Impact of Big Data Analytics on Retail Sector Performance: A Systematic Literature Review
Individual Research Project
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ABSTRACT

The current study undertakes a systematic literature review (SLR) to synthesise prior research on the impact of big data analytics (BDA) in the retail sector. The systematic literature review examines the findings of 41 studies and presents them in a comprehensive framework. According to the findings of this study, the impact of Big Data Analytics in retail can be seen from six perspectives: customer relationship management, increased sales, fraud elimination, decision support, inventory management, and forecasting. This study also reviewed the limitations of integrating Big Data Analytics in retail and was grouped into five categories: scarcity of skilled experts, budget constraints, data policy and security, information hoarding, and ethics. This systematic literature review provides scholars with actionable future research agendas as well as valuable implications for theory and practise.

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1. INTRODUCTION

One of the largest and most important industries is retail and because middle class is growing in size and purchasing power, this industry is likely to thrive. Due to high-speed internet connections, advancements in Smartphone technology and online-related technologies, improvements in company product lines, a variety of delivery options, and better payment alternatives, retail purchases via e-commerce and m-commerce are growing at a rapid rate (Keim, 2009; Wixom & Watson, 2001). Consumers and major companies are anticipated to generate 2.5 billion gigabytes of data per year, which is growing at a 40% annual pace (Manyika et al., 2011). With the advent of high-speed Internet access and the availability of new data types for data analysis, the growth in data is possible.

Big data, according to Akter & Wamba, (2016), is a holistic process that involves data collection, analysis, use, and interpretation for various functional decisions, resulting in actionable insights, creating business value, and establishing competitive advantage. It has been a hot topic for several years, which is why businesses are starting to invest in technologies that collect, distribute, and store big data. Retail is a big data industry almost by definition. On a larger scale, thousands of stores sell hundreds of thousands of items to millions of customers in billions of transactions. Walmart, for example, has over 11,000 stores in over 25 countries, serves over 35 million consumers every day, and offers about 140,000 goods in the majority of its supercentres. Individual consumers have evolved into walking data generators that leave a data trail every time they use their credit card, utilise a loyalty card, send a text message, or conduct a web search (Muller, 2015). Kroger, for example, leverages data on its 40+ million cardholders' shopping habits to deliver personalised coupons to a big percentage of them on a regular basis. Data-driven personalization has become a real option, thanks to the massive amount of data that retailers can collect on their customers' (on- and/or offline) purchases. Furthermore, by supplementing these data with information on the status of inventories throughout the supply chain, location-specific weather data, a variety of social-media metrics, and/or sensor data, the data available to a retailer typically exhibits considerable variety, including both highly structured and highly unstructured data.

The nature of the business necessitates a prompt response to incoming data (which is often referred to as the velocity dimension of big data). To fully utilise predictive analytics, for example, knowing which merchandise to sell more on days with specific weather conditions,

in a specific type of store, at a specific location, real-time (or near real-time) adjustments are critical to avoid stock-outs. Given that price inaccuracies (Goodstein, 1994) or inappropriate recommendations (Bradlow et al., 2017) have been proven to swiftly contribute to consumer annoyance and attrition, accuracy of both data input and subsequent analysis (veracity) is also critical. Furthermore, given the razor-thin margins that retailers (particularly grocery retailers) operate on, a thorough evaluation of the monetary value implications of any data investment is critical. Nonetheless, there appears to be a significant gap between the intrinsic value potential of big data to the industry on the one hand, and the practical ease with which those benefits might be realised on the other. Despite the fact that the industry is defined by a number of data-rich chains that are also at the forefront of big data analytics, the majority of the companies are significantly smaller, and hence have fewer resources to collect and/or analyse data, as well as to fully exploit big data potential. Furthermore, larger retailers frequently lack a complete understanding of the potential benefits of big data analytics and are either unwilling to invest at a level commensurate with those benefits (Germann et.al.,2014), or struggle to gain actionable customer insights from the growing amount of available data (Leeflang, et at., 2014).

1.1.   Research Aim and Objective

By conducting a systematic literature review (SLR), the current study aims to address research gaps in the literature on the use of BDA in (Dhir et al. 2020; Tandon et al. 2020; Talwar et al. 2020). This SLR seeks to address four research objectives, which are as follows:

1. To investigate the current state of research on the use of Big Data Analytics in the retail sector.
2. To investigate the application of Big Data to improve retail performance.
3. To look into the challenges of Big Data in the retail industry.
4. To understand the research gap and future research agendas in retail sector

The remaining part of the paper is structured as follows. The following section provides a brief overview of big data characteristics, particularly in the context of retail. The methodology used in this SLR is described in the second section. This is followed by a section on the findings of this study. The fourth section discusses the study's findings and implications. The fifth section is devoted to acknowledging the limitations of the current study, suggesting future research areas, and presenting the SLR's concluding remarks.

1.2. Background

1.2.1. Characteristics of Big Data

Finding the correct data to support the subject of study might be difficult in the huge pool of data that an organisation receives. The data gathering procedure occurs every second, implying that the volume of data collected cannot be analysed using traditional methods (Kunz et al., 2017). It's significantly more difficult to separate important from irrelevant data. As a result, analysts began to classify and explain Big data using the three Vs: volume, velocity, and variety. Analysts eventually added two more Vs: veracity and value. Seeing big data through the lens of the 5 Vs makes it even easier to grasp the concept of big data in general (Wedel & Kannan, 2016). Even though some say that the only essential Vs are volume, velocity, and variety, this study will also address veracity and value.

The Volume

Simply said, the volume of big data is the amount of data acquired over a given time period (Anuradha, 2015). The amount of big data collected in each period varies based on the company's size, the number and type of commercial activities it does, the number of social media platforms it employs, and other factors. Even if the business is tiny, the volume of data generated will be sufficient to make data analysis difficult and time consuming. (Brkanić, 2020).

The Velocity

Velocity is the rate at which data is processed (Ylijoki & Porras, 2019). It's also known as the frequency with which data changes and the requirement for real-time analysis and decision-making (Anuradha, 2015).

The Variety

The many formats of data that are available are also known as the variety of big data (Kunz et al., 2017). There are two types of data: structured and unstructured. Structured data is data that has been defined in a way that makes it easier to search and analyse (Lycett, 2013).

The Veracity

Data veracity refers to the quality, context, correctness, and vast number of data sources, making it difficult to comprehend where data comes from, who the originator is, whether it is accurate/correct, and, finally, what data means (Kunz et al., 2017). As previously stated, distinguishing important from irrelevant data, as well as correct from wrong data, is difficult.

The Value

Within the context of data analytics and business intelligence, the value of data itself represents the potential to improve business performance (Chen et al., 2012). When it comes to big data, however, value must be attributed to a piece of data in order for it to be valuable.

Table 1. The 5vs of Big Data (Kunz et.al, 2017)

The 5 Vs of Big Data	
Volume	The total amount of data within an organisation
Velocity	The speed of processing data
Variety	The differences in the type of data (structured and unstructured)
Veracity	The quality of data, represents the relevance/importance to a specific project
Value	The benefit it brings to the organization

1.2.2. **Big Data and Retail Sector**

Big data analytics, according to Akter & Wamba, (2016), are advanced technologies that assist the retail sector in providing tailored consumer experiences by anticipating their preferences and choices. By evaluating historical purchasing statistics, surfing behaviour, and credit card transactions, big data can provide valuable customer information. It aids in the gathering of useful consumer data and the forecasting of client expenditure. For example, Amazon uses big data analytics to make goods recommendations based on previous consumer purchases, which has helped the company increase sales by 29%. Costco, a California-based retailer, on the other hand, leverages big data and business analytics to deliver health information to its consumers and keep them healthy. Additionally, brands like Walgreens and Pantene have partnered with weather forecasting channels to obtain important weather forecasting data. It enables businesses to market their products to customers in response to weather changes. As a result, Walgreens had a 4% rise in hair care sales while Pantene saw a 10% boost in sales in just two months. (Brkanić, 2020).

1.2.3. **Advantages of using big data**

Decision Making Process

The first benefit of employing big data is that it makes decision-making easier and more intelligent. When a business decides to embark on a new project, the big data related with that project can be assessed and analysed to determine how to proceed. This isn't to say that big data analysis is required for every project or commercial effort, especially those that are smaller and less hazardous. As will be discussed, large data analysis is time demanding, and wasting time and money on it before each project is inefficient. When it comes to critical corporate undertakings, however, big data analysis can have a significant impact on the project's success (Satyanarayana, 2015).

Reduce Cost

Using big data to gain insights might also help you save money (Marr, 2016). Business optimization can be accomplished via big data analytics, which can result in cost savings. Big

data solutions initially provide data storage at a lower cost than traditional databases. From a technological standpoint, large data storage alternatives such as horizontal scalability or scale-out provide the ability to increase storage capacity as needed. Storage space and computational power are both enhanced in a cost-effective manner by adding nodes. However, big data research reveals that the corporation was overly committed financially in particular areas, indicating that the importance of that area was underestimated.

Gives valuable insights on target customers

One of the most useful benefits of big data has been the ability to discover the buying behaviours of people with various demographic traits. Big data research has given many businesses a greater grasp of their customers' preferences. Furthermore, leveraging big data analytics makes it much easier to target customers (Satyanarayana, 2015). Knowing what customers like and dislike is critical since it greatly boosts the likelihood of success when releasing new products, for example. Each demographic group has specific needs that must be met, and thanks to big data analytics, this has never been easier. (Brkanić, 2020).

