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Assessing Big Data Analytics and Characteristics in Tourism: Agodi Gardens, Ibadan, Nigeria

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Abstract

There is a plethora of both organized and haphazard data in tourism destinations. Analyzing this data appropriately is crucial for optimal engagement. This study focuses on the connection between big data analytics and big data's characteristics in Agodi Gardens, Ibadan, Nigeria. Specific objectives were to examine the characteristics of big data; as well as to examine Descriptive and predictive data analytics. Respondents were chosen purposively. Survey instrument (questionnaire) was used to elicit data. Data was collected using structured questionnaire. The collected data were analyzed descriptively and inferentially. The study revealed that significant relationship exists between the prescriptive/descriptive big data analytics and the characteristics of big data. Precisely, there is a significant relationship between prescriptive data analytics and velocity, veracity, volume as well as value. Similarly, there is a significant relationship between descriptive data analytics and volume, variety, value as well as veracity. Likewise, variety and veracity of big data could influence big data analytics. The study therefore recommends that the management of Agodi Gardens should engage thorough big data analytics, so that data elicited by customers can be appropriately analysed and topical inference could be drawn from the analysis.

Keywords: *Big Data Analytics, Big Data Characteristics, Prescriptive Analytics, Agodi Gardens*

Introduction

Tourism is an industry that earns countries around the world significant and reliable income. Many countries are increasingly exploring various tourism potentials within their spatial boundaries for revenue generation. Tourism is very important to various nations and states, based on the fact that it could generate impressive revenue (Olawuyi 2022; Olawuyi, Alabi, 2018). Tourism essentially deals with travel to destinations for leisure purpose. It is basically a social discipline with effect on the economy and/or the environment where the tourism destination is situated. This effect can either be positive or negative.

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Data is majorly information that could be collected, processed and analyzed. The proportion of data in a particular area usually dictates how they can be manipulated, utilized and stored. It is notable that data can be in various sizes. A significant volume of data can be referred to as big data. A significant supply of data and big means for processing such data created the phenomenon "Big Data" (Yallop, Seraphin, 2020). In essence, data in a large scale or volume is referred to as big data. Leung and Lo (2019) noted that the definition of big data is inclusive of consolidated data from different origin, for instance, data in operational registers and also social media posts. The concept 'Big Data' can be described as a category of impressive data volume that can be explored in generating useful insights to facilitate decisions of management (Leung, Lo, 2019). The concept of big data is a major theme in several discourses and texts, because, of the fact that it can be found anywhere, at any time. Big data's development has turned to become a trending topic in recent time (Zhu, 2016).

There is a conceptual and empirical literature gap that exists vis-à-vis big data characteristics and data analytics in tourism destinations in Nigeria. Li et al. (2018) noted that the concept of big data for tourism is very much in the preliminary phase, irrespective of tourism being a sector generating big data that could be competitively advantageous. Similarly, Mariani (2019) noted that the tourism sector is operationalizing big data progressively, meanwhile, there is much to be done in terms of improvement of big data's usage and interpretations precisely its analytics. Thus, in terms of the characteristics and the analytics of big data for tourism destinations, there is room for a lot of probing and enunciation of solutions. This study thus aimed at examining the synergy between each of the components of big data characteristics and big data analytics in tourism destination in Nigeria, using Agodi gardens as the study area. Specific objectives engaged for this study were to examine the characteristics of big data; as well as to examine descriptive and predictive data analytics. Respondents were chosen purposively. Survey instrument (questionnaire) was used to elicit data.

Literature review

Big data in organizations

It is no gainsaying that there are different forms and proportions of processed and unprocessed data in a typical organization. The daily activities or engagements of people in a typical organization churn out data of different sizes. Each section of an organization has its peculiar data. Oftentimes, data generation by each section are in of big volume and proportion. Organizational sections that can generate big data are inclusive of legal, sales, marketing, purchasing, financial and human resource (Krishnan, 2013). Other sections of business entities such as security, logistics corporate social departments and so on, also churn out Big Data. There is a gamut of data trapped in the daily business transactions and activities of organizations. Customer inquiry in itself traps substantive data, talk less of the main business transactions that involves exchange of cash, invoices, bank drafts and other germane documents that must be captured in the register of the organization. Big data format is inclusive of an array of data like document, electronic mail, SMS, image, graph, video, outcomes of different electronic created telephone data, signal from GPS, sensor, machine's entries and technologies for analysing DNA (Li et al., 2015).

Thus, many organizations explore these technologies for transactional, relational and other important purposes. These technologies are capable of making life easier for the customers,

the staff members of the organization and the management of the organization. Information about organization that prospective customers and customers would have walked in to the organizations to seek can be easily sought via the technologies established by the organization. In the same vein, organization can set up a feedback mechanism through technologies, so as to be able to be fed in about the perception of the customers towards the services rendered by the organization. For several years, business entities have gathered and analyzed data on the digital space one way or the other in a bid to improve their performances (Camilleri, 2019). Many organizations with internet presence are really mining digital data to make organizational decisions as a result of inferences that must have been drawn from the mined data.

Big data and technology

It is notable that data is a concept that has been around for a long time, but the concept of big data emanated as a result of the preponderance of data that are available in a location or different locations at the same or different time(s). The fact that human's population have increased and there are technological facilities to help reduce friction of distance in real time, implies, that big data will be generated in different quarters and sections in real time. Technology has indeed enhanced the multiplication and spread of data from one spatial destination to another spatial destination irrespective of distance. With the increasing volume of data and the creation of unstructured data, information that must be subjected to processing has significantly gone beyond the capacity of traditionally inclined database devices and software in collecting, storing, managing and analyzing and different technological inventions to process big volume of date must be used (Zhang et al., 2021). Only technologies with large repositories can manage, process, store and distribute big data. This is as a result of the fact that the technologies are developed with commensurate data capacities, thus, since, big data essentially involves large volume of data, then, it is expected that technologies with large data capacities can only handle and manage big data.

