http://doi.org/10.23925/2179-3565.2025v16i4p102-119

RISUS - Journal on Innovation and Sustainability
volume 16, número 4 - 2025
ISSN: 2179-3565
Editor Científico: Arnoldo José de Hoyos Guevara
Editor Assistente: Vitória Catarina Dib
Avaliação: Melhores práticas editoriais da ANPAD

RESEARCH ON BIG DATA ANALYTICS CAPABILITY AND SUSTAINABLE FIRM PERFORMANCE DEVELOPMENT: THE MEDIATING ROLE OF FINANCIAL SHARING

Pesquisa sobre capacidade analítica de Big Data e desenvolvimento sustentável de desempenho empresarial: o papel mediador do compartilhamento financeiro

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ABSTRACT

Many companies have developed big data analytics capability (BDAC) to enhance sustainable firm performance because of its recent popularity in big data. The big data has become important resource after people, money, things, and enterprises with data resources, which means that they can seize market opportunities. The implementation of enterprise finance sharing has gradually covered the entire production and operation process from the financial domain. However, few studies have examined the impact of big data capabilities on firm performance based on financial sharing, despite the abundance of existing research on big data capabilities. Therefore, this research examines this hypothesis by collecting necessary information through questionnaires and subsequently testing the relevant hypotheses through path analysis and the mediating effects of structural equation modelling. PLS-SEM proved that the three hypotheses of this study had a positive impact. This study investigated these findings from the perspective of theoretical and managerial significance.

Keywords: Big Data Analytics, Capability, Financial sharing, Sustainable firm performance development, PLS-SEM

SUBMETIDO EM: 11/10/2025
ACEITO EM: 25/11/2025
PUBLICADO EM: 30/12/2025

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PESQUISA SOBRE CAPACIDADE ANALÍTICA DE BIG DATA E DESENVOLVIMENTO SUSTENTÁVEL DE DESEMPENHO EMPRESARIAL: O PAPEL MEDIADOR DO COMPARTILHAMENTO FINANCEIRO

Research on Big Data analytics capability and sustainable firm performance development: the mediating role of financial sharing

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RESUMO

Muitas empresas desenvolveram a capacidade de análise de big data (BDAC) para melhorar o desempenho sustentável da empresa devido à sua recente popularidade em big data. O big data tornou-se um recurso importante depois que pessoas, dinheiro, coisas e empresas com recursos de dados, o que significa que eles podem aproveitar oportunidades de mercado. A implementação do compartilhamento de finanças empresariais gradualmente cobriu todo o processo de produção e operação do domínio financeiro. No entanto, poucos estudos examinaram o impacto das capacidades de big data no desempenho da empresa com base no compartilhamento financeiro, apesar da abundância de pesquisas existentes sobre capacidades de big data. Portanto, esta pesquisa examina essa hipótese coletando as informações necessárias por meio de questionários e, posteriormente, testando as hipóteses relevantes por meio da análise de caminho e dos efeitos mediadores da modelagem de equações estruturais. PLS-SEM provou que as três hipóteses deste estudo tiveram um impacto positivo. Este estudo investigou essas descobertas da perspectiva da significância teórica e gerencial.

Palavras-chave: Análise de Big Data, Capacidade, Compartilhamento financeiro, Desenvolvimento de desempenho sustentável de empresas, PLS-SEM

INTRODUCTION

With the rapid expansion of science and technology, society is transitioning from the "information technology age" to the "data age" (Su et al., 2021). In recent years, economic restructuring and industrial upgrading have contributed to the formation of a large number of enterprise groups in China, which not only play important roles in economic construction but also make important contributions to enhancing the international competitiveness of Chinese enterprise groups (Su et al., 2021). However, under complicated traditional financial processes and increasingly innovative information technology, many enterprises have experienced management problems such as increased operating costs, low service efficiency, and slow decision-making, which have constrained their further development (Vitari & Raguseo, 2020). In recent years, the internal data generated by the enterprise itself and the data and information obtained from the outside have shown explosive growth, and the structure of the data also reflects the diversified development trend (Bhimani & Willcocks, 2014). The question of how to use rapidly changing modern information technology and enterprise groups to speed up resource integration, reduce operating costs, improve efficiency and quality of service, and enhance the overall level of management has become a hot issue of concern (Su et al., 2021). With the birth of the concept of financial sharing, the original financial processes for re-engineering the establishment of financial sharing centres to achieve the above corporate goals will become the future of the enterprise group's financial management changes in the development trend (Chen et al., 2023). The maturity and popularization of internet technology, especially the emergence of big data in 2011, have laid the foundation for the implementation of financial sharing in enterprise groups (Chen et al., 2023). Data have been widely integrated into various industries, becoming an important factor in various business functions (Akter et al., 2016). Through the application of big data analysis, people continue to reflect and derive new value, which stimulates productivity growth and boosts economic demand (Garmaki et al., 2016).

The real-time perception and prediction ability of big data technology for consumer demand enables enterprises to play an important role in reducing overall costs, improving work efficiency, accurately identifying customer needs, optimizing production processes and providing decision-making (Niu et al., 2021). In this situation, it is important to study how financial sharing enterprises affect enterprise performance by cultivating big data analytics capability. Additionally, the question of how enterprises can improve corporate performance by cultivating big data capabilities has also become an urgent issue.

