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Adoption of Big Data Analytics: Determinants and Performances Among Food Industries

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ABSTRACT

The study presents the results of the work undertaken to analyse constructs that make the companies adopt big data in the food industry towards the financial and market performance. Data was collected from 300 food industry employees who work in vital roles in the company. Primary data was collected through a survey method and a theoretical model was tested. Technological—Organizational—Enviornmental (TOE) framework was adopted, and the factors were analysed using Smart PLS software. It reveals that trialability, observability, complexity, and top management support are having a greater influence on big data analytics (BDA) adoption. Furthermore, external support, uncertainty and insecurity, and organizational readiness are also identified to affect BDA adoption. The findings ascertain the impact of BDA on the financial performance and marketing performance of the organisations. Understanding the variables that affect BDA acceptability enables managers to take the appropriate steps for a successful deployment. The research aids BDA service providers in luring and spreading BDA in the food sector.

KEYWORDS

Adoption, Big Data Analytics, Food industries, Organizational performance, Technological–Organizational–Environmental Model

1. INTRODUCTION

Data has been growing in size and complexity over the past few decades to a point where it has become difficult for businesses to convert data into useful information. In 2005, Roger Magoulas from O'Reilly media came up with the term "big data" to describe data sets that are so large, they become nearly impossible to analyze using traditional management systems (Agrawal et al., 2008; Ghaleb et al., 2021). Big data is a term for data sets that are so large and complex that traditional

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data processing applications are inadequate. Big data challenges include capturing data, data storage, data analysis, search, sharing, transfer, visualization, querying, updating and information privacy (McAfee et al., 2012; Ur Rehman et al., 2016). Data has infiltrated nearly every aspect of our lives. "Big data" refers to information sets that are too large and complex to be managed by traditional means. More and more data are being generated across practically all areas of society on a global scale. When leveraged correctly, big data has the potential to generate new insights, streamline decision-making, and improve the quality of products and services (Kim et al., 2014; Gunasekaran et al., 2017). According to a classic Chinese saying, "the people see food as their first want." This means that we are innately programmed to seek out tasty, wholesome, and fresh meals to survive. And since food is such a high demand necessity, it's no surprise that the food industry is the most major and significant industry in the world. The food industry includes farming, food producers, food manufacturers, packers, cooks, food and beverage enterprises, shipping businesses, supermarkets, and dining establishments (Madaan et al., 2021).

Big data and analytics have been helping a wide range of organisations, including the food sector, to develop and evolve in today's business environment. Feleen & David (2021) note that although big data has been around for a while, the food industry has only recently begun to effectively utilise it. The food business is facing a unique issue where, due to its potential in understanding the market, customer behaviour, and buying patterns, big data adoption and analysis has become extremely important. It is vital for food businesses to keep up with changing customer tastes over time in order to stay current in the market (Panpatte & Ganeshkumar, 2021; Garwal et al., 2020).

When businesses can analyse information quickly and efficiently, they are able to make better and faster decisions. In-memory analytics and the ability to analyse new data sources gives businesses the potential to provide customers with what they want. Using analytics to measure client requirements and satisfy them with new products and services is key to success (David 2020_b). Big data analytics is a powerful tool that can help companies make better decisions. The food industry has begun to adopt this technology in order to stay competitive, but there are many factors involved in this adoption. By understanding these factors, we can better understand the industry and its future. This study used the technology-organizational-environmental model to analyze the factors involved in the adoption of big data analytics by the food industry (Maroufkhani et al., 2022_a).

The research questions of the present research work are to study what are the technological, organisational, and environmental elements impact on the adoption of BDA in the food industry? and Does BDA adoption influence the financial performance and market performance of food industries?. The study's objectives are to analyze the factors that influence the extent to which Big Data analytics (BDA) is adopted in food industries using the TOE framework, and to evaluate the market and financial performance of companies that have adopted BDA. What technological, organizational, and environmental elements impact a company's adoption of BDA in the food industry? The main focus of this study is to see how important technological, organizational, and environmental aspects are for a company to effectively adopt big data analytics (David et al., 2022; Ganeshkumar et al., 2020). Furthermore, the aim of this study was to construct a valid and accurate model to assess how TOE, market, and financial aspects of the adoption would affect organizational performance. Top management, chief executives, and manufacturing executives would all be able to use this research to make strategic and operational choices for their companies. Therefore, this research would be extremely useful to food manufacturing enterprises, policy makers, practitioners, researchers and academicians alike.

There have been many research studies conducted on the adoption of big data Analytics in food related industries. This research specifically focuses on the adoption of big data analytics in the food industries. The study evaluates the critical components of big data adoption and its influence on the organization's performance and thereby on the overall growth of the food industries. Thus, this research is big data adoption centric, focusing in depth on the critical components of the adoption

such as technological, organizational and environmental thus evaluating the market and financial performance (Ganeshkumar et al., 2019; Bui et al., 2021).

