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**FACTORS AFFECTING DEMAND FORECASTING ACCURACY IN SHOE
MANUFACTURING COMPANIES IN KENYA**

Kunal Harishchandra Narandass

Admission No 123962

**A dissertation submitted in partial fulfillment of the requirements for the degree of
Master in Business Administration at Strathmore University**



Strathmore University

Nairobi, Kenya

June 2023

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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Kunal Harishchandra Narandass

Approval

The dissertation of Kunal Harishchandra Narandass was approved by the following:

Name of Supervisor: Dr. Ben Ngoye

School/Institute/Faculty: Senior Lecturer, Strathmore University Business School

Dr. Ceaser Mwangi

Executive Dean

Strathmore University Business School.

Dr. Bernard Shibwabo

Director, Office of Graduate Studies

ABSTRACT

The general objective of this study was to assess the factors that affect demand forecasting accuracy in shoe manufacturing companies in Kenya. The specific factors examined in this study included consumer characteristics, product characteristics, competitor activities, external factors, macro-environment factors, forecasting resources and forecasting methods. This study sought to examine the extent to which considering these factors in demand forecasting affects accuracy. A descriptive research design was applied to a target population directly related to the supply chain and forecasting and this constituted employees working in the following departments; sales, marketing, production, procurement and logistics in all shoe manufacturing companies in Kenya. Structured questionnaires were administered to the respondents by the researcher and the collected data was analyzed using descriptive and inferential statistics, and presented in tables and charts. The findings from the analysis revealed that factoring consumer characteristics, product characteristics, marketing activities and competitor activities were significant predictors of demand forecasting accuracy. The positive coefficients of these factors mean that considering them can increase the accuracy of demand forecasting. The results also showed that considering explanatory and macro-environment factors predicted demand forecasting accuracy by positive regression coefficients; thus, enhance the accuracy of forecasting. Additionally, the results suggest that forecasting methods can be used to enhance the accuracy of demand forecasting for shoe manufacturers in Kenya. Lastly, the findings demonstrated that demand forecasting resources partially mediates the association between demand forecasting methods and demand forecasting accuracy. Therefore, demand forecasting resources explain the positive impact of demand forecasting methods on forecasting accuracy.

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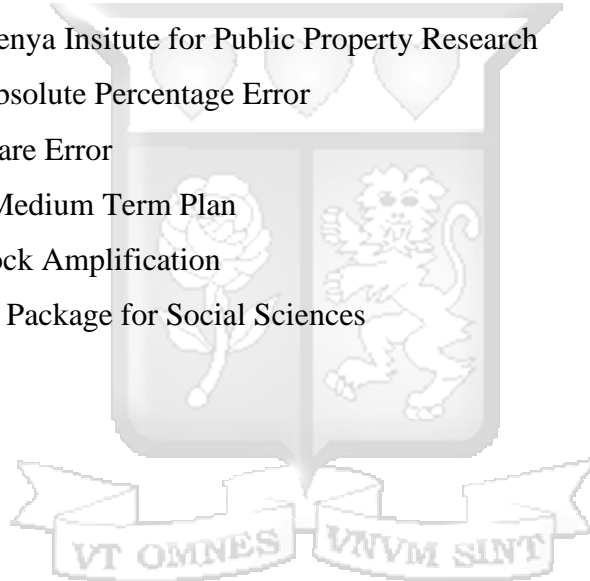


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LIST OF ABBREVIATIONS

- ANN: Artificial Neural Network
ARIMA: Autoregressive Integrated moving average
BDA: Big Data Analytics
BWE: Bullwhip Effect
CFA: Confirmatory Factor Analysis
DWT: Discrete Wavelet Transforms
EFA: Exploratory Factor Analysis
GAM: Generalised Additive Model
GDP: Gross Domestic Product
KIPPRA: The Kenya Institute for Public Property Research
MAPE: Mean Absolute Percentage Error
MSE: Mean Square Error
MTP III: Third Medium Term Plan
NSAmp: Net Stock Amplification
SPSS: Statistical Package for Social Sciences

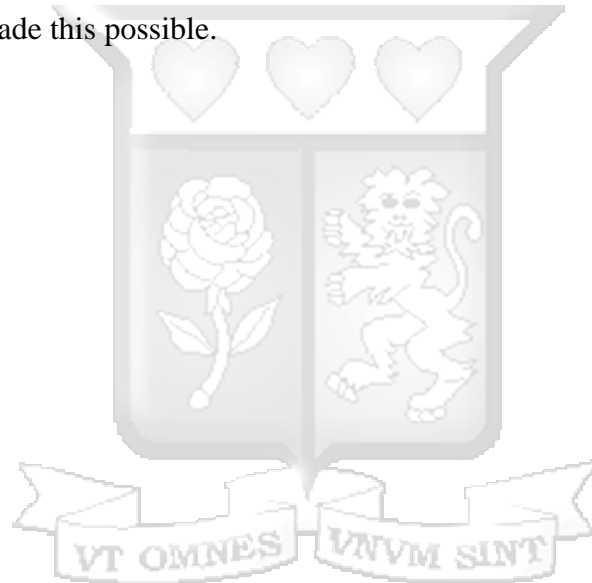


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I sincerely thank my wife, Nirali Patel for being an inspiration in pursuing MBA. You stayed up till late hours of the night, preparing coffee for me as I was writing this project. Those coffees made this possible.



DEDICATION

I dedicate this project to my son Kaveer, your coming into my life has given me the impetus to work harder and make a better world for you.



CHAPTER 1 – INTRODUCTION

1.1 Introduction

This chapter introduces the study. The background and problem statement are discussed. Also, the research objectives and research questions are outlined in this chapter. The scope of the study in terms of sector, size of organization, concepts and geographical location is discussed. Lastly, the significance of the study is presented.

1.2 Background

Since the dawn of civilization, people have always worn something on their feet. With the progress of civilization over time, shoemaking advanced. The shoemaking industry started flourishing from the 18th century and grew further with the emergence of industrialization during the 19th century to become a key economic sector. Currently, the global shoemaking industry has a market size that is estimated to \$ 373.19 billion in 2021. This market size is projected to grow at a compound annual growth rate of 4.3% during the 2022-2030 period (Grand View Research, 2022). The growth of this sector is driven by numerous factors including e-commerce, increased spending on advertising and marketing by shoemaking brands, and the growing demand for athletic shoes (Grand View Research, 2022). Additionally, the increasing prevalence of lifestyle-related health problems like obesity and stress is increasing the number of people engaging in fitness and sports activities, further driving the demand for stylish and comfortable shoes.

The shoe manufacturing sector is a crucial economic sector in developing nations. First, shoes are a basic need in addition to clothing, shelter and food. Additionally, shoe making companies make use of labor-intensive processes; as a result, these companies contribute significantly to employment creation (Okello, 2016). Furthermore, shoemaking companies generate backward linkages in footwear marketing. In Kenya, the shoemaking sector is critical towards the attainment of the vision of the country becoming industrialized and middle-income by 2030 (Okello, 2016). The shoemaking industry in Kenya is experiencing enormous growth with revenues expected to reach \$ 92.72 million by the end of 2022 (Statista, 2022). Revenues from Kenyan shoemaking companies are also expected to exhibit a compound annual growth rate of 4.73% during 2022-2027

period to reach a market volume of \$ 116.8 million (Statista, 2022). Overall, the shoemaking industry constitutes an important economic sector.

According to a report by KIPPRA (2010), the economic structure of Kenya will be transformed into an industrialized economy by 2020 and the shoe manufacturing sector in Kenya shall play an integral role in this transformation process. The identified leading projects in the leather sector are necessary to be implemented to achieve the targets defined and set by Kenya Vision 2030, Third Medium Term Plan (MTP III), and the 'Big Four' Agenda in the manufacturing sector. The highest population of livestock in Africa is in Kenya and this poses a great opportunity for the nation to be able to supply raw hides and skins to the leather processing industry. Priority has therefore been given to this sector to exploit this potential (Ministry of Agriculture, livestock, fisheries and cooperatives and Kenya leather development council, 2020).

In the 1990s, the Kenyan Government was lenient towards international trade which increased the imports of cheap footwear from Vietnam, Italy, and China and this resulted in increased competitiveness negatively affecting the performance of Kenyan shoe manufacturing companies despite cheap labour and availability of raw material such as leather at their disposal (Gituma, 2011). About two decades ago, Kenya was the leather footwear hub for East Africa, however, in 2012, Kenya's total export of leather footwear was US\$2.7 million while the import value was US\$11 million which shows that Kenya is a net importer of leather footwear (World Bank Group, 2015). An estimated 2.5 million pairs of leather footwear were produced by shoe manufacturing companies in Kenya in the year 2014 (Food and Agriculture Organization of the United Nations., 2016).

Despite the significant growth witnessed in the shoemaking industry, a key challenge faced by companies operating in this sector is unpredictable demand. Unpredictability of demand for shoemaking companies be attributed to a number of factors (Antomarioni et al., 2017). First, shoes might new designs with no sales history; thus, forecast should be based on the sales history of comparable products by interpolating and approximating. Additionally, tastes tend to be fickle; thus, forecasts requires considering trends and guesswork. Moreover, shoes are fashion items, which means that their lifecycles are short (Antomarioni et al., 2017). The outcome is that adequate sales history might not be

accumulated to create statistically accurate forecast before the end of a product's season. Furthermore, because of the short lifecycles, there is little opportunity for correcting errors in demand forecast. If the lead times exceed the life of a product, there is no chance of re-ordering materials from suppliers. Concurrently, shorter lead times make it difficult to re-allocate (Lewis, 2012). As a result, developing accurate demand forecasts remains a key problem by shoemakers. Demand forecasts that are overly optimistic can lead to overstocks that force markdowns; thus, reducing revenues and profits. At the same time, conservative and pessimistic forecast have an opportunity cost merchandise that could have been sold at optimal margins but were not sold.

According to Armstrong & Green (2017), demand forecasting is a process of estimating how much goods or services will be bought, required, or consumed at a later time interval while taking into consideration various factors such as the marketing actions, conditions of the industry and market. Accurate and efficient forecasting systems are important in effective decision-making for industrial managers in logistics structures, to avoid poor inventory management practices that could otherwise lead to high inventory levels or stock-outs, obsolescence of stock, low service level, rush orders, inefficient resource utilization, and bullwhip effect (BWE) spreading through the upstream supply chain (Frank et al., 2003; Nenni et al., 2013). According to Sayed et al. (2009), supply chain processes are enhanced by deploying effort and finances, however, if the demand forecasting is inaccurate, the supply chain process will lack reliability and efficiency and it is. As a result, accurate demand forecasting plays a key role in mitigating the demand unpredictability in shoemaking companies.

To improve the forecast accuracy, many companies deploy their focus in different directions and one of the focus areas is to assess the various factors that affect the demand for a product (Danese & Kalchschmidt, 2011). According to Usmani and Shaikh (2020), demand is a multivariate relationship which implies that it is determined by many factors at a time and some of the factors that determine the demand for a good or service are its price, the income of consumers, price of other commodities (complementaries and substitutes), consumers' preference and taste, distribution of income, total population, the wealth of consumer, past income level, and past demand level among others.