There have always been technologies used to retrieve and manage data. Although, the technologies could either be termed obsolete or contemporary. Recent technologies have impressively made it is relatively easier to manage big data. Recent technologies are furnished with big data repositories to be able to meet up with the demand of the big data found in contemporary times. Otherwise, most of the data will be haphazard and largely unstructured. Aside, enhanced storage capacities of the technologies, they also have enhanced speed in collecting and processing big data. The increasing technological advancement has led to substantive enhancement of the speed for processing and saving of enormous data volumes (Camilleri, 2019). These data can either be present in the structured form or unstructured form. Data can also be in the digital form or otherwise. There are unstructured digital data too. The internet, social media, various applications are replete with a gamut of big data. These technologies have made life easier, in terms of access to information in real time. Thus, there is increased number of people that register on and explore these technological innovations and developments for different purposes. Just logging on these technologies is capable of producing big data because, the traffic alone can be subjected to measurability. Thus, technologies are capable of generating both structured and unstructured data from organizations and prospective tourists of tourism destinations. Mariani et al. (2018) opined that the circumlocution identifies the enormous volume of both unstructured and structured data generated by technology developments and the exponentially increasing adoption of devices allowing for automation and connection to the Internet. The more the technology adopted the more the data that can

be harvested and structured. Similarly, premised on the fact that technologies are also capable of generating data, then, the more the technologies adopted the more the data that can be generated in the organization. The source of big data varies, usually, it contains digitally based footprints of users' mobile phones, their credit cards and their social media (WTO, 2020).

Big data in tourism destination

Tourism is part of the fields that generates big data (Chen et al., 2021). This is premised on the fact that it is a field that essentially involves displacement of people from one location to another location for leisure. A major activity in the tourism is travel. Definitely, while travelling, a lot of data can be elicited or retrieved by the tourist. On a similar note, when tourists arrive at the host destination, there are various exchanges and interactions that could generate big data. Major part of big data generated in tourism are made up of electronic vertices of the travel plans of tourist and the behavioral disposition that they exhibit while in transit and the trend is favorable to usage of multiple channels (Xiang et al., 2015). It is notable that in the case of arm chair tourism, big data could also be generated.

Tourism destinations are essentially organizations capable of meeting the leisure and educational desires of tourists. Tourism destinations usually play host to a large number of people (tourists) either at specific time of the year, every other day or every day, depending on the type of tourism facilities in place. The steady inflow of people to tourism destinations equates that there will be enormous data in and around such destinations. A lot of tourism destinations have employed technological innovation and development for specific aspect of their transactions and services rendered to customers. For instance, prospective tourists may check out the facilities available in a tourism destination before setting out to visit such destination. Mobiles phones have made it easy for prospective tourists to review and examine facilities of tourism destinations. Chen et al., (2021) opined that the influence of mobile phones and internet is not only restricted to revolutionizing the means for decision making by tourist, with precise substantive implication for tourism, but has further culminated into the creation of contemporary forms of data useful in addressing and providing insights into obsolete and recent questions. Prospective tourists' access to information of tourism destination can significantly affect the eventual decision that will be made by the tourist. Thus, it is of utmost importance that the tourism destination furnishes their webpage and social media handles with contents that could better sell the destination to the prospective tourist. Conversely, tourism destination can also monitor the activities of the users of their social media handles and webpages, in a bid to collect big data of such user vis-à-vis their likes, preferences, reservations and so on. Progressive advances of internet technologies and the adoptive usage of mobile gadgets have led to the creation of enormous user-generated big data, where populous buzzwords have created changes in the field of tourism and hospitality (Mariani et al., 2018).

The source of big data in organizations, especially, tourism-based organization is numerous depending on how vast the business trajectory of the organization. Big data is premised on heterogeneity of different sources of data, with the support of enhanced stored information, analytics, and technological processes with big data thinking privileges (Zhang et al., 2021). The big data generated in tourism destinations can either be user-generated, tourism-destination generated or environment-generated. The forms of data that are really useful for tourism can be generally be categorized as those created by operators of tourism and online travel, that have developed with movements in the distribution of travel products,

likewise social media and precise non-tourism big data, inclusive of the those created by mobile technology or smart sensors that cover data, for instance, mobile or credit card capable of providing information on spending trajectories and sequences (ADB and UNWTO, 2021). When big data generated are collected and well processed, they are capable of positively impacting the tourism destination. Usage of data can be considered as innovative disruption in the tourism and hospitality business; meanwhile, it gives room for business entities in these industries to create personalization, offering of convenience, cost saving and general competitive advantages (Evans, 2020).

The characteristics of big data

The defining concepts of big is usually dependent on the description of one or more Vs' that are affiliated to big data. For instance, Krishnan (2013) opined that big data as data volume which is available in various categories of complexities, whose creation is as a result of different velocities that has different categories of ambiguity, that cannot be subjected to processing through old facility, mode of processing, algorithm, or other commercial based off-shelf solutions. Big data is generally characteristically defined by 5 concepts that starts with the letter V and they are, volume, velocity, variety, veracity and value. Each of these concepts has precise trajectory that describe the phenomenon big data. They are described as follows;