The focus of this research is on the perception of executives from food manufacturing firms regarding big data analytics adoption, competence, practice, performance, and organizational performance. This is important because they are the executors of important business activities and policies in the manufacturing industries. This research work uses primary data sources, such as questionnaire responses from manufacturing executives and managers, to study the adoption of big data analytics in manufacturing industries and its impact on organizational and market performance as given in the table 5 (in Annexure) (El-Haddadeh et al., 2021; Arokiaraj, 2011).

2. LITERATURE REVIEW AND CONCEPTUAL MODEL

The literature on big data adoption factors and organisational success is critically reviewed in this section. Big data adoption in industries has been the subject of a number of studies that have been analysed and the important takeaways on the adoption's effects and enhanced dimensions on organisational performance are given. Key dimensions or notions and hypotheses have been developed based on the literature review. Due to the characteristics of vast amounts of information (volume, speed, and diversity), which prevent conventional scientific methods from functioning for such information, businesses are compelled to expend some effort to get meaningful knowledge from it (Dubey et al., 2019). The BDA concept is related to current approaches for breaking down vast amounts of data, such as information mining, perception, and sense-making (Grossman & Siegel, 2014). According to Mikalef, the techniques differ, hence this study contends that BDA exercises are critical to the advancement of vast data (volume, speed, and variety). To transform massive amounts of data into authentic characteristics, authoritative resources such as information-driven culture and hierarchical learning should be available (Mikalef et al., 2018). As a result, the Big Data Analytics Capability (BDAC) concept was developed to address this issue, as it supports a company in successfully exploiting vast amounts of data while reaping the benefits of its business values (Akter et al., 2017; David 2020$_a$; Maroufkhani et al., 2022; Ganeshkumar et al., 2021).

BDA has developed into an energizer due to its improved functionality and major advantages, and it may help organisations increase their productivity and viability (Akter et al., 2017; David et al., 2019). Big data should be used by businesses to clarify goals and transform knowledge into understanding, therefore enhancing their presentation (Chen et al., 2015; Maroufkhani et al., 2022b). Ji-fan Ren said that the lack of a connection between BDA speculation and company success was caused by a lack of appropriate information since the amount of business respect obtained through such assumptions was insufficient (Ji-fan Ren et al., 2017; Banumathi & Arokiaraj, 2011). According to Akter, the Resource Based View (RBV) approach may be used to analyse all of BDA's business values. Based on a corporation's characteristics or the types of resources and capabilities available for development, the relationship between assets and capabilities and hierarchical execution is demonstrated (Akter et al., 2017; Barney, 2014). BDA significantly affects how well businesses function across a number of sectors (Wamba et al., 2017). Big data capabilities are used by the majority of retailing organisations to build relationships with their customers. Since BDA allows for more precise medical judgments, the business value of the healthcare sector is anticipated to improve (Wang et al., 2018). In other industries, such as manufacturing, BDA has been found to increase company performance and to be a facilitator of supply chain management development (Maroufkhani et al., 2019; Rout et al., 2019; Ur Rahman et al., 2016; Gunashekaran et al., 2017). Several studies have found that BDA adoption improves financial and corporate success (Akter et al., 2016; Arokiaraj et al., 2020$_a$; Wamba et al., 2018; Ganeshkumar et al., 2022).

Big data is progressively becoming a critical driver for firms seeking a competitive advantage (Sun et al., 2018). Using the outcomes of a content analysis, this study established a framework to reveal the important determinants impacting the adoption of big data by organisations. It was founded

on the Technology-Organization-Environment (TOE) framework, the Institutional theory, and the Diffusion of Innovation (DoI) theory. The content analysis for this study was based on the gathering and review of pertinent publications from the business intelligence and analytics (BI&A) literature published between 2009 and 2015 (Sun et al., 2018), which served as the foundation for the execution of the current investigation.

In a study, Shah S investigated the concept of big data and the issues associated with its use in manufacturing SMEs. The article demonstrates how big data aims to establish an integrated approach in SMEs with developing real-time data visualization to deal with important challenges in a range of market variations for SMEs in every industry (Ganeshkumar & David, 2023). Although prior research studies have emphasised the importance of big data from a technological viewpoint, this study focused on SMEs due to their market viability and flexibility. The findings and preliminary analysis from this study might be used by researchers to address the application of big data analytics in manufacturing SMEs (Shah et al., 2017; Baig et al., 2019).