To improve the accuracy of demand forecasting of shoes, classified as apparel, managers should consider various factors, such as the characteristics of consumers (like their tastes and preferences, gender and level of brand awareness), characteristics of their products (perceived quality, style and design, brand image, country of origin, and product lifestyle), activities of competitors (such as their pricing, marketing and brand image), external factors beyond the firm's control (like weather, public holidays, festivities, special events, and school academic calendar), and macro-environment factors (employment rate, interest rate, exchange rate, political environment, and availability of the US dollar) (Aksoy et al., 2014). Incorporating a broad range of factors in the forecasting model can help improve its accuracy (Thomassey et al., 2002). Additionally, the use of sophisticated software technologies like machine learning can lead to significant improvements in the accuracy of forecasts. Machine learning and advanced analytics algorithms can provide more accurate predictions of future demand by factoring hundreds of variables that can potentially influence demand in comparison to human planners who can only factor a few variables (Carbonneau et al., 2008). Artificial intelligence-powered demand forecasting is useful for predicting demand at each location, which ensures that optimal inventory levels are maintained to minimize lost sales. The forecasting methods are equally an important factor that influences the accuracy of predictions.

1.3 Problem Statement

The manufacturing industry, globally as well as in Kenya, has experienced a decline in performance linked to challenges in meeting demand. Even before the COVID-19 pandemic struck, demand surpassing supply was a key problem in manufacturing companies and the pandemic only served to exacerbate this problem (Industry Today, 2022). Poor inventory control has a key factor contributing to the declining performance of manufacturing firms, especially shoe making companies. Some of the problems associated with poor inventory control include delays in meeting customer orders, unnecessary costs and misallocation of resources (Onchonke & Wanyoike, 2016). Poor inventory control has also been linked to inaccurate forecasts and fluctuating inventories (Nemtajela & Mbohwa, 2017). Other problems associated with poor inventory control include erratic deliveries, increased production costs, and lower consumer effective

demand. At the core of these problems lies the issue of inaccurate demand forecasts. The problem is made worse for shoe manufacturers due to unpredictability of demand.

For shoe manufacturers, demand forecasting is an important business action that influences a firm's profitability and competitiveness. Ineffective demand forecasting strategies have been shown to result in unused inventory, inventory overstock, and imprecise inventory replenishment (Thomassey, 2010a). Despite the important role played by demand forecasting, the process of forecasting the demand for shoes is long and complex due to the number of SKUs involved. As a result, shoe manufacturing companies in Kenya are faced with inaccurate forecasts that ultimately diminish their performance (Gituma, 2011). Consequently, there is the need to determine the factors that enhance the accuracy of demand forecasting for shoe manufacturers in order to address any problems that are linked to inaccurate forecasts. Considering the economic significance of the shoe manufacturing sector in Kenya in terms of job creation and economic growth, it is important to address any issue that contributes to poor performance in this industry.

1.4 Research Objectives

1.4.1 General Objective

This study is aimed at assessing the factors that affect the demand forecasting accuracy in shoe manufacturing companies in Kenya.

1.4.2 Specific Objectives

- i. To determine the effect of considering market factors (consumer characteristics, product characteristics, competitor activities, and market activities) on demand forecasting accuracy in shoe manufacturing companies in Kenya
- ii. To determine the effect of considering macro-environment (external) factors on demand forecasting accuracy in shoe manufacturing companies in Kenya
- iii. To determine the impact of forecasting methods on the accuracy of demand forecasting accuracy in shoe manufacturing companies in Kenya
- iv. To determine the mediating role of forecast resources on the relationship between forecast methods and demand forecasting accuracy

1.5 Research questions

- i. What is the effect of considering market factors on demand forecasting accuracy in shoe manufacturing companies in Kenya?
- ii. What is the effect of considering external factors on demand forecasting accuracy in shoe manufacturing companies in Kenya?
- iii. What is the impact of forecasting methods on the accuracy of demand forecasting accuracy in shoe manufacturing companies in Kenya?
- iv. Does forecast resources mediate the relationship between forecast methods and demand forecasting accuracy?

1.6 Scope of the study

This study focused on shoe manufacturing companies in Kenya. This is because it provides the extent to which various factors affect the demand for shoes in Kenya and the findings from the study can help the firms to improve the forecasting accuracy of this demand. The data was collected from employees working in sales, marketing, production, procurement and logistics departments of shoe manufacturing companies in Kenya.

1.7 Significance of the study

1.7.1 Policymakers and Regulators

The findings from this study are expected to provide insights on how policies can be adopted in the macro-environment in order to improve demand forecasting accuracy. Some policy targets from this study include employment, inflation, and interest rate. The study will show the extent to which these macro-environment factors are crucial in enhancing the accuracy of demand forecasting. Additionally, regulators in the manufacturing industry can use the findings to publish guidelines to manufacturers regarding the demand forecasting practices that they can use to enhance accuracy.

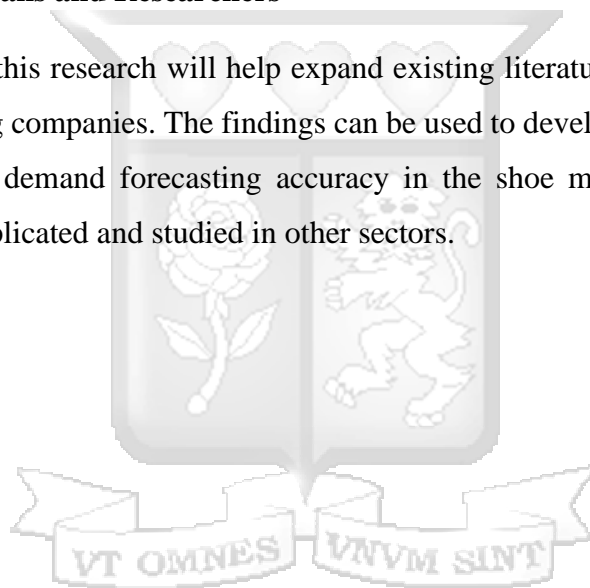
1.7.2 Shoe Manufacturing Companies

For shoe manufacturing companies, the findings from this study will provide recommendations on the practices that they can use to improve the accuracy of their demand forecasting. This study shall be beneficial to the shoe manufacturing companies

in Kenya, as a representation of the manufacturing industry in Kenya, especially for those who are faced with inaccuracy in demand forecasting arising from a large number of SKUs in their inventory. It shall also benefit various functions in the organization such as supply chain management to make more effective decisions which shall enhance the supply chain performance. The suppliers of raw materials, such as leather, synthetic polymers, etc used in the manufacture of shoes shall also benefit from this study. The retailer of the shoes shall also benefit from the study as they shall be certain of the availability of various footwear. The study can also be referred to by other researchers who aim to research in a similar field.

1.7.3 Academicians and Researchers

The findings of this research will help expand existing literature on demand forecasting in manufacturing companies. The findings can be used to develop a model explaining the determinants of demand forecasting accuracy in the shoe manufacturing sector. This model can be replicated and studied in other sectors.



CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

This chapter shall present the theoretical review that supports this study, the empirical literature related to the objectives of this study which are; factors affecting the forecasting accuracy, forecasting resources to improve forecast accuracy, forecasting methods to improve forecast accuracy, the impact of demand forecasting accuracy on supply chain performance, the research gap, a conceptual framework that presents and explains the relation of independent and dependent variables.

2.2 Theoretical Review of Literature

This study shall be anchored on Forecasting Theory, which is discussed in detail in the subsection below.

2.2.1 Forecasting Theory

According to Petropoulos et al. (2022), the theory of forecasting is based on the prediction of the future by utilising current and past knowledge, particularly for the time series, where there is the belief that in the process of predicting future values, patterns from historical values can be identified and implemented. Whilst there are no expectations on the exact future values, there is an expected value known as the point forecast. In the forecasting process, time series may only play a small role and therefore forecasting procedures are optimum when they relate to a problem to be solved. This implies that the theory can be developed by understanding the elements of the problem, which leads to improved practice through theoretical results.

The forecasting theory includes both stochastic modelling and forecasting methods among other related aspects. Stochastic modelling produces prediction intervals, distributions and point forecasts through the data generation process and forecasting methods produce future forecasts through a predetermined sequence of steps (Petropoulos et al., 2022).

In this research, the forecasting theory will be used to assess how factors, forecasting methods and resources affect the forecast accuracy in shoe manufacturing companies in Kenya.

2.3 Empirical Review of Literature

2.3.1 Effect of Considering Market Factors on Demand Forecasting Accuracy

Market factors refer to features or characteristics of the market that have an influence on business decision-making. These factors constitute aspects related to consumer behavior as well as economic trends that can impact sales. In demand forecasting, several market factors have been identified as relevant and require consideration, which include consumer characteristics, product characteristics, activities of competitors, and market activities. Consumer characteristics, such as their age, employment levels, lifestyle, demographics, income levels, and tastes and preferences have been reported to have an influence on demand (Fiig et al., 2019). For instance, Akkaya (2021), using purchase intention as a proxy for demand, reported that consumers' lifestyle segmentation predicted consumer's perceived value, which in turn influenced their purchase intention. The impact of consumer characteristics was also demonstrated by Kalantari et al. (2021), who carried out an analysis to study the effect of gender and level of customisation on consumers' willingness to purchase mass customised shoes. The attributes of willingness to purchase were degree of customisation, price and delivery time. The findings of the study suggested that female customers are more willing to purchase the product than male customers. The finding also suggested that, for women, the degree of customisation and delivery time are the most important attributes while for men, price and degree of customisation are the crucial attributes. With regard to demand forecasting, Seyedan and Mafakher (2020) reported that factoring customer behavior analysis improved the accuracy of supply chain demand forecasting performed using predictive big data analytics (BDA). Similarly, Ren et al. (2017) reported that incorporating customer preferences improved the accuracy of fashion demand forecasting models despite uncertainties in the fashion industry.

Product characteristics/features have also been reported to drive demand. For instance, a study carried out by Chae et al. (2020) reported the positive effect of product characteristics on perceived value, brand trust and purchase intention, suggesting that product characteristics drive demand. Similarly, Chong et al. (2017) illustrated the positive impact of product characteristics on demand. In the same vein, the findings of a multiple regression analysis done by Walintukan et al. (2018), who collected data from

customers of Bellagio Shoes store in Manado to study the effect of product quality, sales promotion and social influence on customer purchase intention, suggested that all independent variables had a significant positive relationship with the dependent variable.

Factoring product characteristics can enhance the accuracy of demand forecasting. Nagashima et al. (2015), as one of the objectives in their study, introduced the concepts of product life cycle stage, retailer type, and product category and then formulated hypotheses on the influence that each variable had on product forecast accuracy. The results showed that product maturation stage had a positive effect on the forecast accuracy and this supported Chopra & Meindl's (2012) hypothesis. In the consumer electronic industry, Kim et al. (2017) found that product features were a significant predictor of accurate demand forecasting. Taken together, these results suggest the potential role played by factoring product characteristics in improving demand forecast accuracy.