Therefore, this research divides the dimensions of big data capability into three aspects. Simultaneously, this research analyses whether big data capability can further improve financial sharing and what role financial sharing plays in the impact between big data capability and sustainable firm performance from the perspective of financial sharing. It is of great significance for exploring the connections among big data analytics capabilities, financial sharing and sustainable firm performance by constructing structural dimensions.

1 THEORETICAL BASE AND HYPOTHESIS DEVELOPMENT

Big data analytics capability (BDAC)

The scholar popularized the term "big data" when he noted that the information storm brought about by the major epochal transformation initiated by big data is gradually changing the way we learn, work and live (Mayer-Schönberger, 2015). In terms of marketing, administration, and process, big data will have a significant impact on modern enterprises (Nisar et al., 2020; Russom, 2011). Big data's primary capabilities include the identification of patterns, the prediction of future events, and the activation of enterprise resources (Mohanty et al., 2013).

Big data analytics capabilities enable the utilization of big data to inform strategic decisions. These capabilities are pertinent to the operational strategy of an organization (LaValle et al., 2010). Furthermore, the broad definition of big data analytics capability (BDAC) is the capacity to transform an organization into a competitive force by utilizing management, technology, and talent to provide business services (Kiron et al., 2014). Similarly, the research propose that the ability of a company to acquire and analyse data to gain new insights through the effective coordination and deployment of data (Mayer-Schönberger, 2015), technology and talent is defined as big data analysis capability (Mikalef et al., 2019). In contrast, divided into resource acquisition

capability, analysis and integration capability, and application capability (Xie et al., 2018). This study categorizes big data analytics capabilities into three areas as follows.

BDA Management capability (BDAMC)

The capacity of an enterprise to effectively administer its resources is referred to as management capability. This capacity to effectively manage its resources in a manner that generates substantial business value (Nisar et al., 2020). The organization of daily in the operation of the business is facilitated by the management capabilities of big data analytics (Adewusi et al., 2024). This is not only a significant aspect of big data analysis of managerial capabilities but also a critical daily activity of the organization, as evidenced by certain studies showing that management capacity analysis concentrates on four primary areas: planning, investment, coordination, and control (DeSanctis & Jackson, 1994).

The rise and development of big data make enterprise management in making relevant decisions not overly dependent on the management of the accumulated personal experience but rather dependent on rational data analysis (Khatib et al., 2023), mining useful information (Adewusi et al., 2024), and effective management of big data to give full play to the utility of the application of big data to enhance the effectiveness of management (LaValle et al., 2010).

BDA Technology capability (BDATC)

BDA technical competency can be defined as an organization's technical capability, which enables data scientists to rapidly upgrade various system components of the enterprise (Duncan, 1995). It embodies the ability of firms to flexibly use the big data computing model to transform data and apply databases after extensive data collection and to analyse all kinds of text, image and audio data in real time by means of data processing technology and ultimately display them by using visualization technology to discover patterns and predict the market (Ryan et al., 2002). This capability is named BDA technical capability (Akter et al., 2016). Organizations may encounter uncertain situations (such as economic pressure, the emergence of hypercompetition and social marketing), making it necessary to revise their short-term and long-term strategies. Therefore, it is imperative that the technical infrastructure of organizations be fortified and adaptable to enhance their technical capabilities (Bharadwaj, 2000; Lu & Ramamurthy, 2011). Many researchers have asserted that the perception of BDA technological capability is enhanced by the following essential components: (1) compatibility, (2) modularity, and (3) connectivity (Akter et al., 2016; Kiron et al., 2014; Kim et al., 2012).

BDA Talent Capability (BDATLC)

The specialized knowledge and abilities of enterprise employees are referred to as BDA talent capability (Ali & Poulova, 2020). This capability has the potential to enhance the efficacy of the organization in disseminating insights, as well as the technical and business knowledge of the analyst (Kiron et al., 2014). Previous research has underscored the necessity for data scientists to possess a variety of skills. In addition, the data researcher must have the necessary competencies, such as the ability to plan, organize, and lead organizational activities and to execute these activities through the collaboration of others in various departments (Bharadwaj, 2000; Lu & Ramamurthy, 2011). They must maintain relationships with consumers. It is imperative that they preserve their relationships with consumers (Jiang et al., 2003; Kim et al., 2012; Lee et al., 1995).

Financial sharing

The researcher proposed that "shared services are a customer-centric + fee-for-service = business practice" (Bergeron & Bergeron, 2003). Shared services are a business practice that moves from the inside to the outside of the organization and focuses on improving customer satisfaction. In "Shared Services" that the implementation of shared services can effectively solve the problems of increased costs, increased financial risks, and miscommunication encountered by enterprises in their business activities so that the managers of all relevant

departments of the enterprise can focus on improving the overall value of the enterprise (Andrew, 2018).

