PREDICTIVE DATA ANALYTICS AND COMPETITIVE ADVANTAGE OF CLASSIFIED HOTELS IN NAIROBI CITY COUNTY

KIIRU, MICHAEL NG'ANG'A

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

2019

DECLARATION

This research project is my original work and has not been presented to any university for any academic award.

Signature: ..... Date: .....

Kiiru, Michael Ng'ang'a

D61/60676/2013

This research project has been submitted for examination with my approval as the University supervisor.

Signature: ..... Date: .....

Dr. James T. Kariuki

Senior Lecturer, Department of Management Science

School of Business, University of Nairobi

ACKNOWLEDGEMENTS

I am very grateful to the God Almighty for the gift of life and for seeing me through the development of this thesis.

My sincere gratitude goes to my wife Mary Ng'ang'a, my cousin Dennis Mungai and to my dear parents Mr. & Mrs. Kiiru, for your patience, support and believing in me to go the distance. Christine, Ethan and Liam, you sacrificed your play time to allow me to study.

Much appreciation to my supervisors, Dr. J.T. Kariuki and Prof. Njihia for challenging my intellect and for appraising my research work which was quite a motivation to press on. May you have more strength and more intellect to inspire even more researchers.

To all, I say Thank you.

DEDICATION

In dedication…

To my wife Mary Ng'ang'a. Sometimes the simplest things mean the most in life.

To my parents, Mr. and Mrs. Kiiru, who taught me that life is a matter of choices and that the largest task can be accomplished one step at a time.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

BDA Big Data Analytics

BI Business Intelligence

CA Competitive Advantage

CBD Central Business District

DOI Diffusion of Innovation Theory

EOU Ease of Use

GDP Gross Domestic Product

IDT Innovation Diffusion Theory

ICT Information and Communication Technologies

PEOU Perceived Ease-of-Use

PU Perceived Usefulness

ROA Return on Asset

ROI Return on Investment

TAM Technology Acceptance Model

TOE Technology Organization Environment

TRA Tourism Regulatory Authority

ABSTRACT

This study's aim was to explore the relationship between predictive data analytics and competitive advantage for star-classified hotels in Nairobi City County. The study was anchored on Technology Acceptance Model and Technology -Organization - Environment Framework, both of which help to explain the factors and motivation behind adoption and use of technology systems. An analytical cross-sectional survey design was adopted as the study focused on the relationship of two variables: Adoption and use of predictive data analytics as the independent variable and competitive advantage as the dependent variable. The research adopted a complete enumeration survey of all 53 star-classified hotels in Nairobi City County. Semi-structured questionnaires were administered in each of the hotels to aid in the collection of primary data. The researcher used descriptive statistics to explain the extent of predictive data analytics adoption by hotels. Linear regression model was applied to determine the relationship between predictive data analytics and competitive advantage of hotels. The study established that there is a significant relationship between the use of predictive data analytics for decision making and hotels' competitive advantage. By using the various data analytics tools such as Microsoft Excel, Google Fusion Tables, and Apache Spark among others, hotels are able to analyze data, both qualitative and quantitative, in order to extract business insights which inform key decisions leading to overall operational efficiency. The study also established that hotels were very much aware of their competitive advantage drivers as viewed from three perspectives of product differentiation, cost leadership and focus strategy. The study recommends that hotels in Nairobi City County should invest in IT infrastructure and specialized human capital to support the application of data analytics technology in order to be more competitive. It also recommends further studies on the application of data analytics for hotels' competitive advantage in other counties as well as in different business sectors.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The amount of data generated by both human and machines has recently increased exponentially at a faster rate than traditional business data (Barnatt, 2015). Historically, organizations gleaned vast amounts of raw data but without much regard to the power hidden therein for data-informed decisions. With the development of data analytics technology however, businesses are increasingly deriving value from data by making data-driven decisions (Gloria & Angela, 2014).

Liu (2014) describe data analytics as the examination of data in order to obtain information contained therein. Predictive data analytics technology, whose application in making business decisions is the core of this study, is a subset of data analytics that examines historical business data in order to detect patterns and relationships between different data sets. The patterns and relationships provide business insights that enable hotels and other businesses to develop models from which likely business process outcomes can be determined with considerable accuracy. Babu and Sastry (2014) accentuates that the ability to forecast outcomes helps businesses to concentrate their efforts on processes, products and services geared towards these potential outcomes, thus increasing efficiency.

Businesses that are known to have tapped into the use of predictive data analytics technology effectively in decision making have gained great value in retention of customers, focused marketing, fraud reduction, effectiveness of internal activities and many other fields (Manyika *et al.,* 2011).

The ability of businesses to understand and extract business value from data through predictive data analysis technology is key to reconfiguring their competitive advantage strategies on the basis of current trends in the competitive market. The use of this technology in profiling customers, for instance, significantly reduces the marketing effort it takes to provide precise information about products and services relevant to those target customers (Chen, Chiang & Storey, 2012).

Gloria and Angela (2014) recognize that while businesses are becoming progressively conscious of how they can gain competitive edge from making data driven decisions, they are also struggling to adopt data strategies so as to address the associated challenges ranging from processing a deluge of data from diverse sources to lack of requisite technical skills.

This study has its focal point on the adoption of predictive data analytics to give classified hotels in Nairobi City County a competitive edge and, as such, is anchored on two theories: Technology Acceptance Model (TAM) and Technology Organization Environment (TOE) framework developed by Davis (1989) and Tornatzky and Fleischer (1990) respectively. Adoption and use of technology, as explained by Juma (2011), is a conscious mental process in which an individual must first have adequate knowledge of the innovation at hand to the point where particular decisions are made to either reject or embrace the technology as an available best course of action. The two theories will help to explain the factors and motivation behind adoption and use of predictive data analytics by hotels.

1.1.1 Predictive Data Analytics

Eric (2018) describes predictive data analytics as the process of collecting, transforming, cleaning, and modeling data using historical data patterns and relationships, with the goal of gaining actionable insights as well as consensus of a forecast necessary for making informed decisions. In support of this view, Babu and Sastry (2014) argue that the ability to make near-accurate predictions of risks and market trends from the analysis of structured and unstructured data helps businesses to enhance their key performance metrics hence better strategic decisions which ultimately gives increased revenue.

Shmueli and Koppius (2010) references predictive data analytics as a technology for developing and evaluating a model used to forecast events or conditions with respect to available quantitative data. This includes empirical predictive models which forecast future events and assessment techniques. Predictive analytics technology performs two functions; the identification of the connections between business drivers and secondly, based on these connections, forecasts the likelihood of specific events (Najdenov & Makhoul, 2015).

Predictive models are as applicable in the hotel industry as they are in other sectors. Conventional business intelligence has been enhanced by the availability of a lot of data from a variety of sources. Eye for Travel (2019) contends that predictive data analytics technology has enhanced the use of Property and Transactions Management and Reporting Systems, such as Micros Opera in hospitality industry by increasing data streams, identifying tendencies and projecting them to create automated forecasts for management.

1.1.2 Competitive Advantage

A company has competitive edge whenever it is able to defend itself against competitive forces in the market and most importantly, has a sustainable ability over its rivals to secure

customers (Namada, 2018). Competitive advantage strategy is therefore an effort consciously undertaken by businesses to identify their target markets to which they provide goods, services and other benefits that are better than competition (Porter, 1998).

Porter (1998) outlines three ways in which companies are able to realize competitive advantage: differentiation, cost leadership, and focus strategy. Differentiation strategy involves taking steps to ensure that products or services are distinguished from the rest in the same market by their unique attribute such as high quality, faster delivery or excellent customer experience. By using predictive analytics, hotels are able to understand their customers' behavior hence offer services and pricing models that suit their specific needs. Cost leadership strategy ensures that a business offers reasonable value at a lower price usually as a result of continuously improving operational efficiency. As noted by Ochieng (2015) and Manyika et al. (2011), the application of predictive data analytics is growing and has resulted in higher management and operational efficiency. Focus strategy refers to the direction taken by businesses such as the hospitality industry to choose a very specific target market and then employing either or both cost leadership and differentiation strategies to offer customized products and services.

