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-RESEARCH ARTICLE-

MODERATING ROLE OF ORGANIZATIONAL FACTORS IN DATA FACTORS-PROFIT MAXIMIZATION LINK: BIG DATA ADOPTION IN CHINESE SME RETAIL

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—Abstract—

In the era of digital transformation, small and medium-sized enterprises (SMEs) in the retail sector face increasing pressures to adopt data-driven strategies to maximise profitability and competitiveness. However, the mechanisms through which data-related factors and organisational dynamics influence profit maximisation remain underexplored. This study investigates the relationships between data security, data management practices, big data adoption, organisational factors, and profit maximisation outcomes in SMEs operating in China's retail sector. Using a quantitative approach, data were collected via online questionnaires from 168 SMEs and analysed with SmartPLS to examine direct, mediating, and moderating effects. The findings

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reveal that data security, data management practices, and big data adoption significantly enhance profit maximisation, with big data adoption mediating these relationships and organisational factors serving a moderating role. This research contributes to the literature by uncovering the complex interplay between data-related factors, organisational dynamics, and financial performance, offering both theoretical insights and practical guidance for SMEs aiming to leverage data-driven strategies to enhance profitability and competitiveness.

Keywords: Data Security, Data Management, Profit maximization, Big Data Adoption, Organizational Factors

INTRODUCTION

Data management in the digital age has profoundly impacted various industries, including retail, with big data technologies granting corporations unprecedented access to both structured and unstructured data. Such data provides valuable insights into market trends, operational performance, and consumer behaviour (Chen et al., 2022). In response, retailers, particularly SMEs, are increasingly adopting big data analytics to enhance strategic decision-making, customer experiences, and competitiveness. The rise of big data in retail has been driven by the proliferation of digital technologies such as e-commerce platforms, smartphone applications, and social media (Witesman et al., 2024). Every interaction, purchase, and digital activity generates data that can be leveraged to refine marketing strategies, predict purchasing patterns, and better understand consumer preferences. However, the sheer volume of data presents both opportunities and challenges for efficient utilisation (P. Jiang et al., 2023). Advancements in big data technologies, including cloud computing, distributed computing, and machine learning, have further enabled the processing, storage, and analysis of vast data sets at unprecedented speeds. These tools empower retailers to make informed decisions and adapt rapidly to market changes (Oliveira et al., 2023). For SMEs, big data analytics has levelled the playing field in the retail sector by providing affordable and accessible solutions to harness advanced analytics, previously exclusive to larger enterprises. By leveraging big data, SMEs can gain deeper consumer insights, optimise operations, and enhance revenue generation, fundamentally reshaping competition in the retail industry (Gu et al., 2023).

Profit maximisation is essential for the growth, survival, and sustainability of SMEs, as it directly impacts financial performance, sales, and cost management, enabling them to navigate economic uncertainties in competitive markets (Sun et al., 2023). By maximising profitability, SMEs can attract investments, drive development, and foster innovation, which enhances their competitiveness and financial stability. Moreover, profitability allows SMEs to meet stakeholder expectations, deliver shareholder returns, and reinvest in their operations, thereby ensuring long-term growth and resilience (Li

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et al., 2024). Sustained profitability also builds investor confidence and stakeholder trust, positioning SMEs for expansion and enabling them to weather market shocks, recessions, and competitive pressures (Roy et al., 2023).

However, achieving profitability is often hindered by market dynamics, operational inefficiencies, customer satisfaction challenges, and competitive positioning. Organisational dynamics and effective data utilisation play a critical role in addressing these challenges, yet many SMEs struggle to harness data effectively for-profit enhancement (R. Zhao et al., 2023). While large datasets offer valuable insights, limitations in infrastructure, funding, and expertise frequently prevent SMEs from implementing data-driven strategies. This inability to fully leverage data resources restricts their potential to optimise operations, innovate, and boost revenue. In the retail sector, ongoing industry transformations further complicate profit maximisation for SMEs, necessitating agile and real-time data-driven approaches to adapt to shifting consumer preferences, market trends, and competitive landscapes. Despite these imperatives, many SMEs face barriers such as organisational inertia, unreliable data, and a lack of analytical expertise, which constrain their ability to respond to market changes and capitalise on emerging opportunities (Rahmati et al., 2023).

SMEs leverage their data assets by adopting strategies centred on big data, data security, and data management, enabling more informed decision-making. While data breaches can result in substantial financial losses, modern data security solutions protect sensitive information and foster stakeholder confidence (Chakabva & Tengeh, 2023). Effective data management ensures the accuracy, availability, and usability of data, providing SMEs with actionable insights to optimise operations. Additionally, big data analytics enables SMEs to better understand customer preferences, forecast industry trends, and identify opportunities to boost revenue and reduce costs (Hossain et al., 2024). The success of data-driven profit maximisation efforts depends on factors such as resource allocation, management support, and technical expertise. Investments in data infrastructure, advanced technology, and workforce development enhance organisational capacity and foster innovation (Z. Lin et al., 2023). Leadership and management play critical roles in aligning data initiatives with corporate goals and departmental strategies, highlighting the complex interplay between data-driven efforts and organisational dynamics. Contextual factors, including company culture, regulatory environments, and employee skills, further influence the effectiveness and outcomes of data strategies (Chakraborty et al., 2023). To develop effective and comprehensive profitability strategies for SMEs, it is essential to understand the interconnections and trade-offs between organisational factors and data-related initiatives.

Retailers and other businesses have increasingly focused on the interplay between data, organisational dynamics, and profit maximisation. Li et al. (2024) highlight that data security not only safeguards personal information but also enhances consumer trust and

reduces financial risks associated with data breaches. Academic research underscores the importance of data management for ensuring reliability, accessibility, and its application in strategic decision-making (Türkoğlu et al., 2024). Additionally, big data has been shown to enhance market adaptability, profitability, and cost efficiency (Xiao et al., 2024). However, organisational factors such as financial resources, technical support, and management involvement significantly influence the effectiveness of data-driven initiatives. Factors like staff competence, organisational culture, and leadership commitment also play crucial roles in determining the success of such projects (Justy et al., 2023).

Despite substantial academic attention, the relationship between organisational dynamics and data-related profit maximisation in retail SMEs remains underexplored. Prior research often focused on larger enterprises or broader industries, overlooking the unique challenges and opportunities faced by SMEs in the retail sector (Gong & Schroeder, 2022; Hang et al., 2024). SMEs are essential for driving retail innovation and growth, yet their specific needs and potential in leveraging data-driven strategies for profit maximisation require further investigation. To date, no comprehensive study has evaluated how organisational factors, data security, data management, and big data adoption collectively influence organisational outcomes for SMEs (Farjam et al., 2023). Understanding the synergy and interconnections among these components is critical for developing effective strategies to enhance SME profitability. This study addresses this gap by investigating the complex relationships between profit-maximising outcomes, organisational dynamics, and data-related factors in the context of retail SMEs in China. It aims to provide a deeper understanding of how these elements interact to shape financial performance and operational success. The research seeks to:

1) Analyse how data security affects profit maximization in SMEs.
2) Examine how data management strategies impact profit maximization in SMEs.
3) Examine how big data usage impacts profit maximization in SMEs.
4) Examine how big data adoption mediates the link between data security, management, and profit maximization.
5) Examine how organizational elements, such as data-related resource investment, technical assistance, and management support, moderate the link between data-related factors and profit maximization.