Financial shared services are interdependent in terms of their integration and control functions. This leads to the information of subsidiaries being centralized to the parent company (Jiang et al., 2023). This is a specific application of shared services in financial activities. Jackson noted that the financial sharing model is applied to the financial department through the reengineering of the financial management process to reduce costs and improve the efficiency of financial management, and it has become a typical shared service model that is widely used and can improve the quality of financial information. The financial shared services subvert traditional financial management, providing new ideas for enterprise cost control, using comparative analysis to explain the advantages and disadvantages of the old and new financial management models, which helps promote the implementation of financial shared services (Yang et al., 2021). The importance of this sharing is generalized even as a good governance principle and is beyond the only business sections. It is essential to open performance development mechanisms for the participation of stakeholders (Muda et al., 2024).

Sustainable firm performance

Firm performance is defined as conducting a business performance evaluation (Herdinata et al., 2023). Every organization's primary goal is to enhance its performance (Ali & Poulova, 2020). Several researchers have proposed a variety of definitions, perspectives, and measurement indicators to assess an organization's performance. Consequently, it is exceedingly challenging for an organization to establish, conceptualize, and evaluate performance (Abu Jarad et al., 2010).

According to Akter (Akter et al., 2016), firm performance management has gone through six stages: observational performance assessment, cost performance assessment, financial performance assessment, joint financial and nonfinancial assessment, strategic performance management and integrated performance management. In this research, the firm performance evaluation system is divided into three main development stages. The first stage is based on financial standards, and this stage of performance evaluation is based on the construction of the financial indicator system. In the second stage, which focused on the sustainable development of enterprises, market competition intensified, and corporate management gradually began to pay attention to business performance. Since financial indicators sometimes focus on the short term but ignore the long term, performance appraisals in this stage of value-based criteria are based on value evaluation indicators. In the third stage, based on the strategy criterion, the centre of gravity of the appraisal indexes shifted from operating results to the evaluation indexes related to strategic development. Nonfinancial indicators, including customer satisfaction, product and service quality, and strategic objectives, are also included in the performance appraisal system, combining financial and nonfinancial indicators to comprehensively evaluate the overall situation of the enterprise. For example, the balanced scorecard evaluation standard, which evaluates enterprises in four dimensions (Kaplan & Norton, 1992). This performance evaluation includes four perspectives and these four dimensions balances financial and nonfinancial, short-term and long-term analyses.

This study emphasizes the financial performance of enterprises as a component of sustainable business performance. It contains the following: sales growth, cash flow, return on investment, net profits, growth in market share, growth in higher net worth of the company. The construct adopted is presented through the items in Appendix 1 below.

Hypothesis development

Big data analytics capability and financial sharing

Big data application capability refers to the ability to apply big data through the integration of basic resources and after mining and analysis to solve real problems, provide decision-making support for enterprises and create value (Akter et al., 2016). With the development of information technology, the establishment of financial sharing centres oriented towards big data capacity building has more stringent requirements for data management and application; for example, cloud computing, as a booster of big data, has accelerated the innovation of financial sharing among enterprises while optimizing their financial management methods (Karaboga et al.,

2023). Through the deep mining of big data, sharing centres can discover laws and make important decisions, such as policy support, economic development laws, industry dynamics, and potential threats related to enterprise management (Guo, 2021). The function of enterprise finance sharing centres is to strengthen group control, support strategic development, improve the informatization level of financial management, etc., while the management and application of big data precisely integrate basic resources and further mine and analyse the data to provide real-time shared and relevant decision support information for the enterprise's development strategy to enable the financial function to realize value creation while completing value retention. Simultaneously, the combination of big data capability and financial sharing not only makes it possible to share and utilize the data of various departments within the enterprise in the financial sharing centre in a timely manner but also provides more comprehensive and accurate market data to the enterprise group and enables multilevel personalized data analysis through the capability of big data analysis to display more valuable information to help the enterprise make corresponding decisions (Chen et al., 2023). Therefore, the first hypothesis is proposed:

Hypothesis 1 (H1). Big data analytics capability has a significant and positive impact on financial sharing capability.

Financial sharing and sustainable firm performance

Ford was the first company to implement financial sharing in the United States, and the impact of this implementation is readily apparent (Guo, 2021). It not only disrupts the original traditional financial management model but also decreases the investment of personal and material resources for companies that implement financial sharing. Exploring the effectiveness of financial sharing implementation is important for developing innovative financial management models. Thus, the value of financial sharing can be summarized as supporting strategic development, improving efficiency, reducing costs, strengthening group control and enhancing the core competitiveness of enterprises.

Previous studies have shown that using financial sharing in enterprises is an important channel through which to improve firm performance. The results of the implementation of financial sharing in Chinese firms were analysed, and it was concluded that the selected financial indicators reached significance beginning in the third year after the implementation of financial sharing (Yang et al., 2021). The impact of financial sharing on operational efficiency is more significant than that on operational effectiveness (Khai Loon & Cean Peing, 2019). The findings show that the establishment of a financial sharing centre has a positive impact on reducing corporate costs, improving corporate accounting efficiency, and improving the development of corporate core businesses (Zhu & Yang, 2021). By comparing enterprises that implemented financial sharing with those that did not, it was found that the enterprise performance of enterprises after the implementation of financial sharing was better than that of enterprises that did not. In addition, financial sharing can improve work efficiency, reduce enterprise costs, etc. (Zhu & Yang, 2021). In terms of nonfinancial performance, the implementation of financial sharing can strengthen group control, release financial resources, support strategic decision-making, etc., which ultimately leads to the enhancement of the core competitiveness of enterprises.