Competitive advantage

Big data is always full of useful information; all that is required is the discovery of it. Cost leadership and differentiation are both ways to gain a competitive advantage. One of the benefits of employing big data has already been mentioned: cost reduction, which can provide a competitive advantage to a business. Because the information may always be found in big data, gaining new customer behaviour insights is vital as well. The organisation may simply boost customer happiness and, as a result, customer loyalty by utilising such customer behaviour data (Satyanarayana, 2015). The majority of sign-ups and personalization of the customer experience are based on a company's insights about its customers.

1.2.4. Disadvantages of using big data

When it comes to big data, there are a number of obstacles to overcome. Data without meaning and value is just data, hence the concept itself can be confusing. Furthermore, the demand for real-time data is enormous and unavoidable, yet the system does not always process data quickly enough to allow it to be used right away. When an issue emerges that requires rapid

attention, such as a stock-out situation, data must be made available to that department as soon as possible so that decisions may be made. Getting the most value out of data can often involve extracting knowledge as quickly as feasible. (Brkanić, 2020)

Using big data and the technology that it necessitates can be risky because it is prone to cyber-attacks and data theft (Satyanarayana, 2015). Many businesses throughout the world generate data that can be beneficial to others. Google, for example, collects information from people who are interested in all that is known about the world. Despite the fact that Google utilises the most secure database, a competent hacker can breach the security and gain access to the so-called cloud.

People are another issue that arises as a result of big data. As previously said, data without context and analysis is just that: data. As a result, businesses must devote resources to developing a strong data science team. Finding talented data scientists can be difficult since there is a strong demand for the position, but there aren't enough experienced data scientists to meet it. When it comes to large data analysis, data scientists play a variety of responsibilities, including data engineering, statistician, scientific method, advanced computing, and many others (Almeida, 2017). Furthermore, data statistician occupations are in high demand now and have the potential for growth in the information technology sector in the twenty-first century (Tharwat, 2017).

2. RESEARCH DESIGN AND METHODOLOGY

Since the purpose of this paper is to investigate the use of big data in the retail sector, qualitative research is the best way to cover the topic. The study relied heavily on secondary data obtained primarily from reputable academic sources, namely Sermon hosted by the University of Huddersfield and Google Scholar, both of which are known for the depth and rigour of their articles, which are important quality criterion (Snyder, 2019). The materials used were restricted to peer-reviewed publications, with a focus on recent papers published after 2010, allowing data to be current as the paper's focus is on reviewing current trends.

The current SLR protocol is made up of three sequential processes: planning the review, performing the review, and presenting the review (Behera, et al., 2019; Tandon et al. 2020). The current SLR includes pre-set inclusion and exclusion criteria (see Figure 1), as recommended by prior literature (Behera et al., 2019; Tandon et al. 2020). The literature sought comprehensive coverage of articles focusing on Big Data practices/measures to improve the performance of the Retail sector.

2.1. Planning the Review

This review considers publications, abstracts, and citations, but excludes books, research reports, blogs, and other non-formal literature. A structured keyword search was carried out for these reasons. Following that, studies that met the eligibility criteria (specifically, the inclusion and exclusion criteria) were evaluated for quality and robustness.

2.2. Performing the Review
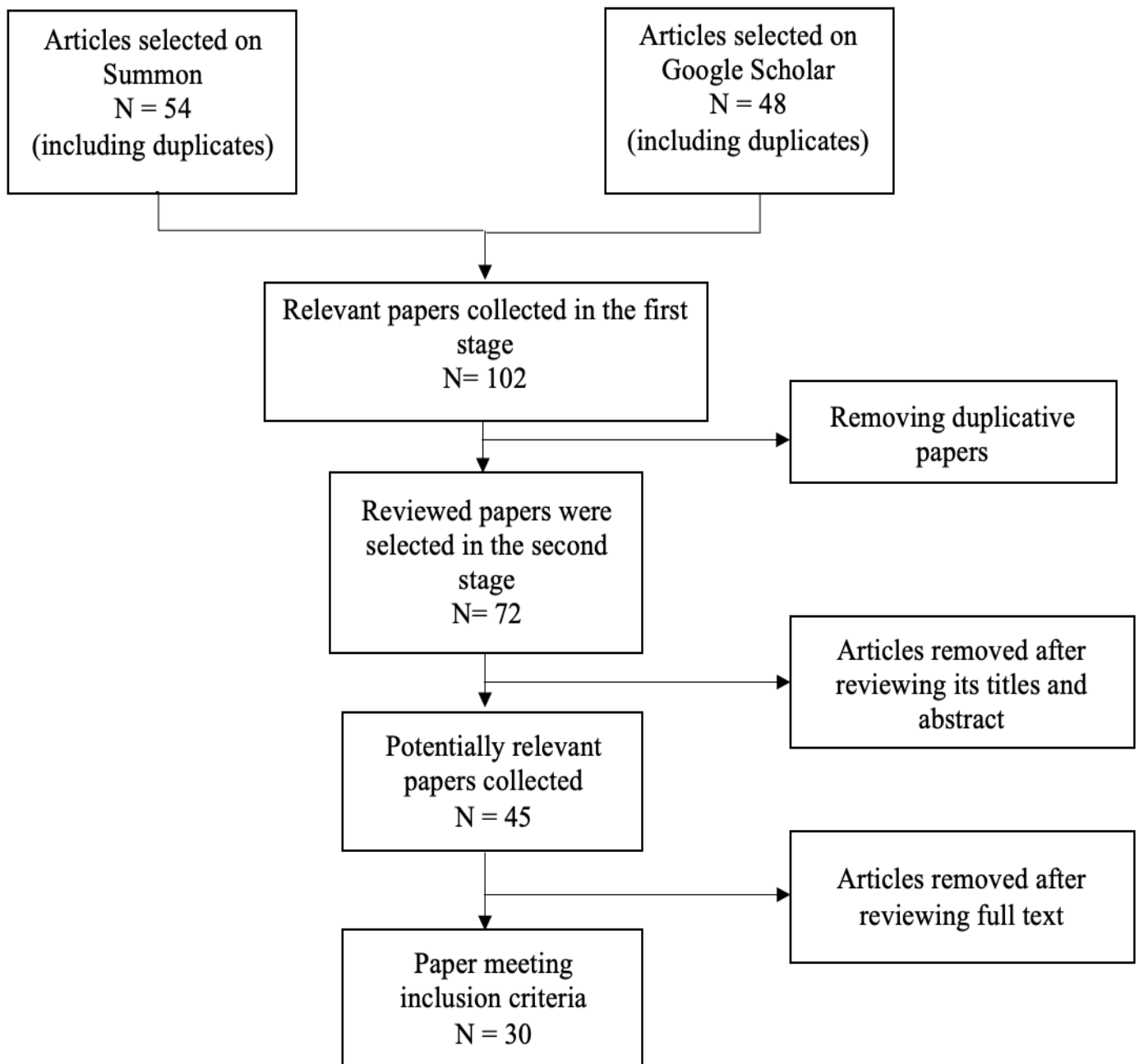
Figure 1.The systematic literature review process

The following keywords were searched using Boolean operator as follow: Big Data* AND Retail* AND "Analytics" AND 'Retail Sector'. One should note that "*" was used at the end of three keywords to cover a broader range of possible papers because many Big Data studies make use of sometimes slightly different keywords for the same concept.

Database	Search Syntax	Total Hit	Abstract Read	Full Text Downloaded
Summons	"Big Data'' and "Retail"	6,681	56	23
	"Big Data" and "Retail Sector"	373	20	14
	"Analytics" and "Retail"	29,441	35	17
	"Analytics" and "Retail Sector"	1,040	40	0
Google Scholar	"Big Data'' and "Retail"	7,230	16	20
	"Big Data" and "Retail Sector"	3,780	12	18
	"Analytics" and "Retail"	3,910	10	8
	"Analytics" and "Retail Sector"	1,040	17	2

Table 2.Database search summary

Note: The search results included resources from different disciplines, such as information science, healthcare, and Education, and were published through different outlets, such as academic journals, practitioners' journals, conference proceedings, and books. The search results were sorted based on 'relevance' prior to reading the abstracts. *In many cases, a study appeared in multiple search results.

In August 2020, two databases were searched using predetermined keyword combinations (see Table 2). 30 of the 102 full texts found in the databases were removed due to duplicate search results (see Figure 1). According to the exclusion criteria, 27 of the screened studies were excluded from further analysis (see Figure 1). A critical review of these 30 studies was required to ensure that the current SLR produced transparent and unbiased results (Behera, et al., 2019).