Academics, practitioners, and policymakers must critically evaluate both the theoretical and practical implications of data-related issues, organisational dynamics, and profit maximisation in SME retail. This study contributes to the existing literature by exploring the complex interactions among these factors and advancing understanding of their impact on SMEs' financial performance and competitiveness. It provides actionable insights and data-driven solutions to optimise profitability, equipping SMEs to enhance sales, operational efficiency, and market positioning. Additionally, the

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findings can guide governments in promoting data-driven strategies among SMEs, thereby fostering economic development, entrepreneurship, and innovation within the retail sector.

LITERATURE REVIEW

Data Factors and Profit Maximization

Organisations aiming for digital success must prioritise data protection as a fundamental pillar of their strategy. Li et al. (2024) highlight that data breaches can result in substantial financial losses, reputational damage, and legal complications, compromising the confidentiality and reliability of critical business information. Such risks underscore the necessity for robust data security measures. By implementing comprehensive cybersecurity frameworks, companies can mitigate the risks of unauthorised access and safeguard trade secrets and consumer data (Koyuncuoğlu & Demir, 2023). Du et al. (2023) further emphasise that data breaches erode consumer trust and loyalty, which are essential for long-term financial stability.

As customers increasingly value data security and privacy, precise data management practices are vital for fostering trust and building enduring customer relationships. Brands that prioritise data security not only retain customers but also enhance customer lifetime value. Compliance with regulations such as the CCPA and GDPR is critical, as non-compliance can lead to significant financial penalties and legal challenges (Cadden et al., 2023). Beyond regulatory compliance, effective data security also improves operational performance. Investing in advanced cybersecurity technologies and personnel training enhances resource management, reduces the frequency of security incidents, and minimises recovery costs associated with cyber-attacks (Ahmed et al., 2024). Moreover, strong data security policies protect intellectual property, strengthen regulatory compliance, bolster consumer confidence, and enhance operational efficiency, collectively maximising financial returns (Rojas-García et al., 2024). By reducing the risks of system outages and costly recoveries, organisations can allocate resources towards revenue-generating activities. In today's digital landscape, prioritising cybersecurity investments is essential for ensuring long-term profitability, resilience, and sustained success.

H1: *Data Security has a significant and positive impact on profit maximization.*

In today's data-driven economy, organisations aiming to maximise profits must prioritise effective data management. Extensive scholarly research has explored the intricate connection between data management practices and financial performance, highlighting the critical role of data management in profit maximisation. (Hang et al., 2024) emphasise the importance of data quality assurance as a cornerstone of effective data management. Accurate, complete, and consistent data enable organisations to make

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strategic decisions that enhance revenue and profitability. By adopting data management frameworks prioritising data quality, businesses can gain actionable insights, optimise resource allocation, and improve strategic planning.

Data management also enhances profitability by enabling customer segmentation and personalised marketing (Yihui, 2024). Through effective customer data management, organisations can classify customers based on demographic, behavioural, and psychographic characteristics, allowing for tailored marketing strategies that address individual needs. Personalised customer experiences drive satisfaction, loyalty, and lifetime value, ultimately contributing to sustainable profitability. Additionally, robust data management practices improve demand forecasting and inventory management (Asaithambi et al., 2024). By analysing sales data, market trends, and consumer demand patterns, businesses can predict demand fluctuations, optimise inventory levels, and streamline supply chain operations. These practices reduce inventory costs, prevent overstocking, and maximise revenues. Moreover, effective data management enhances operational efficiency by automating repetitive tasks, eliminating inefficiencies, and reducing costs (Maziliauske, 2024). Advanced technologies such as BI tools and ERP systems play a pivotal role in improving productivity, optimising resource allocation, and streamlining organisational processes. Collectively, these strategies enable organisations to enhance both their operational and financial performance, securing long-term success in a competitive market. By improving procedures and decreasing human error, organizations may increase profit margins and minimize operational costs.

H2: *Data management has a significant and positive impact on profit maximization.*

Data Factors and Big Data Adoption

Businesses leveraging big data must implement strong data security policies to safeguard sensitive data and reduce risks. Research highlights the complex interplay between data security and big data success, emphasising its role in organisational processes and decision-making (Y. Jiang et al., 2023). Robust policies protect data from cyberattacks, ensuring privacy, accessibility, and reliability. Addressing vulnerabilities boosts platform trust, with authentication, encryption, and access controls recommended for safeguarding data in transit, storage, and processing (Gong & Schroeder, 2022; Ngo, 2023). Compliance with regulations like HIPAA and GDPR is essential to avoid legal issues and fines, as noted by (Witesman et al., 2024). Meeting standards with effective security measures enhances stakeholder confidence, crucial for big data adoption. (Nguyen, 2023) found data security perception fosters trust among users, partners, and employees, creating a positive environment. Balancing security with accessibility remains a challenge. Marullo et al. (2024) suggest risk-based approaches to identify and mitigate vulnerabilities without hampering data use. By using preventative, investigative, and remedial security measures, organizations may decrease security risks and retain data access.

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H3: *Data Security has a significant and positive impact on big data adoption.*

Integrating big data technology requires robust data management procedures. Research highlights the complex relationship between data management and big data integration (Rojas-García et al., 2024). Effective management addresses challenges such as volume, speed, type, and accuracy of data. Poor data management can lead to issues with quality, integration, governance, scalability, and organizational culture, hindering big data adoption. Data integrity is crucial in big data implementation. Zhu et al. (2023) emphasise the need for data quality assurance to ensure accuracy, inclusivity, and consistency. Purification, deduplication, and normalisation enhance data reliability, enabling more accurate insights. Effective data governance helps mitigate security and privacy risks while complying with regulations. Li et al. (2024) stress the importance of clear policies for data collection, storage, and sharing. Scalability is essential to handle growing data volumes. Salvador et al. (2023) suggest cloud infrastructure, distributed storage, and parallel computing to improve scalability and performance. Implementing big data strategies also requires a shift in corporate culture. Zhu et al. (2023) recommend fostering a culture that treats data as a strategic resource, promoting innovative and collaborative data management practices. Successful change management is essential to align a company with its big data goals and overcome resistance.