Combined with other resources and capabilities of a business, the use of predictive data analytics can give hotels a good positioning in the business environment. In an investigation of data analytics as a competitive advantage driver for food retailers, Galletti and Papadimitriou (2013) use synergistic relationships with other resources. In the study, the authors assert that there is evidence that implementation of data analytics is a key competitive advantage driver even though not in isolation but rather when incorporated with the firms' other resources.

1.1.3 Classified Hotels in Nairobi City County

The importance of the hotel sector in Kenya cannot go unnoticed as it not only contributes to the Gross Domestic Product (GDP) of the country significantly, but also creates a number of job opportunities. The 2011 Tourism Act No. 28 provides for an Authority; Tourism Regulatory Authority (TRA), whose primary objective is to control the tourism industry in Kenya. The Authority, together with other stakeholders, develops and implements the criteria for standardization and classification of tourism facilities and services. As such, TRA through its Standardization and Classification Committee has adopted the star rating system, the most common system of rating hotels worldwide based on the standards upheld as well as the quality of amenities provided by such establishments. In this rating, the more the stars awarded to a hotel establishment, the higher the standards and luxury offered. The classification standards and criteria adopted for Kenyan hotels however, only applies to Kenya and the rest of East African Community (EAC) Member states (Tourism Regulatory Authority [TRA], 2019).

The latest classification exercise conducted by TRA (2019) rated 53 hotel establishments in Nairobi City County as Two-Star to Five-Star hotels, 11 of which are Five-Star rated. Appendix II gives a list of the hotels with their corresponding star ratings.

Classified hotels offer quality personalized services and accommodation. The lobbies in the hotels are luxurious with the rooms well furnished. Some of these hotels feature up to 3 restaurants with well-prepared cuisine menus besides other amenities such as sports bars, swimming pools, fitness centers, business centers et cetera. Moreover, according to Forbes travel guide (2014), some of the hotels offer up to five concierges to assist guests during their stay in the hotels, all in an effort to offer unparalleled service.

With such a high number of hotels, Nairobi City County offers a very competitive business environment and therefore hotels need to adopt ways to boost their competitiveness so as to stay afloat.

1.2 Research Problem

The rise of predictive data analytics has resulted in concentrating on the ways in which firms can obtain information to position themselves competitively. The McKinsey report (2011) forecast a 60% margin growth in retail firms who exploited the power of data analytics. Ochieng (2015) observed that predictive data analytics is growing and its emergence as a new technology has resulted in higher management efficiency and informed decision making. Notably, despite the emphasis on the benefits of adopting predictive data analytics, its implementation is still a challenge owing to the need for trained personnel, the cost of analytics tools and service subscriptions (Ndambo, 2016).

In a study conducted by Eye for Travel (2019) on the implementation of predictive data analytics in the hospitality, it was disclosed that predictive data analytics is an important technology that is growing as sources of data increase. The study, though not specific to hotels in Nairobi City County, indicated that predictive analytics makes it easier for the hotel industry to understand customer behavior as well as to price services and products. Additionally, a review by MIT Sloan Management disclosed that leading organizations in data analytics are better able to create innovative and differentiated products and services compared to laggard ones (Ransbotham & Kiron, 2017). Locally, a study by Ndambo (2016) on Big Data Analytics (BDA) and competitiveness of commercial banks and insurance firms in Nairobi found that firms which used big data analytics in their operations were able to forecast effectively the needs of customer and in addition attain operation

optimization, thus facilitating decision making. The study however, was limited in scope as far as the adoption of predictive data analytics in the hotel industry refers.

From the foregoing discussion, predictive data analytics is portrayed as key technology in improving business profits and a critical indicator in making informed decisions. Through online customer bookings and other platforms such as online customer reviews, travel agents, airlines and social media, hotel industry in Kenya has a wide variety of data sources. Studies on how hotels in Nairobi City County have leveraged this resource for competitive advantage are limited. This fact therefore, raises the need for scholarly inquiry in order to verify if the findings still hold true for the hotel industry and hence the study question: What relationship exists between the use of predictive analytics and competitive advantage of hotels in Nairobi City County?

1.3 Research Objectives

The overall objective of this research was to investigate the relationship between predictive data analytics and competitive advantage for hotels in Nairobi City County.

The specific objectives were:

1. To establish the extent to which hotels have adopted predictive data analytics.
2. To determine the relationship between predictive data analytics and competitive advantage of hotels in Nairobi City County.

1.4 Value of the Study

This research will benefit policy makers as it provides an awareness of the framework on which predictive data analytics policy can be constructed. The research will attempt to demonstrate the significance of implementing predictive data analytics technology in a company in order to obtain a competitive advantage.

To academicians, much knowledge will be gained from this study. It will establish a better foundation for researchers who would want to carry out research in future related to predictive data analytics adoption by hotels to gain competitive advantage and other related topics.

This study will also benefit the executive management of classified hotels, as it will be used in the future as a reference material to provide management insights into the implementation of predictive data analytics and its relationship to competitive advantage.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter presents a theoretical and empirical review of literature relevant to the study. It also identifies gaps presented by other studies and in addition, shows the conceptual framework illustrating the relationship between variables under study.

2.2. Theoretical Review

The study was anchored on two theories: Technology Acceptance Model and Technology-Organization-Environment Framework.

2.2.1. Technology-Organization-Environment (TOE) Framework

The TOE framework was proposed by Tornatzky and Fleischer (1990) to assess the approval and implementation of new technology by companies as demonstrated in Figure 2.1. The framework analyzes the impact of three aspects (Environment, Organization and Technology) on a company's resolution to take on new technology. Organizational context describes various organizational actions that significantly influence the decision to embrace new technology. Environmental context deals with how a company conducts its business in an environment which is described by competition, regulatory governance, and the industry in general. Technological context describes technologies, both internal and external to the organization which influence the firm’s ability to adopt and integrate new technology Chau (2001).

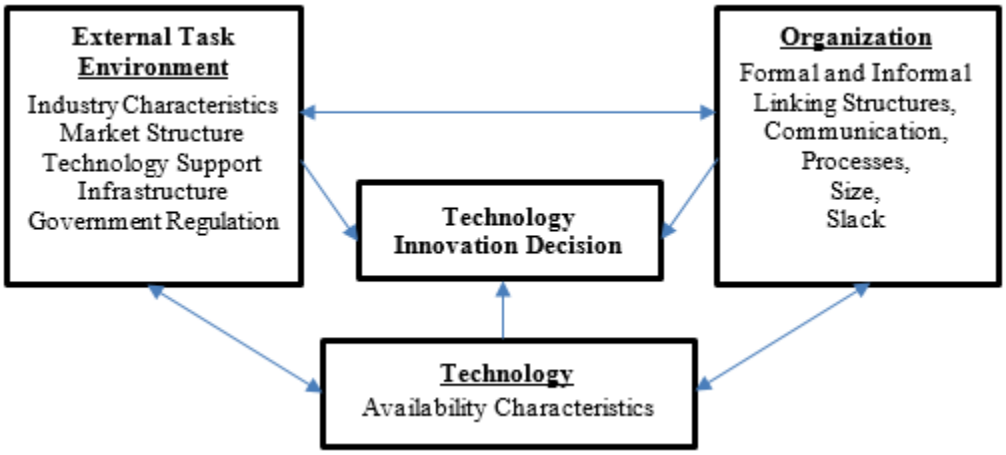

Figure 2.1 : Technology-Organization-Environment (TOE) Framework

Source: Tornatzky & Fleischer, (1990).

TOE framework however, only assesses three out of the many other factors that can influence the adoption of a technology such as social, political and legal elements. According to TOE framework, technology adoption by firms is influenced by: external environment factors for instance lack of external support, the technological factors such as the choice of solution to adopt and quality of IT infrastructure, and finally the organizational factors such as project management policies, user involvement, communication channels and cultural differences Abbasi, Sarker and Chiang (2016).

The relevance of this theory in this study is on its emphasis on the three domains of a business environment which affect adoption of technology and which hotels need to assess prior to adopting technology.

2.2.2. Technology Acceptance Model (TAM)

TAM models the way users make decisions on whether to reject or accept a specific technology as shown in Figure 2.2. The model, developed by Davis (1989), posits that

user's acceptance or rejection of new technology is principally influenced by its Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). As recorded by Davis (1989), PU refers to a user's conviction that the technology will be helpful in improving job performance. PEOU on the other hand is the confidence level of the user on the ease of implementation and use of the technology as either an actual system or as a mediator. Additionally, Venkatesh and Davis (2000) found that PU is directly influenced by PEOU.

