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Users' intention to use business analytics systems in firms: A literature review

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Abstract
Purpose: Although Business Analytics (BA) Systems improve firm performance, few studies concern the factors that approve the value of BA investments. BA research have not acknowledged the key determinants of BA adoption that would impact the successful adoption of BA Systems (e.g., perceived privacy, perceived security, perceived risk, and BA related IT capability). In response to this research problem, the present study investigated the factors affecting users' intention to use BA systems in firms.
Design/methodology/approach: Sourced from established databases, the current research reviewed and discussed pertinent and main published studies which have been published within the period of 2019 to 2023 on the adoption of BA systems.
Findings: This study will offer insights on how BA enablers play a crucial part in influencing the intention to use of BA systems, mediated by perceived trust in BA systems. Such enablers and consequences are crucial in providing guidelines and information to potential researchers, investors, regulators as well as policy makers.
Research limitations/implications: From the theoretical perspective, the results are expected to provide further explanations on BA systems intention to use. Also, from the academic viewpoint, this study addressed the issue of partial causative linkages among BA enablers, perceived trust and BA systems intention to use.
Practical implications: Findings of the current study are of value to organizations and could guide them in seeking the BA systems that meet the needs, requirements, as well as anticipations of both the decision makers and regulators on a competitive base.
Originality/value: Important themes regarding the adoption of BA systems intention to use were revealed in this study. New concerns that emerged in using a relatively new technology, BA systems were raised as well. In practice, this research enriches the evidence on the factors affecting the adoption of BA systems in firms.

Keywords: Business Analytics Systems, Intention to Use, Literature Review

Introduction

Academics have conceptualized Business Analytics (BA) as an inclusive usage of data, statistical and quantitative methodologies, explanatory and predictive frameworks, along with evidence-based management practices to enlighten decision-making and enhance value (Horani et al., 2023; Davenport and Kim, 2013). As indicated by researchers, the use of BA among organizations is mainly to facilitate innovation in their products and services through the provision of insights by the system, and organizations also could benefit through the use of

BA across various fields (Bany Mohammad et al., 2022; Brynjolfsson and McElheran, 2021; Namvar et al., 2021; Asiaei and Rahim, 2019; Marcolin et al., 2019; Moore and Benbasat, 1991).

BA usage allows business organization to manage, process and inspect business data, so that these organizations could develop actionable insights, predict market trends and needs in the future, and increase innovation capabilities and ultimately organizational performance, in addition to creating a competitive advantage (Al-Qaralleh and Atan, 2021; Yerpude and Singhal, 2017; Sharma et al., 2014; LaValle et al., 2010). Piot-Lepetit and Nzongang (2021) indicated that BA transforms the manner in which decisions are being created and accomplished in many organizations. For managers, this system allows them to operate not solely on the basis of their experience, instincts, or intuition; it also allows these managers to use empirical data and factual information to substantiate their decision-making processes and enhance their operational efficacy. By harnessing contemporary data, Business Analytics (BA) provides decision-makers with the capacity to attain deeper insights than traditional managerial methodologies and facilitates a comprehensive understanding of their organizational dynamics. Guru et al. (2021) emphasized that Analytics can improve performance in every business regardless of size. Moreover, the process of decision-making utilizing extensive, noisy, and disorganized datasets necessitates Business Analytics (BA). BA fundamentally pertains to the generation of value, which can manifest in various ways, including enhanced efficiency or improved effectiveness, alongside more informed decisions aimed at reducing expenditures, identifying opportunities, and optimizing the distribution of resources. Based on 81 companies of different sectors in Brazil, de Oliveira et al. (2016) found that BA can leverage process innovation. Also, organizations that employ techniques of BA seem to have better customer service and larger profits (Troilo et al., 2016).

Business Analytics Definition and its Benefits

Moreover, in the global business environments, nearly all sectors are increasingly adopting business analytics systems to gain the maximum benefits of the business. Indeed, the use of business analytics improves organizations in terms of their decision-making, efficiency, competitiveness, risk management, revenue growth, real-time monitoring and forecasting. It also increases customer insights. As data continues to grow in importance, it is becoming increasingly clear that business analytics is no longer a luxury, but a necessity for success. In general, business analytics enables businesses to adopt a data-driven strategy for decision-making, which can help them to increase performance, maintain competitiveness, and make more knowledgeable judgments. Indeed, business analytics is a useful tool that aids firms in decision-making by transforming data into useful information. Businesses of all sizes are increasingly using BA to make data-driven decisions because the use of this system has proven to be key for success across various industries. The business analytics applications are many, ranging from supply chain efficiency to patient outcomes improvement to fraud detection. Business analytics will become more significant as data expands (Cymetrix Software, 2023).

