: Do strong tie and bridge tie matter? *J. Enterp. Inf. Manag.* **2019**, *32*, 714–734. [CrossRef]
26. Akter, S.; Fosso Wamba, S.; Dewan, S. Why PLS-SEM is suitable for complex modelling? An empirical illustration in big data analytics quality. *Prod. Plan. Control* **2017**, *28*, 1011–1021. [CrossRef]
27. Barlette, Y.; Baillette, P. Big data analytics in turbulent contexts: Towards organizational change for enhanced agility. *Prod. Plan. Control* **2022**, *33*, 105–122. [CrossRef]

28. Saleem, H.; Li, Y.; Ali, Z.; Mehreen, A.; Mansoor, M.S. Mansoor. An Empirical Investigation on How Big Data Analytics Influence China SMEs Performance: Do Product and Process Innovation Matter? *Asia Pac. Bus. Rev.* **2020**, *26*, 537–562. [CrossRef]
29. Roaimah, O.; Ramayah, T.; May-Chuin, L.; Tan, Y.S.; Rusinah, S. Information sharing, information quality and usage of information technology (IT) tools in Malaysian organizations. *Afr. J. Bus. Manag.* **2010**, *4*, 2486–2499.
30. Wang, Y.; Ali, Z. Exploring big data use to predict supply chain effectiveness in Chinese organizations: A moderated mediated model link. *Asia Pac. Bus. Rev.* **2021**, 1–22. [CrossRef]
31. Yang, Y.; Zheng, Y.; Xie, G.; Tian, Y. The Influence Mechanism of Strategic Partnership on Enterprise Performance: Exploring the Chain Mediating Role of Information Sharing and Supply Chain Flexibility. *Sustainability* **2022**, *14*, 4800. [CrossRef]
32. Alzoubi RH, M.; Jaaffar, A.H. Leadership styles, crisis management, and hotel performance: A conceptual perspective of the Jordanian hotel industry. *J. Crit. Rev.* **2020**, *7*, 556–562.
33. MOTA. Statistical Bulletins. 2016. Available online: http://www.mota.gov.j (accessed on 25 August 2022).
34. Yadegaridehkordi, E.; Nilashi, M.; Shuib, L.; Nasir MH NB, M.; Asadi, S.; Samad, S.; Awang, N.F. The impact of big data on firm performance in hotel industry. *Electron. Commer. Res. Appl.* **2020**, *40*, 100921. [CrossRef]
35. Samara, D.; Magnisalis, I.; Peristeras, V. Artificial intelligence and big data in tourism: A systematic literature review. *J. Hosp. Tour. Technol.* **2020**, *11*, 343–367. [CrossRef]
36. Xiang, Z.; Schwartz, Z.; Gerdes, J.H., Jr.; Uysal, M. What can big data and text analytics tell us about hotel guest experience and satisfaction? *Int. J. Hosp. Manag.* **2015**, *44*, 120–130. [CrossRef]
37. Park, J.-H.; Kim, M.-K.; Paik, J.-H. The Factors of Technology, Organization and Environment Influencing the Adoption and Usage of Big Data in Korean Firms. In Proceedings of the 26th European Regional Conference of the International Telecommunications Society (ITS): "What Next for European Telecommunications?", Madrid, Spain, 24–27 June 2015.
38. Skafi, M.; Yunis, M.M.; Zekri, A. Factors influencing SMEs' adoption of cloud computing services in lebanon: An empirical analysis using toe and contextual theory. *IEEE Access* **2020**, *13*, 79169–79181. [CrossRef]
39. Ajimoko, O.J. Considerations for the Adoption of Cloud-based Big Data Analytics in Small Business Enterprises. *Electron. J. Inf. Syst. Eval.* **2018**, *21*, 63–79.
40. Parson, G.K. Factors Affecting Information Technology Professionals' Decisions to Adopt Big Data Analytics Among Small-and Medium-Sized Enterprises: A Quantitative Study. Doctoral Dissertation, Capella University, Minneapolis, MN, USA, 2021.