Hypothesis 2 (H2). Financial sharing capability has a significant and positive impact on sustainable firm performance.

Mediating role of financial sharing

Under the impetus of big data and other information technology, enterprises can speed up the construction of financial sharing centres and save construction costs (Peng & Bao, 2023), while the mature use of these technologies to deepen the degree of integration between various information systems can greatly improve the efficiency of the enterprise (Nassani et al., 2023). For example, accounting information system knowledge not only helps to internal control and performance of the organization but also effects user satisfaction (Irene et al., 2023). In addition to collecting financial data, big data technology can also help enterprises mine valuable nonfinancial data from massive amounts of data, such as industry information, market dynamics, competitive environment

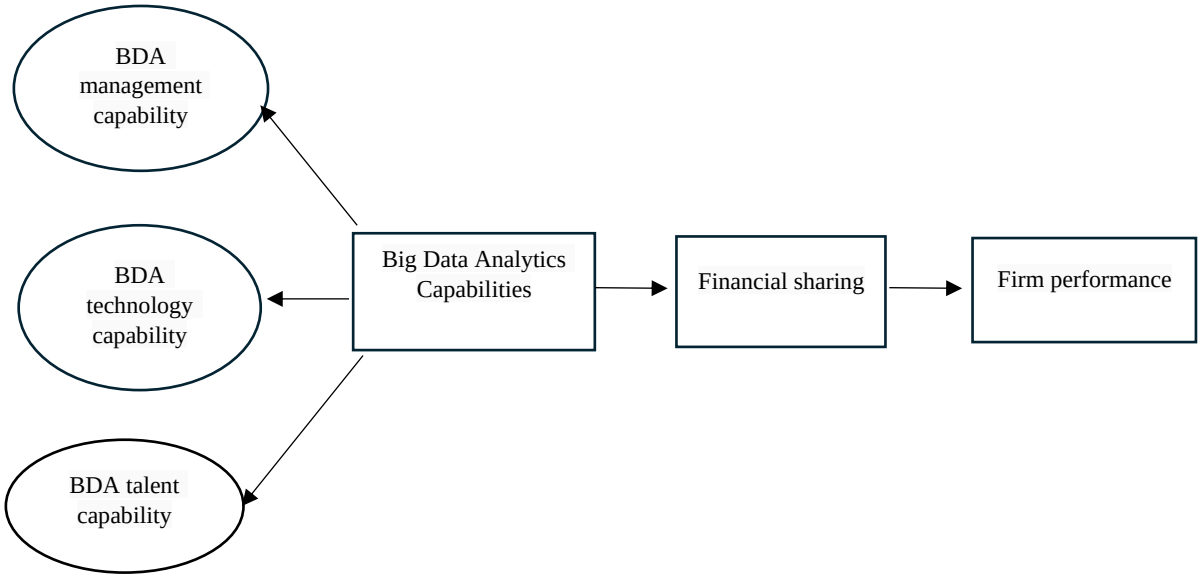
information, and customer information, which can provide the basis for enterprise decision-making, and at the same time, the implementation of a financial sharing centre can also improve an enterprise's ability to control and make decisions. Financial sharing generates value from the dimensions of corporate strategy, operation management, financial management, and human resources to meet the needs of the enterprise and improve its performance.

Additionally, this research contends that the primary factor contributing to the beneficial effect of big data capability on sustainable firm performance is the advancement of financial sharing, which in turn advances enterprise development and enhances firm performance. Therefore, the following hypotheses are proposed in this research:

Hypothesis 3 (H3). Financial sharing capability mediates the relationship between big data analytics and sustainable firm performance.

Based on the above research studies, this study establishes a relationship model between financial sharing, sustainable firm performance, and big data analytics capability; the research model is shown in Figure 1.

Figure 1 - Research model



2 MATERIALS AND METHODS

Through various online questionnaires, the author contacted the relevant junior management, mid-level and senior management, shared centre finance staff, and people with big data practice or IT experience working in group companies to complete the survey.

All classifications were measured using multiple items that were derived from previously published literature and have been shown to be valid. Each measure was rated on a seven-point Likert scale from 1-7 indicating "strongly disagree" - "strongly agree". Appendix 1 lists all the items used in the questionnaire. The experts assessed three dimensions (managerial, technical, and talent capabilities) of the big data analytics capability construct. Financial sharing was measured with six items based on a scale developed by (Bergeron, 2002). Business performance was based on the scale developed by (Chandler & Hanks, 1993).

For data collection, 500 questionnaires were distributed, and 473 were returned. Of the returned questionnaires, 94.6% were valid. The final sample of 473 valid questionnaires returned was analysed with descriptive statistics. Table 1 provides the demographic profile of the respondents. The table shows the basic information of the survey sample of this research, including the company's establishment time, the industry of the company, and the number of staff in the company. In terms of company establishment, most of the companies (46.51%) were established within six to ten years. shows that the company has operational history and stability. Simultaneously, a proportion of companies (15.86%) have been in existence for 1-5 years, which is in the rapid development phase. There are many industries in which a company operates. With regard to the industry to which the company belongs, the company is present in a number of industries, with manufacturing (22.2%) and financial

(10.57%) for a large proportion of them. Furthermore, the retail, transportation and postal services, IT, energy, real estate, construction and pharmaceutical sectors are also distributed but in relatively low proportions. With regard to the number of employees in the company, the number of employees in the company is generally less than 300 employees (72.09%), showing that the company is likely to be a small or medium-sized enterprise, while there is also a certain number of employees in the size range of 301-1000 employees (12.47%).

