

Impact of big data and analytics on quality management in rural tourism in southern Africa - Zimbabwe: A systematic literature review

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ABSTRACT

Big data and analytics have assumed a significant role in the technological advancement that is shaping the world's travel industry today, posing both significant challenges and opportunities for rural tourism in southern Africa. Big data and analytics provide useful information to all tourism businesses, allowing them to estimate visitor need, optimize decision-making, knowledge exchanges and relationships with consumers, and deliver the best service in a more productive and effective way, thereby managing quality. The focus of this research is to investigate the problems and opportunities that may arise from the use of big data and analytics in rural tourism, its management, and the sector's future. The research content was obtained from popular web sources including articles indexed in Google Scholar, institutional repositories, dissertations and Scopus. Thirty-one peer reviewed articles published between 2012 and 2022 were considered for review. A thread of the problems and opportunities faced by use of big data and analytics was drawn inferring to rural tourism in Zimbabwe, a country in southern part of Africa. Despite widespread privacy and security issues, big data and analytics are widely thought to be advantageous for tourist and hospitality firms as founded in literature. In addition, big data and analytics is offering fresh viewpoints on the quality management discussion to both the tourist and hospitality industries. This study is useful for both scholars and practitioners interested in the utilization of big data and analytics.

1. INTRODUCTION

According to a study conducted in Zimbabwe by Musasa & Mago (2014), rural tourism development in Zimbabwe faces several challenges including lack of infrastructure, inadequate funding, poor marketing strategies, lack of government support, and lack of community involvement. Agritourism has become an officially acknowledged activity, and a large portion of the world views it as a panacea for the economic and social development of rural communities. It is also seen as a genuine and long-term solution to rural socioeconomic

problems and an important source of income for the rural population. Globally, humanitarian bodies and national governments, nongovernmental organizations (NGOs), policymakers, and sector stakeholders see tourism as a viable tool for rural development (Roberts, Hall, & Morag, 2017). As an outcome, tourism has turned into a buzzword in rural revitalization initiatives, combating poverty projects, and the conservation of indigenous community ethnic diversity. The main issue in rural tourism in southern Africa-Zimbabwe in general, is a lack of long-term initiatives in rural tourism development. The lack of a rural tourism outreach plan to help sustain livelihoods in the locality through socioeconomic transformation is to blame. Zimbabwe's tourism and development policymakers have largely ignored tourism for a viable livelihood. (Musasa & Mago, 2014). Rural tourism, according to UNWTO (2021), is a type of tourism activity involving visitor satisfaction is linked to a variety of items commonly associated with nature-based activities, the farming industry, rural lifestyle/culture, angling, and excursions. The hospitality and tourism career cluster entails organizing, running, and providing lodging, dining, entertainment, conventions, and tourism as well as related planning and support services like those for travel (Milwood & Crick, 2021). Quality management is the act to regulate all procedures and responsibilities required to maintain an optimal level of excellence (Mizuno, 2020). Quality management encompasses establishing a quality plan, developing and implementing assurance and quality planning, as well as the monitoring of quality as well as enhancements (Mitra, 2016). Big data analytics is the power source use of revolutionary data-driven methods to very large, heterogeneous facts establish that comprise structured, partially organized, and loosely organized data, as well as data from numerous sources and specifications ranging from terabytes to zettabytes (Venkatram & Geetha, 2017). Currently, there are three main types of big data in tourism: e-commerce data, user-generated content and temporal-spatial behavior data (Xu & Han, 2022).

Big data and analytics enable tourism and hospitality businesses to promote personalization, convey ease of doing business, reduce expenditures, and gain a competitive advantage in general. Big data is viewed as disruptive technological advances in the tourism and hospitality industries (Evans, 2020). According to Yeoman & McMahon-Beattie (2018),

one of the major megatrends and drivers that will help define the future of tourism is technology and its rapid development. Changes in technology affect how rural tourism and hospitality businesses engage with customers. Moreover, shifts in customer habits caused by innovation in technology in the tourism industry present an significant chance for tourism organizations to use technology towards their advantage Urquhart (2019), in business report on key trends and market disruptors suggests that technology and new ways of engaging and interacting with customers are accelerating the rate of disruption because businesses can now reach new customers in novel ways and can reinvent customer engagement around service and convenience (Boumphrey, 2019). A consumer-centric strategy is crucial for quality management in a developed tourism and hospitality business and is the key to this knowledge of big data and analytics (Boumphrey, 2019).