1. Volume: This essentially has to do with the size or volume of data. Géczy (2014) opined that the volume of data simply implies its proportion in connection to standard information measurement (bits and bytes). An article by Asian Development Bank (ADB) and World Tourism Organization (UNWTO) (2021) noted that this is the quantity of data that are created and saved for business organization to manage or use; it has enormously increase, precisely after the start of the COVID-19 pandemic. Sonka (2016) noted that big data can be referred to as dataset with size that is beyond the capturing, storage, management and analytic capacity of typical software facilities. Thus, it is a type of data that can only be operationalized by specific big software applications or technologies.
2. Data Velocity: Data velocity refers to the speed or momentum through which data moves. The steady movement of an object is the motion of such object at steady speed and direction Krishnan (2013). This impressive speed of data is as a result of technological innovation and development. Mediratta (2015) noted that the generation of data has been morphed from the old applications such as invoice generation or production where data is being formed during hours of production and majorly limited to the total number of receipts per day or total number of daily productions. With technologies impressive numbers of invoices can be generated within some minutes or hours. In regards to technologies, contemporary technologies have better speed in churning out big data faster than older technologies. Therefore, there is a pressing need for an engine that has ingesting and processing capacities to be able to perform at extreme scalable velocities on extreme volatile volume of data within a short relative period (Krishnan, 2013).
3. Data Variety: One of the essential characteristics of data is its heterogeneity. It could appear in various forms, types and categories. Mediratta (2015) opined that datasets come with a lot new variations and it is notable that social media is one of the pertinent new variations. Processes attached to the complexity affiliated to different forms is based on available pertinent metadata for the identification of what is contained in the real data (Krishnan, 2013).

4. Veracity: This is connected with the capacity of the data to achieve set purpose. It defines the originality of the data in terms of goal achievement. Verification of the data's suitability for its aim and its usability within set analytical model. The veracity of big data is connected to the bias, noises and abnormalities in data: thus, can the stored and mined data contribute meaningfully to the problem that is being analyzed? (Cunha et al., 2020; Song, Liu, 2017)
5. Value: This basically depicts the worth of the data in creating transformative changes and developments. Big data has big value capable of causing technological and scientific breakthroughs, with the capacity of bringing big social change (Zhaohao et al., 2018). The value associated with tourism big data could be explained through its new/rare application in the tourism industry, which, firstly involves individualized application of tourism's big data (Cunha et al., 2020).

Big data analytics

This involves operationalization of big data with appropriate tools or facilities, in a bid to be able to sort, store and disseminate big data in real time. Big Analytics' definition involves collection, organization and analysis of big data in a bid to discovering and visualizing pattern, knowledge and intelligence with sundry information in the big data to support decision making (Sun et al., 2015). Analytics systematically explore different characteristics of big data in a bid to provide solution to an imminent problem or challenge. Sonka (2016) opined that, although, volume, velocity, and variety are germane, analytics is important to create fusion through sources of data and for the creation of novel knowledge. Big data analysis has the capacity to process data from the past and data from the present for future predictions. Mediratta (2015) opined that right now analytics have the capacity to analyze real-time data, that could be created not only from structured in-house data repositories but from non-structured data that emanates from social media applications and the behavioral disposition of consumers.

Based on the fact that big data is enormous in terms of volume, the analytical framework that it must be subjected to must show capacity to conveniently handle the volume that of the data. It must have impressive storage and processing capacity to be able to operationalize the data optimally. Big data analytics usually depends on a broad storage capacity and processing ability, that requires manipulable grid which can be subjected to reconfiguration to suit different purposes (Stergiou et al., 2018). There are specific big data analytical tool that could be engaged depending on the aim of subjecting big data to analytics and the period under study. For instance, Stylos et al., (2021) opined that business enterprises engage metadata from cellphones that are equipped with sensor and sundry electronic gadgets, therefore, providing organizational structure, a different trajectory to meet the organizational needs with enhanced intelligence and creation of value for clients. Similarly, there could be engagement of big data scalable techniques, like text 6 analytics, that give room for business enterprises in processing and tracking data (Buhalis, Sinarta, 2019). The fact that there is a preponderance of internet enabled gadget in both households and offices means that there will be big data around the locations where there are internet facilities and gadgets. Thus, the exploration of these facilities and gadgets to seek for information, submission of application of different kinds, following trends, news and fashion and others could be subjected to proper analytics, so as to be able to make necessary decisions applicable to different quarters.

There are basically three approaches to big data analytics. Sonka (2016) opined that there are three categories to analytical efforts and they are 1) Descriptive: this focuses on the documenta-

tion of what has happened, b) Predictive effort: this explored what will happen and 3) Prescriptive: this identifies what could happen (depending on the engagement of optimized algorithm). Descriptive analytics explores data from the past, such as trend analysis from a particular period to another period in the past. Predictive analytics is based on the use of technology to predict. Predictive analytics solution explores big data via advanced machine learning that provides organization with grounded marketing insights and enhanced alternatives for the creation of competitive advantage and enhanced customer offering (Köseoglu et al., 2020).

Methodology

Sample size

Nanjundeswaraswamy (2021) noted that cochran formula is engaged for calculating sample size using relevant precision level, confidence level as well as calculated proportion of the population's attributes. The sample size used for this study is 248 as determined using Cochran formular at 93% confidence level, evident below:

$$n = \frac{z^2 pq}{e^2}$$

$$n = \frac{(1.89)^2 (0.5)(0.5)}{(0.06)^2} = 248$$

z value was gotten from z table.
p is the (estimated) proportion of the population q is 1-p.
e is the desired level of precision.

Sampling Technique

Nanjundeswaraswamy (2021) noted that the procedure engaged to select a sample from a population could be referred to as sampling. Verma et al., (2017) also noted that established definition of sampling is the capability of researchers to choose a part of the population which is essentially a true representation of the said population.

The respondents for this study were chosen purposively. Verma et al., (2017) opined that purposive sampling is a type of non-random sampling which is researcher(s) intentional selection of specific persons that will be include in a research survey.