Ajibade, (2018) criticizes the use of TAM in explaining the adoption of technology by institutions. The researcher observes that TAM is not applicable for organizations that adopt technology. According to the researcher, TAM is applicable to the adoption of technologies by individuals but not institutions. This is because in institutions there are other factors that have to be considered prior to adopting any technology.

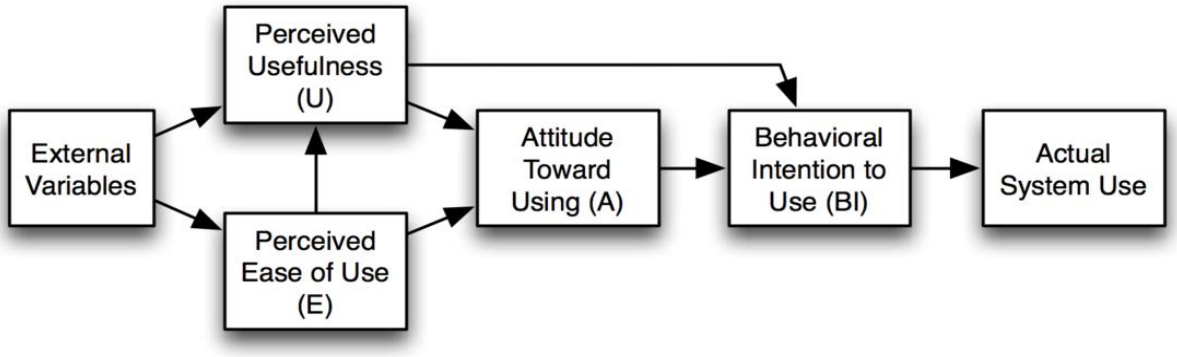

Figure 2.2 : Technology Acceptance Model (TAM)

Source (Davis, 1993)

TAM relevance to this study is in its ability to show hotels' potential perceptions and their effects on adoption of predictive data analytics. Moreover, the theory gives emphasis on why individuals adopt various technologies with respect to their perceived usefulness.

2.3. Empirical Studies

While predictive data analytics is viewed as a breakthrough technological advancement in the business and academic environment Mikalef, Krogstie, Pappas and Pavlou, (2019) sees the need to have more debate on whether and how predictive data analytics can result in a firm's competitiveness. Arnott and Pervan (2016) states that firms ought to be cautious for the ungrounded optimism with initiatives of data analytics while many studies venture into challenges and decisions faced by firms in their quest to gain a competitive position using data analytics (Günther, Mehrizi, Huysman & Feldberg, 2017). According to Sharma, Mithas and Kankanhalli (2014), data analytics creates business value, they posit that investing in BDA is a source of gaining competitiveness.

Liu (2014) clearly illustrates the importance of making investments in predictive data analytics. The researcher observes that data analytics consists of a core differentiator between low-performance and high-performance organizations as it has facilitated organizations to be swift and proactive in identifying opportunities for new business and to be environmentally competitive. Moreover, the research records that data analytics reduces the cost of customer acquisition by 47% and increases revenues by 8% hence improving a firms competitive positioning.

Nathan, Dilip and Jules (2017) reckons that a number of technology companies have employed analytics to forecast the service or a product a customer may want to purchase and later offering recommendations. For instance, it is estimated that over one-third of Amazon's customers' purchases are generated by its recommendation engine by using artificial intelligence in the determination of a rank and serve up the appropriate product or

service recommendation. This means that predictive analytics as used by large corporations such as Amazon contribute to the competitive positioning of the company.

Solutions of the BDA are perceived as a new growing technology that supports businesses for better performance of the firm (Ndambo, 2016). In the process of apportioning resources firms need to be deliberate in making investments in solutions of BDA having realized the economic value of BDA. In the investigations on the effect of BDA implementation on firms' market value, Lee, Kweon, Kim and Chai, (2017) propose that those firms that invest in big data analytics solutions are looked upon favorably by investors in stock market. The study was limited since it used a small sample population due to the fact that BDA is still a growing and emerging technology, the research could not gather an adequate number of announcements. By considering ROA and ROI of firms, research in the future ought to pay attention to assessing the long-term influences of BDA adoption (Lee et al., 2017).

In their study of using BDA for competitive advantage, Arora and Rahman (2016) observed that data analytics, if applied appropriately, can give firms significant opportunities in meeting their customers' needs in unique ways and enhancing performance. Arora and Rahman (2016) posit that data alone cannot present competitiveness to a firm, rather it is the ability of the firm to combine data from various sources and extract value from it, in conjunction with other complementary firm assets in way that is aligned to the strategy of the firm. The study observed that predictive data analytics must be used jointly with the resources in a firm, to gain competitive advantage.

Similarly, Lambrecht and Tucker (2015) asserts that for firms to compete using data analytics it takes more to utilization of data science and mining techniques and knowledge to discover patterns and insights in raw data. The study states that to build a sustainable competitive advantage an organization must leverage its key resources that are unique and hard to replicate. The advantage is built through learning and experience of the organization via knowledge and information possessed by the firm. The study by Lambrecht and Tucker (2015) was however limited since it used a single-case study in a particular industry, its outcomes recommended further research to be conducted before generalizations in other industries can be made to understand the role of predictive data analytics as a dynamic capability in business strategy and competitive advantage.

Nderi (2014) conducted a research on the use of data analytics and its impact on the business results of banks in Kenya with the aim of determining the areas in which banks were applying business analytics and the factors driving the adoption of the technology. The study, based on a census survey of 44 banks, found that business analytics was key and positively related to their performance. However, the study was limited in comparison to the current study in that it focused on the banking industry, different from this study's focus on hospitality.

Similarly, Ndambo (2016) conducted a research on the impact of predictive data analytics on competitive advantage of insurance firms and banks in Nairobi. The study, with a sample population of 20 commercial banks commercial banks and 25 insurance companies, found that the technology was in use by a big number of respondents, though in their early stages. Inferential analysis revealed that predictive data analytics adoption accounted for 60 percent of the respondents' competitive advantage. One of the recommendations of the

study was that banks and insurance companies need to prioritize predictive data analytics investments and adopt the test and learn mentality to help them determine the extent of adopting business intelligence.

2.4. Challenges in the Use of Predictive Data Analytics

The adoption of predictive data analytics comes with its own share of challenges. Referencing the organization elements of TOE framework and the PU element of TAM model of technology adoption, it is evident that the more difficult a given technology is to use, the less likely end users are to adopt it. In their studies, Rigby and Bilodeau (2013) argue that the value of predictive data analytics may not be apparent to everyone in an organization, and therefore it takes the effort and support of senior management to influence and cascade its relevance staff with respect to the main objectives of businesses.

In support of this view, Sahay and Ranjan (2008) reckons that senior management makes a great contribution in influencing an organization's adoption of advanced technology by making key decisions where adoption of predictive data analytics is seen as one. It is therefore inherent that inadequate top management support is a key impediment towards adopting predictive data analytics systems.

Galletti and Papadimitriou, (2013) noted that companies are putting efforts to implement predictive data analytics as a strategic mechanism within organizations, however, there are several hurdles that impede the process. Data analytics technologies cannot operate in isolation, but need human resource with the requisite skills, knowledge, capability and mandate, along with management support in order to deliver the sustainable competitive advantage to a firm (Bradlow et. al., 2017).

A lot of storage space and processing power is required to extract, analyze and report on the insights coming forth from this data thus requiring businesses to invest more in terms of equipment, technology and human resources (He, 2014). According to Ferreira and Otley (2014) predictive analytics solutions are typically designed for highly specialized and skilled staff with statistical modelling knowhow. Ferreira and Otley (2014) claim that the field of predictive data analytics has limited expertise and professionals with the relevant skills making it an expensive affair for businesses to hire or even outsource the skill.

According to Ndambo (2016), the most common challenges faced by banks and insurance companies when implementing data analytics were in the areas of speed of data processing, regulatory requirements, data access, data security and lack of trained data analysts. Mbaluka (2013) also identifies other challenges such as privacy issues, difficulty in information access and sharing (silos), varying characteristics of big data and difficulty in analyzing new data types. Other challenges identified include time taken to analyze huge data sets, inadequate support from management and a high cost of storing and analyzing the data.