The purpose of this research was to investigate how big data and analytics affect quality control throughout rural tourism and hospitality industries, to identify the potential and limitations of big data analytics in rural tourism and hospitality, and to develop mitigation strategies for quality management in rural tourism in Zimbabwe using big data and analytics.

2. LITERATURE REVIEW

Big data refers to the vast, varied, organized, and unstructured information databases that are being produced and exchanged by businesses, individuals, and machines at an ever-increasing rate (Kashyap & Piersson, 2018). It can also be identified by how quickly data is generated, stored, and shown. Big data, when correctly processed and evaluated, can provide important information about patterns, behaviors, and future possibilities as well as point the way for effective quality management and policy decisions. As a result, it may be a critical tool in the formulation and execution of strategies for rural tourism recovery and development. Big data is starting to be employed increasingly to assess, track, and manage tourism developments and community environments. To effectively design policies and control quality, big data and digitalization potential must be fully realized while also addressing their difficulties

and drawbacks (Li et al., 2021). The notion that big data could give the tourism industry a competitive edge, big data in the industry is still in its infancy. Big data and analytics are thought to benefit corporations in overall, and businesses related to hospitality and travel in particular. Indeed, various aspects of technological advancement have an impact on each stage of consumer behavior (Yallop & Seraphin, 2020).

Since the internet became widely used in the mid-1990s, an enormous quantity of data has been produced, sparking a lively global discussion in academic settings and boardrooms about how to use this "big data" responsibly and effectively to advance a governance, corporate, and social agenda (Kusumawidjaya et al., 2021). Big data is already being used by governments all over the world to enhance operations in almost every sector, including planning and managing tourism, finance, security, and transportation. The corona virus disease (COVID-19) has pushed the adoption of big data and analytics by the government in many economies for pandemic-control measures and effect measurement relating to contact tracking, mobility and health analysis among other things. This has resulted in increased usage of social media data and mobility data (capacity, searches, and bookings) in the tourism industry (Adityaji et al, 2023). However, especially in Africa's developing economies such as Zimbabwe, the integration of big data for policy formulation broadly and rural tourism in particular is still in its infancy. Eurostat (2017) claims that national tourism groups are fully utilizing big data.

Big data and analytics are seen favorably by enterprises in the rural hospitality and tourism sector in particular. According to Bavik et al. (2017), many factors of innovation in technology influence each stage of consumer behavior. Research insight on quality management in the tourism industry are supported by big data and analytics (Fitzgerald et al., 2016) and large amounts of data can be examined in a user-friendly manner (Kolajo et al., 2019). Other advancements in big data and analytics include, hardware and cloud infrastructure and reducing the price of these services enhanced their performance (Kolajo et al., 2019). As a result of modernization of technology, organizations can use the richness of data to assist their operations and gain an edge over their rivals. Effective big data and

analytics use drives procedure and cost reductions, as well as strategic changes (Micro Strategy, 2018).

In this context, the prevailing controversy on innovative tourism has attempted to highlight all the consequences and challenges which big data and analytics can present for travel destinations and businesses' competitiveness (Ardito et al., 2019). A smart vacation spots is the result of connecting tourist attractions with multiple stakeholder societies through evolving platforms, which are powered by knowledge communication flows and improved decision-support platforms. It is distinguished by modern amenities, a high level of innovation, and the existence of accessible, integrated, and shared processes aimed at improving the quality of life for both residents and visitors (Stylos et al., 2021).