Data Collection and Analysis

Survey instrument (questionnaire) was used to collect data. It is notable that out of the 248 administered questionnaire 198 were used because 25 of the questionnaires were practically not filled out by the respondents, while others were returned to the researcher either mutilated or wet. This is premised on the fact that the respondents were basically at the destination for leisure and a lot of them were either not ready to participate in the survey or some didn't give due attention to the research instrument. The collected data was analyzed using descriptive statistics (frequency, percentage, mean and standard deviation) and inferential statistics (correlation and path analysis).

Results

Table 1. *Demography*

	Frequency	Percentage
Age		
20-35	96	48.5
36-51	58	29.3
52 and above	44	22.2
Gender		
Male	69	34.8
Female	129	65.2
Educational qualification		
First school leaving certificate	86	43.4
Bachelor's degree	77	38.9
Postgraduate	35	17.7
Total	198	100

Source: Author's Survey

A large percentage (48.5%) of the respondents are between 20-35 years old. This implies that the highest number of demography that visit Agodi gardens are between 20-35 years old. More females (65.2%) responded to the research instruments. All of the respondents are educated as, 43.4% have first school leaving certificates, 38.9% have bachelor's degrees and 17.7% have post-graduate degrees.

Table 2. *Volume*

	Frequency and percentage	Mean and standard deviation
Response time of attendants is impressive		
Strongly agree	110(55.6%)	1.67±0.92
Agree	57(29.8%)	
Disagree	16(8.1%)	
Strongly disagree	15(7.6%)	
Processing time for inquiry on the website is slow		
Strongly agree	13(6.6%)	3.25±0.83
Agree	10(5.1%)	
Disagree	89(44.9%)	
Strongly disagree	86(43.4%)	
Maintenance of facilities is impressive		
Strongly agree	5(2.5%)	3.26±0.72
Agree	17(8.6%)	
Disagree	97(49.0%)	
Strongly disagree	79(39.9%)	
There are no interferences between the different leisure activities in the destination		
Strongly agree	62(31.1%)	1.85±0.74

	Frequency and percentage	Mean and standard deviation
Agree	113(57.1%)	1.85±0.74
Disagree	14(7.1%)	
Strongly disagree	9(4.5%)	
The garden's environment is not well kept		
Strongly agree	22(11.1%)	3.14±0.97
Agree	15(7.6%)	
Disagree	74(37.4%)	
Strongly disagree	87(43.9%)	
Total	198	100

Source: Author's Survey

55.6% strongly agreed and 29.8% agreed that response time of the attendants is impressive, 44.9% disagreed and 43.4% strongly disagreed that processing time for enquiry on the website is slow. 49% disagreed and 39.9% strongly disagreed that maintenance of facilities is impressive. 31.1% agreed and 57.1% agreed that there are no interferences between the different leisure activities in the destination. 37.4% disagreed and 43.9% strongly disagreed that the garden's environment is not well kept. In descending order, the indicators for volume are rated as follows; maintenance of facility is impressive (3.26±0.72), processing time for enquiry on the website is slow (3.25±0.83), the garden is not well kept (3.14±0.97), no interferences between the different leisure activities in the destination (1.85±0.74) and response time of attendant is impressive (1.67±0.92).

Table 3. *Velocity*

	Frequency	Percentage
I don't know anything about the attraction until this time		
Strongly agree	17(8.6%)	3.21±0.97
Agree	26(13.1%)	
Disagree	54(27.3%)	
Strongly disagree	101(51.0%)	
Its only when there is a major event that is being advertised through the media that I hear about Agodi gardens		
Strongly agree	61(30.8%)	1.99±0.89
Agree	96(48.5%)	
Disagree	23(11.6%)	
Strongly disagree	18(9.1%)	
I hardly get information about Agodi gardens through the social media		
Strongly agree	43(21.7%)	1.89±0.58
Agree	138(69.7%)	
Disagree	14(7.1%)	
Strongly disagree	3(1.5%)	
I got to know about agodi gardens via referral		
Strongly agree	62(31.3%)	1.97±0.83
Agree	87(43.9%)	
Disagree	41(20.7%)	

	Frequency	Percentage
Strongly disagree	8(4.0%)	1.97±0.83
Total	198	100

Source: Author's Survey

51% of the respondents strongly disagreed and 27.3% disagreed that they don't know anything about the attraction until this time. this implies that virtually all of the respondents have information about the Gardens before visiting it. 30.8% strongly agreed and 48.5% agreed that it is only when there is a major event that is being advertised through the media that they hear about Agodi gardens. Thus, there is basically no advertisement about the gardens save when an event is billed to be hosted in the gardens. 21.7% strongly agreed and 69.7% agreed that they hardly get information about the gardens through the social media. It is evident that social media is not explored enough for showcasing and advertising the gardens. 31.3% strongly agreed and 43.9% agreed that they knew about Agodi gardens through referral. In descending order, the indicators for velocity are rated as follows; don't know anything about the attraction until this time (3.21±0.97), it is only when there is a major event that is being advertised through the media that they hear about Agodi gardens (1.99±0.89), I got to know about agodi gardens via referral (1.97±0.83) and difficult getting information about Agodi gardens through the social media (1.89±0.58).