As shown in Figure 1, based on Mordor Intelligence, it was predicted that corporate analytics software sales would achieve a market value of $103.65 by year 2026. As accordingly reported by Future of Business Analytics Trends in 2023 & Beyond (2023), the development of business analytics is propelled by quick time-to-insight and enhanced capabilities, and that user of BA are not necessarily data scientists.

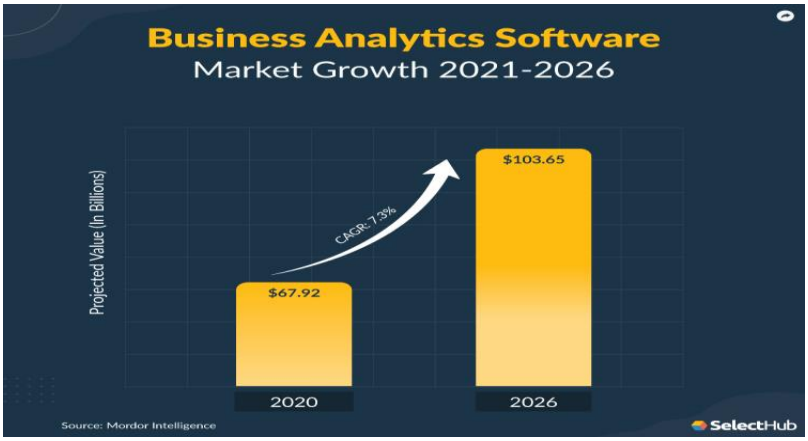

Figure 1: Business Analytics Software Market Growth
Source: selecthub.com

As a result, corporate spending on BA tools has significantly increased and global investments in such tools are continually rising (Horani et al., 2023). In addition, researchers examined the effect of BA Systems on organizational decisions making effectiveness (e.g., Bany Mohammad et al., 2022; Idoko and Akinsunmi, 2021; Wang and Byrd, 2017), and BI on organizational effectiveness (e.g., Masa'deh et al., 2021; Arefin et al., 2015). Among the early definitions of the concept of organizational effectiveness was that by Etzioni (1964) who described it as the effectiveness of a given organization in generating the intended outcomes. Also, researchers (e.g., Pettaway et al., 2015; Kiron and Shockley, 2011; Pavlou and El Sawy, 2010) found that employees whom were allowed to partake in the organization's decision making are more likely to perceive themselves as a crucial factor of the organization's effectiveness.

The idea of organizational effectiveness is a crucial component to the behaviour and management of the organization (Arnett et al., 2018; Cameron and Whetten, 2013; Biswas, 2010; Richard et al., 2009; McShane, 1992; Mahoney and Weitzel, 1969), but various people have varied definitions of what it implies (Akhtar et al., 2018; Cameron, 2015). According to their own arbitrary definitions, academics "conceptualize" organizational effectiveness (Cameron, 1981). It is often that this concept is perceived in terms of measuring "criterion" when objectivity is lacking (Mahoney and Weitzel, 1969). Clearly, over time, the concept of organizational effectiveness has been defined in various manners by various people.

Frequently denoted as "paradigms of organizational efficacy," the four resulting predominant definitions thus far are: the goal-oriented model, the system resource framework, the process-oriented model, and the ecological or participant satisfaction paradigm. As indicated by some scholars (e.g., Hall, 1978; Price, 1972; Etzioni, 1964; Georgopoulos and Tannenbaum, 1957), the degree to which an organization reaches its goals or targets is considered as the organization's organizational effectiveness – this is based on the goal model. As stated by Yuchtman and Seashore (1967), the system resource model describes organizational effectiveness as the capability of an organization in obtaining the rare and treasured resources. Comparatively, the process model elaborates the concept as an internal process and procedures of an organization (Cameron, 1981; Likert, 1967; Bennis, 1966; Argyris, 1964). Lastly, the ecological model, also known as the strategic model, defines the concept as the level to which a given organization meets the needs of its main stakeholders, including customers, employees, regulators, and investors (Connolly et al., 1980; Miles, 1980; Keeley, 1978).