Journals	Numbers of Publication
European Journal of Management Studies	2
Management Decision	1
Journal of Business Strategy	2
International Journal of Research in Marketing	1
Logistics	1
KIET Journal of Computing and Information Sciences	2
International Journal of Advanced Trends in Computer Science and Engineering	1
African Journal of Business Management	1
Textile Research Journal	1
Social Sciences	1
Knowledge International Journal	1
Baltic Journal of Management	1
Management Science Letters	1
British Journal of Management	1
International Journal of Entrepreneurship	1
Journal of Computer Science Research	1

International Journal of Computer Science and Mobile Computing	1
TEM Journal	1
Communications in Computer and Information Science	1
Corporate Ownership and Control	1
Journal of Business Analytics	1
Journal of Textile Science & Fashion Technology	1
Engineering Management in Production and Services	1
Journal of Retailing and Consumer Services	1
Journal of critical Review	1
Conference Proceedings	2
Total	30

Table 3. Numbers of relevant papers per journal

2.3.   Presenting the review

The oldest study in the sample was published in 2010, so the topic under discussion is, arguably, relatively new to the literature. Figure 2, which depicts the annual distribution of studies, shows that the topic has grown in importance in recent years, with 2020 having the greatest number of studies. Furthermore, an increase in the number of citations received by studies in the sample shows that the topic of current SLR is quickly gaining traction in academia (see Figure 2).
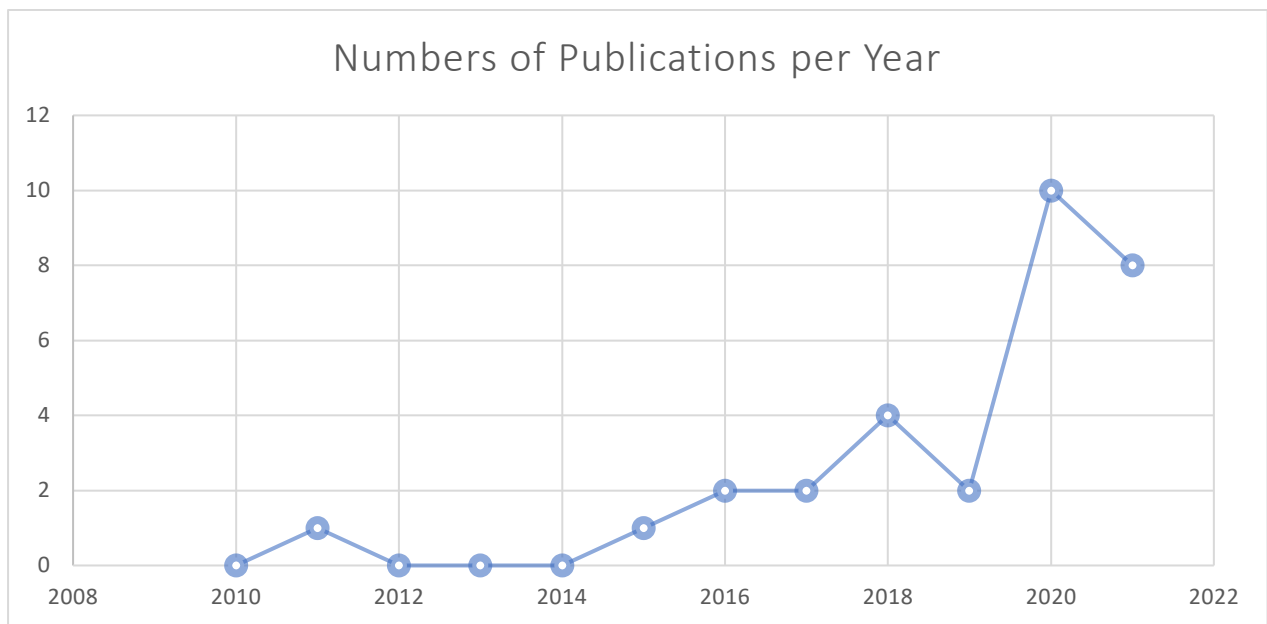
Figure 2.Year-wise distribution of studies from 2010 to 2021

Appendix A presents summaries of 30 studies in our sample and reveals the following information about these studies:

a.   Key Contributors

A total of 112 researchers co-authored the studies under review. Among them , Jabeen, Mehwish co-authored two studies as well as Sultan, Muhammad Faisal and Mannan, Muhammad Adee co-authored two each.   The first authors of the studies in our sample are affiliated with institutes from 17 countries. However, more than half of these studies come from four countries: the India (7 studies), China (3 studies), United Kingdom (3 studies), and Pakistan (3 studies).

b. Key outlets

The sample studies were published in 28 peer-reviewed journals and 2 conference proceedings (see Appendix A). The leading sources among the 14 publishers that contributed to the current study's sample are European Journal of Management Studies (2 studies), KIET Journal of Computing and Information Sciences (2 studies), and Journal of Business Strategy (2 studies). Elsevier is the most prominent publishing house (13 studies), followed by Emerald (3 studies) as shown in Table 3.

c. Common methodologies

In terms of methodology, quantitative research (15 studies) and conceptual approaches (6 studies) were found to be prevalent in the selected studies, followed by analytic approaches (3 studies), case studies (2 studies), exploratory research (1 study), and mathematical method (1 study).
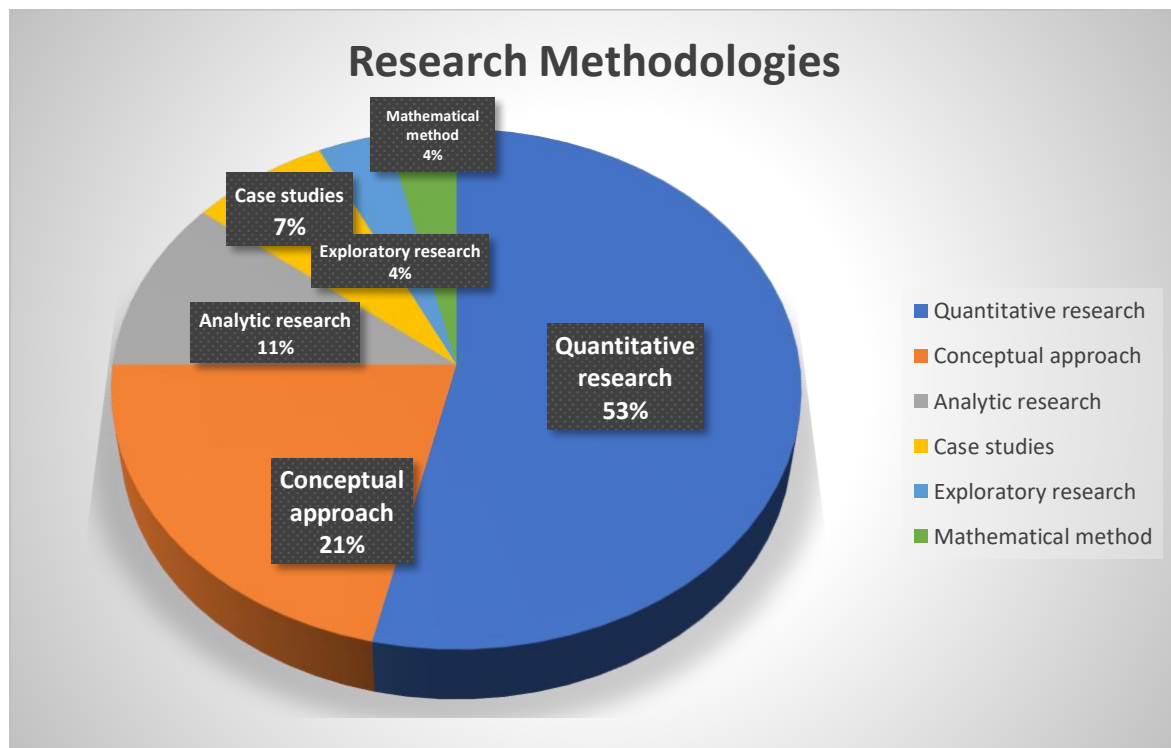

Figure 3. Research Methodologies

3. Findings

3.1. Application of Big Data in Retail Sector

Following an examination of the findings of the studies under consideration, it became clear that Big Data Analytics has the potential to add significant value to retail performance. According to this analysis, the value delivered by BDA in retail can be classified into six themes (see Table 4).

Themes	Details
Customer Relationship Management (CRM)	Customer interaction (Subrahmanyam et al., 2020) Customer experience (Theopilus et al., 2021); Customer targeting, behaviour and sentiment; Customer engagement activities(Lee, 2020) ; Customer engagement (Seetharaman et al., 2016) Personalized customer service (Novikov, 2020); Customer experience (Armitage et al., 2020); Customer experience (Rathod & Kumar, 2021) ; customer emotional detection (Pantano et al., 2021) ; Customer relationship management (Seranmadevi & Senthil Kumar, 2019); Customer experience (Hänninen et al., 2018); Customer shopping experience (Dekimpe, 2020) ; Customer relationship and experience (Ying et al., 2021a)
Sales Increase	Expenses management (Ali & Xie, 2021), Reduced operating cost (Santoro et al., 2019) ; Price optimization (Aktas & Meng, 2017) Sales optimization (Jabeen et al., 2021) ; Cost effective (Matthew et al., 2015) ; Sales increase (Mahesar et al., 2017) ; Increased product sales (Cheema, 2018); Price optimization (Belarbi et al., 2016).
Fraud Elimination	Increased fraud capture rate (John et al., 2020); detect and prevent fraud in retail (Jha et al., 2020)
Decision Support	Data strategy (Aversa et al., 2021); decision making (Prasad & Venkatesham, 2021); Decision suggestions (Rathod & Kumar, 2021); Customer purchase decision (Victor et al., 2018);

	Decision making (Jovevski et al., 2018); Decision making with AI (Guo et al., 2011)
Inventory Management	Inventory management (Santoro et al., 2019); Waste reduction (Silva et al., 2020) Availability and assortment decisions (Aktas & Meng, 2017); Production planning (Makmur et al., 2020) assortment in online retail stores. (Sultan et al., 2020); Utilization of inventory (Seetharaman et al., 2016); In-store behaviour and customer sentiment analysis (Belarbi et al., 2016)
Forecasting	Sales forecast (Rathod & Kumar, 2021); Predict future POS sales (Makmur et.al, 2020) ; Forecasting and pricing (Aktas & Meng, 2017); Trend prediction (Silva et al., 2020)

Table 4. Summary of findings of reviewed studies.