41. Mangla, S.K.; Raut, R.; Narwane, V.S.; Zhang, Z.J. Mediating effect of big data analytics on project performance of small and medium enterprises. *J. Enterp. Inf. Manag.* **2020**, *34*, 168–198. [CrossRef]
42. Nasrollahi, M.; Ramezani, J.; Sadraei, M. The Impact of Big Data Adoption on SMEs' Performance. *Big Data Cogn. Comput.* **2021**, *5*, 68. [CrossRef]
43. Maroufkhani, P.; Ismail WK, W.; Ghobakhloo, M. Big data analytics adoption model for small and medium enterprises. *J. Sci. Technol. Policy Manag.* **2020**, *11*, 483–513. [CrossRef]
44. Loh, C.H.; Teoh, A.P. The Adoption of Big Data Analytics Among Manufacturing Small and Medium Enterprises During COVID-19 Crisis in Malaysia. In Proceedings of the Ninth International Conference on Entrepreneurship and Business Management (ICEBM 2020), 9 May 2021; Atlantis Press: Amsterdam, The Netherlands, 2021; pp. 95–100.
45. Mikalef, P.; Krogstie, J.; Pappas, I.O.; Pavlou, P. Exploring the relationship between big data analytics capability and competitive performance: The mediating roles of dynamic and operational capabilities. *Inf. Manag.* **2020**, *57*, 103169. [CrossRef]
46. Wamba, S.F.; Gunasekaran, A.; Akter, S.; Ren, S.J.; Dubey, R.; Childe, S.J. Big data analytics and firm performance: Effects of dynamic capabilities. *J. Bus. Res.* **2017**, *70*, 356–365. [CrossRef]
47. Mikalef, P.; Pappas, I.O.; Krogstie, J.; Giannakos, M. Big data analytics capabilities: A systematic literature review and research agenda. *Inf. Syst. E-Bus. Manag.* **2018**, *16*, 547–578. [CrossRef]
48. Rajabion, L.; Shaltooki, A.A.; Taghikhah, M.; Ghasemi, A.; Badfar, A. Healthcare big data processing mechanisms: The role of cloud computing. *Int. J. Inf. Manag.* **2019**, *49*, 271–289. [CrossRef]
49. Wang, Y.; Kung, L.; Wang, W.Y.C.; Cegielski, C.G. An Integrated Big Data Analytics-Enabled Transformation Model: Application to Health Care. *Inf. Manag.* **2017**, *55*, 64–79. Available online: http://www.sciencedirect.com/science/article/pii/S0378720617303129 (accessed on 3 September 2022). [CrossRef]
50. Zhu, K.; Kraemer, K.L.; Xu, S. The process of innovation assimilation by firms in different countries: A technology diffusion perspective on e-business. *Manag. Sci.* **2006**, *52*, 1557–1576. [CrossRef]
51. Yoon, T.E.; George, J.F. Why aren't organizations adopting virtual worlds? *Comput. Hum. Behav.* **2013**, *29*, 772–790. [CrossRef]
52. Hsu, P.F.; Kraemer, K.L.; Dunkle, D. Determinants of e-business use in US firms. *Int. J. Electron. Commer.* **2006**, *10*, 9–45. [CrossRef]
53. Barney, J. Firm resources and sustained competitive advantage. *J. Manag.* **1991**, *17*, 99–120. [CrossRef]
54. Wade, M.; Hulland, J. Review: The resource-based view and information systems research: Review, extension, and suggestion for future research. *MIS Quart.* **2004**, *28*, 107–142. [CrossRef]
55. Ghasemaghaei, M.; Ebrahimi, S.; Hassanein, K. Data analytics competency for improving firm decision making performance. *J. Strateg. Inf. Syst.* **2017**, *27*, 101–113. [CrossRef]
56. Ghasemaghaei, M. Understanding the impact of big data on firm performance: The necessity of conceptually differentiating among big data characteristics. *Int. J. Inf. Manag.* **2021**, *57*, 102055. [CrossRef]
57. Bharadwaj, S.; Bharadwaj, A.; Bendoly, E. The performance effects of complementarities between information systems, marketing, manufacturing, and supply chain processes. *Inf. Syst. Res.* **2007**, *18*, 437–453. [CrossRef]