Table 1 - Demographic profile

	Characteristics	Frequency	Percent (%)
Establishment	1-5	75	15.86
	6-10	220	46.51
	11-15	107	22.62
	16-25	46	9.73
	26-over	25	5.29
Industry	Communication	33	6.98
	Manufacturing	105	22.2
	Financial	50	10.57
	Retail	66	13.95
	Transportation and postal services	29	6.13
	IT	24	5.07
	Energy	11	2.33
	Real estate	50	10.57
	Construction	56	11.84
	Pharmaceuticals	40	8.46
	Others	9	1.9
Number of employees	Less than 300	341	72.09
	301-1000	59	12.47
	1001-2000	38	8.03
	2000-3000	22	4.65
	3000-over	13	2.75

3 RESULTS

This research used SEM to analyse the results because of its efficiency, accuracy and persuasiveness. Therefore, it is very popular in quantitative analysis, and its popularity is on an upward trend (Hair et al., 2017). It is beneficial for models that are simple, complex, or large, as it eliminates the need to consider normality concerns and yields superior outcomes. Reliability and validity were assessed in the initial phase, which was followed by hypothesis testing. To accomplish the objective of this investigation, the theoretical model was empirically tested using PLS 4.0 (Sarstedt et al., 2022).

The data analysis is divided into two main parts. First, it is the measurement model. The second is an empirical analysis of the influence path in structural equation modelling.

Measurement model

The internal consistency reliability of the measurement model was evaluated by Cronbach’s alpha, and the composite reliability (CR), outer loading (OL) and average variance extracted (AVE) were used to test the convergent validity (Hair & Alamer, 2022). It is generally recognized that Cronbach’s alpha ranges from 0 to 1. A coefficient range of 0.8-0.9 indicates very good reliability, a coefficient range of 0.7-0.8 indicates good reliability, and a coefficient range of 0.0-0.6 indicates poor reliability (Ali & Poulova, 2020).

As a result, the Table 2 show that the Cronbach's alpha values for the variables BDA Management Capability, BDA talent capability, BDA technology capability, financial sharing and sustainable firm performance are between 0.835 and 0.904, all of which are greater than 0.7. The indicators show that the internal consistency of the questionnaire's dimensions is better. Thus, the reliability of the results of this survey is better, and the structural validity measures include CR and AVE. According to the results, the CR values of the variable dimensions in this

study ranged from 0.884 to 0.922, and the AVE values ranged from 0.562 to 0.603, which were greater than 0.5, indicating that the parameters of the structural validity test for each of the dimensions in this study were in accordance with the requirements of the study.

Table 2 - Measurement model

	Cronbach's Alpha (a)		Composite Reliability (CR)	Average Variance Extracted (AVE)
BDA Management Capaility	0.889		0.911	0.562
BDA Talent Capability	0.904		0.922	0.597
BDA Technology Capability	0.867		0.900	0.601
Financial Sharing	0.835		0.884	0.603
Firm Performance	0.855		0.892	0.580

The results were greater than 0.7, which means that the topics corresponding to each variable in this study are highly representative (see Table 3).

Table 3 - Outer loadings

	BDAMC	BDATLC	BDATEC	FS	FP
BDAMC1	0.704				
BDAMC2	0.756				
BDAMC3	0.755				
BDAMC4	0.737				
BDAMC5	0.756				
BDAMC6	0.769				
BDAMC7	0.792				
BDAMC8	0.726				
BDATLC1		0.783			
BDATLC2		0.767			
BDATLC3		0.774			
BDATLC4		0.770			
BDATLC5		0.757			
BDATLC6		0.766			
BDATLC7		0.789			
BDATLC8		0.776			
BDATEC1			0.716		
BDATEC2			0.772		
BDATEC3			0.829		
BDATEC4			0.815		
BDATEC5			0.760		
BDATEC 6			0.752		
FP1					0.736
FP2					0.744
FP3					0.762
FP4					0.806
FP5					0.767
FP6					0.751
FS1				0.774	
FS2				0.770	

FS3				0.767	
FS4				0.796	
FS5				0.775	

Discriminant validity is also part of the measurement modelling. Discriminant validity is essential for verifying that each construct is distinct from the other. Researchers have proposed that constructs are distinct from one another if the construct value is less than the critical value of 0.85 (Kline, 2023). According to the results in Table 4, these values are within the permissible range and meet the requirements of the study.

Table 4 - Discriminant validity

	BDAMC	BDATLC	BDATEC	Financial Sharing	Firm Performance
BDAMC					
BDATLC	0.550				
BDATEC	0.449	0.576			
Financial Sharing	0.509	0.501	0.464		
Firm Performance	0.508	0.570	0.571	0.570	

Structural model

Subsequently, the reliability and validity of the measurement model were verified through structural model assessment. The main proposed research model's hypothesized relationships are specified by the structural model. It comprises exogenous and endogenous constructs.