Competition intensity is another factor that drives demands and influences the accuracy of demand forecasting. According to Makridakis et al. (2022), demand forecasting is more difficult in industries having more competitors as well as product alternatives, which suggests that competitive intensity is negatively associated with demand forecasting accuracy. The implication is that incorporating competition data can help improve forecasting by making it more accurate. For example, Abbasimehr et al. (2020) developed a demand forecasting model that included competition information, and found the proposed model to be superior to traditional forecasting methods. Similar findings indicating the importance of considering industry competition in enhancing demand forecast accuracy were also reported by Song et al. (2019) in the tourism industry.

Marketing activities can also affect demand forecasting. Arshad & Victor (2020) carried out an analysis to study the impact of brand equity on the purchase intention of international shoe brands in the Kingdom of Bahrain. The main aspects of brand equity were brand loyalty, brand association, brand recognition and perceived quality. The findings suggested that attributes of brand equity are highly important for purchase intention. Rahmawan & Suwitho (2020) carried out an analysis of Converse school shoes to study the effect of brand image and brand awareness on perceived quality and purchase intention. The findings of the results suggested that there was a strong correlation between

Brand Image and perceived quality and a strong correlation between brand awareness and purchase intention. Similarly, Gautam & Sharma (2017), carried out an analysis on a sample size of 243 respondents to study the direct and indirect impact of social media marketing activities on consumer's purchase intention of luxury fashion brands. The findings of the research suggested that there was a significant relationship between the variables. The findings also suggested that customer relations act as a mediating factor in the relationship. In the same vein, the findings of the analysis carried out by Park et al. (2015) in fashion retail stores, to study the effect of in-fashion, attractiveness and function as three dimensions of visual marketing cognition, suggested that in-fashion and attractiveness had a significant positive effect on the brand aesthetics and function had a significant positive association with purchase intention. The impact of marketing on demand forecasting was also demonstrated by Büyükdağ et al. (2020), whose aim was to study the effect of specific discount patterns on perceived price attractiveness and purchase intention, and found that price promotion had a significant positive effect on perceived price attractiveness and purchase intention. Studies also show the benefit of including marketing activities in demand forecasting models (Flig et al., 2019; Pradita et al., 2020). Overall, these studies show that marketing can have an impact on demand forecasting.

2.3.2 Effect of Considering External Factors On Demand Forecasting Accuracy

Accurate demand forecasting requires not only considering internal variables but also external factors beyond the control of the company (Fiig et al., 2019). A study by Spiliotis et al. (2020) reported that including external factors lead to significant improvements in financial forecasting as well as overall performance improvement. Numerous external factors that can be considered in demand forecasting include weather data, public holidays, festivities, special events, employment rate, interest rate, currency value, availability of US Dollar, fuel prices, and the political environment, just to name a few (Spiliotis et al., 2020).

Evidence from numerous studies show the pivotal role played by incorporating external factors in improving forecasting accuracy. A systematic review conducted by Ghalekhondabi et al. (2017) indicated that using weather forecasts as inputs improved

the accuracy of demand forecasting methods. Similar conclusions were reached by Xu et al. (2018), who showed that including data relating to land use, air quality and weather improved the accuracy of demand forecasting for bike-sharing services. To study whether demand forecast accuracy for upcoming season can be improved by taking into account the weather of the previous sales season, Babongo et al. (2018) used a ten year dataset of winter sports equipment sales in Switzerland and Finland and linked it with daily meteorological data to develop and train a generalised additive model (GAM) to predict demand for the next season. The results of their studies showed a reduction of up to 45% in forecasting error when meteorological data from the past season is included.

Public holidays also represent another external factor that affects demand accuracy. Piasecki et al. (2018). reported that the inclusion of holidays improved the demand forecasting model for water consumption. Similarly, Duwalage et al. (2020) showed that demand forecasting models that included holidays as a variable were more accurate in predicting the demand for healthcare services in Australia compared to those that did not. In addition, Thomassey (2010), in their study, suggested that when forecasting the demand in textile-apparels, seasonality such as exterior environment and climate should be considered as they have an impact on sales of certain apparel such as swimwear and sweaters. Explanatory factors such as weather data, competition, calendar data, marketing strategy, political environment, features of items, and macroeconomic and trend data should also be taken into consideration as they have an impact on sales.

Macroenvironment factors also have an effect on demand forecasting accuracy. In a research carried out by Mohd Zain et al. (2020), the aim was to study the macroeconomic factors (Gross domestic product (GDP), interest rate, inflation rate, and unemployment rate) that affect the number of car sales for proton specifically. The authors developed a theoretical framework whereby the macroeconomic factors were the independent variables and car sales were the dependent variable. The findings of the multiple regression models showed that GDP was positively correlated with car sales in Proton while interest rate, inflation, and the unemployment rate had an inverse correlation with car sales in Proton. Taken together, existing literature indicates that external factors influence the accuracy of demand forecasting models.

2.3.3 The Impact of Forecasting Methods on the Accuracy of Demand Forecasting Accuracy

Demand forecasting methods denote the techniques employed to make future estimations regarding customer demand over a predefined period (Ren et al., 2017). Demand forecasting employed predictive analysis to project customer demand in the future. Several approaches can be employed in demand forecasting, such as yearly forecasts, quarterly forecasts, monthly forecasts, factoring sales growth, forecasts based on gut feeling (intuition), working with suppliers, retailers and wholesalers, and forecasting by collaborating with other departments in the organization, just to name a few. The extent to which forecasting is accurate is determined by the methods employed. Vast empirical literature shows the effect of various forecasting methods on accuracy. For instance, Liu et al. (2013) suggested the need for sophisticated and versatile analytical tools to forecast sales of fashion products because retailers are faced with forecasting challenges arising from carrying a large number of SKUs, limited availability of historical sales data and being strongly affected by seasonal factors, fashion trend factors and other factors such as political climate, item features, weather, marketing strategy and macroeconomic trends.

Similarly, to improve forecast accuracy in textile-apparels, Thomassey (2010) in his study, presented a list of variables that need to be taken into account in the forecasting system. These include; long-term and short-term horizon of forecasts whereby two methods of forecasting should be used to address their influence, the lifecycle of items where basic and best-selling items should be considered but fashion ‘one-off’ items should be excluded, sales data of various SKUs such as size, color, etc should be aggregated and the aggregate should be considered and the sales demand information should be considered. The impact of forecasting methods on accuracy was also demonstrated by Hofmann and Rutschmann (2018), who grouped the demand influencing factors of retails supply chains, as discussed by Souza (2014), into six demand forecast categories namely; Products, Consumer Preferences, External factors, Marketing factors, Shop factors, and Supply factors. The purpose of their study was to examine how Big Data Analytics (BDA) improves forecast accuracy. The findings of the study suggested integration of various

data sources when performing forecasting can be done but requires skilled data analysts, technological foundation and technological investments.

The use of technically-sophisticated methods to improve forecasting accuracy has also been demonstrated empirically. To support the primary objective of a study by Basson et al. (2019), the secondary objectives were to determine and compare the pre and post-intervention demand planning activities and performance of company A. The findings showed that there was a positive relationship between a well-informed, team-based and technology-assisted approach to demand planning and improved forecasting accuracy within an FMCG company which is in line with the recommendation by Myerholtz & Caffrey (2014). In the same vein, by performing multiple regression analysis to measure the extent to which various time series features (seasonality, trend, cycle, randomness, number of observations, inter-demand interval and coefficient of variation) and one strategic decision (forecasting horizon) affect forecasting accuracy, Petropoulos et al. (2014), found that for fast-moving data, cycle and randomness have the biggest negative effect on forecasting accuracy and the longer the forecasting horizon, the accuracy reduces.

Additionally, collaboration has been shown to improve forecasting accuracy. Further to a suggestion by Nagashima and Morita (2013), that collaboration can be adapted to changes and variations in interacting factors by adjusting its intensity, Nagashima et al. (2015), in their study, analyzed three collaborations of a manufacturer in France called Company X with its three retailers between 2005 and 2009 and the effect of collaboration on product forecast accuracy. The results of the study showed that high collaboration intensity had a positive effect on forecast accuracy. The specialization of retailers did not affect forecast accuracy however increased collaboration with highly specialized retailers has a positive effect on forecast accuracy. Similar findings were documented by Danese and Kalchschmidt (2011) who conducted a study to evaluate the role of the forecasting process in improving forecasting accuracy. In their study, data collection was done from 343 companies in the manufacturing and assembly sector from 6 different countries (Austria, Ghana, Hungary, Italy, Korea, and Poland). The researchers analyzed three variables that affect forecast accuracy. These include the degree to which forecasting methods are used,

the extent to which knowledge from various sources is used, and the role of forecasting in decision-making. The researchers made the following inferences based on the results; 1) the adoption of forecasting techniques does not enhance the precision of forecasting, but the effectiveness of the techniques depends on the type of technique adopted and the context 2) Collecting data from multiple sources is useful and helps businesses to better assess and understand demand and markets and 3) To facilitate decision-making, forecasting plays a key role. Taken together, it is evident that forecasting methods can impact the accuracy of demand forecasting.

2.3.4 Mediating Role of Forecast Resources on the Relationship Between Forecast Methods and Forecast Accuracy

Forecast resources refer to organizational assets that are available for use in the demand forecasting process. Forecast resources can take various forms, such as availability of data, sophisticated computer software or IT capabilities, skilled employees, and competent managers, just to name a few (Ren et al., 2017). Adopting sophisticated demand forecasting methods without the necessary resources cannot yield the desired results in terms of forecasting accuracy (Fiig et al., 2019). Empirical research shows a positive link between forecast methods and forecast resources as well as a positive association between forecast resources and forecast accuracy. For instance, Seethamraju (2015) reported that the adoption of computer software applications for demand forecasting differed across organizations based on their size, which was used as a proxy to measure the extent of resources that they can allocate towards demand forecasting. Similar results were demonstrated by Hofmann and Rutschmann (2018) and Merkuryeva et al. (2019). Hofmann and Rutschmann (2018) reported variations in the applications of big data analytics in demand forecasting in the retail industry and how these variations were tied to forecast accuracy. Companies that applied big data analytics to a higher degree had more accurate demand forecasting. Similar variations in the demand forecasting resources were also reported by Merkuryeva et al. (2019) in terms of using trending historical datasets and use of forecasting algorithms. Overall, it is expected that having forecasting resources will help explain the relationship between forecast methods and forecast accuracy.

2.4 Summary of Literature and Research Gaps

The empirical literature reveals the impacts of considering market factors, macro-environment factors, and forecasting methods on demand forecasting accuracy. Existing literature shows that taking into account market factors, such as consumer characteristics, product characteristics, activities of competitors, and market activities, can lead to significant improvements in forecasting accuracy. Studies also show that factoring macro-environment variables, like weather data, public holidays, festivities, special events, employment rate, interest rate, currency value, availability of US Dollar, fuel prices, and the political environment, can enhance the accuracy of demand forecasting. The application of forecasting methods like sophisticated and versatile tools, short- and long-term horizon forecasts, and technically-sophisticated tools, can improve forecasting accuracy. Additionally, existing research shows that forecast resources can potentially mediate the association between forecast methods and demand forecasting accuracy.