58. Chen, D.Q.; Preston, D.S.; Swink, M. How the use of big data analytics affects value creation in supply chain management. *J. Manag. Inf. Syst.* **2015**, *32*, 4–39. [CrossRef]
59. Barua, A.; Konana, P.; Whinston, A.B.; Yin, F. An empirical investigation of net-enabled business value. *MIS Q.* **2004**, *28*, 585. [CrossRef]
60. Banker, R.D.; Bardhan, I.R.; Chang, H.; Lin, S. Plant information systems, manufacturing capabilities, and plant performance. *MIS Q.* **2006**, *30*, 315–337. [CrossRef]
61. Bhatt, G.D.; Grover, V. Types of information technology capabilities and their role in competitive advantage: An empirical study. *J. Manag. Inf. Syst.* **2005**, *22*, 253–277. [CrossRef]
62. Fink, L.; Neumann, S. Taking the high road to web services implementation: An exploratory investigation of the organizational impacts. *ACM SIGMIS Database DATABASE Adv. Inf. Syst.* **2009**, *40*, 84–108. [CrossRef]
63. Gupta, M.; George, J.F. Toward the development of a big data analytics capability. *Inf. Manag.* **2016**, *53*, 1049–1064. [CrossRef]
64. Abbasi, A.; Sarker, S.; Chiang, R.H. Big data research in information systems: Toward an inclusive research agenda. *J. Assoc. Inf. Syst.* **2016**, *17*, 3. [CrossRef]
65. Tornatzky, L.; Fleischer, M. *The Process of Technology Innovation*; Lexington Books: Lexington, MA, USA, 1990.
66. Rogers, E.M. *Diffusion of Innovations*, 5th ed.; Free Press: New York, NY, USA, 2003.
67. Alsmadi, A.A.; Al-Gasaymeh, A.; Alrawashdeh, N. Purchasing Power Parity: A Bibliometric approach for the period of 1935-2021. *Qual.—Access Success* **2022**, *23*, 260–269.
68. Almaiah, M.A.; Al Mulhem, A. Thematic analysis for classifying the main challenges and factors influencing the successful implementation of e-learning system using NVivo. *Int. J. Adv. Trends Comput. Sci. Eng.* **2020**, *9*, 142–152. [CrossRef]
69. Almaiah, M.A.; Al-Otaibi, S.; Lutfi, A.; Almomani, O.; Awajan, A.; Alsaaidah, A.; Alrawad, M.; Awad, A.B. Employing the TAM Model to Investigate the Readiness of M-Learning System Usage Using SEM Technique. *Electronics* **2022**, *11*, 1259. [CrossRef]
70. Lutfi, A. Understanding Cloud Based Enterprise Resource Planning Adoption among SMEs in Jordan. *J. Theor. Appl. Inf. Technol.* **2021**, *99*, 5944–5953. [CrossRef]
71. Lutfi, A. Factors Influencing the Continuance Intention to Use Accounting Information System in Jordanian SMEs from the Perspectives of UTAUT: Top Management Support and Self-Efficacy as Predictor Factors. *Economies* **2022**, *10*, 75. [CrossRef]
72. Hsu, C.H.; Li, M.G.; Zhang, T.Y.; Chang, A.Y.; Shangguan, S.Z.; Liu, W.L. Deploying Big Data Enablers to Strengthen Supply Chain Resilience to Mitigate Sustainable Risks Based on Integrated HOQ-MCDM Framework. *Mathematics* **2022**, *10*, 1233. [CrossRef]
73. Lai, Y.; Sun, H.; Ren, J. Understanding the determinants of big data analytics (BDA) adoption in logistics and supply chain management: An empirical investigation. *Int. J. Logist. Manag.* **2018**, *29*, 676–703. [CrossRef]
74. Almaiah, M.A.; Hajjej, F.; Lutfi, A.; Al-Khasawneh, A.; Shehab, R.; Al-Otaibi, S.; Alrawad, M. Explaining the Factors Affecting Students' Attitudes to Using Online Learning (Madrasati Platform) during COVID-19. *Electronics* **2022**, *11*, 973. [CrossRef]
75. Alsmadi, A.A.; Oudat, M.S.; Hasan, H. Islamic finance value versus conventional finance, dynamic equilibrium relationships analysis with macroeconomic variables in the jordanian economy: An ardl approach. *Chang. Manag.* **2020**, *130*, 1–14.