Table 4. *Variety*

	Frequency	Percentage
I came here because I have heard of this garden's paintball		
Strongly agree	82(41.4%)	1.84±0.84
Agree	72(36.4%)	
Disagree	38(19.2%)	
Strongly disagree	6(3.0%)	
I am here just to swim		
Strongly agree	9(4.5%)	3.20±0.93
Agree	41(20.7%)	
Disagree	49(24.7%)	
Strongly disagree	99(50%)	
I am here basically for horse ridiing		
Strongly agree	67(33.8%)	2.56±1.23
Agree	12(6.1%)	
Disagree	61(30.8%)	
Strongly disagree	58(29.3%)	
I am only here for the virtual games		
Strongly agree	59(29.8%)	2.38±1.02
Agree	26(13.1%)	
Disagree	92(46.5%)	
Strongly disagree	21(10.6%)	
I am here for the botanical garden		
Strongly agree	51(25.8%)	2.17±0.86
Agree	70(35.4%)	
Disagree	69(34.8%)	

	Frequency	Percentage
Strongly disagree	8(4%)	2.17±0.86
Total	198	100

Source: Author's Survey

41.4% of the respondents strongly agreed and 36.4% agreed that they were at the gardens because of paintball. 24.7% of the respondents disagreed and 50% strongly disagreed that they were only at the gardens to swim. 30.8% disagreed and 29.3% strongly disagreed that they were only at the gardens for horse riding. 29.8% strongly agreed and 46.5% disagreed that they were at the gardens only for virtual games. 35.4% agreed, while, 34.8% disagreed that they were at the gardens only for the botanical garden. The foregoing reveals that most of the respondents were at the gardens for different activities in the garden rather than for just one activity. In descending order, the indicators for variety that is underpinned by the activities engaged by the tourists are ranked as follows; only to swim (3.20±0.93), only for horse riding (2.56±1.23), only for virtual games (2.38±1.02) and at the gardens because of paintballs (1.84±0.84). this depicts that most of the tourists at Agodi gardens will most likely swim at the pool, followed by riding horses at the garden, followed by playing virtual games and then engage in paintball. This implies that there are various data that can be operationalized by the tourists from the prism of big data. Big data format is inclusive of an array of data like document, electronic mail, SMS, image, graph, video, outcomes of different electronic created telephone data, signal from GPS, sensor, machine's entries and technologies for analysing DNA (Li et al., 2015).

Table 5. *Veracity*

	Frequency	Percentage
All the attractions I saw online are available at the destination		
Strongly agree	49(24.7%)	1.98±0.79
Agree	117(59.1%)	
Disagree	18(9.1%)	
Strongly disagree	14(7.1%)	
All I heard from the person that referred me here is absolutely true		
Strongly agree	57(28.8%)	1.83±0.61
Agree	118(59.6%)	
Disagree	23(11.6%)	
Strongly disagree	-	
I enjoyed every bit of the leisure activities that I participated in while on the park		
Strongly agree	95(48.0%)	1.58±0.64
Agree	95(48.0%)	
Disagree	4(2.0%)	
Strongly disagree	4(2.0%)	
The attendants are ethical with their conducts		
Strongly agree	132(66.7%)	1.59±0.93
Agree	25(12.6%)	
Disagree	31(15.7%)	
Strongly disagree	10(5.1%)	
Total	198	100

Source: Author's Survey

24.7% of the respondents strongly agreed and 59.1% agreed that all the attractions they saw online are available at the destination. This depicts that the management of the gardens are truthful about what the information that they uploaded on the gardens social media platforms. 59.6% of the respondents agreed and 28.8% strongly agreed that all they heard from the person that referred them to the gardens is absolutely true. 48% strongly agreed and 48% agreed that they enjoyed every bit of the leisure activities that they participated in while on the park. 66.7% of the respondents strongly agreed and 12.6% agreed that the attendants are ethical with their conducts. In descending order, the indicators for veracity are rated as follows; all the attractions online are available at the destination (1.98±0.79), all they heard from the referrer is absolutely true (1.83±0.61), the attendants are ethical with their conducts (1.59±0.93) and enjoyment of every bit of the leisure activities (1.58±0.64).

Table 6. *Value*

	Frequency	Percentage
There should be more advertisement for this attraction through print media		
Strongly agree	58(29.3%)	1.79±0.59
Agree	125(63.1%)	
Disagree	13(6.6%)	
Strongly disagree	2(1%)	
All social media platforms should be explored to advertise this attraction		
Strongly agree	65(32.8%)	1.85±0.71
Agree	96(48.5%)	
Disagree	37(18.7%)	
Strongly disagree	-	
There should be trackeable feedbacks on these platforms to monitor the responses of both prospective tourists and tourists		
Strongly agree	70(35.4%)	2.05±0.99
Agree	69(34.8%)	
Disagree	38(19.2%)	
Strongly disagree	21(10.6%)	
Periodically promotions should be done to attract more people		
Strongly agree	125(63.1%)	1.73±1.08
Agree	25(12.6%)	
Disagree	24(12.1%)	
Strongly disagree	24(12.1%)	
Total	198	100

Source: Author's Survey

29.3% strongly agreed and 63.1% agreed that there should be more advertisement for this attraction through print media, 32.8% strongly agreed and 48.5% agreed that all social media platforms should be explored to advertise this attraction. 35.4% strongly agreed and 34.8% agreed that there should be trackable feedbacks on these platforms to monitor the responses of both prospective tourists and tourists. 63.1% strongly agreed and 12.6% agreed that periodically, promotions should be done to attract more people. In descending order, the indicators for value are rated as follows; there should be trackable feedbacks on the platforms for mon-

itoring (2.05±0.99), all social media platforms should be explored to advertise these attractions (1.85±0.71), there should be more advertisement for this attraction through print media (1.79±0.59) and periodically, promotions should be done to attract more people (1.73±1.08).