Customer Relationship Management (CRM)

This theme encapsulates the contribution of BDA in Customer relationship and experience to improve retail performance. For example, Customer interaction (Subrahmanyam et al., 2020), Customer experience (Theopilus et al., 2021); Customer targeting, behaviour and sentiment (Belarbi et al., 2021), Customer engagement activities (Lee, 2020), Personalized customer service (Novikov, 2020), customer emotional detection (Pantano et.al, 2021), Customer relationship management (Seranmadevi & Senthil Kumar, 2019).

Subrahmanyam et al., (2020) identify the potential of BDA and AI in social media interactions in the retail sector in various tenets such as sales and marketing, promotional activities, consumer interactions, customer service, and the effect of end user observations and reactions, as well as real time discussion. Theopilus et al., (2021) suggested that an analytical study could be used to conceptualise a system design for new "players" in the cosmetics retail industry, providing valuable guidelines on how to provide a positive customer shopping experience at their store. According to the findings of this study, customer experience plays a significant role in the cosmetics industry, which is heavily influenced by hedonic factors. Pantano et al., (2021) uses machine learning algorithms to develop a new system to analytically detect emotional responses from customers' static images (considering the exemplar emotions of happiness and sadness)

Sales Increase

This theme entails the integration of BDA in the retail sector to increase sales and maximise profits, such as sales optimization (Jabeen et al., 2021), expenses management (Ali & Xie, 2021), reduced operating costs (Santoro et al., 2019), cost effective (Matthew et al., 2015), sales increase (Mahesar et al., 2017), increased product sales (Cheema, 2018). According to Mahesar et al., (2017) research, the integration of BDA and CRM can provide many benefits to retail stores, including increased sales volume and revenues, as well as a better understanding of the retail store's operations. The findings of Ali & Xie, (2021) provided preliminary evidence that big data analytics, among other emerging technologies, could assist Pakistan's retail industry in resolving various problems and challenges, such as low revenues and increased expenses. According to the findings of Jabeen et al., (2021), BDA was perceived as a powerful tool for organised retail sector operations. The study created a model that is more adaptable and can optimise sales for retail businesses.

Fraud Elimination

This theme involves studies that discussed the application of BDA in reducing and detecting fraud within the retail sector. This includes increased fraud capture rate (John et al., 2020) Detect and prevent fraud in retail (Jha et al., 2020). John et al., (2020) proposed a model that allowed the business to select top 5% sample of refund transactions with a higher likelihood of fraud as indicated and queue them for an audit. Implementation of this model resulted in an incremental lift in fraud capture rate. Jha et al., (2020) reported that Big data analytics is used to identify an unusual pattern to detect and prevent fraud in the retail sector.

Decision Support

This theme acknowledges how BDA has improved decision-making processes in retail Organisations with Data strategy (Aversa et al, 2021), decision making (Prasad & Venkatesham, 2021), Decision suggestions (Rathod & Kumar, 2021), Customer purchase decision (Victor et al., 2018), Decision making with AI (Guo et al., 2011). Aversa et al., (2021) suggested that it was evident that the adoption and development of Big Data decision support was heavily reliant on a data environment that promotes transparency and a clear corporate

data strategy. Guo et al., (2011) suggested that advances have been made to employ AI techniques to handle decision-making problems in the apparel industry.

Inventory Management

This theme captures the ways of inventory management in retail by using efficient application of BDA, for example, Assortment in online retail stores. (Sultan et al., 2020) In-store behaviour and customer sentiment analysis (Belarbi et al., 2016), Inventory management (Santoro et al., 2019), Waste reduction (Silva et al., 2020), Availability and assortment decisions (Aktas & Meng, 2017), Production planning (Makmur et al., 2020), Utilization of inventory (Seetharaman et al., 2016). Belarbi et al., (2016) study highlights that big-data is perceived as the major tool for improving assortment in online retail stores.

Forecasting

This theme captures methods of predicting retail sales through the efficient application of BDA, such as sales forecasting (Rathod & Kumar, 2021), predicting future POS sales (Makmur et al., 2020), forecasting and pricing (Aktas & Meng, 2017), and trend prediction (Silva et al., 2020). According to Rathod & Kumar, (2021) research, BDA aids in predicting future performance, optimising prices, and forecasting demand. The research assists retailers in forecasting trends and identifying target customers. External data, such as competitor prices and weather conditions, were identified by Aktas & Meng, (2017) as being used for demand forecasting and pricing.

3.2. Challenges of Implementing BDA in Retail

The selected studies were reviewed using a meta-ethnography-based approach (Noblit & Hare, 1988), which revealed that the contexts of these studies can be synthesised into five broad themes (see Table 5), which will be discussed further below:

Theme	Details
Lack of skilled Experts	A shortage of the analytical and managerial talent (Jovevski et al., 2018) ; Shortages of people with the right set of skills (Aktas & Meng 2017) ; Lack of skilled analyst (Aversa et al., 2021); Lack of skilled Experts (Ying et al., 2021)(Ying et al., 2021b) ; Lack of skilled Experts (Novikov, 2020) ; shortage skilled

	professionals (Prasad & Venkatesham 2021); Lack of skilled Experts (Mahesar et al., 2017) ; Lack of skilled experts (Silva et al., 2020); shortages of skilled experts (Santoro et al., 2019)
Budget constraints	Cost (Makmur et al., 2020); Investment cost (Matthew, 2015); Budget constraint (Rathod & Kumar, 2021).
Data privacy and security	Data privacy and scalability (Belarbi et al., 2016); Data Privacy and data breaches. (Prasad & Venkatesham, 2021); Data Privacy, quality of data (Jha et al., 2020); Data Privacy and security (Seranmadevi & Senthil, 2019); Data privacy (Victor et al., 2018).
Information hoarding	Information sharing and process integration (Aktas & Meng, 2017); Lack of corporation in sharing data (Jha et al., 2020); Information hoarding (Aversa et al., 2021)
Ethics	Ethical issue (Pantano et al., 2021)

Table 5.Context of reviewed studies.

Lack of Skilled Workers

In this theme, the challenge that comes along with big data are people. Data without meaning and the appropriate analysis is just data. Data without meaning and analysis is just data. For example, Ying et al., (2021) reported that participants identified a lack of skilled workers as an important factor in terms of the feasibility of big data management. According to Novikov, (2020), there is a shortage of specialists in Big Data management and related analytics. According to the studies of Mahesar et al., (2017), there was a lack of the right people to operate the system, but the need eventually forced them to train people accordingly. According to Prasad & Venkatesham, (2021), there is a shortage of skilled analysts who can manage and synthesise big data.

Budget constraints

This theme highlights budget constraints as one of the major challenges of implementing BDA in the retail sector. For example, Rathod & Kumar, (2021) stated in their studies that a firm may face issues related to budget constraints, technology compliance, and employee abilities in providing enhanced services to customers. The main finding from Matthew, (2015) study was that South African retailers are not using big data analytics due to the difficulty in investing in BDA and the cost of implementation. According to Makmur et al., (2020), companies are still defining the benefits of POS while appropriating the cost of collecting, analysing, and using the data.

Data Privacy and Security

This theme acknowledges data privacy and security concerns associated with the use of BDA, for example. Issues can be seen in the integration of AI and Social Media in terms of security and data privacy. Subrahmanyam et al., (2020) Belarbi et al., (2016) identified some barriers to using big data analytics, such as information privacy and the scalability of analytic algorithms. In their study, Prasad et al., (2021) identified data privacy, data breaches, and conflict resolutions in data access and storage as challenges in the implementation of BDA in the retail sector. Jha et al., (2020) identified data privacy as a major challenge in BDA. Seranmadevi & Senthil (2019) acknowledge that privacy and security are major concerns because there is no formal regulation in place for data anonymisation.

Information hoarding

This theme captures information hoarding as a concern in BDA, for example, Jha et al., (2020) suggested a lack of cooperation and support in data sharing in their studies. As a concern of BDA, Aktas & Meng (2017) mentioned information sharing and process integration.

Ethics

This theme emphasises ethical issues related to Big Data Analytics. For example, Pantano et al., (2021) in their studies raised ethical concerns while contributing to the retail management literature with regard to customers' emotions and big data analytics.

3.3. Comprehensive Framework for use of BDA in Retail

The current SLR's findings guided us in developing a complete framework that includes five key components of BDA in healthcare (see Figure 3). The following are the five components that show a degree of interconnectedness:

Personalization

Personalization is the process of creating a unique experience for customers by tailoring offers based on demographics, behavioural targeting, psychographic segmentation, and purchase patterns analysis. It's a way of reaching out to customers with the goal of selling the right things to the right people at the right time. For all organisations, but notably retailers, personalization has shown to be a successful means of increasing sales and profitability. According to a study, 22% of retailers use big data to produce customised offers, and 35% expect to do so in the near future (QBurst, 2015).