While there is vast empirical literature on the factors affecting demand forecasting accuracy, some gaps have been identified in the literature. The first gap relates to context in terms of country and industry. There is scarce literature on factors influencing demand forecasting accuracy in emerging markets in Kenya as well as in the shoe making industry, which was addressed in this research. It has also been noted that most of the studies were carried out in organizations that are located in developed countries. Kenya is a developing country and generalizing results from empirical literature to the Kenyan context would not be advisable because of the varying income levels, varying tastes and preferences in shoes of Kenyan consumers, and an equatorial climate in Kenya which affects the demand for various shoe types. The shoe manufacturing companies in Kenya are net importers of raw materials used in the manufacture of shoes. It would therefore be necessary to take into consideration macroeconomic factors such as US dollar availability among others in the forecasting system, which have not been considered in the empirical literature.

Another gap identified in the literature is that most studies only examined a single set of factors, such as market factors or external factors alone rather than together; as a result, their models of demand forecasting are not comprehensive. From the empirical literature reviewed on the factors, resources and methods that affect demand forecast, it has been

noted that most of the studies have only considered few factors on purchase intention. In this research, various sets of variables are considered including market, external and forecasting methods in order to come up with a comprehensive model that can be used to enhance the accuracy of demand forecasting in the shoemaking industry. due to the complexity involved in the manufacture of shoes Due to various SKUs differentiated by styles, sizes, types, designs, colours, and numerous shoe components, the inaccuracy in demand forecasting increases, and it, therefore, becomes prudent to study the magnitude of the effect, using a holistic approach by considering factors, methods and resources on the demand for shoes and provide solutions for enhancing the forecasting accuracy and optimize the supply chain process. **Error! Reference source not found.** presents a summary of the research gaps identified in the literature and how they were addressed in the present research.

Identified research gaps	How the presents study will address the identified gap
Scarce literature on factors influencing demand forecasting accuracy in emerging markets	The setting for the present study is Kenya
Scarce literature on factors influencing demand forecasting accuracy in the shoemaking industry	The present research will be conducted with respondents from shoe manufacturing companies in Kenya
Most studies only examined a single set of factors, such as market factors or external factors alone rather than together; as a result, their models of demand forecasting are not comprehensive	This study incorporated multiple sets of variables, which includes market factors, external factors, and forecasting resources

Table 2.1: Research gaps

2.5 Conceptual framework

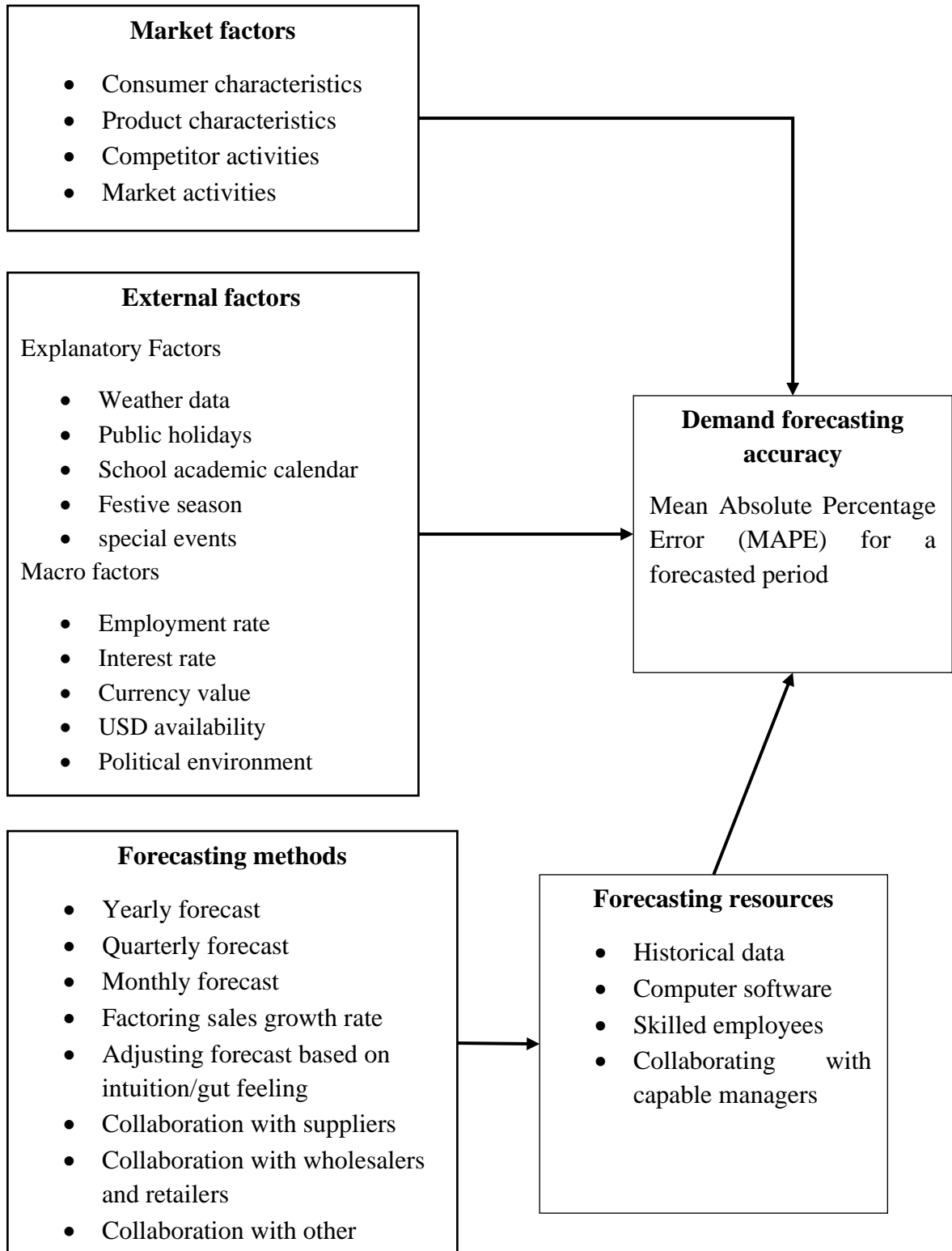




Figure 2.1: Conceptual framework


2.5 Operationalization of the Study's Variables


Error! Reference source not found. shows how the variables in the study were operationalized.

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
Dependent variable						
Demand forecasting accuracy	Mean Absolute Percentage Error (MAPE) for a forecasted period	Ordinal	$MAPE = \frac{ Actual\ sales - forecast\ sales }{Actual\ Sales} \times 100$	Boone et al. (2018)	Respondents' self-report of their estimated MAPE for their company	Forecasting theory
Independent (test) variables						
Market factors	Consumer characteristics	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Fiig et al., (2019)	Survey administered to respondents to collect information about the extent	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					to which consumer characteristics (lifestyle, fashion and trends preferences, brand awareness, and gender) are considered in demand forecasting	
	Product characteristics	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Akkaya (2021)	Survey administered to respondents to collect information	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					<p>about the extent to which product characteristics (perceived quality, design and style, price, brand image, country of origin image, and product lifecycle stage) are considered in demand forecasting</p>	
	Marketing activities	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Akkaya (2021)	Survey administered to respondents to collect	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					<p>information about the extent to which marketing activities (promotion type, visual merchandizing, price discount and social media marketing) are considered in demand forecasting</p>	
	Competitor activities	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Fiig et al. (2019)	Survey administered to respondents to collect	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					<p>information about the extent to which competitor activities (their price, brand image, promotion and visual merchandizing) are considered in demand forecasting</p>	
External factors	Weather data	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Babongo et al. (2018)	Survey administered to respondents to assess the extent to which this	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					variable is factored in demand forecasting	
	Public holidays	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
	School academic calendar	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					variable is factored in demand forecasting	
	Festive season	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
	Special events	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					variable is factored in demand forecasting	
	Employment rate	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
	Interest rate	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					variable is factored in demand forecasting	
	Currency value	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
	US Dollar availability	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					variable is factored in demand forecasting	
	Political environment	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
Forecasting Methods	Yearly forecast	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					variable is factored in demand forecasting	
	Quarterly forecast	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Ghalehkhondabi et al. (2017)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
	Monthly forecast	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Liu et al. (2013)	Survey administered to respondents to assess the extent to which this	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					variable is factored in demand forecasting	
	Factorings ales growth rate	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Liu et al. (2013)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
	Adjusting forecast based on intuition/gut feeling	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Liu et al. (2013)	Survey administered to respondents to assess the extent to which this	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					variable is factored in demand forecasting	
	Collaboration with suppliers	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Liu et al. (2013)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
	Collaboration with wholesalers and retailers	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Liu et al. (2013)	Survey administered to respondents to assess the extent to which this	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					variable is factored in demand forecasting	
	Collaboration with other departments in the organization	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Liu et al. (2013)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
Mediating Variable						
Forecasting Resources	Historical data	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Hofmann and Rutschmann (2018)	Survey administered to respondents to	Forecasting theory

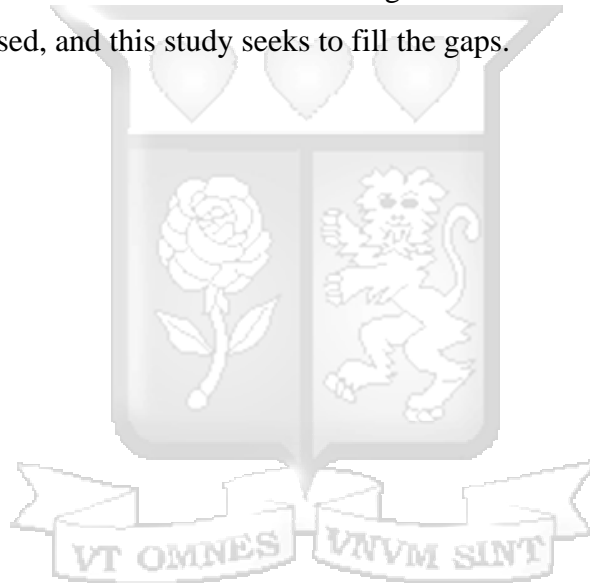
Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					assess the extent to which this variable is factored in demand forecasting	
	Skilled employees	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Hofmann and Rutschmann (2018)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory
	Computer software	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Hofmann and Rutschmann (2018)	Survey administered to respondents to	Forecasting theory

Variable	Specific variable name	Type of variable	Measurement	Literature source	Data source	Theory supported
					assess the extent to which this variable is factored in demand forecasting	
	Collaborating with capable managers	Ordinal	Five-point likert scale (1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high)	Hofmann and Rutschmann (2018)	Survey administered to respondents to assess the extent to which this variable is factored in demand forecasting	Forecasting theory

Table 2.2: Operationalization of variables

2.6 Chapter Summary

This chapter offers an analysis of existing literature regarding the factors that affect demand, forecasting resources and methods for improving forecast accuracy, and how forecast accuracy affects supply chain performance. It has also highlighted the underpinning theory related to the objectives of the study. Various factors affect the demand for a product and a slight change in these factors affects the demand curve of a product to either shift to the left, right or along the demand curve at all price levels. The forecasting accuracy is also affected by forecasting methods and resources used. This phenomenon has been explained using the Consumer Demand Theory in the theoretical literature review. It was also noted that although various literature existed, several gaps remain unaddressed, and this study seeks to fill the gaps.