Table 7. *Descriptive and predictive data analytics*

	Frequency	Mean and Standard deviation
Data from social media can be used to determine level of customer patronage		
Strongly agree	65(32.8%)	2.25±1.14
Agree	63(31.8%)	
Disagree	25(12.6%)	
Strongly disagree	45(22.7%)	
Data from social media can be used to identify challenges tourists encounter while in the attraction		
Strongly agree	69(34.8%)	2.41±1.27
Agree	43(21.7%)	
Disagree	21(10.6%)	
Strongly disagree	65(32.8%)	
Data from social media can be used to decipher customer's expectation		
Strongly agree	50(25.3%)	2.60±1.13
Agree	31(15.7%)	
Disagree	65(32.8%)	
Strongly disagree	52(26.3%)	
Data from the park can be used to predict future challenges and solutions		
Strongly agree	91(46.0%)	1.79±0.88
Agree	67(33.8%)	
Disagree	30(15.2%)	
Strongly disagree	10(5.1%)	
Data from the park can be used to predict people's opinion that will enhance customers patronage		
Strongly agree	26(13.1%)	2.14±0.67
Agree	124(62.6%)	
Disagree	42(21.2%)	
Strongly disagree	6(3%)	
Data from the park can be used to predict strategies for enhancing organizational's productivity		
Strongly agree	36(18.2%)	1.97±0.56
Agree	134(67.7%)	
Disagree	26(13.1%)	
Strongly disagree	2(1%)	
Total	198	100

Source: Author's Survey

Data from social media can be used to determine level of customer patronage (32.8% strongly agreed and 31.8%). Social media's data can useful in identifying challenges tourists encounter while in the attraction (34.8% strongly agreed and 21.7% agreed). Data from social media may not be useful in deciphering customer's expectations (32.8% disagreed and 26.3% strongly disagreed). Data from the park can be used in predicting future challenges and solutions (46% strongly agreed and 33.8% agreed). Data from the park can be used in predicting people's

opinion that will enhance customer's patronage (13.1% strongly agreed and 62.6% agreed). Data from the park can be used to predict strategies for enhancing organizational's productivity (18.2% strongly agreed and 67.7% agreed).

Table 8. *Correlation Matrix*

		Volume	Velocity	Variety	Veracity	Value	Descriptive and predictive
Volume	Pearson correlation Sig. (2 Tailed) N	1 198					
Velocity	Pearson correlation Sig. (2 Tailed) N	-.037 .607 198	1 198				
Variety	Pearson correlation Sig. (2 Tailed) N	.312** .000 198	-.316** .000 198	1 198			
Veracity	Pearson correlation Sig. (2 Tailed) N	-.293** .047 198	.288** .000 198	-.356** .000 198	1 198		
Value	Pearson correlation Sig. (2 Tailed) N	.000 .013 198	-.089 .211 198	-.344** .000 198	.232** .001 198	1 198	
Descriptive and predictive	Pearson correlation Sig. (2 Tailed) N	.013 .860 198	.098 .171 198	-.278** .000 198	.318** .000 198	.001 .986 198	1 198

Correlation is significant at 0.05 level (2-tailed); Source: Author's Survey

The correlation matrix table above shows the relationship between the 5v's of big data and the dynamics of data analytics. It shows that variety (r=.278, p<0.05) has significant positive relationship with data analytics and veracity (r=.318, p<0.05) has significant positive relationship with data analytics; meanwhile, velocity (r=.171, p≤0.05), value (986, p≤0.05) and volume (r=.860, p≤0.05) do not have significant relationship with data analytics. This depicts that for this study there are two characteristics (variety and veracity) of big data that could influence big data analytics. This simply implies that descriptive and predictive big data analytics of Agodi gardens can be done effectively from the trajectories of the variety and veracity of big data. In simple terms it also implies that the big data available for analytics may exhibit structured or/and unstructured nature and the data is essentially accurate.

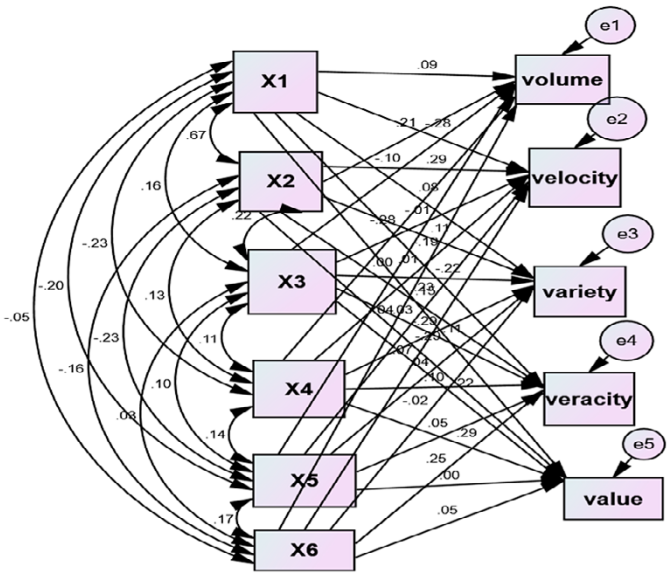

Figure 1. Path Diagram

Table 9. *Goodness-of-Fit Indices*

Model	χ^2	Df	P	GFI	AGFI	NFI	CFI
	93.304	11	.000	0.918	0.507	0.790	0.788

Source: Author's Survey

The chi-square value (χ^2) for the table above is 93.304, P-value is 0.000. The normed-fit index is 0.790, while, the comparative fit index is 0.788 and Goodness of fit index of 0.918. This depicts that the model exhibits goodness of fit.