The RBV, Innovation-Diffusion theory and technology-organization-environment (TOE) model is the theoretical basis. This study uses the RBV theory to examine the theoretical link between BDA adoption and business performance, where BDA adoption is viewed as a capability in companies and an intangible resource (Maroufkhani et al., 2022_{b}). New information acquiring or skills acquiring allows a company to improve its technological capabilities, particularly BDAC, and therefore its performance (Galetsi et al., 2020; Bag et al., 2021). Following RBV, George and Gupta suggested that the firm's resources are what enable businesses to develop the BDAC. The firm's capacity to gather and maximise its resources is determined by the resources accessible to it. It was thought that BDAC might be viewed as an office for the organisation in terms of devices, processes, and cycles that enable the company to analyse and break down information and, as a result, make appropriate functional decisions. Hierarchical assets would be segregated into huge information (volume, speed, and variety) linked abilities, unmistakable, and elusive classes to develop BDAC. Information and creativity, for example, are real assets, although hierarchical learning and an information-driven culture are not (Maroufkhani et al., 2020_{a}).

According to Mikalef, theoretical assets are important because they help broaden leaders' perspectives and increase their understanding, allowing them to make better judgments (Mikalef et al., 2019). "The data obtained by BDAC provides endeavours with consistent data," according to (Song al et al., 2020), so organisations may perform better (Maroufkhani et al., 2022_{a}; Akter et al., 2016; Gupta & George, 2016; David & Ravi, 2017; Wamba et al., 2017). According to previous BDAC research, the ebb and flow focus the whole BDAC term as an elusive asset without which enterprises won't be able to successfully implement an invention. In this regard, BDAC could have a positive influence on how an organisation conducts itself. It may then persuade businesses to use big data for a variety of goals, such as facilitating work, enhancing navigation, maintaining competitive advantage, and fostering business growth (Kwon et al., 2015; Wang & Hajli, 2017). Numerous studies have discovered that combining the TOE hypotheses provides the best fit variables for SMEs' acceptance of innovation. In order to promote innovation distribution and influence how it is received inside the association, DOI emphasises mechanical factors. Essentially, the TOE model thinks about all inside and outside perspectives that might influence business innovation reception, though the DOI model spotlights basically on mechanical components. The components of innovation execution should be noted for development reception research. As a result, including the mechanical components of the DOI hypothesis into the TOE model can provide a complete framework to this investigation while also expanding Rogers' DOI hypothesis' ability to identify intra-firm development spread (Manohar, 2020; Sudhakar et al., 2017; Parson, 2021). In light of the rising literature on BDA and its business values, as well as the TOE factors for innovation reception, the ongoing review offers the calculated model using the TOE model, the DOI, and the RBV hypothesis (Raguseo, 2018; Feleen et al., 2021; Gandomi & Haider, 2015; Maroufkhani et al., 2022_{b}). A variety of TOE elements have affected the acceptance of innovation. This evaluation thoroughly examines the components of innovation (similarity, complexity,

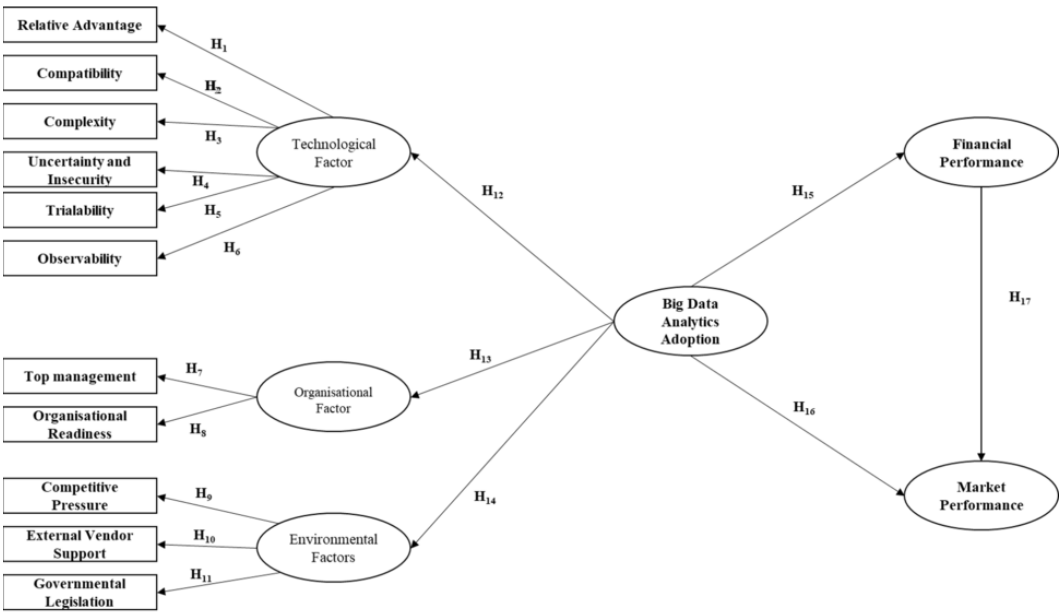
relative benefit, vulnerability and frailty, perceptibility and trialability), connection (top administration support, and hierarchical preparedness), and climate (serious tension, outside help from merchants, and unofficial law) (Wahab et al., 2021; Parne et al., Srivastava et al., 2022).