CHAPTER 3 – RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology and includes the research philosophy, research design, target population, sampling techniques, data collection and analysis, research quality, and ethical considerations that were utilized in the study.

3.2 Research Philosophy

Research philosophy can be defined as the development of research assumptions, made consciously or unconsciously at each stage of the research, its knowledge, and nature which can then impact the research approach and findings (Saunders et al., 2007; Saunders et al., 2019). In business research, two leading research philosophies can be adopted, which are positivism and interpretivism.

This study adopted a Positivism Research philosophy. This philosophy highlights the discovery of data that is observable and measurable with the interpretation of the relations between them (Saunders et al., 2019). The positivism philosophy uses highly structured methods and large sample sizes making it quantitative and the interpretation of the findings is analyzed using statistical methods (Mackenzie, n.d.; Saunders et al., 2019). The findings of research guided by positivism research are strengthened by four assumptions namely; empiricism, parsimony, determinism, and generalizability (Saunders et al., 2019). The positivism philosophy was selected because its philosophical assumptions are aligned with the purpose of the present research, which posed the need to employ statistical analysis to evaluate the relationship between demand forecasting accuracy and various variables including market factors, external factors, forecasting methods, and forecasting resources. The positivism philosophy was also adopted in order to produce results that can be generalized to the shoe manufacturers in Kenya. Since the variables are clearly defined, there was the need to make use of structured methods for collecting and analyzing data. The interpretivism philosophy, which calls for in-depth, subjective investigations into the context of a phenomenon, was not considered suitable for this research. The interpretivism philosophy produces subjective findings that cannot be generalized to the broader population for the study,

which is contrasted with the current researcher's intention of developing results that can be applied in the shoe manufacturing industry in Kenya. In general, positivism was considered the most appropriate philosophy to guide this research since it is aligned with the purpose and the nature of the present study.

3.3 Research design

Research design, according to Kothari (2004), is the obtainment of answers to research questions through the utilization of a plan, a roadmap, and a blueprint strategy of a study conducted. Creswell (2014) defined research design as a masterplan, whose basis is formed by a set of decisions of a study, that provides explanations of methods and actions utilized when collecting and analyzing research data.

In this research, a descriptive cross-sectional design was utilized to evaluate the research objectives and make appropriate conclusions through the findings of the study. The purpose of a descriptive study is to describe how things, such as a situation, an individual, or an event affect and correlate with each other in their natural state of occurrence (Creswell and Creswell, 2017). The descriptive design addresses the “who,” “when,” “how much” or “what” elements of a phenomenon. The descriptive design is also used for assessing relationships between variables (Hair et al., 2019). For this research, the descriptive design was employed to assess the relationships between demand forecasting accuracy (the dependent variable), and various independent variables including market factors, external factors, forecasting resources, and forecasting methods. The cross-sectional aspect of the design denotes the time horizon, which implies that data was collected at a single point in time as opposed to over an extended duration. The descriptive design is aligned with the purpose of the study and the framing of the research questions. In terms of purpose, this study focused on examining relationships between variables, which is one of the use of descriptive studies. In terms of framing of research questions, this study focused on the “what” aspects of the phenomenon of demand forecasting accuracy. Additionally, the descriptive design was the only practical approach since it was not possible to manipulate the variables in this research. For instance, demand forecasting practices used by organizations cannot be controlled; hence, the feasible approach was to survey this data and draw correlations. Thus, an experimental approach was not possible;

leaving descriptive design as the most practical approach to answer the research questions and meet the study's objectives.

3.4 Population and Sampling

A target population is a classification of all members in a group that is related to the investigation (Kotrlík & Higgins, 2001). In this study, the target population constituted employees working in the following departments of shoe manufacturing companies in Kenya; Sales, marketing, production, procurement and logistics. This is because these departments form the skeleton structure of the supply chain of any company and responses from employees in these departments shall, therefore, provide a holistic analysis of the study. Employees from leading shoe manufacturing companies, including Addison Industries Limited, Bata Shoe Co. (K) Limited, C & P Shoe Industries Limited, Umoja Rubber Products Limited, Walker Shoes (K) Limited and Kenafic Manufacturing Limited. A typical shoe manufacturing company has at least seven employees in each of the following departments – sales, marketing, production, procurement and logistics. Therefore, the total estimated size of the population for this research was 210 employees working in these departments from the six shoe manufacturing companies in Kenya (Appendix VI).

Convenience sampling was employed as the strategy to recruit respondents in this research. In this sampling approach, respondents are chosen based on their accessibility and their willingness to participate in the study. The convenience sampling strategy offers numerous advantages that made it ideal for this study, which included being cost-effective and accessing a large pool of research participants needed for this quantitative research (Hair et al., 2019). To recruit respondents, questionnaires were physically distributed to the corporate offices of the six shoe manufacturing companies in Kenya, which were filled with employees who were available and eligible to participate in the research by working for the sales, marketing, production, procurement or logistics departments.

To determine the sample size for this research, Yamane formula ($n = N/1 + N(e)^2$), where N is the population size and e is the expected margin of error, was used. With a population size of 210 and a margin of error of 10%, the required sample size was 67 participants.

3.5 Data collection

Various data collection strategies that are used by social scientists in research have been discussed by Hox & Boeije (2005), one of them is the use of surveys conducted through structured questionnaires which help collect data from a large sample size. In this research, surveys in the form of structured questionnaires were administered to employees in various departments to collect primary data. Structured questionnaires offered numerous advantages that were relevant for this study. First, questionnaires are recommended when there is the need to gather data from a large sample within a short duration. Additionally, data collected from questionnaires is standardized; hence, can be processed and analyzed easily. Moreover, by providing confidentiality and anonymity, honesty from respondents can be improved, which in turn enables the collection of accurate data (Hair et al., 2019).

The structured questionnaires comprised of close-ended, 5-scale Likert-type questions related to the objectives of the study. The first section captured respondents' demographic information including their gender, age, designation, and length of tenure working at the firm. The second section collected information related to market and external factors, which were assessed using a five point Likert scale ranging from 1 (very low) to 5 (very high) to indicate the extent to which the factors were considered when forecasting the demand for shoes in Kenya. The market factors assessed in the questionnaire included consumer characteristics, product characteristics, marketing activities, and competitor activities. External factors captured in the questionnaire included weather data, public holidays, school academic calendar, festive season (Christmas and Easter), special events, employment rate, interest rate, currency value, US Dollar availability, and political environment. The next section captured information relating to forecast resources, which included using historical data to observe trends, using computer software, using skilled employees in forecasting, and collaborating with capable managers when forecasting. The next section collected information regarding the forecast methods including yearly forecast, quarterly forecast, factoring sales growth rate, adjusting forecast based on intuition, collaboration with wholesalers and retailers, and collaboration with other departments in the organization. Lastly, the questionnaire collected information on forecast accuracy using a five point scale from very inaccurate (1) to very accurate (5). A

copy of the questionnaire is presented in Appendix V that shows in detail the individual items used to collect data from respondents.

The questionnaires were administered to three employees per firm in the sales department, three employees per firm in the marketing department, two employees per firm in the production department, two employees per firm in the procurement department and two employees per firm in the logistics department, to get information about the forecast accuracy in their firms. Since there are six firms and the total sample size needed was at least 67, at least ten participants were needed from each organization. The ten participants in each organization were spread across the various departments of interest in this study including sales, marketing, production, procurement, and logistics. The questionnaires were dropped and picked.

3.6 Data Analysis and Presentation

The primary data obtained from the surveys were coded into numerical figures and entered into the Statistical Package for Social Sciences (SPSS) for analysis. Descriptive statistical analysis was conducted using frequencies. The findings were then presented in frequency tables. Inferential statistics were used to determine the relationships between the dependent (forecast accuracy) and independent variables (market factors, external factors, forecasting resources and forecasting methods) using linear regression, multiple regression and correlation analysis. The findings were then presented using tables and the regression equation was then presented. The findings from the extent to which forecasting resources and methods improve forecast accuracy were presented in frequency tables. The correlation between forecast accuracy and supply chain performance was also presented in the form of frequency tables and an equation. The significance level for analysis was set at 0.05.

3.7 Model Specification

To determine the effect of considering market factors on demand forecasting accuracy, the following regression equation was used:

$$DFA = \beta_0 + \beta_1CC + \beta_2PC + \beta_3CA + \beta_4MA + \epsilon$$

Where

CC = Consumer characteristics

PC = Product characteristics

CA = Competitor activities

MA = Marketing activities

ϵ = error function

To determine the effect of considering external factors on demand forecasting accuracy in shoe manufacturing in Kenya, the following equation will be used.

$$DFA = \beta_0 + \beta_1 ExpF + \beta_2 ME + \epsilon$$

Where

ExpF = Explanatory Factors

ME = Macroenvironment Factors

ϵ = error function

To determine the impact of forecasting methods on the accuracy of demand forecasting accuracy in shoe manufacturing companies in Kenya, the following regression equation was used:

$$DFA = \beta_0 + \beta_1 FM + \epsilon$$

Where

FM = Forecasting Methods

To determine the mediating role of forecast resources on the relationship between forecast methods and demand forecasting accuracy, the following equations were used:

First step:

$$DFA = \beta_0 + \beta_1 DFM + \epsilon$$

Where DFM = Mean DFM (demand forecasting methods)

Second step:

$$DFR = \beta_0 + \beta_1 DFRM + \epsilon$$

Where

DFR = Mean DFR (demand forecasting resources)

Third step:

$$DFA = \beta_0 + \beta_1 DFR + \epsilon$$

Fourth step:

$$DFA = \beta_0 + \beta_1 DFM + \beta_2 DFR + \epsilon$$

3.8 Research quality

Research quality can be affected by various factors resulting in the invalidation of findings (Herbert et al., 1989). This research shall be guided by four key factors to enhance the research quality. These are validity, reliability, and objectivity. To test for validity, internal validity was used in this study. According to Campbell et al. (1963), internal validity is the basic minimum of any research and if it is not considered, the results of the study are not interpretable. The internal validity of this study was tested through piloting, where the data collection tools, that is, questionnaires in this study were examined by administering them to a small group of respondents, which were randomly picked from the sample. This helped to make any necessary changes to the questionnaires before administering them to the participants during the data collection stage. In addition, advice from supervisors and other experts from Strathmore University Business School was sought to further address the internal validity of the study.

The reliability of the constructs in the study was ensured by subjecting the questionnaires to Cronbach alpha during the pilot test before conducting the study. The Cronbach's alpha for the subscales and the overall questionnaire was found to be within acceptable limits of > 0.7 (See Table 3.1).

Reliability	Latent constructs	Cronbach's Alpha	
Factors	Consumer characteristics	0.804	0.950
	Product Characteristics	0.934	
	Marketing activities	0.876	
	Competitors' activities	0.895	
	External Factors	0.901	
	Macro factors	0.820	
Resources & Methods	Forecasting Resources	0.930	0.976
	Forecasting Methods	0.718	
Supply chain performance	Supply Chain Performance	0.971	

Table 3.1: The Cronbach's alpha for the subscales

Objectivity was observed during the data collection and analysis stage by adhering to Strathmore University Ethical Review Board guidelines. Additionally, the same questionnaire was distributed to all respondents.