2.5. Conceptual Framework

Conceptual framework identifies two variables: predictive data analytics as the predictor and competitive advantage as the dependent variable as presented in Figure 2.3. Additionally, the framework points out the indicators for each of the listed variables where the level of data analytics technology adoption and data-driven decision making operationalize predictive data analytics. The study seeks to establish the influence that

these have on competitive advantage which, on the other hand, is measured by three factors: Product differentiation, Cost leadership and Focus strategy.

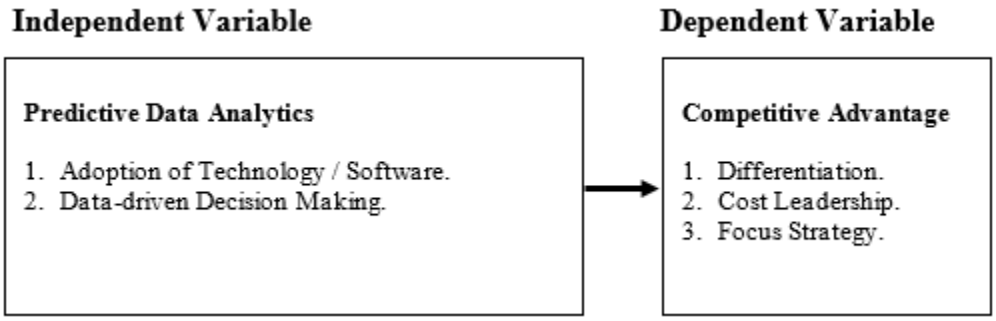

Figure 2.3 : Conceptual Framework

Author: Researcher, (2019)

From Figure 2.3, the dependent variable is competitive advantage while the independent variable is predictive data analytics.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter covers research design, population, data collection and analysis techniques.

3.2. Research Design

The study assumed an analytical cross-sectional survey design to explore the relationship between two parameters namely predictive data analytics, which was the predictor and competitive advantage, the dependent variable. Further, the study relied heavily on primary data gathered during the period of research. Mugenda and Mugenda (2003) clarified that cross-sectional survey gathers information to make deductions about the subject under study at a specific period.

3.3. Population

The research adopted a complete enumeration survey of all 53 classified hotels in Nairobi City County. These hotels are classified as either Two-Star, Three-Star, Four-Star or Five-Star, a list of which is included in Appendix II.

3.4. Data Collection

The study used primary data obtained using a semi-structured questionnaire. (Appendix I). The researcher administered two questionnaires in each of the participating hotels, targeting IT Data Analysts, Customer Service Managers and / or Marketing Managers. The questionnaires had two sections designed in such a way to have the first obtaining data on staff demographics (gender, age, occupation, education level) while the second part of the questionnaire collected hotel data on the use of predictive data analytics technology for decision making as well as competitive advantage.

3.5. Validity and Reliability Tests

Validity was measured by seeking opinions of experts in the hospitality industry who included Information and Communication Technology (ICT) experts, customer service staff, customer experience and marketing managers. Researcher's supervisors also contributed to shape the validity of the questionnaires through critiquing and reviewing the content and questions to align with the study objective. The structure and organization of the measuring instrument was such that different sections were designed to collect specific data related to each of the following aspects; predictive data analytics technology adoption, the use of this technology in making business decisions and the competitive advantage indicators. Based on this, the experts who were consulted and the researcher's supervisors were of the opinion that the content measured what it ought to measure. Additionally, they confirmed that the semantics of the questionnaire instructions and questions, both structured and unstructured, to be unambiguous. To ascertain, this the researcher pre-tested the questionnaire by administering it to five selected hotels on two different random occasions, both of which presented consistent responses.

3.6. Data Analysis

Data from duly filled questionnaires was coded for analysis using Statistical Package for Social Sciences (SPSS). Descriptive statistics were employed to show the extent of predictive analytics adoption by the hotels. To determine the relationship between predictive data analytics adoption and use by the hotels and their competitive advantage, the researcher employed a linear regression model with composite scoring.

The regression model used is illustrated below;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Where;

Y	=	Competitive Advantage
β_0	=	Constant Term
β_1, β_2	=	Regression Coefficient
X_1	=	Adoption of Technology/Software
X_2	=	Data-Driven Decision Making
ε	=	Error Term

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1. Introduction

This chapter presents analysis of data, interpretation of the results and discussions pertaining to the study.

4.2. Response Rate

Out of the 53 hotels contacted for the survey, 38 hotels were responsive to the study questionnaire translating to a response rate of 71.7% which was well fitted for the study. Mugenda and Mugenda (2003) postulates that a response rate of 70% and above are excellent for presentation in a research.

4.3. General Information on Respondents

Respondent's demographic data that was sought for in the study included gender, age, job title and education level while that of the hotels included their rating and the duration for which the hotels have been in operation.

4.3.1. Gender of the Respondents

The research sought to assess the gender of respondents where 52.6 per cent were women while 47.4 per cent were male, as shown in Table 4.1. From the results, it is therefore correct to note that the study considered fairly balanced views of both genders.

Table 4.1 : Gender of the Respondents

Gender	Frequency	Percent
Male	36	47.4
Female	40	52.6
Total	**76**	**100.0**

4.3.2. Age of the Respondents

Respondents' age distribution, which was also important for the study is presented in Table 4.2.

Table 4.2 : Age of the Respondents

Age (Years)	Frequency	Percent
Below 30 years	21	27.6
30-40 years	32	42.1
41-50 years	17	22.4
51-60 years	6	7.9
Total	**76**	**100.0**

From Table 4.2 it is clear that majority of the respondents were between 30-40 years old representing 42.1% of total respondents. These are millennials (Generation Y) generally known for their association with information age and ability to use digital technologies.

4.3.3. Respondents' Job Titles

In terms of job roles, the study established that 50% of the respondents were data analysts, 27.6% were marketing managers while 22.4% were customer service managers as shown in Table 4.3. The study targeted the above respondents because their roles and responsibilities in hotels make them conversant with the area of study.

Table 4.3 : Respondents Job Roles

Job Role	Frequency	Percent
Data analyst	38	50.0
Customer Service Manager	17	22.4
Marketing Manager	21	27.6
Total	**76**	**100.0**

4.3.4. Respondents Level of Education

The study established that 47.4% of the respondents had undergraduate degree as the highest level of education while 38.2% had diploma certificate. Only 14.5% had Master's degrees as the highest level of education. From Table 4.4, it is evident that the respondents were well educated to be able to provide satisfactory answers to the questionnaire items.

Table 4.4 : Respondents Level of Education

Level of Education	Frequency	Percent
Master's degree	11	14.5
Undergraduate degree	36	47.4
Diploma certificate	29	38.2
Total	**76**	**100.0**

4.3.5. Hotel Classification

The study sought to understand the star ratings of the hotels where it was established that 36.8% were Four-Star, 28.9% were Three-Star, 21.1% were Two-Star while 13.2% were Five-Star hotels. This is shown in Table 4.5.

Table 4.5 : Hotel Classification

Hotel Classification	Frequency	Percent
Two-Star	8	21.1
Three-Star	11	28.9
Four-Star	14	36.8
Five-Star	5	13.2
Total	**38**	**100.0**

4.3.6. Duration for Which Hotels Have Been in Operation

Data collected on the duration for which the hotels have been in operation, as shown in Table 4.6, indicated that 15.8% of the hotels had been operational for 1-5 years, 23.7% for 6-10 years, 28.9% of them had been operating for 11-15 years, 18.4% for 16-20 years and 13.2% of the hotels had been operational for over 20 years.

Table 4.6 : Duration for Which Hotels Have Been in Operation

Duration (Years)	Frequency	Percent
1-5 years	6	15.8
6-10 years	9	23.7
11-15 years	11	28.9
16-20 years	7	18.4
Over 20 years	5	13.2
Total	**38**	**100.0**

4.4. Adoption of Predictive Data Analytics by Hotels

Data collected on the adoption of predictive data analytics established that most hotels were aware of predictive data analytics and that they had already adopted the technology for decision making. Microsoft Excel and Google Fusion Tables and Apache Spark topped the list of technology / tools that are widely used in the hospitality industry with a mean of 4.0658, 4.0 and 3.9605 respectively as presented in Table 4.7.