Quality Management and Big Data Analytics in Rural Tourism

Big data is used to understand visitor/tourist wants and desires, and can be used for all business models and industry verticals, including rural tourism (Li, et al., 2018). Big data and analytics such as occupancy rates, bookings, data from outside sources, market research, strategic marketing goals, customer experience, and reputation management, are critical for effective big data and analytics in rural tourism as well as hospitality industries. Quality management (QM) is a participative method that combines internal and external data to determine guest service standards and ensure customer satisfaction (Pereira et al., 2022). Air BnB is a prime example of a company that effectively uses big data to acquire a competitive edge (Evans, 2020; Guttentag, 2019). Big data and analytics is a tool that can process vast amounts of data and bring intelligible decisions to improve quality management in rural tourism (Li et al., 2020). Big data analytics can help the tourism industry improve reputation, client retention, revenue growth, and competitiveness. Big data analytics can help the tourism industry improve reputation, client retention, revenue growth, and competitiveness. It can be managed using the 5Ps of the marketing mix, allowing for improved product design, promotion, and price modifications (Fan et al., 2015).

The government should invest in big data analytics for rural tourism to gain a competitive edge (Mandal, 2018). Big data tools allow for real-time data on how tourists interact through the internet, allowing destination managers to better understand potential visitors' desires and needs (Zhang et al., 2019). Privacy is the most significant data issue and concern for businesses, with 49% of businesses polled saying data privacy and security concerns are the main challenges (Yallop & Seraphin, 2020). Rural tourism businesses must earn and keep customers' trust and uphold internal organizational values (Ciolacu et al., 2019). Big data analytical tools can help secure customer information and behavior, allowing for better quality control and competitive advantage. Digital transformation efforts are being facilitated by the use of big data and analytics (Yallop & Seraphin, 2020).

Big Data and Analytics Challenges for Quality Management across Rural Tourism and Hospitality

The travel and tourism industry is one of the most volatile. This industry is not immune to changes in politics, society, and the economy (Holloway & Humphreys, 2022). The majority of these variables are beyond the control of tourist organizations and travel agencies. People who have made investments in this sector, however, may be more proactive and build adaptable plans more quickly if they are aware of the issues (Filimonau, & De Coteau, 2020). Some of the difficulties the rural tourism sector is of quality management as founded in Roberts et al., (2017) are as follows:

- Cost of infrastructure for establishing big data and analytics

The infrastructure required to set up big data and analytics systems is expensive, which poses problems for rural tourism in marginalized communities (Hammer et al., 2017). The infrastructure includes compatible computers and software programs which can train data from datasets about customer behavior in the tourism sector.

- Lack of Expertise

Rural tourism institution faces challenges to acquire skilled personnel to work on the gathering and analysis of the customer data (Preko & Anyigba, 2022). Training data and running the large volumes of data and practices mining of coming up with trends to help managers for quality management.

- Taxation

Tourism is one sector that is heavily taxed by governments (Sharma, Thomas, & Paul, 2021). Take a look at the taxes paid on hotel rooms and airline tickets to get an idea of the manner in which taxes could detrimentally impact rural tourism. In Zimbabwe, tourism and hospitality businesses pay bed tax and ZTA levy in addition to corporate taxes and VAT, which raises production costs and limits the applications of big data and analytics (Tourism Act, 2005). Therefore, it is crucial for the travel and tourism sector to charge reasonable pricing for the services and goods it provides. Governments should also be aware of the fact that tourists already support regional economies through purchases and other tourism-related expenses. However, because of high taxes, the rural tourism industry is unable to build big data analytics tools and methodologies (Williamson, 2017).

- Promoting travel

Tourists and travelers may occasionally assume that travel marketing is erroneous not adequate, or exaggerated (Avraham, 2016). Marketing organizations can revisit this viewpoint and attract tourists by attempting to develop leading-edge marketing solutions. The use of technology and creativity by travel marketers is equally important. In addition, local materials should be taken into consideration.

- Globalization

Less unique places have been produced as a result of globalization. Indistinguishable goods are available in every nation due to global standardization (Cleveland et al., 2015). A tourism challenge arises when there aren't enough distinctive goods for visitors to gain knowledge about or encounter the unique and unusual. A prime instance is how similar

products can be found in shopping malls all over the world. Numerous travelers also express frustration that hotel uniformity has made it difficult to remember precisely where they reside around the world. Localization is critical because it distinguishes and competitive the environment. As a result, tour operators and tourism regulatory bodies have to appreciate how to engage with foreign tourists. Likewise, should create multilingual websites and translate content using analytics and big data (Goloshchapova et al., 2019).