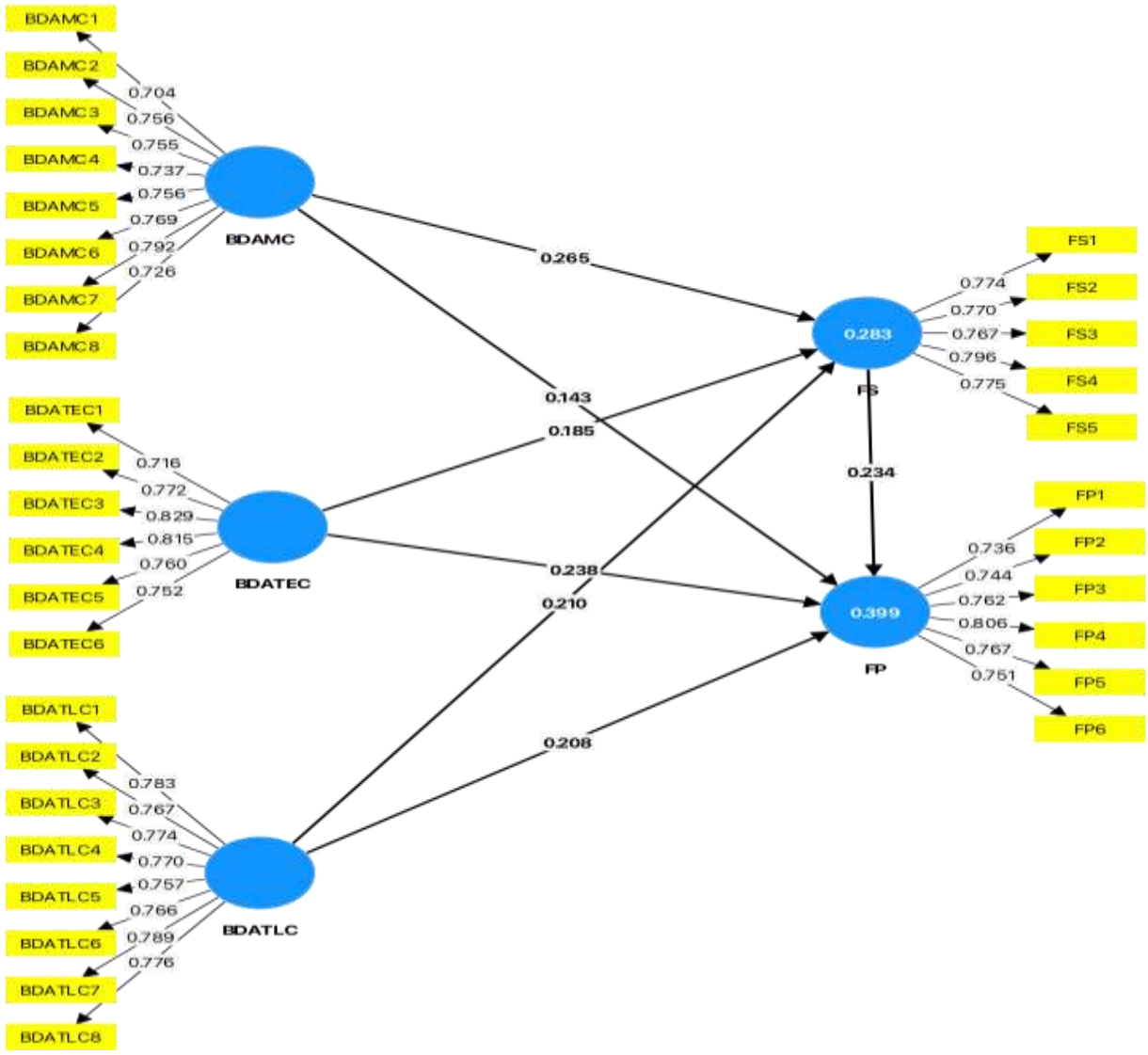
The predictive accuracy R2, predictive relevance Q2 and path coefficient were assessed (Sarstedt et al., 2022). The most frequently employed metric for assessing the predictive accuracy of a structural model is the R2 value (Sarstedt et al., 2022). A higher R2 indicates greater predictive accuracy, as it ranges from 0 to l. The specific research discipline determines the acceptable R2 values. However, R2 values of 0.75, 0.50, and 0.25 can be regarded as substantially moderate, feeble, and moderate, respectively (Sarstedt et al., 2022; Kline, 2023).

Consequently, the structural model that was tested in the present investigation serves as an illustration (see Figure 2). Through the Table 5 show that the total amount of variance in firm performance was 39% (Adj. R2=.394). For financial sharing, the variance in the construct was 28% (Adj. R2= .278). Therefore, the R2 values for both endogenous constructs, firm performance and financial distribution, can be classified as moderate (Hair Jr. et al., 2021). The minimum acceptable level for PLS path modelling is an R2 value of 0.10 (Laila et al., 2023). Therefore, it can be inferred that the endogenous latent constructs had appropriate R2 values based on the recommendation. In addition, an R2 value of 0.25 is considered moderately acceptable according to research standards (Ji-fan Ren et al., 2017; Rasoolimanesh et al., 2016). Overall, the explanation of the variable in the research model of this paper can meet the requirements of the study.