It goes without saying that big data is responsible for personalization. Retailers, on the other hand, may develop a much more advanced customised offer because they have access to their consumers' demographics, likes and dislikes based on their shopping habits, and many other variables (Brkani, 2020). A person who buys white jackets instead of black jackets on a regular basis is likely to be offered a special discount on a new pair of white jackets rather than black ones. These offers are generated at a higher level of complexity. The database keeps note of the time and date, as well as the things purchased that day. As a result, if a single consumer buys a shower gel on the 15th of every month, it's quite possible that the customer will receive a special offer or a discount on shower gel around that time..

In-store data collecting, on the other hand, is done through loyalty programmes. Customer retention was the major purpose of loyalty programmes in the past, as opposed to the current loyalty programmes we have now. A customer would be given a token that could be traded for a discount, a free product, or something similar in the future. Nowadays, the purpose of loyalty programmes is not just to retain customers, but also to collect data on them in order to produce these customised offers. And, as previously stated, individualised offers increase sales, which is a significant benefit for retailers.(Brkanić, 2020)
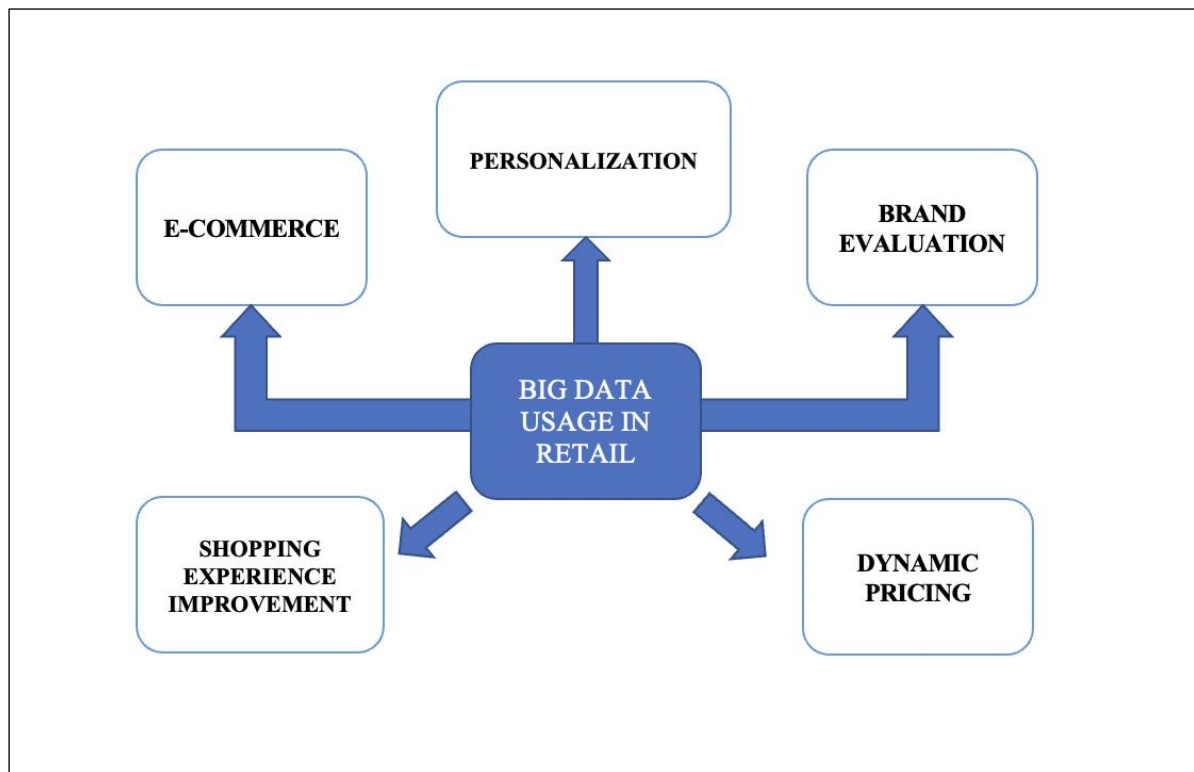
Figure 4. Conceptual model for applications of BDA in retail

E-commerce Optimization

E-commerce optimization is the process of designing and configuring a web store to make it relevant, interesting, simple to use, and appealing to the eye. E-commerce optimization also refers to the process of continuously upgrading and updating your online business until it precisely meets the expectations of your customers (QBurst, 2015).

Retailers use big data to evaluate the performance of their online stores. Retailers may see which portions of their online store are more commonly used by analysing heatmap research. (Khomtchouk et al., 2017)

Brand Evaluation

Every company's goal is to maintain the highest degree of customer satisfaction possible. Customers' perceptions of a company and its product/service are critical for the company to acknowledge. Since consumers began to use social media platforms, it has been easier for

businesses to learn about their customers' perceptions. As a result, data analysts began collecting data from social media networks. (QBurst, 2015).

Data analytic tools have been developed by social networking sites such as Facebook to assist businesses, particularly small and medium-sized businesses who lack a data analysis staff or sufficient resources to devote to data analysis. These data analytic tools will assess the success of a company's page, post, or campaign over a certain time period. It has numerous benefits, such as the fact that these analytical tools are always error-free, that they save a significant amount of time and money, and that the data analysis results are always presented in an easy to understand manner (Facebook, 2021).

Shopping Experience Improvement Using Big Data

One of the most significant aspects of the retail industry is the in-store purchasing experience. It will determine whether or not the customer returns to the store. Many aspects influence the buying experience, and by combining them, the store produces a one-of-a-kind experience for the customer (QBurst, 2015). Furthermore, each consumer has their own preferences and needs, and they will choose their favourite merchant based on those. Retailers large and small are discovering new methods to engage with customers in physical locations, from interactive storefronts to recommendations written on till receipts. From data captured on video cameras and CCTVs, video analytics can be used to detect hotspots within retail locations.

Dynamic pricing

Retailers typically employ dynamic pricing to obtain varying selling prices for the same product. It's a clever technique to keep a healthy inventory level while also generating additional income. Dynamic pricing isn't possible for brick-and-mortar merchants in the same way that it is for e-retailers. Discounts on specific products will reach every consumer who walks into the store, as opposed to e-retailers' dynamic pricing, which sends different offers to different customers.

In order to be successful, dynamic pricing necessitates ongoing data analysis. Furthermore, tracking market patterns (supply and demand) as well as inventory levels will enable dynamic pricing with relevant data to determine whether or not discounts should be offered (QBurst, 2015)

3.4. Future research agendas

Prior literature on BDA in retail examined herein acknowledged two major limitations: data collection limitations and methodological constraints (see Table 6). Furthermore, the studies reported four types of future research scopes: study extension, methodological rigour, research design, and technological advancement (see Table 6).

Themes		Details
Limitations acknowledged by prior research	Data collection	Assess to data (Hänninen et al., 2018); Data quality (Sultan et al., 2020); Large data (Aversa et al., 2021)
	Methodological constraint	Available method (Pantano et al., 2021); Execution time (Mahesar etal., 2017)
Future scope recommendations by prior research	Study Extension	Replication in different countries (Ali et al., 2021; Mahesar et al., 2017; Ying et al., 2021; Sultan et al., 2020; Aversa et al., 2021); Scope in other industry (Silva et al., 2020; Hänninen et al., 2018)
	Methodological rigour	Quantitative research (Santoro et al., 2019); Systematic academic research (Dekimpe, 2020);
	Research design	Bricks and clicks and flips retailers (Jabeen et al., 2021); Decision making (Matthew et al., 2015); Privacy issues (Pantano et al., 2021); The Confirmatory experience analysis (Theopilus et al., 2021)
	Technological based advancement	AI based methodologies (Guo et al., 2011); Analytical and business intelligence tools (Jha et al., 2020); Integration of Artificial Intelligence and social media. (Subrahmanyam et al., 2020)

Table 6. Summary of study limitations and future scopes

3.4.1. Limitations acknowledged by prior research

Data collection

This theme captures research limitations related to data collection, such as Assess to data (Hänninen et al., 2018), Data quality (Sultan et al., 2020), and Large data sets (Aversa et al., 2021). Hänninen et al. (2018) mention the difficulty in assessing the reliability of the data sources used (e.g., popular journal articles) and the inability to obtain the same depth of data as would be possible with structured or semi-structured interviews and surveys. According to Aversa et al., (2021), there is still a knowledge gap in understanding how increases in data volume, velocity, and variety affect retail decision-making activities.

Methodological Constraint

This theme acknowledges the limitations that researchers encountered as a result of their studies on the application of Big Data Analytics in retail. For example, execution time (Mahesar et al., 2017), available method (Mahesar et al., 2017). (Pantano et al., 2021). Mahesar et al., (2017) identified execution time as a constraint for their study and proposed a longer duration to carry on the research in order to conduct it in a broader perspective. Pantano et al., (2021) proposed only one system as an example of how to consider two emotions out of the six fundamental ones identified.

3.4.2. Future scope recommendations by prior research

Study Extension

This theme encapsulates suggestions from previous researchers on the need for study extensions. For example, research done was not generalizable beyond the population studied, so future studies were suggested to take other countries into account. (Ali et al., 2021; Mahesar et al., 2017; Ying et al., 2021; and Sultan et al., 2020) Silva et al., (2020) and Hänninen et al., (2018) report limitations of their findings' lack of generalizability outside of the retail sector and recommend additional research to verify findings and expand insights in different industries.