The mechanical hierarchical natural structure uses the DOI and RBV hypotheses in view of the developing writing on innovation reception and its precision on deciding the elements affecting that specific reception. This structure additionally permits us to foster speculations as for the variables that are engaged with the innovation reception (Oyewo et al., 2022; Pratheepkumar et al., 2017; Ravi et al., 2018). The ongoing structure incorporates eleven factors that perhaps impact the reception of big data Analytics. This structure is sent for the examination of BDA reception in food businesses in India with the information and measurements gathered from deeply grounded food enterprises.

Based on the conceptual model deployed in the study the following hypotheses are statistically tested and evaluated through which the findings are derived.

H_1 – Relative Advantage is a dimension of Technological Factor.
H_2 – Compatibility is a dimension of Technological Factor.
H_3 – Complexity is a dimension of Technological Factor.
H_4 – Uncertainty and Insecurity is a dimension of Technological Factor.
H_5 – Trialability is a dimension of Technological Factor.
H_6 – Observability is a dimension of Technological Factor.
H_7 – Top management is a dimension of Organisational Factor.
H_8 –Organizational readiness is a dimension of Organisational Factor.
H_9 –Competitive pressure is a dimension of Environmental Factor.
H_{10} –External vendor support is a dimension of Environmental Factor.
H_{11} - Governmental legislation is a dimension of Environmental Factor.
H_{12} - Technological Factor is a dimension of Big Data Analytics Adoption.
H_{13} - Organisational Factor is a dimension of Big Data Analytics Adoption.

Figure 1.
TOE Framework model



H_{14} – Environmental Factor is a dimension of Big Data Analytics Adoption
H_{15} - Big Data Analytics Adoption influences a food industry's financial performance favorably.
H_{16} – Big Data Analytics Adoption influences a food industry's market performance favorably.
H_{17} - Market performance influences a food industry's financial performance favorably.

Based on the past several literature review studies, we found several studies on adoption of the big data analytics in various sectors like retail, telecommunication, smart cities, education, healthcare etc in emerging economy there are no studies on the adoption of the big data analytics in the food sector using survey method research and conducted in the emerging economy from the managers' perspective through lens of the Technology-Organization-Environment (TOE) framework.

3. RESEARCH METHODOLOGY

The approach used by the researcher in performing the suggested research activity is described in detail in this section. The motive of this research work is to analyse and mark out the extant characteristics of the factors determining the adoption of big data analytics with respect to food industry context. This study also aims to evaluate the relationship between the factors and big data adoption related variables and organizational performance of food manufacturing industries. Six factors comprise the survey for this study, which was developed after reviewing the literature on the topic the technology element, organisational factor, environmental factor, financial performance, market performance, and demographic data. A Technology-Organization-Environment (TOE) framework was used in more detail. The three components are organisational factor (5 items), environmental factor (8 items), and technology factor (4 items). Second, the Questionnaire used by (El-Haddadeh et al., 2021) to measure market performance and financial performance was divided into three and nine items, respectively. Gender, age, education, and job experience round out demographic data. A five-point scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree," was used to evaluate these factors. To be consistent with the literature analysis, all advances were operationalized as reflective.

The causative research design has been employed to study the impact of big data adoption on financial performance and market performance. Primary data is collected for the study. To assess the questionnaire's consistency, a pilot test was conducted. 30 responses were received. Four weeks were spent conducting the survey. In order to prevent respondents from providing biased responses, we randomly selected and invited executive managers from various cities. Data are collected from Managers/ Executives of various food industries across India. Primary data pertaining to the factors and determinants of adoption of big data in industries, related variables, organizational performance (financial and market) was collected from the food industries. Data has been collected employing the survey method by administering a properly structured 300 questions to the Executives/ Managers of the food manufacturing firms. The Managers/ Executives of food manufacturing businesses/industries throughout India's states were personally communicated by e-mail and mobile communication, get their consent to participate in this survey after that given a well-crafted questionnaire. Frequent follow up had been made to inform the Executives/ Managers complete in order to get primary data. Big data adoption variables in the studied sectors, their position in relation to the competition, and their potential influence on the financial and market performance of the businesses were all covered by the questionnaire's quantitative and qualitative sections.