H4: *Data management has a significant and positive impact on big data adoption.*

Big Data Adoption and Profit Maximization

Big data has transformed decision-making, offering organizations new opportunities to maximise revenue. Scholars have explored the complex relationship between big data analytics and financial performance, showing that this advantage stems from strategic insights and improved decision-making. Big data analytics enables firms to analyse vast data sets, providing actionable insights and predictive capabilities (Rojas-García et al., 2024). This helps businesses identify market opportunities, customer preferences, and trends, enhancing strategic planning and increasing profitability. Focused marketing and consumer segmentation are key to boosting revenue. Gu et al. (2023) show that big data analytics can segment customers based on demographic, behavioural, and psychographic traits, allowing firms to tailor marketing efforts and improve customer satisfaction, loyalty, and lifetime value. Revenue management and dynamic pricing models also enhance earnings. Sun et al. (2023) demonstrate how flexible pricing, based on market conditions and demand, can improve revenue and profit margins. Additionally, big data enhances productivity and reduces costs. According to Li et al. (2024), big data analytics significantly influences operational performance by enhancing business processes. The authors present case studies of companies that have leveraged data-driven strategies to reduce costs and improve productivity. Through

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operational data analysis, firms can identify bottlenecks, optimise workflows, reduce cycle times, and eliminate inefficiencies, leading to cost savings and increased profitability. Big data analytics also maximises profitability through predictive maintenance and risk management. R. Zhao et al. (2023) highlight how predictive analytics can optimise asset performance by forecasting equipment failures and scheduling timely maintenance. By utilising real-time sensor data, predictive models help mitigate business risks, prevent operational disruptions, and minimise revenue losses, further enhancing financial outcomes.

H5: *Big data adoption has a significant impact on profit maximization.*

Big Data Adoption as a Mediator

Big data, data security, and profit maximisation are integral to the success of businesses. However, many enterprises hesitate to adopt big data technologies due to concerns over data security (Rojas-García et al., 2024). Data breaches, unauthorised access, and regulatory constraints can impede the effective use of big data analytics. These challenges may hinder organisations' ability to innovate and make data-driven decisions. However, by investing in data security solutions, businesses can mitigate these concerns and safely integrate big data technologies. Once secure, big data enables firms to maximise earnings by unlocking the full potential of their data. Big data analytics enhances income, operational performance, and strategic decision-making (Scuotto et al., 2023). Through advanced analytics, companies can uncover revenue opportunities, optimise pricing strategies, refine marketing efforts, and improve risk management, all of which contribute to increased profits. By enabling data-driven decision-making, big data offers actionable insights that drive business growth. The relationship between business maximisation and data security is clear, with each element being interdependent. Al-Sharafi et al. (2023) explore how investments in data security create a secure foundation for big data adoption.

Ultimately, big data analytics empowers businesses to leverage their data assets more effectively, driving enhanced performance and profitability. Big data can drive revenue growth, operational efficiency, and market opportunities. It allows organizations to maximise profits while ensuring data security through safe environments and data-driven decision-making. Understanding how big data adoption influences organizational practices is crucial for successful implementation. To facilitate integration, organizations must prioritise data security to build trust and confidence. Strong security policies enhance stakeholder trust, mitigate risks, and ensure compliance with regulations (Sohns et al., 2023). Moreover, organisations must leverage big data analytics to create value and generate actionable insights. A robust infrastructure, skilled people, and advanced technology are essential for data-driven decision-making, fostering innovation, and gaining a competitive edge.

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H6: *Big data adoption mediates the relationship between data security and profit maximization.*

Companies using big data technology require efficient data management systems to impact profitability significantly. Prabowo et al. (2020) highlight the importance of effective data management in addressing big data's volume, speed, variety, and accuracy. Governance frameworks, data quality assurance, and integration skills are essential for successful big data adoption. These strategies ensure data reliability, availability, and security, transforming raw data into valuable insights for innovation and decision-making (M. S. Lin et al., 2023). Big data technologies help companies maximise their data assets, boosting revenue and operational performance. Analytics improve income, strategic decisions, resource allocation, and risk reduction, enhancing profitability.

Investments in data management build trust in data reliability and accuracy, allowing businesses to adopt big data technologies confidently (Oliveira et al., 2022). By optimising data management, companies can enhance their analytical capabilities, efficiency, and market potential. Big data enables profit maximisation through data-driven strategies and decisions, influencing organisational behaviour (Chakabva & Tengeh, 2023). Organizations must prioritise data management to fully leverage big data technology. Effective governance, data quality assurance, and integration ensure data asset dependability, availability, and protection. Understanding big data analytics is essential to generate value and provide actionable insights. Investing in data-driven staff, technology, and infrastructure fosters innovation and enhances competitiveness.

H7: *Big data adoption mediates the relationship between data management and profit maximization.*

Organizational Factors as a Moderator

Several organizational factors, including technology support, investment, and management backing, influence the relationship between profit maximisation and data security. Investment in data security infrastructure ensures digital asset availability, confidentiality, and integrity, while reducing risks (Zide & Jokonya, 2022). Allocating resources to data security helps prevent breaches and regulatory issues, safeguarding the brand and reducing financial risk. These efforts enhance data security, fostering consumer trust and increasing customer loyalty, which drives repeat business. Effective data protection requires skilled personnel and advanced technology (Rafiki et al., 2023). Technicians must implement security policies, audit systems, and respond to issues promptly. Technical support is crucial for resolving data security challenges, mitigating risks, and ensuring business continuity (Pacheco, Castillo, Manotas, & Arevalo, 2022). By developing technological skills, businesses can reduce data breach risks and boost profits.

Cultivating a security-conscious culture requires strong management support, particularly leadership and organisational culture (Zide & Jokonya, 2022). Allocating resources, setting priorities, and maintaining clear communication channels are key to managing data security risks. Organisations that prioritise data security and promote employee accountability can prevent breaches, quickly identify issues, and respond effectively. Management support helps minimise financial losses, protect the brand, and enhance profitability by building stakeholder trust (Srisathan et al., 2023). Organisational factors, such as management support, financial investment, and technological resources, shape the relationship between data security and profit maximisation. By hiring skilled personnel, allocating resources, and fostering a security-aware culture, organisations can reduce security risks and improve financial returns (Xie et al., 2020). Integrating data security into strategic planning makes it essential for business success.

H8: *Organizational factors moderate the relationship between data security and profit maximization.*

Research shows that organisational factors such as investment, technical support, and managerial backing significantly influence profit maximisation and data management. Effective data management systems depend on infrastructure and technology investments (Subramanian & Suresh, 2022). Companies focusing on data management prioritise governance, quality assurance, and integration. Zide and Jokonya (2022) argue that finance boosts data integrity, accessibility, and security. Investment in data management enhances decision-making, operational efficiency, and financial outcomes. Skilled personnel are needed to ensure regulatory compliance, audits, and effective data management (Marullo et al., 2024). Innovation and optimising data processes, combined with technology, can drive revenue. Leadership and organisational culture are critical for efficient data management. Management support fosters a data-driven culture and innovation (Al-Sharafi et al., 2023). It requires setting goals, allocating resources, and integrating data management across the business. Management assistance enhances data utilisation and revenue generation. Understanding how organisational factors impact data management and profit maximisation is essential for strategic planning (Mikuletič et al., 2024). Effective resource allocation, skilled staff, and data-driven decision-making boost data asset value. A framework has been developed based on the hypothesis development and the literature discussed, as illustrated in Figure 1.