In addition, according to Taylor (2021) on big data and business analytics market share worldwide by country for year 2021 (see Figure 2): With a 51% market share, the United States

is expected to be the industry leader for big data and business analytics (BDA) for the particular year (2021). The market share for the next four most important counties is all around 5%. The estimated amount spent on BDA globally in 2021 will be close to 216 billion dollars, with the majority going toward IT services as well as software.

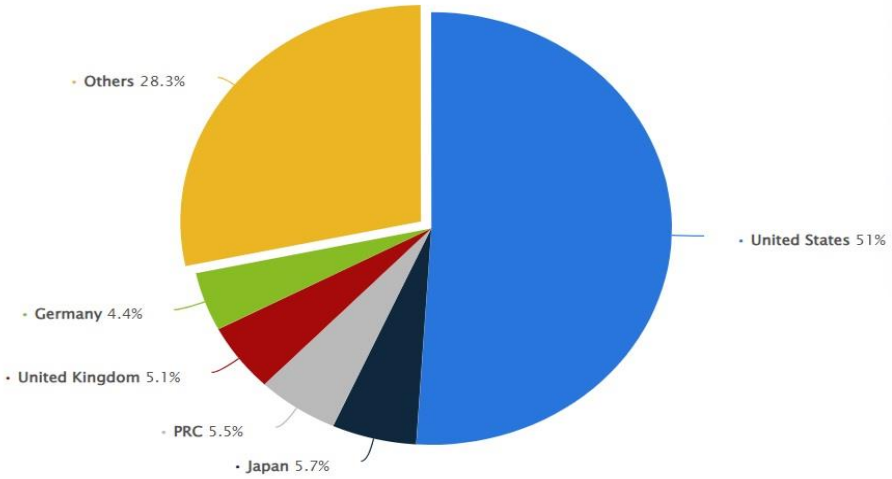

Figure 2. Big Data and Business Analytics Market Share Worldwide in 2021
Source: www.statista.com

Moreover, as delineated by the Business Analytics Software Market, the worldwide valuation of Business Analytics solutions was approximated at $61.10 billion in the year 2020, with projections indicating an ascent to $177.27 billion by the year 2030, thus reflecting a composite annual growth rate of 11.2% from 2021 to 2030 (Pramod et al., 2022). Notably, Jordan was not recognized as one of the top investors in BA systems. Researchers (e.g., Horani et al., 2023; Lutfi et al., 2023; Nam et al., 2019), emphasized that despite the widespread use of BA, many businesses have struggled to achieve the expected strategic advantages. According to Hussinki (2022), since several complementary tools and talents were discovered to have a major impact on the link between business analytics and firm performance, this approach may be examined more deeply in future studies. Further, most of the research that was examined was cross-sectional in nature, and the data used in them was gathered from just one nation or even just one industry. Longitudinal research would be useful for studying how business analytics affects firm performance over a longer time frame. Moreover, the credibility and reliability of the scholarly literature pertaining to business analytics research might be enhanced through the utilization of secondary data sources to compile information regarding organizational performance indicators.

Moreover, past works (e.g., Idoko and Akinsunmi, 2021; Potanˇcok et al., 2021; Zeidan and Itani, 2021; Whitelock, 2018; Wang and Byrd, 2017) had proposed carrying out more studies on the effect of BA Systems on organizational effectiveness. In addition, numerous researchers (e.g., Al-Qaralleh and Atan, 2021; Duan et al., 2020; Ashrafi et al., 2019; Mikalef et al., 2019; Côrte-Real et al., 2017; Gunasekaran et al., 2017; Wang and Byrd, 2017; Cao et al., 2015; Malladi and Krishnan, 2013) had proposed examining the moderators, mediators and causal recipes on the associations among BA enablers, BA Systems and organizational outcomes.

Consequently, this research decided to address these gaps by identifying the enablers of BA Systems intention to use.

Methodology

This research utilized the Scopus and Google Scholar databases, which encompass numerous peer-reviewed journals. We then applied a search criterion using "Keywords". Further, the current research reviewed and discussed pertinent and main published studies which have been published within the period of 2019 to 2023 published in English language, on the adoption of BA systems. This resulted in a final sample of 11 articles (refer to Table 1).