Probability sampling technique is employed to gather data from the respondents. The survey's sampling units were picked using a simple random sampling method. The food manufacturing enterprises and food industries operating in different enclave of the various states in India constitute the population for the research work (Siddhartha et al., 2021; Arokiaraj et al., 2020_b). The sample size for the study is fixed at 300 since the sampling unit consists of Managers/ Executives in the food industries and data analysis tool used is Microsoft excel and AMOS. The measurement model is used to identify the components that make up each construct or variable, as well as to assess the

variable's or construct's reliability and validity. The structural model, on the other hand, is used to investigate the causal link between constructs or variables. AMOS is the programme used in this study for structural equation modelling estimates. Estimate model will be used to assess the data set's fit to the given conceptual model. Using the structural equation modelling (SEM) framework, the conceptual model assessed the offered thirteen hypotheses.

4. RESULTS AND DISCUSSION

The demographic profile of the respondent has given in the below Table 1. It gives a clear understanding of the sample unit for this research.

The majority of respondents, 93.30%, are postgraduate degree holders with a major in food science-related courses. Only 6.67% of respondents are undergraduate degree holders. The respondents are spread out between the ages of 23 and 54, with 43.30% between the ages of 20-29, around 30% between the ages of 30-39, 20% between the ages of 40-49, and only 6.67% 50 years or older. This age classification gives us a clear view of the wide range of age groups covered by the study.

The measuring model is a model that quantifies the relationship between research findings (indicators) and theoretical underlying conceptions or causes. Prior to moving on to the evaluation of the structural model, evaluation of the measurement model needs to be done to confirm that the quality standards are met. The conceptual model deployed in the study is portrayed below in Figure 1. The thirteen constructs presented in the conceptual model are employed to test the causal relationship among the various factors and the organization's market and financial performance.

4.1 Confirmatory Factor Analysis & Structural Equation Model

Testing and validating all the constructs for the measurement model takes place through CFA. The overall measurement model was tested with the observed items' reliability and scale used to measure the unobserved variables. At the 0.05 level of significance, the factor loadings for each item in the model are greater than 0.5 and fairly highly significant. Factor loadings, composite reliability (CR), and average extracted variance were used to analyse the convergence of the constructs (AVE). Using a repeated indication technique, BDA adoption was understood as a second-order construct. A previous study determined that factor loadings, CR, and AVE values should be more than 0.7, 0.5, and 0.7, respectively (Maroufkhani et al., 2022$_a$). Each construct satisfies the criteria and has a high level of convergent validity.

The Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) criteria were used to evaluate the discriminant validity. The study discovered that all of the HTMT values were less than 0.85, which indicates that the discriminant validity of all of the components was satisfied. Previous studies had

Table 1.
Demographic Profile of the Respondents

Variable (N=300)	In %
Education Level	
Undergraduate degree	6.67%
Postgraduate degree	93.30%
Age	
20-29	43.3%
30-39	30%
40-49	20%
50 years old or older	6.7%

suggested that the HTMT values should be less than 0.85. The Fornell-Larcker (1981) criteria have been widely applied to assess the level of shared variation across the model's latent variables. These criteria claim that the measurement model's convergent validity may be evaluated using the Average Variance Extracted (AVE) and Composite Reliability (CR). Using the Fornell-Larcker criteria and cross-loadings, the discriminant validity of the constructs should be assessed as follows: Each item load on its linked construct should be the highest, and (1) each construct's AVE should be higher than its correlation with another construct. According to the Fornell-Lacker criterion, the inter-construct correlations were lower than the square roots of AVEs, indicating excellent discriminant validity (Maroufkhani et al., 2022$_a$; Fornell & Larcker, 1981).

In the Figure 2 the structural model, big data adoption constructs fit the data well as its CMIN/DF value reported as 3.269, lesser than the recommended value. Goodness of fit (GFI) and comparative fit index (CFI) were 0.951 and 0.975 respectively. Furthermore, root mean square error approximation (RMSEA) was 0.066. If the model attained, GFI and CFI are surpassed 0.9 and RMSEA less than 0.08, the model is considered to be a good fit model (Hair et al., 1995). The indicators' strong relations to their claimed latent variables were shown via factor loading estimations. The model fit measures are listed in Table 2.