H9: *Organizational factors moderate the relationship between data management and profit maximization.*

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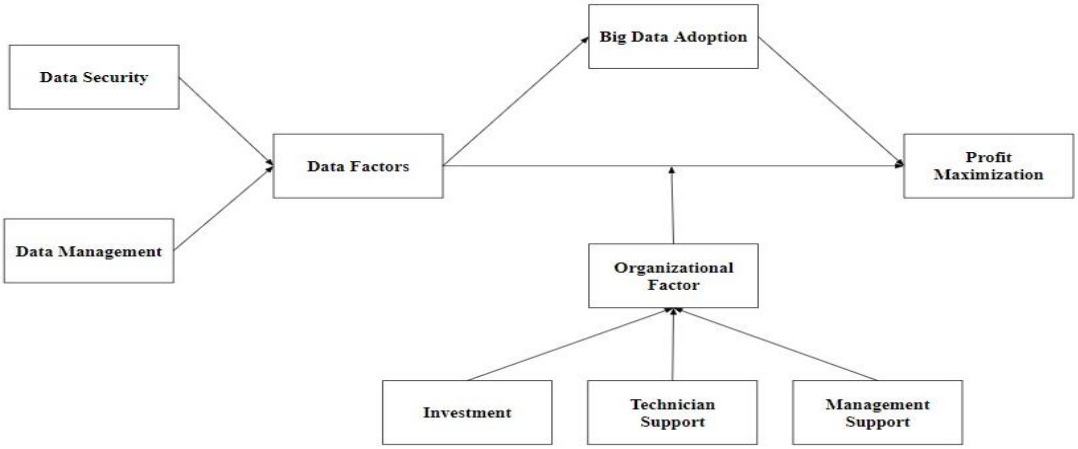

Figure 1: Conceptual Framework

METHODOLOGY

This quantitative study examined the impact of organisational factors on profit maximisation and data management within Chinese companies. Numerical data were analysed to test hypotheses and explore relationships between variables. A cross-sectional research design was employed, collecting data at a specific point in time to illustrate the relationships among the variables (Javed et al., 2023). The research focused on Chinese firms across various industries, including retail, manufacturing, technology, finance, and services. As a global economic powerhouse, China is home to both SMEs and multinational corporations (MNCs), offering a diverse sample that represents organisations of varying sizes, structures, and operational sectors within the vast Chinese economic landscape. The study encompassed a mix of local Chinese businesses and international enterprises, broadening the scope of the population under investigation. Participants were drawn from major urban centres like Beijing, Shanghai, Guangzhou, and Shenzhen, as well as developing markets in smaller towns, ensuring regional and market diversity. The Chinese sample was deemed representative, accounting for regional legislative frameworks, market conditions, cultural factors, and industry dynamics. This large and varied sample of Chinese companies provided valuable insights into the ways organisational factors influence profit maximisation and data management. The appropriate sample size for this study was determined using SEM statistical power and precision. Formulas for calculating the SEM sample size incorporated the number of variables, estimated effect sizes, and desired statistical power and significance. This approach yielded a final sample of 168 Chinese firms. The complexity of the study design and the anticipated correlations among the variables guided the selection of this sample size, ensuring reliable and accurate SEM analysis. The results demonstrated that organisational factors significantly moderated the effects of data management and profit maximisation within Chinese firms.

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168 Chinese companies were selected for practicality, feasibility, and data collection. While the sample size was adequate for insights, larger samples would enhance statistical power. Due to the challenges of gathering a diverse sample, convenience sampling was used, which, despite biases, was cost-effective. Participants were recruited through networks and online platforms. Data collection was confidential, transparent, and aimed to minimise biases, with sensitivity testing for reliability. The study surveyed Chinese firms using an online questionnaire, overcoming logistical challenges by reaching a geographically dispersed sample. Standard measures and closed-ended questions ensured accuracy, leading to high participation. SmartPLS software was used for PLS-SEM data analysis, which can handle complex variable correlations in latent concept investigations and moderate-sized datasets (Wu et al., 2017). This method is suitable for non-normal data and small samples, analysing structural and measurement models simultaneously. The study model, including organisational factors, data management, and profit maximisation, was evaluated using this approach.

RESULTS

Table 1 shows internal consistency, measured by Cronbach's alpha coefficients, for each research variable. The instruments used to evaluate big data adoption, data management, data security, organisational factors, and profit maximisation are robust. A Cronbach's alpha of 0.863 for big data adoption in SMEs indicates excellent internal reliability, reflecting the data adoption strategies of the sampled SMEs. The coefficient for data management strategies (organisation, quality assurance, integration) also demonstrates high internal consistency. For data security perspectives, the Cronbach's alpha is 0.809, which, although lower than the others, still indicates strong reliability in reflecting respondents' views on corporate data security. Data resources, technical support, and management support received the highest Cronbach's alpha of 0.906, confirming the reliability of the evaluation instrument for assessing SMEs' organisational environment and data-driven support systems. Lastly, the Cronbach's alpha for profit maximisation in SMEs is 0.876, indicating good internal reliability in measuring financial performance and profitability.

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confirming the reliability of the evaluation instrument for assessing SMEs' organisational environment and data-driven support systems. Lastly, the Cronbach's alpha for profit maximisation in SMEs is 0.876, indicating good internal reliability in measuring financial performance and profitability.

Table 1: Cronbach Alpha

	Cronbach's Alpha
Big Data Adoption	0.863
Data Management	0.867
Data Security	0.809
Organizational Factors	0.906
Profit Maximization	0.876

Table 2 presents the composite reliability (CR) and average variance extracted (AVE) values for each research variable, confirming the convergent validity and internal consistency of the measuring instruments. Composite reliability gauges latent construct reliability, while AVE reflects the variance related to dimension errors. For big data adoption, a composite reliability of 0.902 and AVE of 0.649 demonstrate convergence validity and internal consistency. The data management assessment has a composite reliability of 0.904 and an AVE of 0.654, confirming the instrument's validity. For data security perceptions, the composite reliability of 0.868 and AVE of 0.571 indicate valid convergence and internal consistency. The organisational factors construct, with a composite reliability of 0.923 and an AVE of 0.571, reflects the validity and reliability of the tool in assessing resources, technical support, and management assistance. Finally, the profit maximisation variable shows a composite reliability of 0.915 and AVE of 0.730, suggesting strong convergent validity and internal consistency in evaluating companies' earnings maximisation. The measuring instruments are reliable, as all variables exhibit good composite reliability and AVE values, confirming convergent validity and internal consistency. These findings strengthen confidence in the study's conclusions and provide insights into variable interactions and organisational effects.

Table 2: Composite Reliability and AVE

	CR	AVE
Big Data Adoption	0.902	0.649
Data Management	0.904	0.654
Data Security	0.868	0.571
Organizational Factors	0.923	0.571
Profit Maximization	0.915	0.730

Table 3 and Figure 2 present the outer loading values for each item in the analysed variables, showing the strength of the relationship between observable variables and

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latent constructs. Higher outer loading values indicate stronger links, with big data adoption components ranging from 0.691 to 0.854. BDA1–BDA4 show strong associations, while BDA5, with an outer loading of 0.691, has a weaker connection. Data management components have outer loadings from 0.763 to 0.852, with DM2 and DM5 exhibiting the highest loadings, indicating robust relationships. DM1, with the lowest loading of 0.763, suggests a weaker link. Data security components range from 0.566 to 0.821, with DS1 having the lowest loading, indicating a weaker data security correlation than DS2 and DS3, though all items are important for data security attitudes. Organisational factors show outer loadings between 0.677 and 0.817, with OF3 and OF7 most strongly associated with the latent construct, while OF6 has the lowest loading at 0.677. Profit maximisation components have outer loadings from 0.833 to 0.881, suggesting strong relationships between the observable variables and the latent construct. Overall, the outer loading values across all variables validate the study's measuring methods, enhancing the reliability of the data analysis and conclusions.