Table 5 - Coefficient of determination (R2)

	R^2	Adj. R^2
Financial sharing	0.283	0.278
Firm Performance	0.399	0.394

Figure 2 - Structural model in SmartPLS



In addition to assessing the magnitude of R2, the predictive relevance of the model was tested using Stone-Geisser's Q2 value (Hair et al., 2017). The values of Q2 for all the endogenous constructs are presented in Table 6. Financial sharing and firm performance have predictive relevance (see Table 6).

Table 6 - Predictive Rrelevance (Q2)

	SSO	SSE	Q^2(1-SSE/SSO)
BDA management capability	3784	3784	
BDA talent capability	3784	3784	
BDA technology capability	2838	2838	
Financial sharing	2365	1973.054	0.166
Firm Performance	2838	2189.501	0.229

Subsequently, the bootstrapping method was employed to evaluate the assumptions, including path coefficients and t-statistics (Sarstedt et al., 2022). This study employed a one-tailed t test because all of the alternative hypotheses are directional. According to (Sarstedt et al., 2022), if the path coefficient is significant (i.e., $p < .05$), the t value must be equal to or greater than 1.65 when using a one-tailed test. The results in Table 7 show the structural path analysis, where all hypothesized direct effects were supported.

Table 7 - Structural Path Analysis

Hypothesized Direct Relationships	Path Coefficient (β)	Standard Deviation (STDEV)	t Value	p Value	Result
BDA management capability -> Financial sharing	0.265	0.052	5.116	0.000	Support
BDA management capability -> Firm Performance	0.143	0.051	2.786	0.006	Support
BDA talent capability -> Financial sharing	0.210	0.056	3.737	0.000	Support
BDA talent capability -> Firm Performance	0.208	0.059	3.510	0.001	Support
BDA technology capability -> Financial sharing	0.185	0.053	3.469	0.001	Support
BDA technology capability -> Firm Performance	0.238	0.049	4.869	0.000	Support
Financial sharing -> Firm Performance	0.234	0.049	4.787	0.000	Support

The typical method for obtaining inferential statistics for all coefficients in the SEM is the bootstrap procedure method (Henseler, 2017). Additionally, bootstrap confidence intervals, which offer supplementary information regarding the stability of coefficient estimates, were used (Nisar et al., 2020). According to the recommendation of Hair (Hair Jr. et al., 2021), to evaluate the significance of coefficient estimates in the proposed mediator model, the bootstrapping procedure was implemented with a resampling level of 5000.

The results in Table 8 show that the indirect effects of "BDA management capability -> Financial sharing-> Firm Performance" (β=.062. p<.05); the indirect effects of "BDA talent capability -> Financial sharing-> Firm Performance" (β=.049. p<.05); the indirect effects of "BDA technology capability -> Financial sharing-> Firm performance (β=.043. p<.05). Thus, H3 was supported.

Table 8 - Mediating effects

Specific Indirect Paths	Indirect effect	Standard Deviation (STDEV)	t Value	p Value	Result
BDA management capability -> Financial sharing -> Firm Performance	0.062	0.017	3.713	0.000	Support
BDA talent capability -> Financial sharing -> Firm Performance	0.049	0.018	2.698	0.007	Support
BDA technology capability -> Financial sharing-> Firm Performance	0.043	0.015	2.880	0.004	Support

4 DISCUSSION

Although researchers and experts have increasingly focused on big data analytics capabilities, empirical research has not yet thoroughly investigated the internal mechanism by which big data analytics capability generates business value. Academicians contend that only a small number of organizations are capable of fully leveraging the capabilities of big data analytics (Hao et al., 2019; Côrte-Real et al., 2019). It was determined that big data continue to be a significant factor in the performance of firms. This study describes the contributions in

terms of theory and practice.

Theoretical contribution

This research contributes to the theory on big data analytics capabilities. This study provides scientific validity and credibility to the findings through an empirical analysis. Additionally, the previous articles have focused mainly on BDAC's direct impact on firm performance without distinguishing among the three dimensions of BDAC. This study explores the mediating effect of financial sharing on this relationship through a survey-based study, thereby filling this important gap. This research introduces financial sharing to investigate the intrinsic influence mechanism between big data capability and enterprise performance, enriching the research perspective of big data capability.

Practical contribution

The complex nature of big data itself cannot directly enhance enterprise performance and provide additional value to enterprises. Consequently, it is imperative to investigate the process of transforming big data into big data capability and recognizing the value of big data capability to enterprise groups by integrating financial sharing. The development of enterprise is significantly influenced by financial sharing. By examining the impact of big data capabilities on financial sharing, enterprise groups can not only improve the application of big data capabilities, but also further develop financial sharing. Studying the influence of big data capability on enterprise performance from the perspective of financial sharing will be beneficial in the realization of enterprise value and the improvement of enterprise competitiveness.