Figure 2.
Structural Equation Model

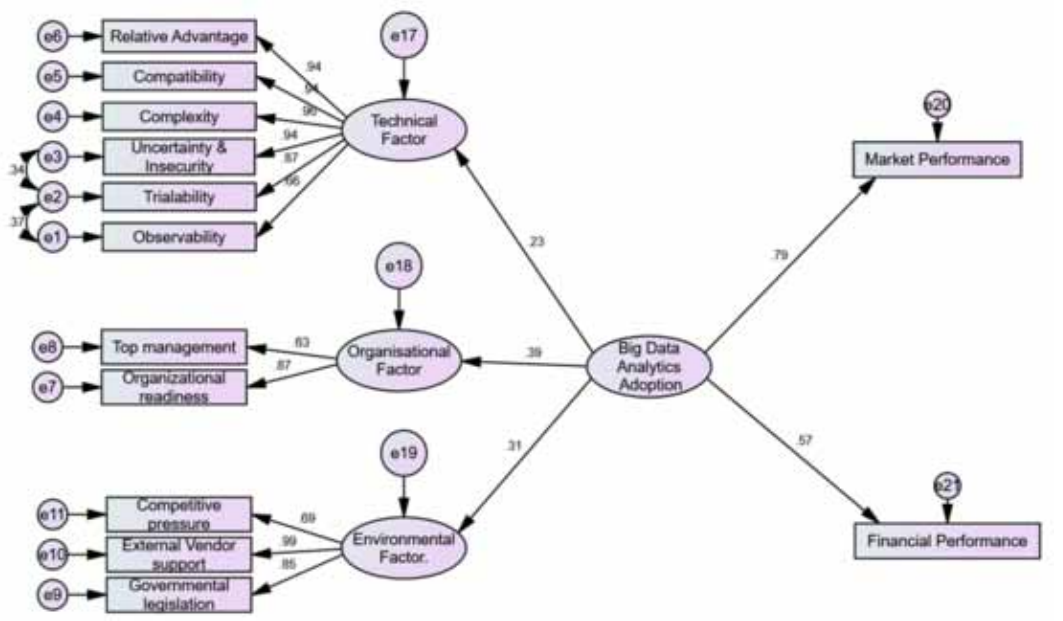


Table 2.
Structural Model Fit Measures

Fit Indices	Attained Value
CMIN/ DF	3.269
Goodness of Fit (GFI)	0.951
Comparative Fit Index (CFI)	0.975
Room Mean Square Error Approximation (RMSEA)	0.065

Estimates and hypothesis tests for the causal linkages between exogenous and endogenous variables, as indicated in the route diagram are used to evaluate the structural model. The results indicate three constructs (namely environmental factor, organisational factor, and technological factor) found to witness significant relationship with big data adoption (BDA) factor, furthermore BDA positively influences food industry market performance (H_{12}) and financial performance (H_{13}) as well in Table 3.

The T-statistics values are inferential statistic determining if we should support or reject a hypothesis. With the T-statistics values and P values obtained, hypotheses H_3, H_4, H_5, H_6, H_7, H_8, H_{10}, H_{12} and H_{13} are validated.

The aim of this research was to learn about the many elements that influence the adoption of big data analytics, as well as the connections between them. A survey of food and food manufacturing businesses in several Indian states was conducted to determine these goals. Data was gathered on big data adoption-related characteristics as well as the food industry's market and financial performance. The findings derived from the analysis are presented based on the factors influencing the adoption and findings of the organizations market and financial performances.

This research was attempted to study the big data analytics adoption facets established in food industry and to identify the big data analytics adoption (BDA) influence on financial and market performance of the same. To test Hypotheses H_1 to H_6, concerning the dimensionality of technological factors, Hypotheses H_7 to H_8, concerning the dimensionality of organisational factors, and Hypotheses H_9 to H_{11}, concerning the dimensionality of environmental factors, first order factors have confirmed the dimensionality of the big data adoption named technological factors, organisational factors, and environmental factors. Furthermore, Hypotheses H_{12} to H_{14}, affirm the second order constructs.

Hypotheses H_{15} to H_{16} have concerning the influence of big data adoption to financial performance and market performance, respectively.

Table 3.
Structural Model Path Analysis

Hypothesis	Path Coefficients	P Value	Remarks
H_1: Technological Factor → Relative Advantage	0.938	0.000	Supported
H_2: Technological Factor → Compatibility	0.936	0.000	Supported
H_3: Technological Factor → Complexity	0.962	0.000	Supported
H_4: Technological Factor → Uncertainty and Insecurity	0.937	0.000	Supported
H_5: Technological Factor → Trialability	0.867	0.000	Supported
H_6: Technological Factor → Observability	0.662	0.000	Supported
H_7: Organisational Factor → Top management	0.634	0.000	Supported
H_8: Organisational Factor → Organizational readiness	0.875	0.000	Supported
H_9:Environmental Factor → Competitive pressure	0.634	0.000	Supported
H_{10}: Environmental Factor → External vendor support	0.849	0.000	Supported
H_{11}: Environmental Factor → Governmental legislation	0.988	0.000	Supported
H_{12}: Big Data Analytics Adoption → Technological Factor	0.231	0.000	Supported
H_{13}: Big Data Analytics Adoption → Organisational Factor	0.391	0.000	Supported
H_{14}: Big Data Analytics Adoption → Environmental Factor	0.308	0.000	Supported
H_{15}: Big Data Analytics Adoption → Financial performance	0.792	0.000	Supported
H_{16}: Big Data Analytics Adoption → Market performance	0.571	0.000	Supported