Table 3: Outer Loading

Variables	Items	Outer Loading
Big Data Adoption	BDA1	0.850
	BDA2	0.854
	BDA3	0.825
	BDA4	0.797
	BDA5	0.691
Data Management	DM1	0.785
	DM2	0.841
	DM3	0.763
	DM4	0.801
	DM5	0.852
Data Security	DS1	0.566
	DS2	0.808
	DS3	0.821
	DS4	0.756
	DS5	0.797
Organizational Factors	OF1	0.709
	OF2	0.775
	OF3	0.817
	OF4	0.804
	OF5	0.763
	OF6	0.677
	OF7	0.800
	OF8	0.738
	OF9	0.707
Profit Maximization	PM1	0.881
	PM2	0.833
	PM3	0.860
	PM4	0.841

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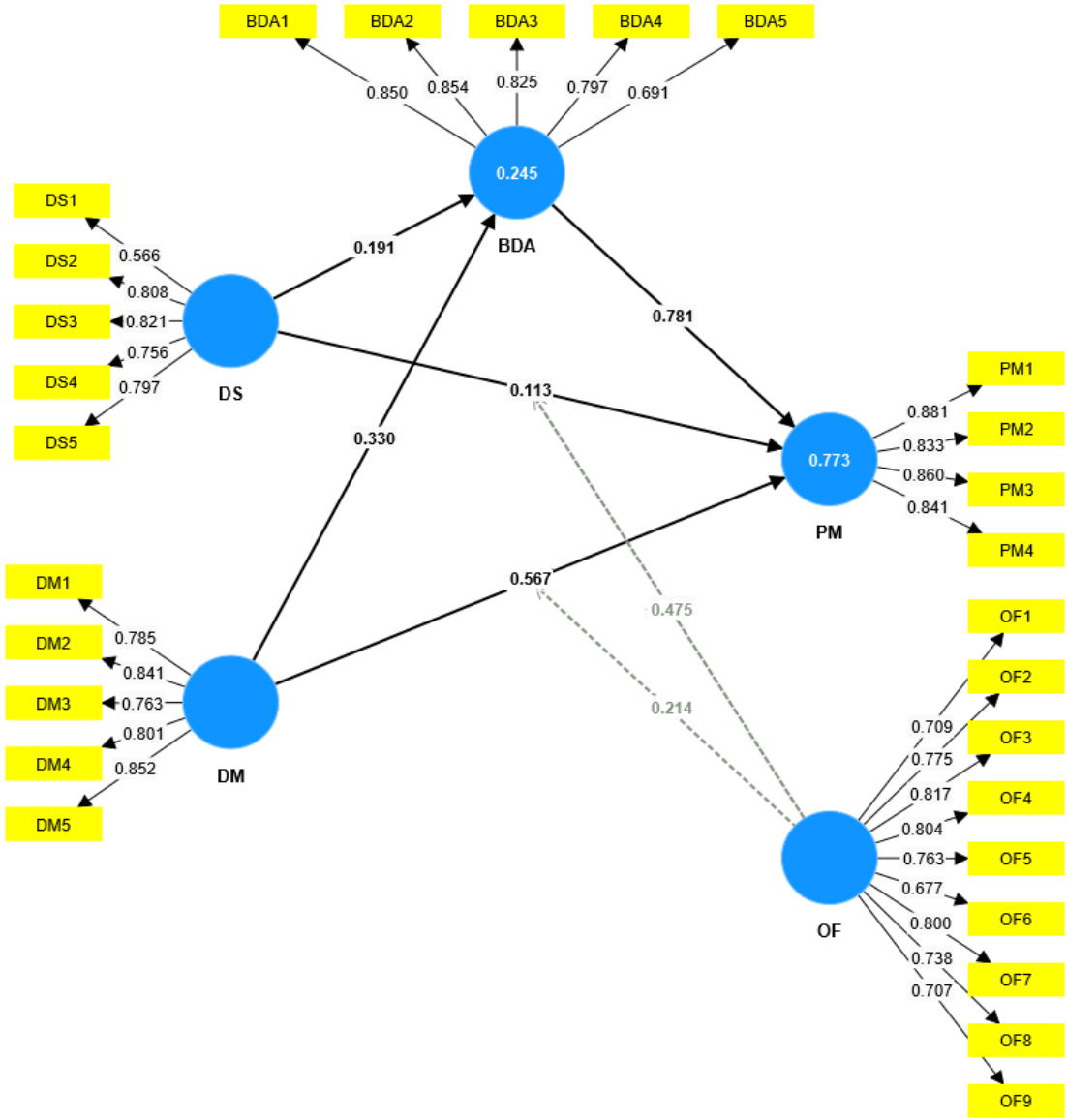

Figure 2: Measurement Model

Table 4 presents the heterotrait-monotrait (HTMT) ratio test, which compares construct correlations across and within components to assess discriminant validity. HTMT values below 0.85 indicate discriminant validity, suggesting that constructs are distinct from one another. All HTMT values in this study are below the threshold, confirming discriminant validity. Big data adoption has HTMT values ranging from 0.387 to 0.563, demonstrating sufficient uniqueness from other constructs. Data management shows HTMT values from 0.214 to 0.590, while data security ranges from 0.525 to 0.751, distinguishing it from other variables. Organizational factors have HTMT values

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between 0.214 and 0.563, and profit maximisation has HTMT values from 0.387 to 0.529, differentiating it from other components. The HTMT ratio test thus supports the discriminant validity of the study's constructs, ensuring that each variable assesses a unique aspect of the phenomena. These findings reinforce the validity of the measurement model and the study's reliability, facilitating meaningful interpretations and insights into variable interactions and organisational outcomes.

Table 4: Discriminant Validity (HTMT)

	BDA	DM	DS	OF	PM
Big Data Adoption					
Data Management	0.560				
Data Security	0.525	0.626			
Organizational Factors	0.563	0.214	0.751		
Profit Maximization	0.387	0.590	0.588	0.529	

Table 5 presents the R-square (R^2) and Q-square (Q^2) values for big data adoption and profit maximisation, indicating the structural model's explanatory power and predictive relevance. R-square measures the variation in endogenous variables explained by exogenous variables, while Q-square reflects the model's predictive significance. The R-square for big data adoption is 0.245, showing that external variables explain 24.5% of the variation, suggesting that other factors influencing big data adoption may not be captured in the current study. The Q-square value of 0.365 indicates moderate predictive significance for big data adoption. In contrast, profit maximisation has a higher R-square value of 0.773, meaning that 77.3% of its variation is explained by the model's exogenous variables. The Q-square value of 0.615 indicates that the model provides strong predictive power for profit maximisation. These R-square and Q-square values highlight the structural model's explanatory and predictive strength, enhancing the study's conclusions and providing valuable insights for SMEs' strategic planning and profit maximisation in a dynamic business environment.