- Security

Despite the fact that security is a major issue in the field of tourism and travel, a lot of executives have been incapable to cope with security-related concerns (Linda & Nzama, 2020). A great deal of tourism workplaces or visitor and custom bureaus do not or rarely correspond with law enforcement. Furthermore, several law enforcement agencies lack officers trained in security or policing for the tourism industry. Industry stakeholders must prioritize advancing the creation of stronger passenger safety system (Lykou et al., 2018). In order to achieve quality management, rural tourism and hospitality organizations must take into consideration the growing concerns about customer data privacy and security when choosing analytics solutions (Bouranta et al., 2017). To accomplish this, they have to develop sound data governance models capable of producing high-quality data, as well as frameworks capable of effectively protecting the data of all stakeholders. This will get increasingly worse.

Opportunities for Rural Tourism Quality Management in Africa Using Big Data and Analytics

- Enhance discovery of data, accessibility, distribution, utilization, and establishment.

Big data and analytics enable better information exploration, access, availability, exploitation, and supplying within organizations and along the supply chain (Kache & Seuring, 2017). Predictive analytics and big data analytics enable more precise decision-making, automation of productivity gains, leaner operations, and optimized service (Duft &

Durana, 2020). This can increase supply chain visibility and transparency, decreasing time to market, improving resilience, and increasing real-time responsiveness to changing market conditions.

- Improve customer segmentation and personalization

Big Data and analytics can help improve quality control for customer segmentation, scalability, mass personalization, customer acquisition and sales techniques, delivery customization, and service levels (Foresti et al., 2020). It can also offer insights for preparing product release and launch strategies, and improve risk assessment and continuity management (Belhadi et al., 2021).

- Parties cooperate and share big data insights to make vital information more accessible

Big data can be used to improve inventory management, reduce lead times, facilitate real-time rescheduling, route planning, re-routing, and planning for roadside services (Gutierrez et al., 2020). It can also lower long-term costs, boost investment potential and enhance comprehension of cost causes and effects. Rural tourist organizations must increase the appreciation of big data and analytics implementation in their business practice to improve quality management (Ross, 2017).

3. METHODOLOGY

The research content was obtained from secondary data, popular web sources including Google scholar, institutional repositories, dissertations and Scopus. The articles were found using key search words used in this study; big data and analytics, opportunities and challenges, rural tourism and quality management. The authors chose the journals to use for this study based on their relevance to the subject under study, the reputation of the authors, the quality of the information contained in them, and published dates ranging from 2012 to 2022. An exhaustive systematic review of 31 publications was performed from tourism industry related to this subject. The systematic literature review, which is often used in the social sciences, was applied as propagated by Iden et al. (2017). The systematic literature review

enables research to be evaluated against one another in terms of the confidence with which their conclusions may be accepted, whilst data integration makes it possible to draw a general conclusion from all investigations. Literature review contributes to enhancing the communication between scholars and practitioners. They also reduce the time and effort needed by practitioners and other service decision-makers to locate and analyze study data.

4. FINDINGS AND DISCUSSION

Given the popularity of the buzzword "Big data," as well as its association with some of the most significant developments in computer history, such as the invention of individual computers in the decade of the 1970 the World Wide Web in the 1990s, and social networking sites in the early part of the 2000s. Big data has emerged as a contentious issue in technological, social, and ideological publications (Emani et al., 2015). The research that is available clearly explains the conceptual foundations while range of big data services, nevertheless it is largely confined to highly focused discussions of how big data and analytics are used beyond the rural tourism sector. The quantity of studies that are linked (Alaimo & Kallinikos, 2015) articles published in academic and popular periodicals (The Economist and Forbes), private endeavors, workshops, and conventions (Davenport 2013); McKinsey Global Institute (2011) suggest an expanding trend in academia. There is indication of a rapidly growing interest in this topic, as evidenced by the availability of studies based on business analysis and publications, along with materials obtainable primarily via the internet. Big data adoption for quality management is challenging due to tough market rivalry, a lack of investors, a lack of employee motivation for quality behavior, a lack of commitment from top management to quality management, insufficient technology and resources for generating quality products (Nyambwa, 2017). Economic collapse, employee opposition to change, little funding, fierce competition from imports, low-priced goods, high manufacturing costs, low inventory turnover and diminishing sales revenues (Ngwenya & Matunzeni, 2016).