Table 10. *Regression Weights Table*

			Estimate	S.E.	C.R.	P	Label
Volume	<---	X1	.202	.231	.872	.383	NS
Velocity	<---	X1	-.486	.183	-2.653	.008	S
Variety	<---	X1	.261	.333	.782	.434	NS
Veracity	<---	X1	-.485	.250	-1.942	.052	S
Value	<---	X1	.591	.254	2.324	.020	S
Volume	<---	X2	.434	.211	2.057	.040	S
Velocity	<---	X2	.465	.167	2.784	.005	S

			Estimate	S.E.	C.R.	P	Label
Variety	<---	X2	.347	.304	1.141	.254	NS
Veracity	<---	X2	.343	.228	1.505	.132	NS
Value	<---	X2	-.674	.232	-2.906	.004	S
Volume	<---	X3	-.235	.162	-1.450	.147	NS
Velocity	<---	X3	-.026	.128	-.203	.839	NS
Variety	<---	X3	-.758	.233	-3.248	.001	S
Veracity	<---	X3	.272	.175	1.555	.120	NS
Value	<---	X3	.566	.178	3.178	.001	S
Volume	<---	X4	-.855	.226	-3.786	***	S
Velocity	<---	X4	.015	.179	.083	.934	NS
Variety	<---	X4	-1.279	.326	-3.927	***	S
Veracity	<---	X4	.334	.244	1.370	.171	NS
Value	<---	X4	.963	.249	3.873	***	S
Volume	<---	X5	.008	.281	.028	.977	NS
Velocity	<---	X5	-.105	.223	-.472	.637	NS
Variety	<---	X5	.218	.405	.539	.590	NS
Veracity	<---	X5	.198	.304	.651	.515	NS
Value	<---	X5	-.001	.309	-.004	.997	NS
Volume	<---	X6	-.164	.304	-.540	.589	NS
Velocity	<---	X6	.247	.241	1.027	.305	NS
Variety	<---	X6	-.156	.438	-.355	.722	NS
Veracity	<---	X6	1.200	.328	3.658	***	S
Value	<---	X6	.254	.334	.759	.448	NS

Source: Author's Survey

- X1 is Data from social media can be used to determine level of customer patronage
- X2 is Data from social media can be used to identify challenges tourist encounter while in the attraction
- X3 is Data from social media can be used to decipher customer's expectation

- X4 is Data from the park can be used to predict future challenges and solutions
- X5 is Data from the park can be used to predict people's opinion that will enhance customer patronage
- X6 is Data from the park can be used to predict strategies for enhancing organizational's productivity

From the above, it is evident that velocity, veracity and volume predict the perception that data from social media could determine level of customer patronage. Volume, velocity and value predict the perception that data from social media can be used to identify challenges tourist encounter while in the attraction. Veracity and value predict the perception that data from social media predict the perception that data from social media could decipher customer's expectation. Volume, Variety and value predict the perception that data could be used to predict future challenges and solutions. Only veracity predicts the perception that data from the study area could be used to predict strategies for enhancing organizational productivity.

Discussion

It can not be overstated that the tourism industry generates pantagruelian amount of data. Alaei and Becken (2019) noted that the volume of data generated by individuals travelling exceed human capability to search, manipulate as well as analyse manually. Hence, it is only realistic and pertinent to subject such amount of data to big data analytics. Exploration of big data via veracity and variety makes it pretty unchallenging to decipher tourists/prospective tourists' choices and desires of/from Agodi gardens. In connection to the tourism industries and irrespective of the industry's size, the application of big data analytics makes it easy to decipher the need and desire of tourists or visitors (Li et al., 2018). The analytics of veracity and variety of big data for Agodi gardens will help Government to make appropriate decisions in expanding the business horizon of the gardens and make the gardens meet more tourism desires of both prospective tourists and tourists. Belias et al. (2021) opined that in general, big data is capable of having significant contributions as paraphernalia that could make available the germane information for making pertinent decision. This simply because both tourists and prospective tourists' behaviors and desires can easily be deciphered by the tourism destination's management. Hence, tourism destinations will be able to put in place things and facilities that will please more tourists and pull more tourists to the destination. Hence, rather than what was obtainable in the past that just a few individuals travelled for leisure consequent upon lack of information, in contemporary times there are more information about tourism destinations for both tourists and investors (Olawuyi and Adedara, 2015). Via data mining, prospective tourists could be updated in real time about their tourism choices especially with respect to new product as well as service that such prospective tourists prefer (Olawuyi et al., 2017).

Fuchs et al. (2014) opined that the analytic tools of big data could be explored to have an indepth knowledge of the disposition of tourists in a tourism site. In the light of the results of the study the importance of predictive and subjective data analytics of big data for this study cannot be overemphasized. Data analytics can easily be used to analyze and track tourists' behavioral tendencies especially considering the fact that tourists are essentially global citizens. In contemporary times the borders of people are not constrained to where they live in

their Nation, rather it is extended to the different parts of the globe (Misirlis, 2022). Aguiar and Szekut (2020) opined that appreciation to improved software, that has made it achievable to proceed from descriptive analytics, that is the evaluation of data or contents, oftentimes operationalized through manual means, in a bid to proffer answers to "What took place?" (what is presently taking place?); prescriptive analytics is a type of improved analytics with the examination of data or contents in a bid to proffer answers to "what is going to take place?" or "how could things or situations be made to occur?".

Thus, variety and veracity of data for the study area can be examined from the trajectory of what happened or what is going to happen. This implies that data about tourists' activities while in the garden could be analyzed. Belias et al. (2021) noted that in an organization that essentially has anthropocentric character and organizations focus on people, monitor and profound analysis of the internet activities done by tourists prior to, while on and after their tours, so that the experiences could shape and improve organizational ideas. These data are capable of helping the organizations to roll out impressive initiatives that will ensure tourist get value for money spent. Likewise, the data about prospective tourists' activities at the garden can also be analyzed. The engagement of big data for the estimation or prediction of the demand of tourism is a novel skill, similarly a pertinent phase for tourism researches and profession (Cvelbar et al., 2018). In the light of technological evaluations, 'sensing socially' as a concept makes available huge volume of data which could take care of information shortage and enhanced prediction of tourists' dispositions via big data analytics, that could provide real predictions of dispositions than orthodox tourism researches (Zhang, 2018). This will enable tourism destinations to have profound knowledge of the tourism industry, predict tourists' behavior and understand the environment better. The prediction of tourist disposition can help tourism organization precisely send out the appropriate message to the target demography.