76. Božič, K.; Dimovski, V. Business intelligence and analytics for value creation: The role of absorptive capacity. *Int. J. Inf. Manag.* **2019**, *46*, 93–103. [CrossRef]
77. Bianchini, M.; Michalkova, V. Data Analytics in SMEs: Trends and Policies. *OECD SME Entrep. Pap.* **2019**, *3*, 1–45. [CrossRef]
78. Ahmed, A.; Yusof, S.A.M.; Oroumchian, F. Understanding the Business Value Creation Process for Business Intelligence Tools in the UAE. *Pac. Asia J. Assoc. Inf. Syst.* **2019**, *11*, 214–247.
79. Almaiah, M.A.; Ayouni, S.; Hajjej, F.; Lutfi, A.; Almomani, O.; Awad, A.B. Smart Mobile Learning Success Model for Higher Educational Institutions in the Context of the COVID-19 Pandemic. *Electronics* **2022**, *11*, 1278. [CrossRef]
80. El-Haddadeh, R.; Osmani, M.; Hindi, N.; Fadlalla, A. Value creation for realising the sustainable development goals: Fostering organisational adoption of big data analytics. *J. Bus. Res.* **2021**, *131*, 402–410. [CrossRef]
81. Li, S.; Rao, S.S.; Ragu-Nathan, T.S.; Ragu-Nathan, B. Development and validation of a measurement instrument for studying supply chain management practices. *J. Oper. Manag.* **2005**, *23*, 618–641. [CrossRef]
82. Sheko, A.; Braimllari, A. Information technology inhibitors and information quality in supply chain management: A PLS-SEM analysis. *Acad. J. Interdiscip. Stud.* **2018**, *7*, 125. [CrossRef]
83. Chang, H.H.; Wong, K.H.; Chiu, W.S. The effects of business systems leveraging on supply chain performance: Process innovation and uncertainty as moderators. *Inf. Manag.* **2019**, *56*, 103140. [CrossRef]
84. Tsai, W.C. Determinants and consequences of employee displayed positive emotions. *J. Manag.* **2001**, *27*, 497–512. [CrossRef]
85. Jaworski, B.J.; Kohli, A.K. Market orientation: Antecedents and consequences. *J. Mark.* **1993**, *57*, 53–70. [CrossRef]
86. Wei, S.; Ke, W.; Liu, H.; Wei, K.K. Supply chain information integration and firm performance: Are explorative and exploitative IT capabilities complementary or substitutive? *Decis. Sci.* **2019**, *51*, 464–499. [CrossRef]
87. Sheu, C.; Rebecca Yen, H.; Chae, B. Determinants of supplier-retailer collaboration: Evidence from an international study. *Int. J. Oper. Prod. Manag.* **2006**, *26*, 24–49. [CrossRef]
88. Almaiah, M.A.; Hajjej, F.; Lutfi, A.; Al-Khasawneh, A.; Alkhdour, T.; Almomani, O.; Shehab, R. A Conceptual Framework for Determining Quality Requirements for Mobile Learning Applications Using Delphi Method. *Electronics* **2022**, *11*, 788. [CrossRef]
89. Nath, S.D.; Khayer, A.; Majumder, J.; Barua, S. Factors affecting blockchain adoption in apparel supply chains: Does sustainability-oriented supplier development play a moderating role? *Ind. Manag. Data Syst.* **2022**, *ahead-of-print*. [CrossRef]

90. Podrug, N.; Filipović, D.; Kovač, M. Knowledge sharing and firm innovation capability in Croatian ICT companies. *Int. J. Manpow.* **2017**, *38*, 632–644. [CrossRef]
91. Dwivedi, M.; Laddha, N.C.; Arora, P.; Marfatia, Y.S.; Begum, R. Decreased regulatory T-cells and CD4+/CD8+ ratio correlate with disease onset and progression in patients with generalized vitiligo. *Pigment Cell Melanoma Res.* **2013**, *26*, 586–591. [CrossRef]
92. Hair, J.F.; Risher, J.J.; Sarstedt, M.; Ringle, C.M. When to use and how to report the results of PLS-SEM. *Eur. Bus. Rev.* **2019**, *31*, 2–24. [CrossRef]