The research by Vu et al. (2019) explores security concerns (cyber-attacks) associated with the sensitive information exchanged in location-based social media (LBSM). Although LSBM offers chances to improve traveler decision-making and experiences, privacy concerns may deter users from giving their location data eventually negating the benefits of such big data in the tourist sector (Ardito et al., 2019).

There appear to be several methods and patterns on the current publications. For instance, Fuchs et al. (2014) the use of big data and analytics as a tactical instrument for learning about a location in order to achieve quality management was investigated. In accordance with Fuchs et al. (2014), the adoption of big data analytical techniques could assist destinations in better understanding the behavior of their visitors. The authors investigated how big data technologies have worked as a business intelligence tool in the context of Sweden as a travel destination. Big data and analytical tools can provide immediate insights into how online visitors interact with a goal in mind. It also suggests that big data can provide comprehension that could assist destination managers comprehend more fully exactly what the needs and desires of potential tourists of a specific area are (Fuchs, et al., 2015).

Marine-Roig & Clavé (2015) conducted a similar study on Barcelona as a tourist destination, emphasizing the use of big data analytics in the development of smart destinations. To better understand this, the team collected data from more than ten thousand travel writers in addition to travel reviews (OTRs) posted by visitors to Barcelona on social networks. While they used business information, their research was primarily based on user-generated content. According to the study's findings, using big data analytics to uncover new information about how tourists behave can aid in the creation of smart destinations and even play a crucial part in a destination's growth.

Fuchs et al. (2015) created a data-driven strategy for leveraging destination-specific intelligence for business. Fuchs et al. (2015) created a data-driven strategy for leveraging destination-specific intelligence for business. The authors in this instance have cited the prominent Swedish mountain resort as an example. Criteria related to the proper utilization of a data center our storage facility that holds extensive and uniformly distributed data, according

to Fuchs et al. (2015), will dictate the optimal use of big data tools to extract crucial details about visitor behavior. Criteria related to the proper utilization of a data center our storage facility that holds extensive and uniformly distributed data, according to Fuchs et al. (2015), will dictate the optimal use of big data tools to extract crucial details about visitor behavior. New knowledge will be created with the aid of data collection methods and analytical technologies. These conditions must be met in order to maximize the usage of big data analytics to produce fresh information on destinations (Franks, 2014). A distinct development is the rise in databases based on information gathered through the use of big data analytical tools. Businesses rely on the organized, semi-organized and data with no structure they choose and use (Gandomi & Haider, 2015). Only 5% of the data that is currently available appears to be in tabular format taken from a database. As a result, Gandomi & Haider (2015) must create databases with current and organized data in order in order to comprehend the sector and its future prospects. Stylos et al. (2021) carried out an ethnographic study on the use of big data analytics along with databases in the tourism industry, involving thirty-five database experts in five online discussion forums. According to our findings, using big data, specifically database development, aids in a better understanding of destination issues, customer behavior, and data that can be used for destination marketing. Using big data analytics to create databases, according to the empirical findings, could assist destinations in providing potential visitors with proposals that are specifically tailored to their needs (Ubaldi, 2013). Nonetheless, despite the value of using big data analytics to create databases with well-organized data that decision makers can use for quality management, such an initiative encounters significant technological limitations.