Table 4.7 : Adoption of Predictive Data Analytics by Hotels

Data Analytics Tool	Mean	Standard Deviation
R Programming	3.9079	1.02212
Python	3.8026	.93836
IBM Business Analytics	3.5921	1.39693
Oracle Analytics Cloud	3.9079	1.02212
Microsoft Power BI	3.5132	1.27010
SAP Predictive Analytics	3.9216	1.05600
SAS Visual Analytics	3.9316	1.03076
Hadoop Big Data	3.4447	.93387
Google Fusion Tables	4.0000	1.01980
Microsoft Excel	4.0658	.92859
Apache Spark	3.9605	1.22682
Tableau Public BI	3.4737	1.20525

As to how predictive data analytics technology has been used by the hotels for data-driven decision making, the respondents were required to rate relevant statements on five point likert scale ranging from “Strongly Disagree”, “Disagree”, “Neutral”, “Agree”, and “Strongly Agree”. Table 4.8 shows the corresponding mean for each of the statements ranging from 3.5263 to 3.9605 implying that the hotels use predictive analytics technology for data-driven decision making.

Table 4.8 : Predictive Data Analytics for Data-Driven Decision Making

Management Decision	Mean	Std. Deviation
My hotel makes decisions based on hard data rather than intuitive or based on observation alone.	3.7895	1.07475
My hotel analyzes data, both qualitative and quantitative, to make smart data driven business decisions.	3.9605	.85543
Data Management team is usually consulted when making critical decisions.	3.8026	1.05855
My hotel uses predictive data analytics to make decisions on new products and service packages for customers.	3.8421	1.14371
My hotel uses predictive data analytics to discard or discontinue an existing products or service package for customers.	3.8947	1.13817
My hotel is in touch / has linkages with other players in hospitality industry to leverage variety of customer data sources.	3.8421	1.31709
My hotel values customers' feedback and use it to continuously improve customer experience decisions accordingly.	3.9079	1.54210
The preferences of customers with respect to products and services by the hotel is assessed using predictive data analytics	4.0526	1.32559
My hotel management uses data to make decisions whenever the decisions follow directly from the data.	3.5789	1.37853
Predictive data analytics is used to make decisions on staffing resources deployed at different times.	3.6579	1.28117
Predictive data analytics is used to make decisions on the appropriate time to carry out maintenance / renovations of the hotel.	3.5921	1.33843
Predictive data analytics is used to make decisions on promoting certain sports events or special cuisines.	3.5263	1.25935

From Table 4.8, the respondents agreed with the questionnaire with the means ranging from 3.5263 and 4.0526. Most notably, the respondents agreed that the preferences of customers with respect to products and services offered by hotels are assessed using predictive data analytics as shown by a mean of 4.0526 and a standard deviation of 1.32559. The respondents also agreed that; hotel analyzes data, both qualitative and quantitative, to

make smart data driven business decisions (Mean (M) =3.9605, Standard Deviation (SD) = .85543), hotel values customers' feedback and use it to continuously improve customer experience decisions accordingly (M=3.9079, SD=1.54210) and that hotel uses predictive data analytics to discard or discontinue an existing products or service package for customers (M=3.8947, SD=1.13817). These findings imply that most of the hotels which participated in the study use predictive data analytics to make decisions on customer experience and retention, new products, service packages, resources, maintenance / renovations, competition among other key decisions.

As to whether the hotels maintain database of transactional data on products, customers, services and suppliers. As shown in Table 4.9, 81.6% of the hotels have the databases while only 18.4% did not have. Predictive data analytics technology is based on past business data to build models used to support decision making. Retention of transaction data by most of the hotels therefore indicates that they have the fundamental requirements for using predictive data analytics.

Table 4.9 : Database of Transactional Business Data

	Frequency	Percent
Yes	31	81.6
No	7	18.4
Total	**38**	**100.0**

4.5. Challenges in the Use of Data Analytics

The study sought to identify the hurdles facing the implementation of data analytics in hotels. The respondents were required to rate the extent of such challenges on a five point likert scale where; **1**-"Very Little Extent", **2**-"Little Extent", **3**- "Moderate extent", **4**- "Great Extent", **5**-"Very Great Extent".

Table 4.10 : Challenges in the Use of Predictive Data Analytics

Challenges in the use of Data Analytics	Mean	Std. Deviation
Staff resistance to change (implement new technology)	3.5000	1.24900
Lack of awareness for staff on the technology.	3.5921	1.34836
Lack of adequate and relevant training for the staff.	3.5995	.98578
Inadequate support from top management	3.1842	.94813
Prohibitive cost of implementing technology	3.3684	.90689
Inadequate infrastructure for the technology	3.2632	1.14738
Technology considered too complex for the hotel	3.5921	1.03509
Technology considered irrelevant for operations	3.3092	1.17180

As presented in Table 4.10, the respondents highlighted low staff awareness, lack of adequate training and technological complexity challenges as the key challenges that hotels face in the implementation of predictive data analytics technology. To a moderate extent the respondents agreed that the challenges include; inadequate support from top management, prohibitive cost of implementing technology, inadequate infrastructure for the technology and technology considered irrelevant for operations as shown by means of 3.1842, 3.3684, 3.2632 and 3.3092 respectively.

4.6. Competitive Advantage

Competitive advantage was analyzed by looking at product differentiation, cost leadership and focus strategy indicators of the hotels. The respondents were asked to indicate their level of agreement to the statements on competitive advantage using the following scale; **1**-"Very Little Extent", **2**-"Little Extent", **3**- "Moderate extent", **4**-"Great Extent", **5**-"Very Great Extent".

In terms of product differentiation, the respondents acknowledged to a large extent that hotels use technology to promote products and services as shown by a mean of 4.4211 and a standard deviation of 1.09684 as shown in Table 4.11. The respondents also agreed to a

great extent that; products and services are produced and offered by skilled staff (M=3.8421,SD=1.07148), customers can easily access their hotel (M=3.7632,SD=1.12982), hotel ensures timely services to customers (M=3.7632,SD=.99154), the hotel uses up to date technologies in providing services and production of products (M=3.6842, SD=1.17995) and the hotel produces products based on customer demands (M=3.6711,SD=.1.11221). The results imply that the hotels employ product differentiation so as to beat competition.

Table 4.11 : Product Differentiation

Product Differentiation Indicator	Mean	Std. Deviation
The hotel provides unique products and services.	3.3553	1.02897
The hotel produces products based on customer demands.	3.6711	1.11221
The hotel ensures timely services to customers.	3.7632	.99154
Customers can easily access our hotel	3.7632	1.12982
The hotel uses up to date technologies in providing services and production of products	3.6842	1.17995
Our products and services are produced and offered by skilled staff	3.8421	1.07148
We use technology to promote the hotel	4.4211	1.09684
We offer unique products and services in comparison to our competitors	3.1711	1.32049

The study also sought to establish the competitive advantage developed from cost leadership strategies by the hotels. From the results shown in Table 4.12, respondents agreed that the hotels use cost leadership to remain competitive in the market (M=3.8816, SD=1.42330) and that the prices charged on their products and services are worth the quality of the product (M=3.8026, SD=1.38583). The respondents further agreed that focus on cost leadership has not diminished the quality of their products and services as shown by a mean of 3.7895 and a standard deviation of 1.11135. In taking advantage of cost

leadership, the hotels ensure that their products are affordable, best priced as compared to competitors without compromising the quality of products.

Table 4.12 : Cost Leadership

Cost Leadership Indicator	Mean	Std. Deviation
Our products and services are affordable	3.8553	.91948
We offer the best price of products and services in the market in comparison to competitors	3.5395	.85543
The prices charged on our products and services are worth the quality of the product	3.8026	1.38583
We use cost leadership to remain competitive in the market	3.8816	1.42330
New entrants are not able to compete with our prices	3.6053	1.09641
Quality of our products and services not reduced.	3.7895	1.11135

In terms of focus strategy, the respondents agreed to the questionnaire statements to a great extent with respective means ranging from 3.7632 to 3.9737 as shown in Table 4.13. The respondents agreed that they use their staff competencies to reduce production costs (M=3.9737, SD=1.00630), products and services target a specific market (M=3.7632, SD=1.06919), advertisements target segment of customers (M=3.7763, SD=1.09055), success in the market is cemented by focusing on a specific target market (M=3.8947, SD=1.30209), collect feedback on products from customers (M=3.7895, SD=1.12328), implement the feedbacks from customers to improve products and services (M=3.9342, SD=1.12351). The findings therefore imply that the hotels apply focus strategy such as staff competencies, market segmentation and customer feedback among others in order to beat competition.