Table 5: R-Square and Q- Square

	R-Square	Q^2
Big Data Adoption	0.245	0.365
Profit Maximization	0.773	0.615

Table 6 presents the saturated and estimated model fit indices, showing the structural equation model's goodness of fit. The standardized root mean square residual (SRMR) measures the difference between observed and predicted covariance matrices, with lower values indicating better fit. In this study, the saturated model has an SRMR of 0.077, and the estimated model has a value of 0.080. Both values fall within the acceptable range for model fit, with values below 0.08 generally considered excellent.

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However, the slightly higher SRMR for the estimated model suggests a marginally poorer fit compared to the saturated model. SRMR values can be influenced by sample size and model complexity, so small differences between values may not indicate significant issues with fit. While the predicted model may not align perfectly with the saturated model, both SRMR values suggest good data fit. These findings support the structural equation model's ability to effectively represent variable interactions and provide insights into organizational outcomes.

Table 6: Model Fit

	Saturated Model	Estimated Model
SRMR	0.077	0.080

Table 7 and Figure 3 display the direct path analysis coefficients, t-values, and p-values for data security (DS) and profit maximization (PM), as well as data management (DM) and PM. The results highlight how data-related factors impact SME profit maximization. A positive but modest direct effect is observed between data security and profit maximization, with a path coefficient of 0.113. The t-value of 1.901, significant at 0.05, indicates a relationship between data security and profit maximization, though its direct effect is relatively small compared to other factors. In contrast, the path coefficient between data management and profit maximization is significantly larger at 0.567, with a t-value of 5.947, significant at 0.001, showing a strong and significant influence of data management practices on profitability. Effective data management strategies, such as data organization, quality assurance, and integration, are key to improving SME profitability. Furthermore, big data adoption and data security have a positive but moderate direct effect (path coefficient 0.191), with a t-value of 2.110, also significant at 0.05, indicating a statistically significant relationship between data security and big data adoption. This suggests that SMEs prioritising data security are more likely to invest in and adopt big data technology to enhance data analytics and decision-making.

To encourage SMEs to leverage big data for strategic advantages, addressing data security is essential. The path coefficient of 0.330 indicates a positive and significant direct effect between data management and big data adoption. Effective data management practices are strongly linked with the adoption of big data technology, as shown by the t-value of 2.683, which is highly significant at 0.01. Approaches such as data organization, quality assurance, and integration are crucial for SMEs to maximize their data assets. Big data analytics can help SMEs analyse customer behaviour, market trends, and operational performance, facilitating data-driven decisions that foster innovation and growth. The path coefficient of 0.781 between big data adoption and profit maximization highlights the significant impact of big data on SME profitability, with a t-value of 16.324 (p-value = 0.001). This demonstrates that SMEs leveraging big data technologies to utilise their data assets can increase revenue through improved

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operational efficiency, targeted marketing, and informed decision-making, ultimately boosting competitiveness.

Table 7: Direct Path Analysis

	Path Coefficient	T Value	P Value
DS -> PM	0.113	1.901	0.029
DM -> PM	0.567	5.947	0.000
DS -> BDA	0.191	2.110	0.017
DM -> BDA	0.330	2.683	0.004
BDA -> PM	0.781	16.324	0.000

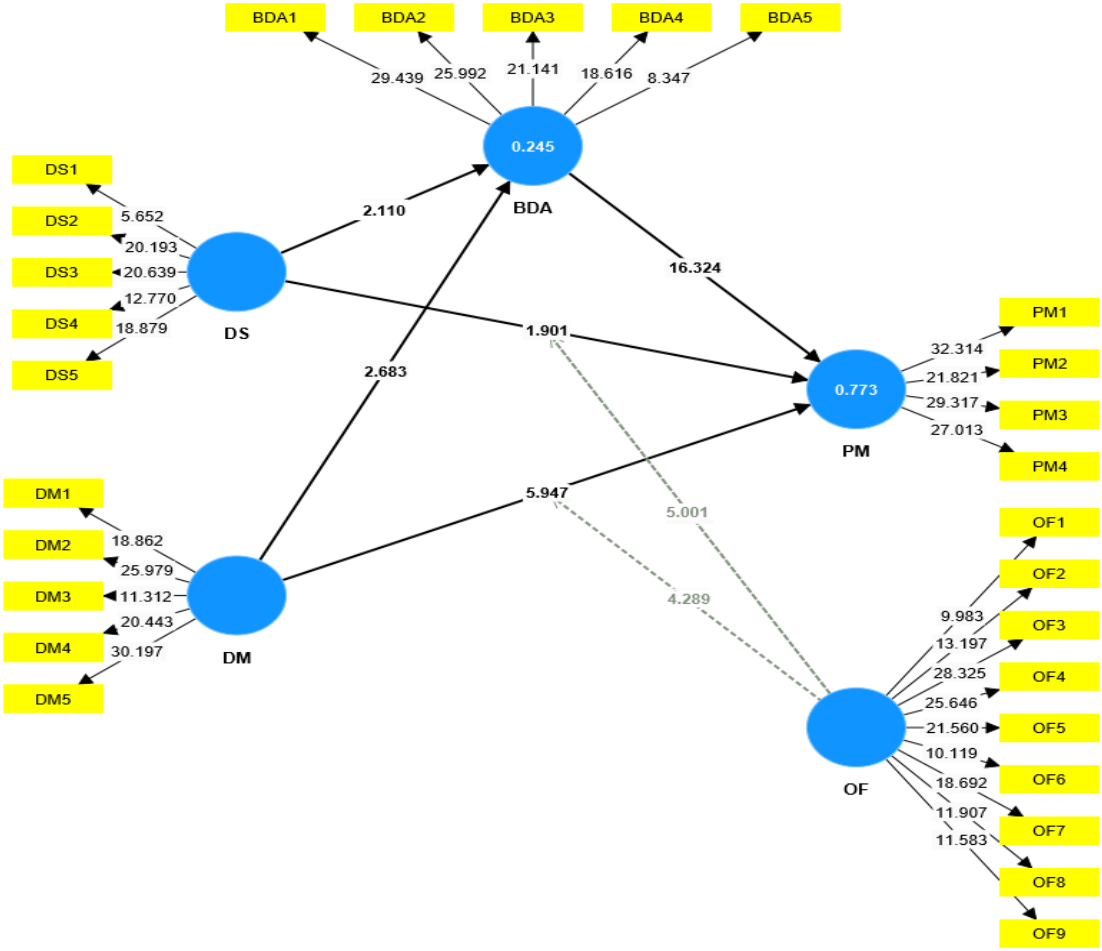

Figure 3: Structural Model

BDA mediates the relationship between DM and PM, as well as between DS and PM, as shown in Table 8. These results highlight how big data adoption mediates the indirect impact of data-related factors on profitability in SMEs. Big data adoption has a positive and strong indirect effect on the connection between data management and profit

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maximization, with a path coefficient of 0.258. The mediation effect is statistically significant at 0.01 with a t-value of 2.653. Effective data management enhances profit maximization by encouraging big data technology adoption, enabling SMEs to utilise data-driven insights to boost earnings. Integration of data management and big data adoption is crucial to maximise data asset revenues. Furthermore, big data adoption mediates a positive and significant indirect relationship between data security and profit maximization, with a path coefficient of 0.149. This mediation effect is supported by a t-value of 2.031, which is significant at 0.05. Thus, data security indirectly impacts profitability by influencing the adoption of big data technologies. SMEs that prioritise data security are more likely to invest in big data solutions, leveraging data-driven opportunities for economic growth. These findings underscore the interconnectedness of data security, big data adoption, and profitability in SMEs, emphasising the need for a comprehensive data management and governance approach.