Literature Review

This section reviews the relevant literature related to the adoption of BA systems. Table 1 presents an overview of the relevant research.

Table 1. Literature Review Matrix

Author (Year)	Theories	Independent Variables	Dependent Variables	Methodology (Country)	Findings
Min & Lea (2023)	TAM, DOI	Organizational Characteristics, IT Investment, Organizational Readiness, Implementation Challenges	BA Adoption	Quantitative (Korea U.S.)	In order to evaluate the direction of causality between these characteristics and the decision to adopt the BA during numerous periods of longitudinal studies, future research will need to broaden the scope of this study. Future studies should also look into the influence that other contextual factors, including as market trends, peer pressure, and the firm's risk orientation (risk aversion versus risk tolerance), may have on the choice to implement BA.
Won, Chiu & Byun (2023)	TAM, DeLone and McLean	Information Quality, System Quality	Intention to Use	Qualitative (South Korea)	Users of branded sport applications were more likely to see them as having better system and information quality and as being more enjoyable, practical, and simple to use. Perceived enjoyment, perceived utility, and perceived ease of use were the TAM factors that most strongly affected users'

					intentions to use. A multigroup research showed that the gender differences in some associations between TAM determinants and app system success factors were statistically significant. The IPMA also revealed that the perceived satisfaction and system quality of branded sport apps were substantially more significant than the other predictors.
Al-Okaily (2022)	TAM	Perceived Usefulness, Perceived Convenience, Perceived Compatibility, Perceived Ease of Use	AIS Net Benefits	Quantitative (Jordan)	Eight of the 10 proposed hypotheses were found to be true. The empirical findings largely support the proposed hypothesis that perceived convenience (PCN) and perceived ease of use (PEU) have a favorable and significant impact on the perceived usefulness (PUS) of AIS. The results also show that PUS, PEU, and perceived compatibility (PCM) have a big impact on AIS usage. Finally, it was discovered that both AIS usage and information technology (IT) expertise had a beneficial impact on the net advantages of AIS. IT knowledge has both a direct and indirect impact.
Alkaabi, Kassim & Yin (2022)	TAM UTAUT	Perceived Usefulness, Perceived Ease of Use, Functional Risk, Time Loss Risk, Financial Risk,	Behavioral Intention	Quantitative (UAE)	The results of this study are expected to help dashboard designers choose the features and functionalities to take into account

		Informational Risk, Behavioral Attitude			when creating dashboards. The study may also assist businesses and managers in making wise judgments about the layout and features of dashboards. Overall, it is anticipated that the study's findings will make it simpler to comprehend the currently underappreciated problems with dashboard adoption and use and will improve those concerns at the individual level.
Chawla & Joshi (2019)	TAM UTAUT	Perceived Ease of Use (PEOU), Perceived Usefulness (PU), SECURITY, Facilitating Conditions (FC), Lifestyle Compatibility (LC), Attitude	Intention	Quantitative (India)	The findings demonstrate that a number of elements, including perceived usefulness (PU), perceived ease of use (PEOU), trust, security, enabling conditions, and lifestyle suitability, significantly influence customer attitudes and intentions toward using mobile wallets. 15 of the 17 hypotheses put forth were accepted. Usefulness and trust were strongly impacted by ease of use, but PU was significantly. Trust, attitude, and intention were influenced. Security and trust were discovered to be crucial components in establishing trust.
Wang, Zhao, Zhang & Evans (2021)	TAM	Perceived Usefulness, Perceived Ease of Use, Perceived Privacy Risk, Perceived Security Risk	Use Intention	Quantitative (China)	Results indicate that trust can increase consumers' trust in STS by lowering perceived security risk and perceived privacy risk.