Table 4.13 : Focus Strategy

Focus Strategy Indicator	Mean	Std. Deviation
We use our staff competencies to reduce production costs	3.9737	1.00630
Our products and services target a specific market	3.7632	1.06919
Our advertisements target our segment of customers	3.7763	1.09055
Our success in the market is cemented by focusing on a specific target market	3.8947	1.30209
We collect feedback on our products from our customers	3.7895	1.12328
We implement the feedbacks from our customers to improve our products and services	3.9342	1.12351

4.7. Predictive Data Analytics and Competitive Advantage

To determine the relationship between predictive data analytics and competitive advantage of hotels, which was the key objective of the study, the researcher carried out a linear regression analysis on SPSS.

4.7.1. Model Summary Results

The researcher introduced a new composite indicator namely Competitive Advantage. The new indicator was calculated by taking the mean of three individual variables: Product Differentiation, Cost Leadership and Focus Strategy.

Table 4.14 : Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.713[a]	.508	.494	.42841

a. Predictors: (Constant), Data-Driven Decision Making, Adoption of Technology

The coefficient of determination shows the changes in the dependent variable (competitive advantage) that can be determined by the percentage of variability in the independent

variables (adoption of technology/software and use of technology in data-driven decision making). The findings shown in Table 4.14 indicated that the predictive data analytics explained 50.8% of competitive advantage of the study population. This implies that other factors not considered in the study contribute the remaining 49.2% of competitive advantage.

4.7.2. Analysis of Variance

Table 4.15 : Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.825	2	6.912	37.664	.000[b]
	Residual	13.398	73	.184		
	Total	27.223	75			

a. Dependent Variable: Competitive Advantage

b. Predictors: (Constant), Data-driven Decision Making, Adoption of Technology / Software

Table 4.15 shows the ANOVA results where the significance of the model is determined using the F statistic and the p value.

4.7.3. Model of Coefficients

The use of predictive data analytics (adoption of technology/software and its use in making data-driven decision) was statistically significant in explaining the competitive advantage of classified hotels because the probability value obtained from the regression model was below 0.05 (5%), P=0.000.

The linear regression model obtained in this study was:

$Y= 1.225 + 0.313X_1 + 0.320X_2 + \varepsilon$

Table 4.16 : Model Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.225	.284		4.312	.000
	Adoption of Technology/Software	.313	.084	.372	3.744	.000
	Data-driven Decision Making	.320	.073	.433	4.362	.000

a. Dependent Variable: Competitive Advantage

The regression model obtained indicates a positive relationship between predictive data analytics, as measured by the adoption of technology/software and the use of analytics for data-driven decision making, and competitive advantage of hotels. As shown in Table 4.16, holding other predictor variables at zero, competitive advantage would be 1.225 as shown by the constant term. Further, with other factors held constant, a unit change in adoption of technology/software results into an increase of competitive advantage by 0.313 units while a unit change in the use of predictive analytics in decision making results into an increase of competitive advantage by 0.320 units.

4.8. Discussion of Research Findings

The study established that most hotels had adopted data analytics technology and that they were actively using business data for smart data-driven decisions. It was further noted that products and services by hotels are assessed using predictive data analytics. These findings are corroborated by Ndambo (2016) who indicated that many organizations are now adopting data analytics for decision making. In his findings, the researcher indicated that many of the institutions surveyed were at their early stages of adopting big data. Inferential

analysis revealed that predictive data analytics adoption accounted for 60 percent of the respondents' competitive advantage.

The study also established that classified hotels in Nairobi County faced various challenges in the implementation and use of data analytics such as lack of adequate and relevant training for staff in the use of the technology and resistance of staff to change. These findings are in line with a study by Gloria and Angela (2014) which acknowledges that although businesses are increasingly aware of the competitiveness they can obtain from data-driven decisions, they are also struggling to implement data strategies to overcome the associated challenges, ranging from the collection of data from different sources to lack of relevant skills. Arguing in the same vein, Galletti and Papadimitriou, (2013) noted that while companies are putting efforts to successfully implement predictive data analytics to aid in the decision-making process there are several hurdles that threaten to impede the process.

Regression results indicated that the predictive analytics contributed 50.9% of competitive advantage of classified hotels in Nairobi City County. The regression model obtained also point to a positive relationship between predictive analytics and competitive advantage of hotels. These findings concur with Arora and Rahman (2016) who noted that data analytics, if applied appropriately, can give firms significant opportunities in meeting their customers' needs. Arora and Rahman (2016) posit that data alone cannot present competitive advantage to a firm, rather it is the ability of the firm to combine data from various sources and extract value from it, in conjunction with other complementary firm assets in way that is aligned to the strategy of the firm.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This chapter presents a summary of the data analysis findings done in chapter four. Conclusion drawn, recommendations made from the findings as well as the limitations encountered in the field during data collection are also presented in this chapter.

5.2. Summary of Findings

The study established that most of the hotels are well aware of predictive data analytics and that they have adopted the technology to a great extent to aid in the process of decision making. Microsoft Excel, Google Fusion Tables, Apache Spark, SAS Visual Analytics, SAP Predictive Analytics, R Programming, Oracle Analytics Cloud and Python had been adopted and used by the hotels to a large extent.

Regarding the challenges faced in the adoption of data analytics, the study established that besides lack of adequate training for the staff in the use of predictive analytics technology, hotels also suffer inadequate support from top management to adopt data analytics. Additionally, the cost of implementing the technology and inadequate infrastructure prohibit the intake of data analytics.

Competitive advantage was analyzed by looking at focus strategy, cost leadership and product differentiation. The respondents were in agreement that hotels use analytics technology to understand their customer demands in detail. Through such insights, hotels provide high quality products specifically tailored for their customers. On cost leadership strategies, the respondents agreed that the hotels remain competitive in the market by

offering specific products and services at costs relatively lower in the market. The respondents further agreed that focus on cost leadership by the hotels was employed without compromising on the quality of services offered. In terms of focus strategy, the respondents agreed that they use their staff competencies to reduce production costs and that they had their specific customer segments cut out to which their advertisement campaigns and efforts are directed. The respondents further noted that they collect feedback from customers which is used to improve products and services offering.

5.3. Conclusion

On the basis of the results, the study concludes that graded hotels in Nairobi City County have embraced and used various data analytics tools to make data-driven decisions. However, the extent of adoption differed from one hotel to another. Every business is under pressure to remain competitive and on the other hand, customers are increasingly demanding and expecting high quality services affordably. These unforgiving market conditions notwithstanding, data analytics is promising to provide managers with the insights they need to make better and faster decisions which, as expected, would improve their competitive position in the marketplace. The study further concludes that there is a significant relationship between the use of predictive data analytics for decision making and hotels' competitive advantage. Classified hotels that had adopted predictive data analytics are able to make better and timely decisions in addition to improving their overall operational efficiency and hence had superior performance compared to their competitors. The transformation of data into information and consequently into knowledge is part of a traditional information value chain that uncovers insights, based on which business users make their decisions.

5.4. Recommendations

This study recommends that classified hotels should invest in IT infrastructure and specialized human capital as these are the antecedents of predictive data analytics. This will ensure maximum leverage on technology to gain competitive advantage. For this to be successful, top management of the hotels should support the process of adoption of data analytics.

With proper understanding, managers can strategically and coherently leverage data resources to gain competitive advantage.

5.5. Limitations

One big challenge in this study was the unwillingness of the respondents to provide the required information. Some of the respondents were unable to participate as a matter of business policy. Some hotels also has elaborate procedures to address study surveys, some of which required more time than was available for the survey.

5.6. Suggestions for Further Research

The current study focused on the relationship between the use of data analytics by star-classified hotels in Nairobi City County and their competitive advantage. Similar studies are recommended for hotels in other counties as well as firms in other industries such as manufacturing firms, agricultural sector and financial institutions among others.