3.9 Ethical considerations

Several ethical considerations were incorporated when undertaking this research. Necessary approvals were sought from Strathmore University Ethical Board before data collection by sharing the data collection instruments with the board. Upon receipt of approval, the data collection instruments were circulated to the respondents before undertaking data collection to make them aware that confidentiality and anonymity shall be guaranteed. Identification information of respondents shall not be indicated in the questionnaires which shall reinforce confidentiality.

Potential participants were requested to give consent before participating in the study by signing a consent form which informed respondents of their liberty to revoke their consent

at any stage of the study. Respondents were also informed that they could choose to refuse to answer any questions in the questionnaires.

The anticipated duration of filling out the questionnaires was shared with respondents so that they could schedule their time appropriately. They were also informed that the research is strictly for academic purposes. Potential risks of participating were highlighted and the fact that participation is voluntary was emphasized. Moreover, any other ethical considerations that arose during the research were highlighted to the Strathmore University Ethical Review Board.



CHAPTER 4 – PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter presents the findings of the study, analysis and interpretation of the data. The study involved the assessment of the factors affecting the demand forecast accuracy and how the accuracy affects supply chain performance in shoe manufacturing companies in Kenya. This study was guided by the following research objectives: studying the extent to which various factors affect the demand for shoes in Kenya, analysing the extent to which forecasting resources improve forecasting accuracy, analysing the extent to which forecasting methods improve forecasting accuracy in shoe and establishing a statistical relationship between forecast accuracy and supply chain performance in shoe manufacturing companies in Kenya.

4.2 Research Instrument Return Rate

The research involved the administration of questionnaires to potential respondents in different departments of shoe manufacturing companies in Kenya as follows: sales, marketing, procurement, production and logistics. The minimum sample size needed for this study as determined by Yamane's formula was 67; thus, 72 questionnaires were distributed in order to achieve the target threshold sample size. Table 4.1 shows these findings.

Department	Total administered	Total realized	Response Rate (%)
Sales	18	17	94%
Marketing	18	17	94%
Procurement	12	12	100%
Production	12	12	100%
Logistics	12	12	100%
Total	72	70	97%

Table 4.1: Research instrument response rate

The results showed that 70 out of 72 questionnaires were returned, filled and ready for analysis. Questionnaires administered to potential respondents in Production,

Procurement and Logistics department realized a 100% return rate. Questionnaires administered to potential respondents working in sales and marketing departments questionnaire realized a 94% return rate. On average, a 97% questionnaire return rate was realized. The self-administration of the questionnaires was a key attribute to the high response rate. In this study, it was important to collect data from various departments to address each objective that corresponds to the function of the respective department.

4.3 General and Demographic information

This section presents the demographic information of the respondents. It includes the designation of the respondent and the number of years of experience the individual had in the organisation. The majority of the respondents were male (55.7%, n = 39), aged 31-35 years (44.3%, n = 31), worked in the sales and marketing department (24.3% each, n = 17), and had worked 4-6 years (54.3%, n = 38). These findings are summarized in detail in Table 4.2.

		Frequency	Percent
Gender	Male	39	55.7
	Female	31	44.3
Age group	24 to 30 years	15	21.4
	31 to 35 years	31	44.3
	36 to 40 years	6	8.6
	41 to 45 years	6	8.6
	46 to 50 years	6	8.6
	Above 50 years	6	8.6
Department	Sales	17	24.3
	Marketing	17	24.3
	Procurement	12	17.1
	Production	12	17.1
	Logistics	12	17.1
	Less than 1 year	3	4.3
	1 to 3 years	22	31.4

		Frequency	Percent
Number of years of employment	4 to 6 years	38	54.3
	7 to 10 years	7	10.0
	Total	70	100.0

Table 4.2: Respondents' demographic information

No significant differences were observed in demand forecast accuracy across respondents based on their demographic characteristics. Based on gender, there was no significant difference in demand forecast accuracy between males ($M = 3.92$, $SD = 1.08$) and females ($M = 3.68$, $SD = 1.07$), $t(68) = 0.944$, $p > 0.05$ (See Appendix VII). Similarly, analysis by one-way ANOVA did not reveal any significant differences in demand forecasting accuracy based on respondents age group, department, and number of years in employment ($p > 0.05$), which suggests that demographic characteristics did not have a confounding effect on the dependent variable (See Appendix VII).

4.4 Descriptive Analysis of Study Variables

This section highlights the effect of various variables on forecasting in shoe manufacturing companies in Kenya.

4.4.1 Market Factors

The respondents were requested to rate the extent to which market factors, including consumer characteristics, product characteristics, competitor activities, and marketing activities, were considered in the last financial year when forecasting the demand for shoes in Kenya. Table 4.3 summarizes these results. Most respondents indicated that consumer characteristics including consumer lifestyle, their fashion and trend awareness, brand awareness, and gender are moderately considered, as reported by 50%, 51.4%, 64.3%, and 41.4% of respondents respectively. Product characteristics including perceived quality of shoes, design and style of shoes, price of products, brand image, county of origin image, and product life cycle stage were reported to be highly considered by the majority of respondents during demand forecasting as indicated by 57.1%, 60%, 67.1%, 67.1%,

65.7%, and 57.2% of respondents respectively. Marketing activities including promotion type, visual merchandizing, price discount and social media marketing were also reported to be highly considered in demand forecasting by the majority of respondents as indicated by 55.7%, 68.6%, 54.3%, and 61.5% of respondents respectively. Competitor activities including their prices, products' brand image, promotional activities and visual merchandising were also highly considered during demand forecasting as reported by 4.3%, 37.2%, 51.4%, and 32.9% of respondents respectively.

	Low	Moderate	High
	(%)	(%)	(%)
Consumer Characteristics	14.3	51.8	33.9
Consumer lifestyle	12.9	50.0	37.1
Consumers' fashion and trends awareness	11.4	51.4	37.2
Consumers' brand awareness	12.9	64.3	22.9
Consumer's gender	20.0	41.4	38.6
Product Characteristics	17.0	20.5	62.4
Perceived quality of shoes	22.9	20.0	57.1
Design & style of shoes	17.2	22.9	60.0
Price of products	14.3	18.6	67.1
Brand Image	12.9	20.0	67.1
Country of origin image	12.9	21.4	65.7
Product life cycle stage	22.9	20.0	57.2
Marketing Activities	7.9	32.1	60.0
Promotion type	8.6	35.7	55.7
Visual merchandising	5.7	25.7	68.6
Price discount	4.3	41.4	54.3
Social media marketing	12.8	25.7	61.5

	Low	Moderate	High
	(%)	(%)	(%)
Competitor activities	22.3	36.4	32.9
Competitors' price	18.6	37.1	44.3
Competitors' products' brand image	25.8	37.1	37.2
Competitors promotional activities	25.8	25.7	51.4
Competitors products' visual merchandising	21.4	45.7	32.9

Table 4.3: The Extent to which market factors are considered in demand forecasting in shoemaking companies in Kenya

4.4.2 External Factors

Respondents were asked to rate the degree to which explanatory (weather data, public holidays, school academic year, festive season, and special events) and macro factors (employment rate, interest rate, currency value, USD availability in the country, and the political environment) are considered during demand forecasting. The results showed that weather data, public data, school academic calendar, festive season, and special events were reported to be highly considered as reported by 41.4%, 54.3%, 72.9%, 65.7%, and 75.7% of respondents respectively. Similarly, amongst the macro factors, the majority of the respondents indicated that employment rate, interest rate, currency value and USD availability were moderately considered in demand forecasting as shown by 55.7%, 45.7%, 41.4%, and 50% of respondents respectively, while the political environment was highly considered as indicated by 52.8% of respondents. These findings are summarized in Table 4.4.

	Low	Moderate	High
	(%)	(%)	(%)
Explanatory Factors	11.4	22.6	66.0
Weather data	12.9	32.9	41.4

	Low	Moderate	High
	(%)	(%)	(%)
Public holidays	12.9	25.7	54.3
School Academic calendar	10.0	17.1	72.9
Festive season - Christmas & Easter	8.6	25.7	65.7
Special events	12.9	11.4	75.7
Macro factors	24.0	44.9	31.1
Employment Rate	21.4	55.7	22.9
Interest rate	35.7	45.7	18.6
Currency value	22.9	41.4	35.7
US Dollar availability in the country	24.3	50.0	25.7
Political environment	15.7	31.4	52.8

Table 4.4: The extent to which different market and macro factors are considered by respondents when forecasting

4.4.3 Resources Used when Forecasting

The respondents were requested to rate the extent to which they utilised various forecasting resources in the last financial year when forecasting the demand for shoes and the results are presented in Table 4.5. These resources including using historical data to observe trends, using computer software, collaborating with capable managers, and using employees having the right forecasting skills were reported to be highly considered by the majority of respondents as indicated by 58.6%, 65.7%, 65.7%, and 65.7% of respondents.

Resources	Low	Moderate	High
	(%)	(%)	(%)
Use of historical data to observe sales trends in previous years	27.1	14.3	58.6
Use of computer software	0.0	34.3	65.7
Collaborating with capable managers to provide guidance	5.7	28.6	65.7
Use of employees who have the right skills in forecasting	22.9	11.4	65.7

Table 4.5: Resources used when forecasting

Additionally, the respondents were also asked to rate the extent to which they agreed with the statements regarding resources used and the results are presented in Table 4.6. Most respondents agreed that providing training (73.3%), using computer software (63.3%), using historical sales data (93.3%) and training managers (73.3%) would improve forecasting accuracy.

	Disagree	Neutral	Agree
	(%)	(%)	(%)
Providing training to employees to harness their forecasting skills	0.0	26.7	73.3
Use of computer software	10.0	26.7	63.3
Use of historical sales data that provides insights of past trends and seasonality	3.3	3.3	93.3
Providing training to managers to enhance their forecasting skills	0.0	26.7	73.3

Table 4.6: Resources that would improve forecast accuracy

4.4.4. Forecasting Methods

The respondents were requested to rate the extent to which various forecasting methods were considered in the last financial year when forecasting the demand for shoes and the results are presented in Table 4.7. Some forecasting methods including monthly forecasting, using historical data, using computer software factoring growth sales growth rate, collaborating with capable managers, using skilled employees, collaborating with suppliers, and collaborating with wholesalers and retailers were reported to be highly considered during demand forecasting by the majority of respondents. Other forecasting methods including yearly forecasting were indicated to be moderately considered whereas quarterly forecasting and collaboration with other departments in the organization were lowly considered as indicated by the majority of the respondents. These findings are summarized in detail in Table 4.7.

Method	Low	Moderate	High
	(%)	(%)	(%)
Yearly Forecasting	34.29	58.57	7.14
Quarterly Forecasting	55.72	41.43	2.86
Monthly Forecasting	1.43	14.29	84.28
Use of historical data to observe sales trends in previous years	5.7	28.6	65.7
Adjusting theoretical forecast due to intuition/ gut feeling	45.7	15.7	38.5
Use of computer software	0.0	34.3	65.7
Factoring sales growth rate	20.0	14.3	55.7
Collaboration with capable managers to provide guidance	27.1	14.3	58.5
Use of employees who have the right skills in forecasting	22.9	11.4	65.7
Collaboration with suppliers	17.1	31.4	51.4
Collaboration with wholesalers and retailers	17.1	24.3	58.6

Method	Low	Moderate	High
	(%)	(%)	(%)
Collaboration with other departments in the organisation	35.7	31.4	32.8

Table 4.7: Methods used when forecasting

Moreover, respondents were also requested to rate the extent to which they agreed with the statements regarding the forecasting time horizon and the results are presented in Table 4.8. The results suggest that nearly all respondents aware in agreement that performing short-term forecasts are more accurate than long-term forecasts, monthly reviews improve accuracy of forecasts, short-term forecasting horizons provide better insights, and that considering both short- and long-term horizons are critical for enhancing accuracy.