Methodological rigour

This theme highlights researchers' recommendations for additional research methodology in this field. For example, Santoro et al., (2019) propose that future studies conduct quantitative research to assess the impact of big data deployment on firm performance. In his studies, Dekimpe, (2020) recognised the critical need for systematic academic research on the economic viability of Big Data Analytics in retail.

Research design

This theme captures researchers' recommendations for investigating various plans of study relating to the application of Big Data Analytics. For example, Jabeen et al., (2021) conducted a study on the perceived uses of big data, and the results obtained were only from IT managers and experts associated with the online retail sector. They did, however, suggest that future studies investigate the differences in big data practises of retailers who prefer bricks and clicks, and flips and clicks in order to assess the application of big data in hybrid and online retailing. According to Matthew et al., (2015), there is a debate about the definition of big data and big data analytics, as well as a plethora of conflicting perceptions on the topic. They did, however, recommend further research into big data analytics, specifically how these perceptions influence decision making and how this affects the future use of big data analytics in the retail industry. Pantano et al., (2021) propose future research to address emerging privacy issues and determine under what conditions customers would be willing to accept this type of data collection, as well as whether the use of this data collection would change consumers' attachment to the retailer. Theopilus et al., (2021) conducted a study that compared customer experiences at offline and online cosmetics stores to assist retailers in deciding which path to take. They did, however, recommend additional research with a focus on a confirmatory analysis of the customer experience factors explored in their study.

Technological based advancement

This future research agendas theme captures the future research scope of incorporating technological advancements in future research. Guo et al. (2011), for example, argue that more emphasis should be placed on developing methodologies based on rarely used but promising and newly developed AI techniques such as the AIS, GP, and HI. Jha et al., (2020) propose future research to address issues and provide a framework for aggregating data from various data sources and applying analytic tools and business intelligence to detect transaction anomalies. Subrahmanyam et al., (2020) advocate for the integration of artificial intelligence

and social media. They also proposed incorporating AI into customer service for payments, returns, warranties, and post-purchase support, among other things.

4. DISCUSSION

Figure 4 shows a summary of peer-reviewed articles on the application of BDA to retail performance. Overall, the number of articles dedicated to customer relationship management is significantly higher, followed by sales increase and fraud elimination.
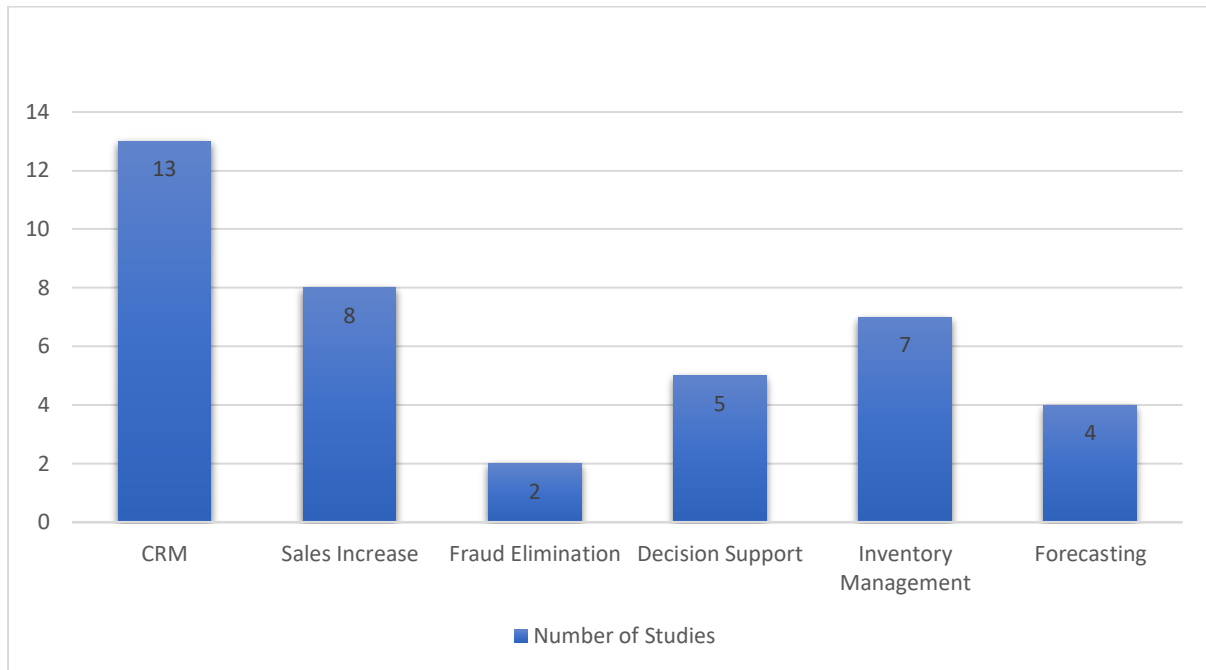
Figure 5. The number of studies on retail performance categorised by the theme

Research objective 1 The first research goal was to summarise the present research profile of BDA in retail. In response to this question, Figure 2 shows a rising trend in the number of publications, indicating that the study topic is becoming more prevalent in academia. Furthermore, notable contributors who are making significant contributions to the literature are recognised. The application of BDA in retail performance was a **research objective 2** question, which was answered by a summary of the findings of the studies under consideration (see Table 4).

The **research objective 3** attempted to analyse the drawbacks of implementing Big Data Analytics in retail based on reviewed studies. This question was answered by analysing the contexts of the reviewed studies (see Table 5). In addition, based on the findings of the chosen

studies, a comprehensive framework was created that summarises the use of Big Data Analytics in retail (see Figure 3). **Research objective 4** The fourth research objective sought to identify future agendas for Big Data Analytics research in retail. Future research is encouraged to address the limitations identified herein and to adhere to the future research scopes recommended in the prior literature on Big Data Analytics in the retail sector (see Table 6).

4.1. Theoretical implications

The use of Big Data Analytics in retail is gaining traction, especially in the areas of customer retention, profit optimization, and decision making. The current study, being one of the first complete analyses on the subject, has three key theoretical implications, which will be examined later. First, this paper provides an overview of existing studies on the use of Big Data Analytics in retail. This study profile includes information on the major contributors, well-known publishing sources, and common methodology used in the papers that were assessed. Second, the current study has highlighted the themes of contexts in the reviewed studies on the limitations of integrating Big Data Analytics in the retail industry. According to the review of previous literature, the contexts can be categorised into five broad themes: a lack of skilled experts, budget constraints, data policy and security, information hoarding, and ethics. A thematic identification was used to organise prior literature and to catalyse future research in various related areas of study. Third, the current study proposed a comprehensive framework for capturing the relationships between the processes of customer personalization, e-commerce optimization, brand evaluation, shopping experience, and dynamic pricing.

4.2. Practical implications

Customer relationship management, sales increase, fraud elimination, decision support, inventory management, and forecasting are the six themes highlighted in this study as being appropriate for adding considerable performance value to the retail sector. The findings of this study are intended to be valuable to retail managers, researchers, policymakers, and service developers, as stated later. First, retail practitioners, particularly retail managers, should take note of the novel approaches to improving performance and efficiency in retail service delivery using Big Data Analytics presented here. Predictive analytics to know which merchandise to sell more on certain days, personalised customer experience by predicting their preferences and choices, and using customer behaviour insights to easily increase customer satisfaction, which will lead to increased customer loyalty are just a few of the innovative approaches.

Second, the findings of the current study will be useful to academics and policymakers in recognising the drawbacks of applying big data analytics in the retail sector, defining retail policies, focusing future research, optimising public funds use, and developing legal frameworks. Effective decision-support systems, infrastructure expansion, and technological improvement in retail are all possible outcomes of appropriate public policies.

Third, retail service developers would be worth considering the findings of this study when exploring opportunities to develop new services for the retail sector using cutting-edge technologies. For example, in the future, BDA could use machine learning, artificial intelligence, and blockchain to maximise the value it adds to retail.

Fourth, we are currently confronted with a difficult challenge in the form of the Covid-19 outbreak. Big Data Analytics, on the other hand, has the potential to transform a crisis into an opportunity for retailers, for example. Retail managers and retail policymakers can use Big Data Analytics to analyse new opportunities. For example, retailers can use social media analytics for customers who are not in stores but are online in various social networks, as well as demand and forecasting for last-mile logistics in the delivery of goods at a lower cost. BDA not only helps retail firms by providing opportunities, but it can also aid in various efforts to control and prevent its spread.

5. CONCLUSION, LIMITATION AND FUTURE RESARCH

The purpose of this study was to answer four research questions on the impact of Big Data Analytics in the retail industry. These questions were addressed using a standard procedure for reviewing resources from major databases. Customer relationship management, sales increase, fraud elimination, decision support, inventory management, and forecasting were the six primary themes in the preceding literature on the application of Big Data Analytics in improving retail performance. This paper also outlines possible challenges faced my retail companies in implementing Big Data Analytics technologies which are; addressing lack of skilled experts, budget constraints, data policy and security, information hoarding, and ethics. The study identified gaps in the existing literature and proposed a research agenda for future research on the use of big data in the retail industry.

However, despite its significant contributions, this study has three major limitations: first, book chapters, magazine articles, and thesis studies were excluded from the study's scope; second, journal articles and conference studies that were not available in English were not considered; and third, studies that were not available in the two databases were not reviewed unless they appeared in the forward and backward searches. Future research is encouraged to address these flaws.