Irudeen & Samaraweera (2013) investigated the destination of Sri Lanka. Despite the fact that the use of databases is generally acknowledged by tourism professionals, their research revealed that there are still a number of barriers preventing its implementation, such as a lack of funding for the creation of such systems and a lack of expertise among tourism professionals. The usage of databases appears to be an attractive issue, despite these technical constraints, it should be mentioned. Database development using cloud computing

is the most recent addition (Lin & Wei, 2020). The use of big data analytics as an operational tool is another trend that will aid in the quality management of rural tourism. According to Li et al. (2018), there are numerous resources available today the fact that an attraction for tourists or a tourism-related enterprise might utilize. User-generated content (UGC), online photos, GPS, mobile device roaming data, transaction data, reservations made online data, evaluations, and weather forecasts are examples. Gathering all of this information is crucial for a destination. As stated in Li et al. (2020), the use of big data as a planning instrument could become one of the upcoming patterns, though more research needs to be conducted in this area and applications tailored to the tourism industry must be developed.

On the other hand, a number of publications suggest that big data and analytics has already proven to be valuable from a strategic standpoint. Varelas et al., (2020), big data has been discovered to be useful in better understanding the socioeconomic status of tourists, allowing those making decisions to make the best choices. In addition, Miah et al., (2017) suggest that big data analysis is able to supply useful data to assist travel agencies and destinations in making decisions regarding marketing based on behavioral characteristics of visitors, and that big data can also provide precise data to feed market categorization and targeting. Moreover, the broad adoption of portable electronics generates additional observations that can be used to make tactical decisions, whereas big data analytics data provides the necessary knowledge to transform a tourist destination into a smart destination (Chen et al., 2012).

It is an appropriate foundation over the use of big data analytics tools, alongside outcomes which improve credibility, client loyalty, financial success, and the business's competitive advantage, marketing, and quality management, all of which are important aspects of the tourism industry (Titu et al., 2016). The mass market attitude was encouraged and the person and his wants remained the center of attention in the last ten years by using traditional instruments that were based on a planned strategy timeframe. Recent severe shifts in balances and increased customer power and control are the result of the technology's rapid development and the internet's emergence as a major market entry point (Patrono et al.,

2020). The capacity to communicate with customers and tourists directly has been improved by big data and analytics (Li et al., 2018).

Big data has improved an inclination to connect with prospective consumers/tourists while also allowing for elevated customized features in facilitating interaction effort (Fan et al., 2015). The integration of data aiding in management-related decisions is at the heart of the most recent trends in tourism quality management, which are centered on "management intelligence." According to Abraham (2020), the POLC (planning, organizing, leading, and controlling) management principles can be applied to big data, fostering revolutionary ideas involving significant changes in the creation of products, promotion, and price. Tourism is a phenomenon that exhibits variability: expectations, preparation, spontaneity, danger and adventure are all impacted by the shifting preferences of travelers. Big data gives the quick and specific adaption of approach techniques which are distinctive to individual character (WTTC, 2014).

Even though big data innovations are taking over the global tourism industry in large companies maximizing data dynamism (Zhang et al, 2019), British Airways (BA) serves as one of the most well-known examples of an international tourism company that has recently launched initiatives and measures for facilitating the adoption of big data technologies. This airline has created and implemented apps and technologies into its operations that enable the individual approach of traveler (Towerdata, 2018). In order to communicate with the clientele in a more personal manner, it has launched the 'Know Me' campaign. However, if a traveler has lately been frustrated by delays or other aspects of their journey, staff is encouraged by the knowledge to recognize the issue and offer the necessary services (Towerdata, 2018). Customers express their happiness that one knows their travel demands in the early findings, which are particularly positive due to big data and analytics (Davenport, 2013). Beginning with the information provided by tourists through the numerous transactions they complete, any travelers' unit is likely to benefit from the opportunities provided by big data in terms of managing and analyzing its clientele, as well as better configuring its marketing efforts.

Summary of Findings

Major findings from the literature are further captured in Table 1a, 1b, 1c, and 1d revealing quality management and big data. The hurdles of big data analytics are discussed, as well as the opportunities that arise from big data science along with mitigation strategies for the challenges posed by big data analytics. The tables show articles and publication dates for materials used in systematic research for the paper.