The results showed that BDA adoption significantly affects the marketing and financial success of the food business. Previous studies have shown that adopting BDA boosts a company's commercial worth and capacity. By enabling businesses to provide items and services that offer consumers greater value and differentiate them from rivals, BDA aids businesses in enhancing their marketing success. BDA has the power to increase a business's profitability as well as its ability to draw in and keep customers (Maroufkhani et al., 2022). BDA enables food firms to view the environment via a data-driven lens, enabling them to base their decisions as best as possible on the data acquired. BDA has the capacity to offer enterprises precise and comprehensive information. In conclusion, BDA adoption aids manufacturing companies in reducing manufacturing waste and additional production expenses, as well as preventing defective product and re-producing; as a result, firms remain superior, and their performance improves.

4.2 Mediation Analysis

To investigate the mediating function of market performance, a mediation study was carried out in accordance with the recommendations made by Baron and Kenny (1986). Researchers should carefully consider the function of an indirect impact when evaluating a mediation effect. Researchers can get the conclusion that there is a considerable mediation effect if an indirect effect is significant and larger than a direct effect (Ro, 2012; Rucker et al., 2011). According to Table 4, there was a considerable and bigger impact on financial performance through an indirect channel through market performance than there was from a direct link between the adoption of big data BDAs and financial success. When the indirect effect was taken into account, the direct link between the implementation of BDA and financial performance was not there. This outcome suggests a mediation in the conceptual model, often known as a full mediation (Ro, 2012; Rucker et al., 2011). This study demonstrated that market performance is both a full mediator in the direct relationship between BDA adoption and financial performance and a hypothesised mediator in the conceptual model. Thus, H_{17} was supported.

The model fitness of the mediation analysis (figure 3) as follows, CMIN/DF value reported as 3.269, lesser than the recommended value. Goodness of Fit (GFI) and Comparative Fit Index (CFI)

Figure 3.
Mediation Analysis

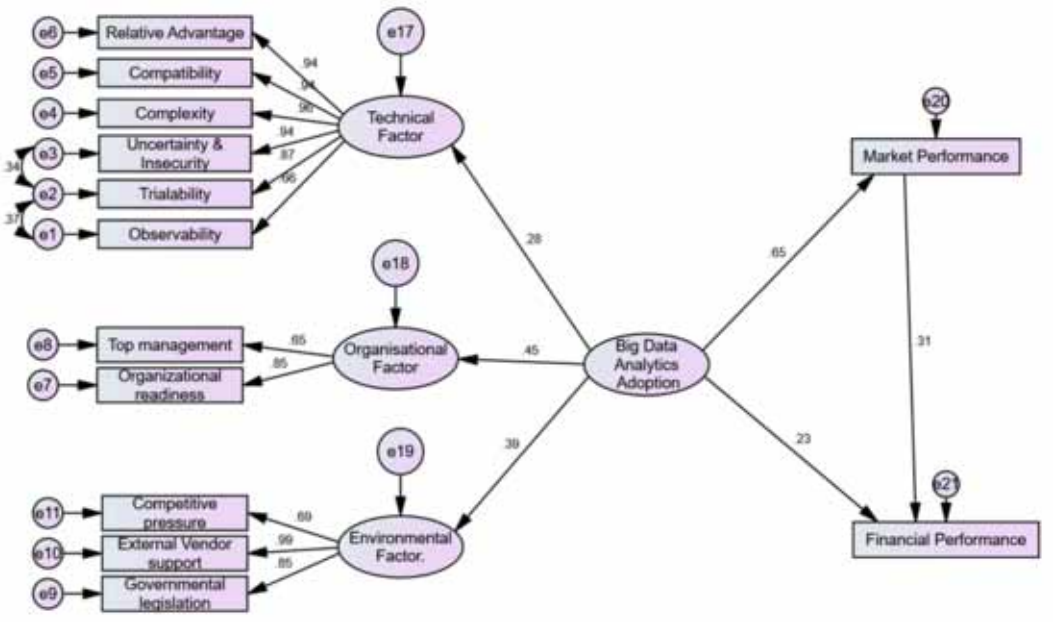


Table 4.
Mediation Analysis

Hypothesis (Mediation)	Path Coefficients	P Value	Remarks
H_{15M}: Big Data Analytics Adoption → Financial performance	0. 230	0.073	Not Supported
H_{16M}: Big Data Analytics Adoption → Market performance	0.792	0.000	Supported
H_{17M}: Market performance → Financial performance	0.307	0.000	Supported

were 0.956 and 0.979 respectively. Furthermore, Root Mean Square Residual (RMR) was 0.074. If the model attained, GFI and CFI are surpassed 0.9 and RMR less than 0.08, the model is considered to be a good fit model (Hair et al., 1995).