					Our discoveries have significant application for government agencies and service providers to boost acceptance China's use of smart transportation services.
Liu & Ye (2021)	TAM	Perceived Usefulness, Perceived Ease of Use, Output Quality, Information Quality, Calculation-based Trust	Intentions to Use Blockchain	Quantitative (China)	The findings demonstrate that, with the exception of output quality, factors like trust and information quality have favorable influence on the users' behavioral intentions. Both theoretical and empirical insights can be drawn from the findings, and these will be useful for the advancement of blockchain theory while directing the use of pertinent enterprises.
Haritha P.H. (2022)	TAM and UTAUT	Perceived Usefulness, Ease of Use, Social Norms, Facilitating Conditions	Intention of the Adopt FinTech	Quantitative (India)	The analysis's findings back up the model that has been put forward and, in doing so, aid in illuminating the effects of adoption readiness, trust, and intention to utilize digital payments. Mobile payment institutions will be able to comprehend the factors relating to the expanding usage of technology in customers' lives thanks to the study's important findings. The study demonstrates the importance of the service's facilitation, perceived usefulness, and ease of use. The investigation also focuses on how perceived utility has

					a significant impact on consumer behavior, enabling it is the responsibility of software developers to promote user-friendly procedures and device advantages.
Chin, Wong, Cham, Thong& Ling (2023)	TAM	Perceived Usefulness, Perceived Ease of Use, Perceived Technology Security, Perceived Social presence, Social Identity	Intention to Use	Quantitative (Malaysia)	According to the results of the current study, perceived utility, simplicity of use, and social presence were the key factors influencing both actual and potential users' intents to use and actual usage of smart home devices. Furthermore, trust had a moderating impact on the relationship link the ambition to use AI-powered devices and perceptions of perceived usability, social presence, and social identity intelligent homes.
Lee, Ayyagari, Nasirian & Ahmadian (2021)	Delone McLean	VAS's Interaction Quality, VAS's Information Quality, VAS's System Quality	Intention to Use the VAS	Quantitative (North America)	The findings imply that interaction quality and trust are significant determinants of whether AI-based VASs are adopted. The results also show that in the context of AI-based systems, interaction quality influences the effects of conventional quality variables (such as information quality and system quality).
Azman, Albattat & Valeri (2023)	TAM	Perceive Ease of Use, Perceive Value, Perceive Usefulness, Social Influence	Intention to Use Neuro Marketing	Quantitative	According to this study, neuromarketing closes the gaps created by conventional marketing research. With its capacity to visualize tourists'

					subconscious minds, neuromarketing is an important tool for describing and understanding tourist behavior minds. Neuromarketing can offer insights into these issues by analyzing brain activity. Decision-making and consumer preferences that may not be immediately obvious by conventional means. This knowledge can be very useful in the tourist sector is one that heavily relies on subconscious and emotional aspects to make decisions.

As indicated in Table 1, Min and Lea (2023) posited that the objective of the investigation was to assess the impact of various perceived costs and barriers related to Business Analytics (BA), along with the following factors: organizational characteristics, industry sectors, organizational culture, familiarity with BA, information technology resources, and concerns regarding information security and privacy, on deciding to adopt BA. Notably, this research was among the early ones that utilized data mining methodologies to construct detailed profiles of those who adopt BA and those who don't, as opposed to utilizing a series of hypothesis testing through traditional multivariate analyses or confirmatory factor analysis, which are inherently limited in their ability to concurrently encompass a diverse array of influencing factors pertinent to BA adoption. Won, Chiu & Byun (2023) stated that to generalize the findings of their study, future research should take diverse research designs and circumstances into account. Second, the ISSM and TAM core concepts were the focus of the current study. Future research may therefore take into account other extended antecedents, moderators, and outcome variables. In performing comparative research between the Jordanian settings and those of others throughout the world, Al-Okaily (2022) suggested that future studies consider other contexts and cultures besides those of Jordan and Arab. This will better reap the rewards of AIS usage in enterprises. Also, other elements (such as user training) might be the antecedent factors with direct impact on AIS utilization, considering the difficulty in achieving the full potential benefits of AIS owing to the dearth of efficient training programs. Alkaabi, Kassim & Yin (2022) posited that future research initiatives could be operationalized across various industries and nations that elect to broaden their investigations, thereby yielding diverse interpretations and applications of systems. Chawla and Joshi (2019) asserted that it is feasible to explore the integration of supplementary antecedents that have not been addressed in this study, for instance, relative advantage, perceived benefits, and individual creativity. Furthermore, additional research could be employed to scrutinize the effect of demographic factors on the adoption of mobile wallets, including the moderating effects.