Research limitations

Although this investigation confirms the influence of big data capabilities on business performance and derives pertinent conclusions, it is crucial to acknowledge that there are still numerous constraints to be addressed. First, this paper categorizes BDAC into three perspectives to verify the impact of BDAC on firm performance and draws relevant conclusions. However, the internal structure of big data capability is complex and hierarchical, so future research on big data capability can focus on the specialized dimension of segmentation. Second, this study used quantitative methods for data analysis. Further research could use mixed methods to validate the results. Finally, this study solely examines the mediating function of financial sharing in the transformation of big data analytics capability into performance results without considering contextual conditions. Further investigation is required to determine whether contextual factors moderate the effective use of data analytics capabilities, as it is possible that the value of BDAC may be more advantageous in certain scenarios than in others. Future research should focus on this area, as it is of greater practical significance.

CONCLUSION

The results indicate that the following are critical elements for generating commercial value from big data investment: management capability, technology investment, talent capability and embedded big data decision-making. In addition, combining financial sharing capabilities can contribute to the sustainability of firm performance.

The results show that the cultivation of big data capability will play a positive role in improving organizational performance when enterprises implement financial sharing, which on the one hand expands the scope of big data management applications and, on the other hand, promotes the development of financial sharing. This investigation demonstrated that sustainable product development is significantly positively correlated with big data analytics. Thus, H1 was supported. Furthermore, this research can help organizations gain valuable knowledge from big data analytics capabilities to promote their growth.

The relationship between financial sharing and firm performance is significant, and H2 is supported. The results of this study are consistent with those of prior studies showing that financial sharing enhances a firm's

performance. Enterprises in the process of financial management change. This process ranges from traditional to the implementation of financial sharing and then includes the application of big data capabilities, and financial management methods will change, thus increasing the accuracy and intelligence of financial management to promote the sustainable development of enterprises.

As suggested in the research, financial sharing acts as a mediating effect between big data analytics capabilities and firm performance; therefore, H3 was supported. Moreover, this study emphasizes the importance of implementing big data analytics to achieve firm performance.

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APPENDIX 1: SURVEY MEASURES

Constructs	Items	Sources
Big data analytics management capabilities (BDAMC)	We continuously examine the innovative opportunities for the strategic use of big data analytics.	(Boynton et al., 1994); Karimi et al., 2001; Kim et al., 2012; Sabherwal, 1999; Segars & Grover, 1999)
	We enforce adequate plans for the introduction and utilization of big data analytics.	
	When we make big data analytics investment decisions, we think about and estimate the effect they will have on the productivity of the employees' work.	(Kim et al., 2012; Ryan et al., 2002; Sabherwal, 1999)
	When we make big data analytics investment decisions, we consider and project about how much these options will help end-users make quicker decisions.	
	In our organization, business analysts and line people meet frequently to discuss important issues both formally and informally.	(Boynton et al., 1994; DeSanctis & Jackson, 1994; Karimi et al., 2001; Li et al., 2003)
	In our organization, business analysts and line people from various departments frequently attend cross-functional meetings.	
	In our organization, the responsibility for big data analytics development is clear.	(Karimi et al., 2001; Kim et al., 2012)
	We are confident that big data analytics project proposals are properly appraised.	
Big data analytics technology capability (BDATEC)	Compared to rivals within our industry, our organization has the foremost available analytics systems.	(Duncan, 1995; Kim et al., 2012; Terry Anthony Byrd, 2000)
	All remote, branch, and mobile offices are connected to the central office for analytics.	
	Software applications can be easily transported and used across multiple analytics platforms.	

	Our user interfaces provide transparent access to all platforms and applications.	(Duncan, 1995; Kim et al., 2012; Terry Anthony Byrd, 2000)
	Reusable software modules are widely used in new analytics model development.	(Broadbent et al., 1999; Duncan, 1995; Kim et al., 2012;Terry Anthony Byrd, 2000)
	End-users utilize object-oriented tools to create their own analytics applications.	
Big data analytics talent capability (BDATLC)	Our analytics personnel are very capable in terms of programming skills.	(Boar, 1995; Broadbent et al., 1999; Kim et al., 2012; Lee et al., 1995; Terry Anthony Byrd, 2000)
	Our analytics personnel are very capable in terms of managing project life cycles.	
	Our analytics personnel show superior understanding of technological trends.	(Kim et al., 2012; Terry Anthony Byrd, 2000); Tippins & Sohi, 2003)
	Our analytics personnel show superior ability to learn new technologies.	
	Our analytics personnel understand our organization's policies and plans at a very high level.	(Duncan, 1995； Kim et al., 2012; Terry Anthony Byrd, 2000;Tesch et al., 2003)
	Our analytics personnel are very capable in interpreting business problems and developing appropriate technical solutions.	
	Our analytics personnel are very capable in terms of planning, organizing, and leading projects.	(Boar, 1995; Duncan, 1995); Jiang et al., 2003; Kim et al., 2012; Lee et al., 1995; Terry Anthony Byrd, 2000)
	Our analytics personnel are very capable in terms of planning and executing work in a collective environment.	
Financial sharing	The impact of financial sharing on the financial control of the enterprise	(Bergeron, 2002; Andrew Kris 2003)
	Impact of financial sharing on the core competitiveness of enterprises	
	Impact of financial sharing on financial staff	
	Impact of financial sharing on business decision-making	
	Impact of financial sharing on business strategy	
Firm performance	Sales growth	(Chandler & Hanks, 1993)
	Cash flow	
	Return on investment	
	Net profits	
	Growth in market share	
	Growth in higher net worth of the company	