5. CONCLUSION AND IMPLICATIONS

As a result of BDA, firms' efficiency and effectiveness have increased, making them increasingly reliant on analytical tools for more reliable judgements. Despite the fact that food industries are critical to any economy, they are behind in BDA implementation. Due to the scarcity of research on the elements/drivers and outcomes of BDA adoption among food industries, the effects of technological, organisational, and environmental attributes on BDA adoption, as well as the impact of BDA adoption on the financial and marketing performance of food industries, were investigated in a single and unified framework using the TOE model.

The data collected and analysed encompassed 25% of the food industry across the country, leaving the remaining 75% unaffected. The use of big data analytics has been a good boost and a substantial enhancer of performance for the firms studied. Thus, food organisations who have yet to implement this technology in their operations can do so without hesitation. This research is useful in this scenario because it provides organisations with a clear image of the technology being used, the use cases, and it assists managers in analysing the elements that contribute favourably to the adoption of BDA. It also gives a detailed picture of the statistical measures that contribute to the adoption of BDA in an organisation. A food company may have a precise grasp of the elements and determinants involved in the implementation of BDA for their corporation by using the preceding study.

6. LIMITATION AND SCOPE FOR FUTURE STUDY

This study, like all empirical studies, contains limitations that may restrict the generalizability of the findings. To begin, the sample population is confined to Indian food enterprises, which differ from other industries in terms of resources and structural flexibility. The model used in this study might be applied to the global food business in future studies. Second, because India was under sanctions at the time, it was chosen as the subject of the study. The fines have a significant impact on market competitiveness and the government's ability to persuade enterprises to embrace BDA.

More study is needed to test the conceptual framework in both developed and developing nations' food businesses. Third, the study is cross-sectional and employs a questionnaire survey to examine the validity of the hypotheses. This strategy reduces the capacity to demonstrate causation in linkages that can change. The findings were influenced by dynamic variations in BDA intake, which the current study was unable to follow. A longitudinal research is needed to analyse the formed associations over time and achieve more exact results. Finally, more research is needed to refine the conceptual framework of this study in light of other relevant aspects such as organisational culture, market pressure, and technological infrastructures.

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APPENDIX

Table 5. Big data deployment (toe model) in the companies

Technological Factors in Big Data Deployment (BDA - Big Data Analytics)	**SDA**	**DA**	**N**	**A**	**SA**
The organization's decision to adopt BDA was primarily because of the advantage this technology would offer to the organization's performance.					
BDA looked superior to the existing system in the organization					
Compatibility with the existing system (standards and procedures of the organization) was a major influential determinant for adoption of BDA organization)					
The big data technology was complex from the existing system					
The employees able to adopt to the new technology quickly					
The issue of privacy and security that is naturally linked with big data affected the adoption of the technology					
The organization took a trial of the working of the technology before implementing					
The success of other firms that have adopted BDA acted as a major driver for the organization to adopt it					
Organizational context in the deployment of Big Data Analytics (BDA)	**SDA**	**DA**	**N**	**A**	**SA**
The top management was willingly ready to adopt this new technology in the firm					
The managers supported comprehended and embraced the technological capabilities of the new system					
The firm was capable to manage and invest in the adoption of BDA					
The firm had enough IT capability and expertise to bring in the technology					
The investment for the adoption of this technology was too expensive for the organization					
Environmental Context	**SDA**	**DA**	**N**	**A**	**SA**
The influence from the external environment (pressure from customers, suppliers and competitors) prompted the organization to adopt BDA					
Do you think the firm's adoption to BDA will uphold its competitive position in the market place?					
The firm received external support from vendors or third parties for the adoption of this technology					
The government was supportive of this implementation of technology in the firm in terms of support and providing incentives					
Financial performance of the company after adoption of Big Data Analytics (BDA)	**SDA**	**DA**	**N**	**A**	**SA**
The adoption of BDA technique increased the firm's return on investment					
In the event of an e-commerce aspect to your business, do you think the adoption of BDA increased the buying process from the consumer end?					
The company has had more substantial financial outcomes after BDA adoption					
Market performance of the company after BDA adoption	**SDA**	**DA**	**N**	**A**	**SA**
The adoption of BDA leveraged the firm with customer engagements in the business					
The firm was able to acquire a higher degree of market share after implementation of BDA					
The company was able to introduce new products and services regularly with a higher rate of success after BDA adoption					
The BDA adoption increased the performance of the organization through better decisions about marketing strategies and innovations					
The company was able to attract and retain customers better, post the adoption					
The organization was able to better analyze the opportunities and risks in the market after BDA adoption					
The adoption of BDA gave the firm a competitive advantage over the other firms					
The organization was able to outline, determine and identify the most appropriate market, marketing strategies, product and service by the lens of BDA					
BDA adoption has had a positive influence in the firm's					

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