Table 1a. Quality Management and Big Data Analytics

Author	Brief Notes
Fuchs et al. (2015).	Big data and analytics as a tactical tool for learning about a location in order to accomplish quality management.
Sivarajah et al. (2017)	Quality management closely related to the idea of continuous improvement enhanced by Big data and analytics.
Guttentag (2019) ISO (2020)	Big data providing competitive advantages to tourism companies. ISO 22483: 2020 specifies quality standards and recommendations for hotels in the areas of staff, service, events, entertainment, adequate security and safety, maintenance, hygiene, procurement, and guest satisfaction.
Li et al. (2020)	It is evident that big data and analytics may be used in all business model for quality management.
Pereira et al. (2022)	Quality management is a participative method that allows all levels of staff to work in groups through use of big data and analytics.

Table 1b. Challenges of Big Data and Analytics

Author	Notes
Irudeen & Samaraweera (2013)	Looked at the prospect of Sri Lanka as a destination. Despite the fact that the use of databases is generally acknowledged by tourism professionals, their research revealed that there are still a number of barriers preventing its implementation, such as a lack of funding for the creation of such systems and a lack of expertise among tourism professionals.
Ngwenya & Matenzi (2016)	Economic collapse, employee opposition to change, little funding and stiff competition affect big data and analytics for quality management
Nyambwa et al. (2017)	Big data and analytic adoption for quality management is difficult because of lack of rivalry, investors, and insufficient technology.
Hammer et al. (2017)	The infrastructure required to set up big data and analytics systems is expensive, which poses problems for rural tourism in marginalized communities.
Bouranta, Psomas & Pantouvakis (2017)	In order to achieve quality management, rural tourism and hospitality organizations must take into consideration the growing concerns about customer data privacy and security when choosing analytics solutions.
Vu et al. (2019)	Explores security concerns (such as cyberattacks) associated with the (sensitive) information exchanged in location-based social media.
Holloway & Humphreys (2022)	This sector is not exempt from changes in politics, society, and the economy.
Preko & Anyigba (2022)	Rural tourism institution faces challenges to acquire skilled personnel to work on the gathering and analysis of the customer data.

Table 1c. Opportunities Created by Big Data Analytics Implementation

Author	Brief Notes
Chen, Chiang & Storey (2012)	Big data analytics renders the information required making it a tourist destination into a smart destination.
Ubaldi (2013)	Open government data: Towards empirical analysis of open government data initiatives
WTTC (2014)	Big data gives the quick and specific adaption of approach techniques which are distinctive to individual character.
Franks (2014)	These conditions must be met in order to maximize the usage of big data analytics to produce fresh information on destinations
Hopken et al. (2015)	Hopken and others had created a knowledge-driven strategy in utilizing destination-specific business intelligence
Fan et al. (2015)	Big Data has improved a capability to converse directly with consumers/tourists while also allowing for ultimate customized services in any communication effort.
Titu et al. (2016)	The company's competitive position, marketing, and quality management are important aspects of the hospitality sector, provide an appropriate foundation for the effective application of big data analytics tools.
Miah et al. (2017)	Big data analysis has the potential to offer helpful data that will assist travel agencies and destinations in making marketing decisions based on psychographic profiles of visitors
Li et al. (2018)	The capacity to communicate with customers and tourists directly has been improved by big data and analytics
Li et al. (2020)	Although more research is needed in this area, and applications tailored to the tourism industry must be developed, the use of big data as a planning tool could become one of trends to come.
Varelas et al. (2020)	According to one study, big data can help decision-makers gain insight into the social and economic circumstances of tourists, allowing them to make the best choices.
Stylos et al. (2021)	According to the findings, using big data and analytics, particularly database development, helps us better understand issues pertaining to the place of vacation, such as customer behavior and data that can be used for destination marketing.