	Disagree (%)	Neutral (%)	Agree (%)
Performing short-term (1-3 months) forecasts provides more accuracy than long-term forecasts	0%	0%	100%
Performing monthly reviews of the long-term forecasts improves accuracy of future long-term forecasts	0%	0%	100%
A short-term forecasting horizon provides a better insight of factors that need to be considered when forecasting, hence improving its accuracy.	0%	3%	97%
Consideration of both short-term and long-term horizons are important for forecasting accuracy	0%	0%	100%

Table 4.8: Respondents agreement to various statements regarding the forecast time horizon

Furthermore, respondents were also requested to rate the extent to which they agreed to various supply chain collaboration aspects when forecasting and the results are presented

in Table 4.9. The findings indicated that the majority of respondents agreed that forecast accuracy can be improved through collaboration in the supply chain (93.3%) and collaboration between the company, suppliers, wholesalers and retailers (73.3%).

Supply chain collaboration	Agree	Neutral	Disagree
	(%)	(%)	(%)
Improving collaboration between various functions in the supply chain improves forecast accuracy	3.3	3.3	93.3
Improving collaboration between the company, suppliers, wholesalers & retailers improves forecast accuracy	3.3	23.3	73.3

Table 4.9: Supply chain collaboration to improve forecast accuracy

4.4.5 Forecast Accuracy

The respondents were asked to give the forecast accuracy (MAPE) in their organisation and the results are presented in Table 4.10. The majority of the respondents (65.8%, n = 46) indicated that the MAPE is accurate.

		Frequency	Percent
Valid	Very inaccurate	0	0
	Inaccurate	12	17.1
	Moderate	12	17.1
	Accurate	23	32.9
	Very accurate	23	32.9
	Total	70	100.0

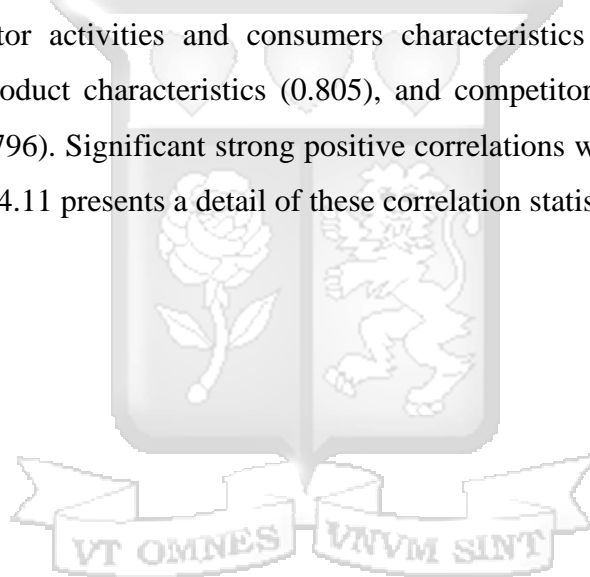
Table 4.10: Forecasting accuracy in shoe manufacturing companies in Kenya

4.5 Inferential Analysis

Correlation and regression analysis were conducted for inferential analysis, and the results are displayed in the section.

4.5.1 Correlation Analysis

This section highlights the correlation between the independent and dependent variables. Correlations are used to explore the relationships between various variables. It indicates the strength and direction of the relationship of the independent variable to the dependent variable(s). In this case, correlation describes the strength and direction of the relationship between factors, resources used, methods used and forecast accuracy. It also describes the strength and direction of the relationship between forecast accuracy and supply chain performance. The findings revealed significant positive correlations between product characteristics and consumer characteristics ($r = 0.786$), marketing activities and consumer characteristics ($r = 0.751$), marketing activities and product characteristics ($r = 0.831$), competitor activities and consumers characteristics ($r = 0.590$), competitor activities and product characteristics (0.805), and competitor activities and marketing activities ($r = 0.796$). Significant strong positive correlations were found between all the variables. Table 4.11 presents a detail of these correlation statistics.



Correlations										
		CC	PC	MA	CA	EF	MF	DFR	DFM	MAPE
CC	r	1								
	Sig.									
PC	r	.786**	1							
	Sig.	.000								
MA	r	.751**	.831**	1						
	Sig.	.000	.000							
CA	r	.590**	.805**	.796**	1					
	Sig.	.000	.000	.000						
EF	r	.797**	.887**	.799**	.706**	1				
	Sig.	.000	.000	.000	.000					
MF	r	.659**	.777**	.865**	.846**	.716**	1			
	Sig.	.000	.000	.000	.000	.000				
DFR	r	.769**	.925**	.805**	.832**	.844**	.812**	1		
	Sig.	.000	.000	.000	.000	.000	.000			
DFM	r	.742**	.819**	.849**	.816**	.804**	.844**	.788**	1	
	Sig.	.000	.000	.000	.000	.000	.000	.000		
MAPE	r	.779**	.897**	.912**	.905**	.867**	.918**	.903**	.905**	1
	Sig.	.000	.000	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4.11: Correlations between variables

Legend - CC = Consumer characteristics; PrC = Product characteristics; MA = Marketing activities; CA = Competitor activities; EA = Explanatory factors; MF = macro factors; DFR = Demand forecasting resources; DFM = demand forecasting methods; PC = Pearson Correlation

4.5.2 Regression Analysis

A multiple linear regression was performed to determine the effect of considering market factors on demand forecasting accuracy with demand forecasting accuracy as the dependent variable, and consumer characteristics, product characteristics, competitor activities and market activities as the independent variables. A significant regression equation was found ($F(4, 65) = 285.347, p < 0.05$) with an R-squared of 0.946, which shows that these independent variables explain 94.6% of the variability in demand forecasting accuracy. Participants predicted that Demand forecasting accuracy is equal to $-1.667 + 0.324$ (Factoring Consumer Characteristics) $+ 0.219$ (Factoring Product Characteristics) $+ 0.495$ (Factoring Marketing Activities) $+ 0.567$ (Factoring Competitor Activities). Factoring consumer characteristics, product characteristics, marketing activities and competitor activities were significant predictors of demand forecasting accuracy ($p < 0.05$) (See Table 4.12). These results suggest that factoring consumer characteristics, product characteristics, marketing activities and competitor activities increased the accuracy of demand forecasting.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.667	.197		-8.445	.000
	Consumer Characteristics	.324	.100	.162	3.224	.002
	Product Characteristics	.219	.087	.167	2.528	.014
	Marketing activities	.495	.095	.312	5.187	.000
	Competitor activities	.567	.072	.427	7.853	.000

a. Dependent Variable: Forecast Accuracy (MAPE)

Table 4.12: Regression analysis for predicting MAPE using market factors

A multiple linear regression was also performed to determine the effect of considering external factors (explanatory and macro-environment factors) on demand forecasting accuracy with demand forecasting accuracy as the dependent variable, and explanatory and macro-environment factors as the independent variables. A significant regression equation was found ($F(2, 67) = 461.51, p < 0.05$) with an R-squared of 0.932, which shows that these independent variables explain 93.2% of the variability in demand forecasting accuracy. Participants predicted that Demand forecasting accuracy is equal to $-1.788 + 0.608$ (Explanatory Factors) $+ 1.073$ (Macro Factors), wherein explanatory factors included factoring weather data, public holidays, school academic calendar, festive season and special events, and macro factors included employment rate, interest rate, currency value, US Dollar availability and political environment. Factoring explanatory factors and macro-environment factors were significant predictors of demand forecasting accuracy ($p < 0.05$). (See Table 4.13). These findings suggest that considering external factors (explanatory and macro factors) increased the accuracy of demand forecasting.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.788	.188		-9.529	.000
	Explanatory factors	.608	.065	.429	9.430	.000
	Macro factors	1.073	.080	.610	13.400	.000

a. Dependent Variable: Forecast Accuracy (MAPE)

Table 4.13: Regression for Predicting MAPE using external factors.

To determine the impact of forecasting methods on the accuracy of demand forecasting accuracy in shoe manufacturing companies in Kenya, a simple linear regression was performed with demand forecasting accuracy as the dependent variable and forecasting methods as the independent variable. A significant regression equation was found ($F(1, 68) = 307.296, p < 0.05$) with an R-squared of 0.819, which shows that these independent variables explain 81.9% of the variability in demand forecasting accuracy. Participants predicted that Demand forecasting accuracy is equal to $-1.941 + 1.768$ (Demand Forecasting Methods), wherein demand forecasting methods included conducting yearly, quarterly and monthly forecasts, factorings sales growth rate, adjusting forecast based on gut feeling, and collaborating with suppliers, wholesalers, retailers, and other departments in the organization. Overall, the results suggest that forecasting methods can be used to enhance the accuracy of demand forecasting for shoe manufacturers in Kenya. These findings are presented in Table 4.14.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.941	.333		-5.831	.000
	Demand Forecasting Methods	1.768	.101	.905	17.530	.000

a. Dependent Variable: Forecast Accuracy (MAPE)

Table 4.14: Regression for Predicting MAPE using demand forecasting methods

To determine the mediating role of forecast resources on the relationship between forecast methods and demand forecasting accuracy, the first step was to conduct a regression with demand forecasting accuracy as the dependent variable and demand forecasting methods as the independent variable in order to establish the zero-order relationship between the variables. This regression has already been reported in Table 4.14 ($\beta_0 = -1.941, \beta_1 = 1.768, p < 0.05$).