We further suggest that scholars use the protocol used in this work to investigate the implementation of BDA in services supplied by, for example, banking and financial institutions, media and broadcast channels, and the travel and hospitality business. Similarly, the use of emerging technologies in retail, such as blockchain, cloud computing, and artificial intelligence/machine learning, opens up exciting new possibilities. This SLR comes to a close with a call for more research into the specific applications of BDA and the overall integration of technology in the retail industry.

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7. APPENDIXES

7.1. Appendix A:

Citation (arthur)	Affiliation (country)	Journal / conference	Publisher	Aurthur keywords	Purpose, rationale, research question	Research methods, sample, variables	Major findings, contributions	Research BDA limitations theme	Research limitation and future research recommendation	Research BDA application Theme
Ali & Xie, (2021)	China	European Journal of Management Studies	Emerald	30 ; big data emerging; industry 4; organizational performance; retail industry; service sector	The purpose of this paper was to assess and determine the impact of the five core technologies of Industry 4.0 (3D Printing, Big Data Analytics, Cloud Computing, Internet of Things (IoT) and Robotics) on the organizational performance of the retail industry in the context of Pakistan.	Quantitative Research	The findings obtained by this research work showed a significant relationship among the five core pillars of Industry 4.0 and the organizational performance of Pakistan's retail industry.	Lack of skilled Experts	study extension	Cost Effective / increase sales
Santoro et al., (2019)	Italy	Management Decision	Emerald	Big data; Data and knowledge; Retail industry	to shed light on how big data deployment transforms organizational practices, thereby generating potential benefits, in a	Quantitative Research	Data analysis helped identify specific aspects related to big data deployment, data gathering methods, required competences and data	Lack of skilled Experts	**methodology rigour**	customer targeting, optimized processes(cost effective) . Reduced operating cost, improved qulaity,

					specific industry: retail.		sharing approaches		inventory managemtn
Silva et al., (2020)	United Kingdom	Journal of Business Strategy	Semantic Scholar	Big data; Consumer experience; Fashion; Fashion retail; Technology; Trend forecasting	to consider the most recent and trending applications of Big Data in fashion retailing with the aim of concisely summarising the industry's current position and status.	conceptual Method	The authors find that the main reasons underlying the application of Big Data analytics in fashion are trend prediction, waste reduction, consumer experience, consumer engagement and marketing, better quality control, less counterfeits and shortening of supply chains.	Lack of skilled Experts	**Study extension.**	Inventory Management, Forecasting, Customer Experience, Marketing, Quality control

Dekimpe, (2020)	Netherlands	International Journal of Research in Marketing	Elsevier	Big data analytics; Retailing	The paper considers to what extent the Retail sector still holds, and explores a number of additional opportunities and challenges that emerge from the ongoing big data revolution.	essay	Big Data Analytics have had a major impact on the very foundations of the retailing domain by affecting (i) its institutions (such as consumers, brand manufacturers, and institutional retailers), (ii) its processes (e.g., the consumers' shopping experience and engagement), and (iii) the ways of value creation and value appropriation in the sector.	Budget constraints	**study extension**	Customer Experience /CRM

| Aktas & Meng, (2017) | United Kingdom | Logistics | MDPI | big data; retail operations; maturity; availability; assortment; replenishment; pricing; layout; logistics | investigate how big data is, and can be used in retail operations. | Quantitative Research | historical sales data and loyalty schemes can be used to obtain customer insights for operational planning, but granular sales data can also benefit availability and assortment decisions. External data such as competitors' prices and weather conditions can be used for demand forecasting and pricing | Lack of skilled Experts | data collection | inventory management/ Forecasting and Price optimization |
| Jabeen et al., (2021) | Pakistan | KIET Journal of Computing and Information Sciences | Elsevier | big-data; organized retail sector; perceived usefulness; store layout | Q1: How Big-Data might benefit organized retail sector? Q2: How unavailability of Skilled Data Scientist affects application of Big-Data? Q3: How Big-Data is influencing consumer purchase at | Quantitative Research | Results indicated that Big-Data was perceived as the potent tool for operations of the organized retail sector of Karachi. | Lack of skilled Experts | **Research Design** | Sales optimization |

					organized retail sector of Karachi? Q4: How effective layout design at organized retail influence sales					
Makmur et al., (2020)	Indonesia	International Journal of Advanced Trends in Computer Science and Engineering	WARSE	Big data; Bullwhip effect; Distribution centre; Fresh Food; Point-of-sale; Predictive analysis; Product availability; Retail; Supply chain analysis		Quantitative Research	this study shows a higher degree of value in using POS data when it comes to using historical POS to better predict future POS sales and adjust the production planning	Budget Constraints		sales optimization and production planning (inventory management) / forecast sales

Matthew et al., (2015)	South Africa	African Journal of Business Management	ResearchGate	big data; data analytics; retail industry	The purpose of the study was to assess the usage of big data analytics in the retail industries in South Africa.	Quantitative Research	The main finding of the study was that South African retailers are not using big data analytics due to difficulty in investment in BDA and implementation cost. Some retailers are, however, using big data analytic platforms to improve the speed of processing large amounts of structured data and to deliver information cost effectively.	Budget constraint	**Study extention**	Cost effective
Guo et al., (2011)	China	Textile Research Journal	SAGE	apparel industry; artificial intelligence; decision making; survey	review on the state-of-art of artificial intelligence (AI) applications in the apparel industry.	case studies	advances have been made to employ AI techniques to handle decision-making problems in the apparel indus-try.	Lack of skilled Experts	**Technological based a advancement.**	DECISION MAKING

Author	Country	Journal	Publisher	Keywords	Objective	Method	Results			
Victor et al., (2018)	Hungary	Social Sciences	MDPI	Big data; Consumer behavior; Dynamic pricing; E-commerce; India; Industry 4.0	This study investigates the factors that influence consumer behavior, and their prospective online purchase decisions in a dynamic pricing context,	exploratory research	The results of the exploratory factor analysis identified shopping experience, awareness about dynamic pricing, privacy concerns, buying strategy, fair price perceptions, reprisal intentions and self-protection intentions as factors which could have a significant influence on consumer behavior and their prospective purchase decisions.	Data privacy	Methodological constraint and Methodological rigour.	Correct Pricing or decision making
Jovevski et al., (2018)	Macedonia	Knowledge International Journal	Elsevier	Big data, adoption, the Technology-Organization-Environment Framework (TOE), retail sector, Republic of Macedonia	o determine factors affecting the big data analytics adoption in selected companies in the Republic of Macedonia	conceptual Method	The research framework explains that these three factors stimulate and influence the technology innovation adoption-	Lack of skilled Experts	Technological based advancement	

Author	Country	Journal	Publisher	Keywords	Objective	Methodology	Findings	Challenges	Future research	Theory
					from the retail sector.		decision in companies			
Hänninen et al., (2018)	Finland	Baltic Journal of Management	Emerald	Business model; Big Data; Business strategy; Industry transformation; Multi-sided platforms; Platforms; Retailing	To provide an overview of how multi-sided digital platforms are transforming the retail exchange logic and assess the implications and impact of these platform-based businesses on the retail sector	conceptual analysis	study shows that multi-sided digital platforms aim to create value to consumers through their digital ecosystem thus facilitating several types of consumer value to lock-in consumers to the specific platform	Lack of skilled Experts	Data collection. and **Study extension**	Customer Experience
Seranmadevi & Senthil Kumar, (2019)	India	Management Science Letters	licensee Growing Science	Artificial intelligence; Big data; Consumer delight; Offline; Online; Retail; Retailers intention	research was conducted with the objectives of evaluating the contribution of quality, customer relationship management and big data in designing futuristic retail model and analysing the intention of retailers and	quantitative research	This study found that quality, customer relationship management and big data had significant influence in determining the retailers' intention and customers delight.	Data Privacy and security	**research design**	Customer Relationship Management

					shoppers in experiencing the emergence of AI.					
Pantano et al., (2021)	United Kingdom	British Journal of Management	JohnWiley & Sons		to explore the match between the supply of new analytical tools and retail managers' attitudes towards new tools to capture customers' emotions.	conceptual Method	To this end, Study 1 uses machine learning algorithms to develop a new system to analytically detect emotional responses from customers' static images (considering the exemplar emotions of happiness and sadness), whilst Study 2 consults management decision-makers to explore the practical utility of such emotion recognition systems,	ethical issues	**Methodological constraint.**	Customer Relationship Management

							finding a likely demand for a number of applications,			
Rathod & Kumar, (2021)	Pakistan	International Journal of Entrepreneurship	Elsevier	Analytics; Automation; Big Data; Data Science; Forecasting; Retailing	The study highlight the challenges and opportunities involving big data and analytics for enhancing the process of retailing.	Quantitative Research	The research identified that big data and business analytics help in predicting future performance, price optimizing, and forecasting demand. Managerial and Social Implications: the study helps retailers It was found that technologies also help in predicting	Budget constraints		Big data and business analytics are essential technologies that are highly used by the firm in the retail sector to capture customer experience, forecast sales, and provide normative decision suggestions.