Table 8: Mediation Analysis

	Path Coefficient	T Value	P Value
DM -> BDA -> PM	0.258	2.653	0.004
DS -> BDA -> PM	0.149	2.031	0.021

Table 9 presents the path coefficients, t-values, and p-values for the moderating effects of organizational factors (OF) on the relationships between DS and PM, and DM and PM. The results reveal how organizational factors influence the profitability of SMEs by moderating the effects of data-related factors. Organizational factors and data security positively and significantly reduce profit maximization by 0.475. The t-value of 5.001, highly significant at 0.001, confirms the robustness of this moderation effect. This shows how organizational factors such as resource investment, technician support, and management involvement strongly affect the relationship between data security and profitability. SMEs with solid organizational support structures can better utilize data security measures to enhance profitability, highlighting the critical role of organizational competencies in maximizing data asset value. Additionally, organizational factors positively moderate the relationship between data management and profit maximization, with a path coefficient of 0.214. The t-value of 4.289, also significant at 0.001, indicates that strong organizational support enables SMEs to effectively apply data management practices to increase profits. This demonstrates the synergy between organizational capabilities and data management efforts in driving profitability.

Table 9: Moderation Analysis

	Path Coefficient	T Value	P Value
OF x DS -> PM	0.475	5.001	0.000
OF x DM -> PM	0.214	4.289	0.000

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DISCUSSION

The discussion in this paper explores the empirical findings and their implications for understanding the complex relationship between maximizing profitability, organizational dynamics, and data within Chinese firms. It critically examines the hypotheses and their alignment with previous academic studies to better understand how organizational factors, data management, big data adoption, and data security influence financial performance and competitive advantage in today's digital economy (Berlilana et al., 2021). The analysis offers practical insights for policymakers, practitioners, and scholars aiming for data-driven organizational success by integrating empirical evidence with theoretical concepts. Hypothesis 1 is validated, confirming that data security positively and significantly impacts the profitability of Chinese businesses. This supports prior research indicating that data security safeguards valuable assets, enhances consumer trust, and improves operational efficiency, ultimately boosting financial outcomes (Khan & Faisal, 2023). Effective data security frameworks allow businesses to detect and mitigate breaches swiftly, preserving consumer trust and ensuring minimal disruption. Data security also helps firms remain resilient and comply with stringent data protection laws in the digital economy, fostering trust among stakeholders, partners, and customers (Hueros-Barrios et al., 2022). This trust, in turn, strengthens brand reputation and customer loyalty, while reducing risks, increasing productivity, and reassuring stakeholders, all contributing to improved profitability.

The study also supports Hypothesis 2, confirming that data management strategies contribute to increased profits for Chinese companies. Previous research has highlighted the critical role of data management in enhancing data quality, accessibility, and use for informed decision-making and operational efficiency (Kotir et al., 2022). Effective data management requires strong governance, quality assurance, integration, and analytics, all aimed at maximizing the value of a company's data assets. By implementing comprehensive data management frameworks, firms can optimise workflows, ensure data quality and consistency, and generate insights to drive strategic objectives and revenue growth (Chakabva & Tengeh, 2023). Data management transforms raw data into actionable insights, new solutions, and competitive advantages. Furthermore, data-driven decision-making strengthens earnings by improving supply chain efficiency, marketing effectiveness, and organizational agility, enabling faster market responsiveness (Esteves et al., 2023).

The study also validates Hypothesis 3, confirming that data security enhances big data integration in Chinese enterprises. Prior to adopting big data and advanced analytics, firms must ensure data security. Robust data security measures are essential for safeguarding data assets and ensuring their privacy and reliability in big data initiatives (Hussain et al., 2023). In industries such as banking, telecommunications, and

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healthcare, where data protection regulations are stringent, addressing data security is crucial. Effective data security can mitigate compliance and legal concerns, thereby facilitating the adoption of big data systems and analytics. It ensures that data access, usage, and distribution adhere to regulatory standards, enhancing data governance (Zhu et al., 2023). This fosters the integration of diverse data sources, enabling more effective big data analytics. Consequently, data security plays a pivotal role in supporting big data adoption, which in turn drives innovation, competitiveness, and profitability in digital enterprises.

The findings validate Hypothesis 4, confirming that data management strategies enhance big data adoption in Chinese enterprises. Effective data management is essential for integrating and utilizing big data technologies and analytics. Efficient data management involves governance, quality assurance, integration, and analytics, which ensure that data assets are effectively utilised for organizational purposes. Comprehensive data management frameworks and procedures can optimise workflows, maintain data quality and consistency, and provide insights for achieving strategic goals and revenue growth (Chakabva & Tengeh, 2023). Data managers can apply machine learning algorithms and predictive analytics to identify correlations, patterns, and trends that provide a competitive advantage. Establishing data management standards enables big data analytics programs to evaluate multiple data sources, ensuring data integrity, consistency, and quality across platforms and facilitating integration and analysis.

The results support Hypothesis 5, confirming that big data integration enhances profits for Chinese enterprises. Big data analytics drives creativity, productivity, and competitiveness within organizations (Mitręga, 2023). By analysing customer preferences, market trends, and operational efficiency, firms can increase revenue, reduce costs, and improve market responsiveness. Advanced analytics enable personalized marketing and customer experiences, thereby boosting earnings and competitiveness in dynamic markets (Menzies et al., 2025). Big data transforms raw data into valuable insights, innovations, and strategic initiatives, unlocking value from data assets. Data-driven decisions enabled by big data analytics help organizations increase profits, cut costs, and enhance efficiency (Nguyen, 2023). These decisions can optimize supply chains and product development, allowing firms to quickly adapt to shifting client preferences and market conditions. This responsiveness strengthens their ability to address emerging opportunities and threats (Justy et al., 2023).

The findings also validate Hypothesis 6, which asserts that big data integration mediates the relationship between profit maximization and data security. Big data analytics plays a pivotal role in transforming investments in data security into financial gains and competitive advantages. Robust security frameworks and industry standards help businesses prevent, detect, and address security issues, maintaining customer trust and preventing disruptions (Cadden et al., 2023). Data security policies ensure the

availability, integrity, and confidentiality of data, enabling the use of big data analytics to unlock the benefits of advanced tools and techniques. Organizations with strong data security practices can leverage big data analytics, machine learning, and predictive analytics to achieve strategic objectives, enhance sales, and increase profitability (Mahdiraji et al., 2022). Furthermore, data security measures bolster data governance, ensuring that data access, use, and sharing comply with regulatory standards (Ricci et al., 2021).