Appropriate message could be coded in promotional or advertising messages directed at the prospective tourists. Line et al. (2020) noted that big data makes available to tourism and hospitality businesses important devices in forming advertising means for ensuing the appropriate messages are passed on to the appropriate people (via the appropriate means or tools) in due time, that depicts creating value through means; improvement of efficient searching, allowance of customer relationship management, reduction in cost of transactions, and allowing customizing services. Thus, this could make the organization's response to tourists and the industry's demand timely as much as possible. Via prescriptive and descriptive analysis, organizations could have deeper knowledge of the market and detect novel and ingenious means of responding promptly to developing situations (Sivarajah, 2016). Li et al. (2022) noted that messages on social media and big data analytics has made available important perceptions and earned a lot of operations-based opinions, for helping makers of policies in determining markets flows and consumers demands, thereby, leading to the creation of market advantage over competing businesses, as they usually go in line with orthodox operational means.

It is evident that velocity, veracity and volume predict the perception that data from social media could determine level of customer patronage. Volume, velocity and value predict the perception that data from social media can be used to identify challenges tourist encounter while in the attraction. Veracity and value predict the perception that data from social media predict the perception that data from social media could decipher customer's expectation. Volume, Variety and value predict the perception that data could be used to predict future challenges and solutions. Only veracity predicts the perception that data from the study area could be used to predict strategies for enhancing organizational productivity. This is germane for the growth and development of tourism organizations, especial-

ly with respect to the different range of tourism's big data associated with such prediction. Alaei and Becken (2019) asserted that there is evidence of broad categories of the sources of big data which are topical for the travel and tourism sector, inclusive of credit card transaction, mobility induced data, behavioral tendencies associated with bookings as well as distribution of experience. The ability to predict tourist perception based on big data is capable of ultimately availing tourists' smart tourism experiences. Lee et al., (2020) noted that experiences of smart tourism is premised on solid smart organizational ecosystems at a tourism site, which is essentially operationalized via distribution of data amongst stakeholders. Xu (2023) asserted that by communicating in record time as well as information dissemination, the tourism sector procedures get better as tourists would review with ease and savor new experiences of intelligent tourism.

The characteristic of big data on the basis of variety is its ability to exist in structured and unstructured form (Hiba et al., 2015); characteristic of big data on the basis of veracity is connected to the precision and accuracy of data (Alwan, Ku-Mahamud, 2020; Carlos et al., 2018). The prospective advantage in the exploration of big data for tourism as evident in the findings of this study is in line with existing literatures. British Airways have created and infused in its operation, application and technology with the allowance of personalized perspectives of tourists and knowledge of internally and externally based conditions capable of influencing decision of shareholders (Towerdata, 2018). Similarly, online travel agents could take advantage of big volume of unstructured and structured information that stems from reviewing of online travels in a bid to have a deeper knowledge of virtual dispositions of tourists via virtual data analytics (Mariani et al., 2019). Agodi gardens has a website that can churn out big data with variety and veracity. Outside of the personal websites, big data for Agodi Gardens can be retrieved from social networking sites, just as it is done for/by other tourism destinations. The digital footprints of tourism enthusiast from social networking sites have led to the churning out of good value data links that is not restricted to businesses of tourism and its advertisement (Onder, 2017). There is the provision of participation, interaction and user focused attributes by social media which goes beyond allowing a user to talk about his/her experiences, data, perception, and others (Altinay, Taheri 2019). Rahmadian et al., (2022) noted that other social networking sites linked to the source have been operationalized for advertising tourism destinations, for instance, YouTube, Vimeo and Daily motion.

Similarly, transaction using card (payments on the spot and withdrawal of cash) are engaged as impressive sources of data in analyzing anonymous local tourism dynamic, because it engages digital source of information that is not well engaged when compared with local statistical survey (Palop et al., 2019). Aguiar and Szekut (2020) Innovative online travel companies like Amadeus have already implemented Big Data into their business strategies, to refine their products and differentiate themselves from their competitors. Hotels use the data for power system management. Big Data is flexible; when a particular need arises, it can be adapted to perform the necessary analyses and achieve positive results. In the same vein, while there is a focus on user-experience, ARTour, that is a game premised on augmented realities, was engaged for promoting agritourism via the encouragement of tourists in maintaining responsible environmental attitude, via active outdoor learning experiences (Garzon et al., 2018). Social big data had been engaged in investigating nature-based tourism through the identification of sites as well as why visitors investigate the attributes that attract them (Kim et al., 2019). On the basis of characteristics of big data, the requirements for effectively managing data, that leads to the transformation of data to important information capable of improving the attributes for making decisions (Mariani, 2019).

Conclusion and recommendations

It is worthy of note that there is connection between prescriptive/descriptive big data analytics and the characteristics of big data. Precisely, there is significant relationship between prescriptive data analytics velocity, veracity, volume and value. Similarly, there is significant relationship between descriptive data analytics and volume, variety, value and veracity. Likewise, variety and veracity of big data could influence big data analytics. The import of this is that the management of Agodi gardens can make better business decisions for their customers and organization via big data analytics by emphasizing on velocity, veracity, volume and value attributes of big data for prescriptive big data analytics, while, emphasizing on volume, variety, value and veracity for descriptive big data analytics. The study therefore recommends; that the management of Agodi Gardens should engage thorough big data analytics, so that data elicited by customers can be appropriately analysed and topical inference could be drawn from the analysis; and there should be a focus of the analytics on specific characteristics of big data, in terms of, volume, variety, veracity and value.

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