								trends and identifying target customers.			
Mahesar et al., (2017)	Pakistan	Journal of Business Strategies	Elsevier	big data analytics; customer relationship management; retail stores	This study investigates the prevalence of Big Data Analytics in retail stores of Pakistan, and analyses the benefits of integrating CRM and Big Data.	Quantitative Research	This study found that the integration of Big Data and CRM in retail stores have manifold benefits, it can help handle data efficiently, increases sales, diversify business and creates better marketing impact	Lack of skilled Experts	Methodological constraint and Study extension	Increase sales
Jha et al., (2020)	india	Proceedings of the 4th International Conference on Computing Methodologies and Communication, ICCMC 2020	Elsevier	Big Data Analytics; Fraud Detection; Fraud Prevention and Retail Transactions Analysis	The main goal of this work is to make a survey on the detection and prevention of fraud using data mining, machine	mathematical method	Big data analytics is used to identify an unusual pattern to detect and prevent fraud in the retail sector.	Data Privacy, quality of data, lack of corporation in sharing data, load balancing and data aggregation	Technological advancement.	Fraud detection

					learning, and big data analytics approach					
Armitage et al., 2020	India	Journal of Computer Science Research	Bilingial Publishing	Artificial Intelligence(AI) Big data Retail Internet of Things (IoT)	This article outlines the Significant innovation done in retails which helped them to evolve such as Artificial Intelligence (AI), Big data and Internet of Things (IoT), Chatbots, Robots.	Quantitative Research	Companies have started embracing the Artificial intelligence into their business process which are nor only boosting up their businesses but also giving them better suggestion based on the distinctive data captured through new smart device, RFID, Robots, Chat Bots, Conversational			customer experience
Prasad & Venkatesham, (2021)	India	International Journal of Computer Science and Mobile Computing	Elsevier	Analytics, Big data, Forecasting, Retailers, volume	In this study it tells about how big data analytics impacts retail sector	Quantitative Research	Companies are trying to understand how big data and analytics can empower them to take right decisions.	Lack of skilled experts		decision making

Novikov, 2020	Russia	TEM Journal	UIKTEN	Big Data technology; Digital economy; Innovative technologies; Machine learning; Project management based on Data Science	To determine Data science and big data technologies role in the digital economy	conceptual Method	The role of the Big Data is to be a liquid product, a prerequisite for improving the profitability of organizations through personalized customer service and predictive analytics. For	Lack of skilled Experts		Customer Relationship Management
Ying et al., (2021)	China	European Management Journal	Elsevier	Big data analytics; Big data management; Customer satisfaction; Organizational performance; Retail industry; Singapore	usage of big data analytics to understand customer relationships and experience	Quantitative research method	The results of the study stated that amongst the different big data analytics utilized for Customer Relationship and experience within the retail industry of Singapore, social media analytics had been majorly answered by the participants.	Lack of skilled Experts	study extention	Customer Relationship Management

Sultan et al., 2020); (2020)	Pakistan	KIET Journal of Computing and Information Sciences	Elsevier	Big-Data, Sentiment Analysis, SMART-PLS, Assortment and Sentiment Analysis	this study aims to explore the impact of sentiment analysis through relating impact of big-data with effective assortment s of online stores.	Quantitative	Results of the study highlights that big-data is perceived as the major tool for the betterment of assortment in online retail stores although data scientist and their applicability might diminish the impact of the use of big-data.	moderation of skilled data scientist actually diminishes the impact of big-data from assortment strategies of online retailers therefore	**Data collection, Study extension**	assortment in online retail stores
Cheema, (2018)	India	Communications in Computer and Information Science	Elsevier	Big data; Customers; Hadoop; Retail industry; Retailer	The main objective of this research paper is to use big data analytic for analyzing retail data to better understand customers in a systematic manner, so that retailer can take better decisions.	Analytical Method	Big data with proven results of enhancing productivity, streamlining supply chain efficiencies, and increasing product sales			Increased product sales
Seetharaman et al., (2016)	Malaysia	Corporate Ownership and Control	Virtus Enterprise	data analysis tools; data security; data source; financial and economic outcomes; retail	This research analyses the impact of big data analysis on retail firms that use data and business	Quantitative	The new finding is arrived that financial and economic outcome showed a strong support			utilization of inventory, customer engagement and market value

					analytics to make decisions		and have direct relationship with data analysis tools of retail industry.			
John et al., (2020)	India	Journal of Business Analytics	Elsevier	Refund management; e-commerce; fraud mitigation; logistic regression; online purchase	The case considered for the present study is fraud mitigation in return–refund process managed by the customer services of an online retail business.	conceptual Method	he proposed model allowed the business to select top 5% sample of refund transactions with a higher likelihood of fraud as indicated and queue them for an audit. Implementation of this model resulted in an incremental lift in fraud capture rate.			Fraud elimination

Lee et al., (2020)	USA	Journal of Textile Science & Fashion Technology	Iris Publishers	Social media; Consumer engagement; Facebook; Social media analytics; Retailer; Marketing	This study is to investigate the relationship between retailers' Facebook activities (e.g., type of post they use, time they upload) and the resulting consumer engagement behaviour on the Facebook fan pages.	Quantitative Analysis	Big data enables the measurement of actual customer behaviours (e.g., liking, commenting, sharing) on Facebook fan pages and accurate understanding of consumer engagement phenomenon in social media. Thus, this study suggests specific strategies for retailers to increase consumer engagement activities on their Facebook fan pages.			Customer Relationship Management
Belarbi et al., (2016)	Morocco	International Conference on Computing Wireless and Communication Systems (ICCWCS-2016)	ResearchGate	Big data; Retail industry; Big data analytics.	This article attempt to focus on the value created by big data for retail industry.	case studies	In retail we can use big data to make decision about pricing and merchandising.	Data privacy and scalability of analytic algorithms.		Customer targeting, Inventory management, Price optimization, In-store behaviour and customer sentiment analysis

Theopilus et al., 2021	Indonesia	Engineering Management in Production and Services	International Society for Manufacturing Service and Management Engineering	cosmetics; customer experience; customer journey analysis; eye tracking; in-depth interview; millennial women; retail; retrospective think aloud	this study fills the existing gap in that area of exploratory research on customer experience in the cosmetics retail sector.	Analytical Method	This study could also inform the system design for new "players"in the cosmetics retail industry with valuable guidelines for a positive customer shopping experience at their store.	n/a	**Research design.**	Customer Experience
Aversa et al., (2021)	Canada	Journal of Retailing and Consumer Services	Elsevier	Big data analytics; Location analytics; Retail location decision-making	This paper examines the incorporation of Big Data within retail organiza-tions.	Analytical Method	he key findings reveal that while there was general awareness of the importance of Big Data, it was evident that the adoption and development of Big Data decision support was heavily reliant on a data environment that promotes transparency and a clear corporate data strategy.	information hoarding, a lack of understanding and buy-in from senior management, and a lack of skilled analysts who can manage and synthesize the big data.	**Data collection and Study extension**	Decision Making Support

Subrahmanyam et al., 2020)	India	Journal of critical Review	Elsevier	Artificial Intelligence, Social Media Analytics, Retail sector, Social networking Data, AI in Marketing	The objective is to study the integration of artificial intelligence with social media information for the betterment of the Retail Industry. Exploring	Descriptive Research	AI and Social media interactions in Retail sector in various tenets like Sales and Marketing, promotional activities, Consumer interactions, customer service as well as effect of end user observations and reactions, and real time discussions,		Technological advancement	Customer experience and retention

Staff research ethical review form (Version 2020)

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THE UNIVERSITY OF HUDDERSFIELD
Business School Research Ethics Committee

STUDENT (UGT/PGT) PROJECT/DISSERTATION
RESEARCH ETHICAL REVIEW FORM (E0)

APPLICABLE TO ALL UNDERGRADUATE AND TAUGHT POSTGRADUATE PROGRAMMES

</div>

Please complete and return to your Project / Dissertation Supervisor for approval.

SECTION A: APPLICANT(S) DETAILS

Before completing this section students should consult their Course/Module handbook alongside appropriate ethical guidelines. The student's supervisor is responsible for advising the student on appropriate professional judgement in this review.

Student name	Chukwuwendu Steven Chiazor
Student number	U2056060
Course the student is registered to	MS Business Intelligence and Analytics
Names of Supervisor	Dr. Fahham Hasan Qaiser
Title of research/project	Impact of Big Data Analytics on Sales Performance: A study of UK Retail Sector
Brief overview of how the data will be collected	This study (Structured literature review) intends to use secondary data from reputable academic sources such as the University of Huddersfield library service.
Project start date	07/07/2021

SECTION B – STATEMENT BY APPLICANT

I, as the student undertaking this research, confirm that my proposed project does not involve:
- direct contact with human/animal participants
- access to identifiable personal data for living individuals not already in the public domain
- increased danger of physical or psychological harm for researcher(s) or subject(s)
- research into potentially sensitive areas
- joint responsibility for the project with researchers external to the University.
- ☐ this research will conform to the principles outlined in the University of Huddersfield and Huddersfield Business School research procedures,
- ☐ the information I have given in this form on ethical issues is correct.

Student's (i.e. applicant) Signature (Electronic is acceptable):_____
Date: 06/09/2021

Affirmation by Supervisor (where applicable)
In signing this Declaration I confirm that I have reviewed the proposed project and am satisfied that that it does not involve any specific ethics risk as defined by the School policy.

Staff research ethical review form (Version 2020) **THE UNIVERSITY OF HUDDERSFIELD Business School Research Ethics Committee**

Main supervisor's signature (Electronic is acceptable)**:_____F. Qaiser**

Date:_____19-Jan-22