Table 1d. Mitigation Strategies

Author	Brief Notes
Sakas et al. (2022)	The government should invest in big data and analytics in tourism sector in order to take advantage of consumer data mining and process
Abrahams (2020)	Management principles can be applied to handle big data, fostering innovations that involve major alterations in product design, promotion, and price
Zhang et al. (2019)	British Airways (BA) is one of the most well-known examples of an international tourism company that has recently launched initiatives and measures for the incorporation of big data technologies.
Towerdata (2018)	The airline has developed and implemented apps and technologies into its operations that allow for the distinctive perspective of the Traveler as well as understanding of both internal and external factors which impact the decisions of all the parties involved.
Davenport (2013)	Customers express their happiness that one knows their travel demands in the early findings, which are particularly positive due to Big data and analytics mitigation strategies.

Big data, in general, can make a significant contribution as a tool that provides any required information for making critical decisions. Big data analytics as a resource for

knowledge generation tool and intelligence-driven tactics are becoming increasingly popular (Fuchs et al., 2015; Marine-Roig & Clav, 2015; Hopken et al., 2015), as well as database development (Gandomi & Haider, 2015; Stylos et al., 2021). The most significant trend is the way big data analytics tends to be used as a tool for strategy (Miah et al., 2017; Li et al., 2018; Li, et al., 2020). Still, scholars are in agreement that this is a new phenomenon in tourism, implying that more research upon big data and analytics within rural tourism quality management is needed for better decision making.

According to authors such as, academics and practitioners hadn't fully absorbed the significance of big data analytics or the possibilities it offers (Li et al., 2018). This reflects mainly attributable to a scarcity of empirical evidence to help comprehend big data's potential. Furthermore, big Data is linked to a grasp of cutting-edge technology and subjects that involve databases and Artificial Intelligence (AI), both of which necessitate significant effort. This implies that in the future research must unravel and deepen on knowledge of such technologies. Mariani (2020) While academics studying rural tourism recognize the importance and impact of big data, there is still a need to better understand how decision-makers can analyze and apply big data analytics, as well as how to connect the notion of big data analytics coupled with artificial intelligence and the digital realm of objects. As a result, more research into the aforementioned relationship is required.

Aside from the preceding course of action, it is necessary to examine how big data analysis is typically applied to the rural tourism sector. This refers to investigating how its applications might be used and understood by the travel industry. It constitutes a big data analytics weakness because plenty of individuals believe that big data and analytics are extremely complicated and difficult to use (Hariri et al., 2019). Regardless of the fact that there are remedies which can make big data analysis easier, as Centobelli & Ndou (2019), point out, the majority of tourism management professionals lack the expertise required to understand and use these applications. The following are the six main research areas that Pereira et al. (2022) and other researchers proposed to focus on:

- How will the future of big data digitalization in the rural tourism sector be fashioned for quality management?
- What are the main organizational, technological, and cultural issues that could influence how big data is used in the quality management of rural tourism sector?
- What talents and skills might someone possess in the coming years in order for coping with big data analytics in rural tourism in order to achieve quality management?
- What are the new models and best practices for using big data to increase the efficiency of rural tourism agencies?
- What are the essential ingredients for using big data analytics to achieve success in rural tourism industry?
- What financial commitments must rural tourism and developing-country governments render to support big data applications?

The afore-mentioned are all important questions that must be answered in a subsequent study. The findings in these areas will help the rural tourism industry better grasp big data and analytics.

5. CONCLUSION

Through an analysis of the relevant literature, the study looked at the example showing the tourism sector might use big data analytics. According to the study, the prevailing pattern is to use big data analytics to improve quality management and achieve a competitive edge even in the face of pandemics like COVID 19 as well as to generate new information and maximize the advantages of using databases that contain big data. Big data analytics techniques promote rural tourism in southern Africa countries like Zimbabwe. Use of big data analytics enables realization of national development goals improving tourism product quality hence improving the nation gross domestic product (GDP), which is a measurement that seeks to capture a country's economic output. However, there are a number of limitations that must

be addressed, including the fact that many academics and travel industry professionals are unable to understand the content of big data, the tools for analysis and how to use them and security concerns regarding customer data. Other deficiencies are related to a lack of practical knowledge. In future there is need to use primary data to understand the impact of big data analytics from tourism industry practitioners on the ground. Literature analysis is far-fetched since in this case the literature analyzed is from international context which is not very compatible with southern African country context.

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