Also, Wang, Zhao, Zhang & Evans (2021) emphasized that to strengthen the model's capacity for explanation, future research can explore these elements. Research in the future may conduct specific examinations on distinct towns or cities at various levels to more thoroughly research the topic at hand and offer solutions that are more pertinent to the situation there, that will be more illustrative and representative Research in the future may concentrate specifically on interviews or surveys for the traffic management divisions, and examine the main factors variables influencing their plans for using smart transportation. Liu & Ye (2021) concluded that future research could build on our model by adding new characteristics, such cost and efficiency, to better understand the factors affecting the adoption of blockchain, Future research must examine more categories of trust to properly understand the impact of trust. Haritha P.H. (2022) stated that in the future, it will include a few other factors to assess how customers feel about emerging technology. The study suggested other factors including consumer value addition, loyalty, purchasing experiences, awareness, and perceived risk and culture on the attitudes of consumers. Researchers might additionally confirm the results by including a different demography to the overall market intention level of the three characteristics of wealth, sex, and age.Chin, Wong, Cham, Thong& Ling (2023) argued that in the context of smart technology, a more thorough examination should be conducted into the factors that influence perceived utility, usability, and social presence and also user behaviors (intention to use and actual usage). Last but not least, the participants were mostly concentrated in Sarawak's largest cities, which led to an inadequate distribution. Hence, the incorporation of a wider variety of opinions and suggestions would be worthy, with the incorporation of input from supply-side participants, in order to wider-ranging outcomes.

Moreover, Lee, Ayyagari, Nasirian & Ahmadian (2021) recommended that in order to add specificity and broaden the function of interactivity in the VAS setting, researchers might further investigate the characteristics of interaction. One can start with these four dimensions to create interactivity dimensions that are appropriate for the VAS environment. Activating the "black as described above, will present opportunities for upcoming researchers. This study makes a contribution by suggesting design implications for VASs and relevant research avenues for pertinent future studies. Azman, Albattat and Valeri (2023) stated that future studies should look at the effects of doing experiments using neuromarketing methods like fMRI, facial recognition and eye tracking, to understand how people react to marketing stimuli. Also, future studies should look into the links between destination promotion tactics and neuromarketing.

Discussion and Conclusion

This study is expected to better understand the BA system's intention to use by focusing on the BA enablers and consequences. Furthermore, given that the majority of the literature regarding Behavioral Analytics usage intentions is predominantly theoretical and devoid of empirical substantiation, forthcoming research endeavours will not merely provide a comprehensive synthesis of the existing literature concerning BA usage intentions, but will also represent the inaugural scholarly investigation of its kind to empirically evaluate the causal relationships between the facilitators of BA systems usage intentions and their consequential outcomes. Also, coming research will contribute to the theory by evaluating the applicability of Davis's (1989) Technology Acceptance Model (TAM), and DeLone and McLean's (2003) Delone and McLean updated IS success model – these two models were initially developed and implemented widely in developed and developing countries. This knowledge is expected to enhance the current understanding of the determinants of BA based technologies acceptance. Additionally, companies may find value in the results of this study as these results could become a guideline for these companies in their efforts of determining the most appropriate

BA systems, in order that the needs, requirements, and expectations of the decision makers and regulators could be fully met.

Furthermore, researchers have underscored that despite the managerial advantages attributable to Business Analytics (BA) in quotidian business operations, e.g., enhanced customer service stemming from a more profound comprehension of consumer behavior via customer/demand data visualization; improved security and risk management as a result of expedited fraud detection and prompt detection of vulnerabilities through data integration throughout the organizations; diminished order cycle time and the ensuing reduction in inventory attributable to augmented transparency regarding the present and the projected inventory levels; increased cost efficiencies stemming from heightened operational and supply chain effectiveness attained through a consolidated perspective and the succeeding enhancement of visibility throughout the supply chain), numerous organizations remain hesitant to adopt BA systems. Consequently, this study will assist investors, regulators, and policy makers to recognize the resources and mechanisms of adopting BA systems into which maximizing the organizational outcomes.

Theoretical Implications

From the theoretical perspective, the results are expected to provide further explanations on BA systems intention to use. Also, from the academic viewpoint, this study addressed the issue of partial causative linkages among BA enablers, perceived trust and BA systems intention to use.

Practical and Social Implications

Findings of the current study are of value to organizations and could guide them in seeking the BA systems that meet the needs, requirements, as well as anticipations of both the decision makers and regulators on a competitive base.

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