REFERENCES

Abbasi, A., Sarker, S., & Chiang, R. H. (2016). Big data research in information systems: Toward an inclusive research agenda. *Journal of the Association for Information Systems*, *17*(2), I.

Ajibade, P. (2018). Technology acceptance model limitations and criticisms: *Exploring the Practical Applications and Use in Technology-related Studies, Mixed-method, and Qualitative Researches.* University of Nebraska – Lincoln.

Arnott, D., & Pervan, G. (2016). A critical analysis of decision support systems research revisited: *The rise of design science. In Enacting Research Methods in Information Systems* (pp. 43-103). Palgrave Macmillan, Cham.

Arora, B., & Rahman, Z. (2016). Information technology investment strategies: A review and synthesis of the literature. *Technology Analysis & Strategic Management*, *28*(9), 1073-1094.

Babu, M. P., & Sastry, S. H. (2014, June). Big data and predictive data analytics in ERP systems for automating decision making process. *In 2014 IEEE 5th International Conference on Software Engineering and Service Science* (pp. 259-262). IEEE.

Barnatt, H. J. (2015). Tutorial: Big data analytics: Concepts, technologies, and applications. *Communications of the Association for Information Systems*, *34*(1), 65.

Bradlow, E. T., Gangwar, M., Kopalle, P., & Voleti, S. (2017). The role of big data and predictive data analytics in retailing. *Journal of Retailing, 93(1), 79-95.*

Chau, P. Y. (2001). Influence of computer attitude and self-efficacy on IT usage behavior. *Journal of Organizational and End User Computing (JOEUC)*, *13*(1), 26-33.na

Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS quarterly*, *36*(4).

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly 13* (3), 319-340

Davis, F. D. (1993). User acceptance of information technology: System characteristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies*, *38*(3), 475-487

Eric, W. (2018). *The 4 Phases of Predictive Data Analytics.* Retrieved from https://demand-planning.com/2018/10/10/the-4-phases-of-predictive-analytics/

Eye for travel (2019). *Bringing Predictive Analytics to the Hotel Industry. Business Intelligence*. Retrieved from. https://www.eyefortravel.com/sites/default/files/1613_eft_predictive_analysis_report_v3.pdf

Ferreira, A. and Otley, D. (2014). *"The design and use of performance management systems: an extended framework for analysis",* Management Accounting Research, 20, pp. 263-282.

Forbes travel guide (2014). *Forbes Travel Guide Announces 2014 Star Ratings.* Retrieved from https://www.forbes.com/sites/forbestravelguide/2014/01/22/forbes-travel-guide-announces-2014-star-ratings/#6eeb7d697d3a.

Galletti, A., & Papadimitriou, D. C. (2013). *How 'Big Data' Analytics are perceived as a driver for Competitive Advantage: A qualitative study on food retailers*, Uppsala University.

Gloria, P., & Angela, H. (2014). *Decision Support with Big Data: A Case Study in the Hospitality Industry.*

Günther, W. A., Mehrizi, M. H. R., Huysman, M., & Feldberg, F. (2017). Debating big data: A literature review on realizing value from big data. *The Journal of Strategic Information Systems*, *26*(3), 191-209.

He, X. J. (2014). Business intelligence and big data analytics: An overview. *Communications of the IIMA*, *14*(3), 1.

Juma, J., (2011). *Information and Communication Technology Adoption among Public Secondary Schools in Kisumu County, Kenya.* Maters Thesis, University of Nairobi.

Lambrecht, A., & Tucker, C. E. (2015). Can Big Data protect a firm from competition?. *Available at SSRN 2705530*.

Lee, H., Kweon, E., Kim, M., & Chai, S. (2017). Does Implementation of Big Data Analytics Improve Firms' Market Value? Investors' Reaction in Stock Market. *Sustainability*, *9*(6), 978.

Liu, Y. (2014). Big data and predictive business analytics. *The Journal of Business Forecasting*, *33*(4), 40.

Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., and Byers, A. (2011). *Big data: The next frontier for innovation, competition, and productivity* [Kindle edition]. McKinsey Global Institute.

Mbaluka, W. (2013). *Big data management and business value in the commercial banking sector in Kenya* (Doctoral dissertation, University of Nairobi).

Mckinsey (2011). *The rise of the African Consumer*: A report from Mckinsey's Consumer Insight Center.

Mikalef, P., Krogstie, J., Pappas, I. O., & Pavlou, P. (2019). Exploring the relationship between big data analytics capability and competitive performance: The mediating roles of dynamic and operational capabilities. *Information & Management*.

Mugenda, O.M., & Mugenda, A.G. (2003). *Research Methods: Qualitative and Qualitative Approaches*. African Centre for Technology Studies, Nairobi, Kenya.

Najdenov, B., & Makhoul, F. (2015). *Predictive analytics–examining the effects on decision making in organizations.*

Namada, J. M. (2018). Organizational learning and competitive advantage. *In Handbook of Research on Knowledge Management for Contemporary Business Environments* (pp. 86-104). IGI Global.

Nathan S., Dilip B., and Jules S. (2017). *Advanced analytics in hospitality: Driving innovation, delighting customers, and capturing value.* Digital McKinsey.

Ndambo, D. (2016). *Big data analytics and competitive advantage of commercial banks and insurance companies in Nairobi, Kenya* (Doctoral dissertation, University of Nairobi).

Nderi, C. G. (2014). *Business analytics and performance of commercial banks in Kenya.* (Master's Thesis, University of Nairobi).

Ochieng, G. F. (2015). *The adoption of big data analytics by supermarkets in Kisumu county* (Doctoral dissertation, Doctoral dissertation, University of Nairobi).

Porter, M. E. (1985). *The competitive advantage: Creating and Sustaining Superior Performance*. NY: Free Press, 1985. (Republished with a new introduction, 1998.)

Ransbotham, S., & Kiron, D. (2017). Analytics as a source of business innovation. *MIT Sloan Management Review, 58*(3).

Rigby, D., & Bilodeau, B. (2013). Management Tools & Trends 2013. Bain & Company. *URL: http://www. bain. Com /consulting-services/strategy/fundamentals-of-growth. aspx*.

Sahay, B. S. and Ranjan, J. (2008). *Real time business intelligence in supply chain analytics.* Information Management &Computer Security, 16, 28-48.

Sharma, R., Mithas, S., & Kankanhalli, A. (2014). *Transforming decision-making processes*: a research agenda for understanding the impact of business analytics on organisations.

Shmueli, G., & Koppius, O. (2010). *Predictive analytics in information systems research*. Robert H. Smith School Research Paper No. RHS, 06-138.

Tornatzky, L., & Fleischer, M. (1990). The process of technology innovation. *Lexington, MA: Lexington Books*.

Tourism Regulatory Authority. (2019). *Classified Tourism Enterprises.* Retrieved from https://www.tourismauthority.go.ke/index.php/resource-centre/downloads/category/12-classified-tourism-enterprises.

Venkatesh, V., & Davis, F. D. (2000). *A theoretical extension of the technology acceptance model: Four longitudinal field studies*. Management Science, 46, 186-204. doi:10.1287/mnsc.46.2.186.11926.

APPENDICES

Appendix I: Research Questionnaire

This questionnaire is intended to assist in conducting a study on the relationship between predictive data analytics and competitive advantage of hotels in Nairobi City County. Your hotel has been nominated to take part in the study. Your frank participation is highly appreciated and will greatly support the objective of the study.

Rest assured that information provided in this questionnaire is strictly confidential and for academic purpose. Thank you.

Section I - General Information

1) Respondent Data – Tick as appropriate

a) Please indicate your Gender.

Male [ ] Female [ ]

b) Please select your age bracket.

Below 30 Years[ ] 30-40 Years [ ] 41-50 Years [ ]

51-60 Years [ ] Over 60 Years [ ]

c) What is your Job Title?

Data Analyst [ ] Customer Service Manager [ ]

Marketing Manager [ ]

Other (Please Specify)……...

d) State your highest level of education.

Ph.D [ ] Master's Degree [ ]

Undergraduate [ ] Diploma [ ]

Secondary School [ ]

Others Please Specify)……...……...

2) Hotel Data – Tick as appropriate

c) Please specify the star rating of your hotel.

2-Star	[ ]	3-Star	[ ]	4-Star	[ ]
5-Star	[ ]				

d) For how long has your hotel been operational in Kenya?