93. Tu, M. An exploratory study of Internet of things (IoT) adoption intention in logistics and supply chain management. *Int. J. Logist. Manag.* **2018**, *29*, 131–151. [CrossRef]
94. Maroufkhani, P.; Tseng, M.L.; Iranmanesh, M.; Ismail, W.K.; Khalid, H. Big data analytics adoption: Determinants and performances among small to medium-sized enterprises. *Int. J. Inf. Manag.* **2020**, *54*, 102190. [CrossRef]
95. Cheng, J.H. Inter-organizational relationships and information sharing in supply chains. *Int. J. Inf. Manag.* **2011**, *31*, 374–384. [CrossRef]
96. Garrison, G.; Wakefield, R.L.; Kim, S. The effects of IT capabilities and delivery model on cloud computing success and firm performance for cloud supported processes and operations. *Int. J. Inf. Manag.* **2015**, *35*, 377–393. [CrossRef]
97. Garrido-Moreno, A.; Padilla-Meléndez, A. Analyzing the impact of knowledge management on CRM success: The mediating effects of organizational factors. *Int. J. Inf. Manag.* **2011**, *31*, 437–444. [CrossRef]
98. Laitinen, E.K. Influence of cost accounting change on performance of manufacturing firms. *Adv. Account.* **2014**, *30*, 230–240. [CrossRef]
99. Zeglat, D.; Zigan, K. Intellectual capital and its impact on business performance: Evidences from the Jordanian hotel industry. *Hotel. Hosp. Res.* **2014**, *13*, 83–100. [CrossRef]
100. King, W.R.; He, J. External validity in IS survey research. *Commun. Assoc. Inf. Syst.* **2005**, *16*, 45. [CrossRef]
101. Alsharif, A.H.; Salleh NZ, M.; Baharun, R.; Abuhassna, H.; Alsharif, Y.H. Neuromarketing in Malaysia: Challenges, limitations, and solutions. In Proceedings of the 2022 International Conference on Decision Aid Sciences and Applications (DASA), Chiangrai, Thailand, 23–25 March 2022; pp. 740–745.
102. Alsharif, A.H.; Salleh, N.Z.M.; Baharun, R.; Hashem, E.A.R.; Mansor, A.A.; Ali, J.; Abbas, A.F. Neuroimaging Techniques in Advertising Research: Main Applications, Development, and Brain Regions and Processes. *Sustainability* **2021**, *13*, 6488. [CrossRef]
103. Fornell, C.; Larcker, D.F. Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* **1981**, *18*, 39–50. [CrossRef]
104. Hameed, M.A.; Counsell, S. Assessing the influence of environmental and CEO characteristics for adoption of Information Technology in organizations. *J. Technol. Manag. Innov.* **2012**, *7*, 64–84. [CrossRef]
105. Lutfi, A. Investigating the moderating effect of Environment Uncertainty on the relationship between institutional factors and ERP adoption among Jordanian SMEs. *J. Open Innov. Technol. Mark. Complex.* **2020**, *6*, 91. [CrossRef]
106. Saleem, H.; Li, Y.; Ali, Z.; Ayyoub, M.; Wang, Y.; Mehreen, A. Big Data Use and Its Outcomes in Supply Chain Context: The Roles of Information Sharing and Technological Innovation. *J. Enterp. Inf. Manag.* **2020**, *34*, 1121–1143. [CrossRef]
107. Grover, V.; Chiang, R.H.; Liang, T.-P.; Zhang, D. Creating strategic business value from big data analytics: A research framework. *J. Manag. Inf. Syst.* **2018**, *35*, 388–423. [CrossRef]
108. Rivera, M.A. Big data research in hospitality: From streetlight empiricism research to theory laden research. *Int. J. Hosp. Manag.* **2020**, *86*, 102447. [CrossRef]