The findings support Hypothesis 7, which demonstrates that big data influences profit maximization and data management in Chinese firms. Big data analytics is essential for converting effective data management into tangible financial rewards and competitive advantages (Steens et al., 2024). Proper data management enhances data quality, accessibility, and utilization, serving as the foundation for successful big data adoption programs. Comprehensive data management frameworks and processes optimize data workflows, ensure data quality and consistency, and provide insights that align with strategic goals and revenue growth. By employing data governance frameworks, companies can maintain data integrity, consistency, and quality across silos, facilitating data integration and interoperability for analytics (Willetts & Atkins, 2024). This enables the adoption and application of big data analytics techniques and technologies, helping organizations extract valuable insights from large data volumes. Big data analytics enables firms to unlock the full potential of their data assets, transforming raw data into actionable insights, innovative solutions, and strategic initiatives (Justy et al., 2023).

The study validates Hypothesis 8, confirming that organizational factors influence profit maximization and data security in Chinese enterprises. (Marullo et al., 2024) emphasize the role of organizational resources and competencies in unlocking the financial and competitive advantages of data security. Companies that prioritize security, technology, and teamwork gain substantial benefits. Strategic allocation of resources can improve operational efficiency, consumer confidence, and stakeholder trust by establishing a robust data security framework and practices (Zide & Jokonya, 2022). Organizational factors such as leadership commitment and management support are critical for fostering a data security culture. Leaders can demonstrate their commitment by setting goals, allocating resources, and promoting data security, reputation, and ethics. Technical support, investment in data protection technology, and other organizational factors impact operational performance, stakeholder trust, and data security effectiveness (Al-Sharafi et al., 2023). By aligning skills with data protection strategies, companies can enhance the value of their data assets and achieve success.

The study confirms Hypothesis 9, highlighting that organizational factors influence profit maximization and data management in Chinese businesses. Subramanian and Suresh (2022) suggest integrating data management with organizational competencies

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for financial and competitive gains. Prioritizing data resources, technology, and company culture supports strategic data management adoption. Comprehensive frameworks enhance data operations, consistency, and insights, driving revenue, cost savings, and efficiency (Pacheco, Castillo, Manotas, Archibol, et al., 2022). Managerial support is crucial for data-driven innovation and decision-making. Leadership commitment, resource allocation, and goal-setting foster long-term success (Mikuletič et al., 2024). Organizational factors, such as technology investment and management support, improve data quality and market competitiveness.

CONCLUSION

This study enhances our understanding of Chinese enterprises' profit maximization, organizational dynamics, and data connections. Through empirical analysis and previous research, it shows that organizational factors, data security, management, and big data utilization impact financial performance and competitive advantage. Early findings emphasize that data security is vital for-profit improvement. Strong data security protects assets, increases productivity, and builds customer trust, while advanced security practices mitigate risks such as data breaches, penalties, and reputational harm. The study also highlights data management's role in profit optimization. Effective data management—through quality assurance, integration, and governance—improves workflows, data consistency, and revenue growth. Big data adoption further boosts earnings by analysing consumer behaviour, market trends, and operational efficiency, driving revenue, cost savings, and market responsiveness. Advanced analytics enhance marketing, identify new income streams, and personalize customer experiences, thus increasing competitiveness in dynamic markets. The report advocates leveraging big data for data security and management, revealing its potential to enhance income and support strategic goals. Additionally, it suggests that organizational factors, including management support, data resource investment, and technical assistance, are crucial for maximizing the value of data assets and ensuring long-term success.

IMPLICATIONS

The findings are relevant for Chinese companies aiming to drive data-driven operations and increase profits. It is essential to prioritize data security infrastructure, including access controls and encryption, to minimize data breach costs and legal consequences. Improving data management practices is also crucial, focusing on data accuracy, consistency, and adopting best practices in data governance and quality assurance. Implementing robust data management frameworks and technologies can provide valuable insights to help companies achieve revenue growth and strategic goals. Strategic use of big data enhances income by helping firms understand customer preferences, market trends, and operational efficiency. Predictive analytics and machine learning can further identify new income sources and optimize marketing efforts.

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Enhancing organizational capacity is key; data-driven initiatives require investment in data resources, skilled technologists, and strong management support. Additionally, staff training in data management and analytics can foster creativity and improve data-driven decision-making.

This study enhances our understanding of data-driven strategies and their impact on Chinese corporate profit optimization. It explores the complex relationships between data security, data management, big data application, and organizational dynamics. The recognition of mediating and moderating mechanisms supports existing theories. Theoretical frameworks should reflect the dynamic nature of data-driven strategies, considering their adaptability to organizational and market changes. The study also highlights the importance of cross-cultural analysis in data-driven methods, as cultural, legislative, and institutional factors influence the execution and reception of data initiatives. Thus, theoretical frameworks must account for cultural differences in outcomes. Additionally, transdisciplinary approaches are needed to tackle data-influenced phenomena. Collaboration across academic disciplines offers diverse perspectives and methodologies to address complex research challenges and practical issues in the data-driven economy. The study's practical and theoretical implications provide valuable insights and opportunities for further research and application of data-driven strategies to enhance Chinese corporate profitability.

LIMITATIONS AND FUTURE DIRECTION

Limitations

Although the research offers valuable insights, it has notable limitations. The small sample size restricts the generalizability of the findings, and the focus on Chinese SME retail limits the broader applicability. The cross-sectional design limits the ability to establish causal relationships between profit optimization and data-related factors. Longitudinal or experimental methods would be beneficial to explore how data-driven activities impact financial success over time. The use of self-reported metrics from online surveys introduces potential biases, such as social desirability and common method biases, which could affect the results. Future research should incorporate multi-method approaches and triangulate data to enhance accuracy. Since self-designed methods were used to assess data security, data management, and profit maximization, there may be concerns about the validity of the measurement approach. Employing validated scales from existing literature would improve comparability and reliability. Finally, the study may have overlooked contextual factors—such as industry trends, market conditions, legal frameworks, and organizational culture—that could influence data-driven strategy outcomes. Future research should explore how these factors affect the implementation and results of data-driven strategies.

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Future Direction

The study's limitations open avenues for further research. Longitudinal studies can explore the long-term effectiveness of data-driven profit optimization strategies in Chinese enterprises, providing deeper insights into the sustained impact of data-related factors on financial performance. Experimental designs, such as randomized controlled trials or quasi-experimental methods, could assess the cause-and-effect relationships between specific interventions, like data management or security training, and profit maximization. Additionally, multilevel analysis methodologies can examine how organizational and human factors influence the success of data-driven projects, offering a more nuanced understanding of organizational dynamics. Comparing data outcomes across different industries, regions, and organizational contexts would help identify key contextual factors and best practices, enhancing the implementation and acceptance of data-driven strategies in diverse settings. Lastly, qualitative research methods, including case studies, focus groups, and interviews, could provide deeper insights into organizational attitudes, dynamics, and lived experiences, complementing quantitative findings and fostering the development of context-specific solutions.

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