1-3 Years	[ ]	4-10 Years	[ ]	11-15 Years	[ ]
16-20 Years	[ ]	Over 20 Years	[ ]		

Section II - Predictive Data Analytics Adoption and Use - Tick as appropriate.

1) Please select technology / software that your hotel has adopted for predictive data analytics. **(You may choose more than one.)** For each of the selected option(s) specify the extent to which the technology is used, with **1**-"Very Little Extent", **2**-"Little Extent", **3**- "Moderate extent", **4**-"Great Extent", **5**-"Very Great Extent"

Technology / Software Used for Analytics			Extent of Application				
	In-house	**Outsourced**	**1.**	**2.**	**3.**	**4.**	**5.**
R Programming	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Python Programming	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
IBM Business Analytics	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Oracle Analytics Cloud	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Microsoft Power BI	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
SAP Predictive Analytics	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
SAS Visual Analytics	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Hadoop Big Data	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Google Fusion Tables	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Microsoft Excel	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Apache Spark	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Tableau Public BI	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Other (Please Specify)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

2) To what extent do you agree with the following statements about the use of predictive analytics technology for data-driven decision making in your hotel. Please rate each of the statements from 1 to 5 with **1**-"Strongly Disagree", **2**-"Disagree", **3**- "Neutral", **4**-"Agree", **5**-"Strongly Agree"

	1	2	3	4	5
My hotel makes decisions based on hard data rather than intuitive or based on observation alone.	[ ]	[ ]	[ ]	[ ]	[ ]
My hotel analyzes data, both qualitative and quantitative, to make smart data driven business decisions.	[ ]	[ ]	[ ]	[ ]	[ ]
Data Management team is usually consulted when making critical decisions.	[ ]	[ ]	[ ]	[ ]	[ ]
My hotel uses predictive data analytics to make decisions on new products and service packages for customers.	[ ]	[ ]	[ ]	[ ]	[ ]
My hotel uses predictive data analytics to discard or discontinue an existing products or service package for customers.	[ ]	[ ]	[ ]	[ ]	[ ]
My hotel is in touch / has linkages with other players in hospitality industry to leverage variety of customer data sources.	[ ]	[ ]	[ ]	[ ]	[ ]
My hotel values customers' feedback and use it to continuously improve customer experience decisions accordingly.	[ ]	[ ]	[ ]	[ ]	[ ]
The preferences of customers with respect to products and services by my hotel is assessed using predictive data analytics	[ ]	[ ]	[ ]	[ ]	[ ]
My hotel management uses data to make decisions whenever the decisions follow directly from the data.	[ ]	[ ]	[ ]	[ ]	[ ]
Predictive data analytics is used to make decisions on staffing resources deployed at different times.	[ ]	[ ]	[ ]	[ ]	[ ]
Predictive data analytics is used to make decisions on the appropriate time to carry out maintenance / renovations of the hotel.	[ ]	[ ]	[ ]	[ ]	[ ]
Predictive data analytics is used to make decisions on promoting certain sports events or special cuisines.	[ ]	[ ]	[ ]	[ ]	[ ]

3. Does your hotel maintain a database of transactional data on customers, suppliers, products and services?	**YES [ ] NO [ ]**

If YES, briefly explain how this data has been helpful in making business decisions.

……...……

……...……

…….....

…….....

…….....

…….....

…….....

Section III – Challenges Faced in the Implementation of Data Analytics.

1. Please select all the challenges, among those listed below, associated with the implementation of the data analytics technology as applicable to your hotel. For each selected option, please indicate the extent to which the challenge has hindered the application of analytics technology at your hotel. **(You may choose more than one option) 1**-"Very Little Extent", **2**-"Little Extent", **3**- "Moderate extent", **4**-"Great Extent", **5**-"Very Great Extent"

Data Analytics Implementation Challenges		**Extent of Hindrance**				
		1	**2**	**3**	**4**	**5**
i. Staff resistance to change (implement new technology)	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
ii. Lack of awareness for staff on the technology.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
iii. Lack of adequate and relevant training for the staff.	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
iv. Inadequate support from top management	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
v. Prohibitive cost of implementing technology	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
vi. Inadequate infrastructure for the technology	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
vii. Technology considered too complex for the hotel	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
viii. Technology considered irrelevant for operations	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
ix. Other ……..	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
x. Other ……..	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

2. Make any other comments you may have associated with the challenges of adopting data analytics technology in your hotel.

   ……..……

   ……

   ……

   ……

   ……

Section IV - Competitive Advantage

1. To what extent do you agree with the following statements on your hotel's competitiveness in the hospitality industry? Please rate each of the statements from 1 to 5 with **1**-"Strongly Disagree", **2**-"Disagree", **3**- "Neutral", **4**-"Agree", **5**-"Strongly Agree"

Product Differentiation	**1**	**2**	**3**	**4**	**5**	**N/A**
The hotel provides unique products and services.						
The hotel produces products based on customer demands.						
The hotel ensures timely services to customers.						
Customers can easily access our hotel						
The hotel uses up to date technologies in providing services and production of products						
Our products and services are produced and offered by skilled staff						
We use technology to promote the hotel						
We offer unique products and services in comparison to our competitors						

Cost Leadership	**1**	**2**	**3**	**4**	**5**	**N/A**
Our products and services are affordable						
We offer the best price of products and services in the market in comparison to competitors						
The prices charged on our products and services are worth the quality of the product						
We use cost leadership to remain competitive in the market						
New entrants are not able to compete with our prices						
Our focus on cost leadership has not diminished the quality of our products and services.						

Focus Strategy	**1**	**2**	**3**	**4**	**5**	**N/A**
We use our staff competencies to reduce production costs						
Our products and services target a specific market						
Our advertisements target our segment of customers						
Our success in the market is cemented by focusing on a specific target market						
We collect feedback on our products from our customers						
We implement the feedbacks from our customers to improve our products and services						

2. In your opinion, where applicable, what makes your products and services unique in the hospitality industry?

   ……..……..……..……

   ……

   ……

3. In your opinion, where applicable, what enables your hotel to offer the same quality of products and service at lowest prices in the market?

   ……..……..……..……

   ……

   ……

Many thanks for completing this survey.

We appreciate the precious time you took and the honest information you gave to help in our evaluation.

<u>Once again, we undertake to use the data obtained for scholarly purposes only.</u>

Appendix II: Classified Hotel Establishments in Nairobi City County.

Five Star Hotels

1. Intercontinental Nairobi
2. Radisson Blu Hotel Nairobi
3. The Sarova Stanley
4. Villa Rosa Kempinski
5. Fairmont The Norfolk
6. Sankara Nairobi
7. The Boma Nairobi
8. Crowne Plaza Nairobi Airport
9. Tribe Hotel
10. Dusit D2
11. Hemingway's Nairobi

Four-Star Hotels

1. Hilton Nairobi Limited
2. Crowne Plaza
3. Hilton Garden Inn Nairobi Airport
4. City Lodge Hotel At Two Rivers
5. Southern Sun Mayfair Nairobi
6. Eka Hotel
7. Sarova Panafric Hotel
8. Silver Springs Hotel
9. Nairobi Safari Club
10. The Panari Hotel, Nairobi
11. Ole Sereni Hotel
12. Windsor Golf Hotel and Country Club
13. Fairview Hotel
14. Weston Hotel
15. Golden Tulip Westlands
16. Pride Inn Lantana Apartments and Suites

17. Executive Residency by Best Western.
18. House of Waine
19. Carnivore Restaurant

Three-Star Hotels

1. Ibis Styles Nairobi Westlands
2. Azure Hotel
3. Best Western Plus Meridian Hotel
4. Ngong Hills Hotel
5. The Heron Portico
6. Pride Inn Raptha Nairobi,
7. Sportsview Hotel Kasarani
8. Kenya Comfort Suits
9. La Masion Royale
10. The Clarion Hotel
11. Boma Inn Nairobi
12. Utalii Hotel
13. Marble Arch Hotel
14. Fahari Gardens Hotel

Two-Star Hotels

1. Jacaranda Hotel Nairobi
2. Town Lodge
3. Central Park Hotel
4. After 40 Hotel
5. Summerdale Inn
6. Elton Hotel
7. Zehneria Portico
8. Kahama Hotel
9. West Breeze Hotel

Source (TRA, 2019)