The second step was to perform a regression with demand forecasting resources as the dependent variable and demand forecasting methods as the independent variable. A

significant regression equation was found ($F(1, 68) = 111.452, p < 0.05$) with an R-squared of 0.788, which shows that this independent variable (demand forecasting methods) explain 78.8% of the variability in demand forecasting resources. Participants predicted that Demand forecasting resources is equal to $-0.446 + 1.302$ (Demand Forecasting Methods ($p < 0.05$)). These findings are presented in Table 4.15.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.446	.407		-1.095	.277
	Demand Forecasting Methods	1.302	.123	.788	10.557	.000

a. Dependent Variable: Demand Forecasting Resources

Table 4.15: Predicting Demand Forecasting Resources using Demand forecasting methods

The third step was to perform a regression with the demand forecasting accuracy as the dependent variable and demand forecasting resources as the independent variable. The regression equation was significant ($F(1, 68) = 301.658$) with an R-square of 0.816; hence, demand forecasting resources explains about 81.6% variance in demand forecasting accuracy. Demand forecasting accuracy was equal to $-0.238 + 1.068$ (Demand Forecasting Resources) ($p < 0.05$). Table 4.16 presents these findings.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.238	.240		-.991	.325
	Demand Forecasting Resources	1.068	.062	.903	17.368	.000

a. Dependent Variable: Forecast Accuracy (MAPE)

Table 4.16: Predicting demand forecasting accuracy using demand forecasting resources

The final step was conduct a regression analysis using demand forecasting accuracy as the dependent variable and demand forecasting methods and demand forecasting resources as the independent variables. The regression equation was significant ($F(2,67) = 357.459$) with an R-square of 0.914. The demand forecasting accuracy was equal to $-1.677 + 0.594$ (Demand Forecasting Resources) + 0.995 (Demand Forecasting Methods) ($p < 0.05$). See Table 4.17.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.677	.233		-7.205	.000
	Demand Forecasting Resources	.594	.069	.502	8.642	.000
	Demand Forecasting Methods	.995	.114	.509	8.766	.000

a. Dependent Variable: Forecast Accuracy (MAPE)

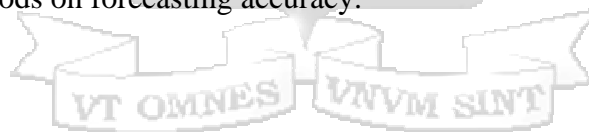
Table 4.17: Predicting Demand Forecasting Accuracy using demand forecasting resources and methods

In steps 1 through 3, there are significant relationships, which suggests the possible mediation effect of demand forecasting resources. In step 4, the effect of demand forecasting resources remained significant even after controlling for demand forecasting

methods, which suggests a partial mediation in the sense that both demand forecasting methods and demand forecasting resources significantly predict demand forecasting accuracy. The Sobel test confirmed this partial mediation effect $z = 9.02$, $p < 0.05$. Therefore, it was concluded that demand forecasting resources partially mediates the association between demand forecasting methods and demand forecasting accuracy.

4.6 Chapter Summary

The findings from the analysis revealed that factoring consumer characteristics, product characteristics, marketing activities and competitor activities were significant predictors of demand forecasting accuracy. The positive coefficients of these factors mean that considering them can increase the accuracy of demand forecasting. The results also showed that considering explanatory and macro-environment factors predicted demand forecasting accuracy by positive regression coefficients; thus, enhance the accuracy of forecasting. Additionally, the results suggest that forecasting methods can be used to enhance the accuracy of demand forecasting for shoe manufacturers in Kenya. Lastly, the findings demonstrated that demand forecasting resources partially mediates the association between demand forecasting methods and demand forecasting accuracy. Therefore, demand forecasting resources explain the positive impact of demand forecasting methods on forecasting accuracy.



CHAPTER 5 - DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion of the research findings, conclusions and recommendations based on the specific objectives of the study. The discussion is organized in accordance with the objectives of this research, which are linked to theory and previous studies. This chapter also outlined policy, managerial and theoretical recommendations as well as the limitations of the current study and the suggestions for additional research.

5.2 Discussions

The discussions of the study are presented in this section.

5.2.1 Effect of Considering Market Factors on Demand Forecasting Accuracy in Shoe Manufacturing Companies in Kenya

The findings from this research showed that the consideration for market factors ranges from moderate to high in demand forecasting. Consumer characteristics including consumer lifestyle, their fashion and trend awareness, brand awareness, and gender are moderately considered. Product characteristics (perceived quality of shoes, design and style of shoes, price of products, brand image, county of origin image, and product life cycle stage), marketing activities (promotion type, visual merchandizing, price discount and social media marketing) and competitor activities (their prices, products' brand image, promotional activities and visual merchandising) are highly considered in demand forecasting by shoe manufacturing companies in Kenya. Additionally, the findings suggested that factoring consumer characteristics, product characteristics, marketing activities and competitor activities were significant predictors of demand forecasting accuracy. Specifically, these factors increased the accuracy of demand forecasting as evidenced by their positive regression coefficients. These findings are consistent with previous studies demonstrating the important role played by considering various market factors in improving demand forecasting accuracy (Akkaya, 2021; Chae et al., 2020; Ching et al., 2017; Fiig et al., 2021; Kalantari, 2021; Seyedan & Mafakher, 2020). These

studies show that analyzing the behaviors of customers, product characteristics/features, competition intensity, and marketing activities can improve the accuracy of demand forecasting. The findings of Akkaya (2021) showed that consumers' perceived value is affected by their lifestyle which significantly impacts their purchase intention. It also complements the findings of Arshad & Victor (2020) that brand awareness has a positive impact on purchase intention. Lastly it supports the findings of Kalantari et al. (2021), that female customers are more willing to purchase shoes than males. The findings obtained from the current study supports the view documented in previous studies showing that demand forecasting can be more accurate if market factors are considered. The results also support Chae et al. (2020) whose research findings suggested that product characteristics had a strong positive relationship with perceived value, brand trust and purchase intention. The results also support Kalantari et al., (2021) whose findings suggested that for men, price and degree of customisation positively affect purchase intention. For the product lifecycle stage, the findings of the study support the findings of Nagashima et al. (2015) that the product maturation stage had a positive effect on the forecast accuracy. Market factors have been reported to affect the demand of services/products (Chae et al., 2020; therefore, there is the need to include them in demand forecasting models. Promotion type, visual merchandising, price discount, and social media marketing are rated by the respondents as the major contributors to the effect of marketing activities on shoe demand. For promotion type, the findings of the study support the findings of Walintukan et al. (2018) that sales promotion is strongly and positively associated with customer purchase intention. For visual merchandising, the findings of this study supported the findings of Park et al. (2015), where function, being one of the dimensions of Visual merchandising cognition, had a significant positive association with purchase intention. For price discount, the findings of this study supported the findings of Büyükdağ et al. (2020), which showed that price promotion had a strong positive effect on purchase intention. For social media marketing, the findings of this study support the findings of Gautam & Sharma (2017) whose results showed that social media marketing had a significant positive effect on purchase intention. Additionally, the results also support the forecasting theory on the basis that past and current knowledge of the market can provide useful insights for making predictions.

5.2.2 Effect of Considering External Factors on Demand Forecasting Accuracy in Shoe Manufacturing Companies in Kenya

External Factors, comprising of explanatory weather data, public holidays, school academic year, festive season, and special events) and macro factors (employment rate, interest rate, currency value, USD availability in the country, and the political environment) were reported to be highly considered in demand forecasting by shoe manufacturing companies in Kenya. Findings from this study revealed that factoring explanatory factors and macro-environment factors were significant predictors of demand forecasting accuracy, which suggests that considering external factors (explanatory and macro factors) increased the accuracy of demand forecasting. These findings are consistent with results of previous studies showing that the inclusion of external factors in demand forecasting models enhances accuracy (Babongo et al., 2018; Fiig et al., 2019; Ghalekhondabi et al., 2017; Spiliotis et al., 2020). Evidence from these studies show that incorporating external data, such as meteorological information, air quality, land use data, information regarding public holidays, and political factors helped to improve the accuracy of demand forecasting. Incorporating macro-environment variables like interest rate, inflation rate and employment rate have been reported to improve the accuracy of demand forecasting (Mohd Zain et al., 2020). This research supports the findings of Thomassey (2010) that factors such as weather data, competition, calendar data, marketing strategy, political environment, features of items, and macroeconomic and trend data should be taken into consideration when forecasting as they have an impact on sales. It also supports the results of the study by Babongo et al. (2018) that there is a reduction of up to 45% in forecasting error when meteorological data from the past season is included. Additionally, these findings are consistent with the findings of Mohd Zain et al. (2020), which showed that GDP was positively correlated with car sales in Proton while interest rate, inflation, and the unemployment rate had an inverse correlation with car sales in Proton. The implication of these findings is that considering factors in the external business environment can make demand forecasting more accurate. These external factors influence the demand of products/services; hence, it is prudent to consider them when predicting demand.

5.2.3 Impact of Forecasting Methods on Demand Forecasting Accuracy in Shoe Manufacturing Companies in Kenya

The use of forecasting methods varied from low to high. Some forecasting methods including monthly forecasting, using historical data, using computer software factoring growth sales growth rate, collaborating with capable managers, using skilled employees, collaborating with suppliers, and collaborating with wholesalers and retailers were reported to be highly considered during demand forecasting by the majority of respondents. Other forecasting methods including yearly forecasting were indicated to be moderately considered whereas quarterly forecasting and collaboration with other departments in the organization were lowly considered as indicated by the majority of the respondents. The findings from this study showed that forecasting methods significantly predicted demand forecasting accuracy. The results showed that the aforementioned forecasting methods can increase the accuracy of demand forecasting. Consistent findings have been reported in previous studies showing that employing complex and sophisticated methods can enhance demand forecasting accuracy. Employing methods like predictive analysis, analytical tools such as big data analytics, and other technology tools, are useful in enhancing forecasting accuracy, especially in sectors characterized by large numbers of SKUs as well as multiple variables and an uncertain business environment (Basson et al., 2019). The overall implication is that forecasting accuracy can be improved by utilizing technology, which is more accurate and can handle numerous variables.

5.2.4 The Mediating Role of Forecast Resources on the Relationship between Forecast Methods and Demand Forecasting Accuracy

Demand forecasting resources including using historical data to observe trends, using computer software, collaborating with capable managers, and using employees having the right forecasting skills were reported to be highly considered by the majority of respondents. Findings showed that demand forecasting resources partially mediates the association between demand forecasting methods and demand forecasting accuracy. This means that demand forecasting resources explain the positive impact of forecasting methods on forecasting accuracy. These results are consistent with the findings of previous studies showing that forecasting resources explain the positive impact that

forecast methods have on forecasting accuracy (Ren et al., 2017). The results support the findings of Hofmann and Rutschmann (2018) which suggested that the integration of various data sources when performing forecasting can be done but requires skilled data analysts, technological foundation, and technological investments. An inference that can be made from this observation is that forecasting methods without the needed resources, such as skilled employees, capable managers and computing infrastructure might not yield improvements in forecasting accuracy. Therefore, forecasting methods, like quarterly, monthly forecasts, factoring sales growth rate and collaboration can be complemented using forecasting resources like computing infrastructure and skilled employees who are experts in forecasting.

5.3 Conclusions

The findings from this study suggest that factoring consumer characteristics, product characteristics, marketing activities and competitor activities were significant predictors of demand forecasting accuracy. The positive coefficients of these factors mean that considering them can increase the accuracy of demand forecasting. The results also showed that considering explanatory and macro-environment factors predicted demand forecasting accuracy by positive regression coefficients; thus, enhance the accuracy of forecasting. Additionally, the results suggest that forecasting methods can be used to enhance the accuracy of demand forecasting for shoe manufacturers in Kenya. Lastly, the findings demonstrated that demand forecasting resources partially mediates the association between demand forecasting methods and demand forecasting accuracy. Therefore, demand forecasting resources explain the positive impact of demand forecasting methods on forecasting accuracy.

5.4 Recommendations

5.4.1 Policy Recommendations

A policy recommendation from this study is that the government should consider adopting initiatives aimed at increasing the adoption of forecasting technologies, such as computer software and big data analytics. Some approaches that can be initiated by the government include reducing taxes on computing forecasting technologies in order to incentivize

companies to adopt these technologies. Additionally, the government can encourage adoption of these sophisticated forecasting technologies using incentives like tax breaks, recognition and appreciation, computing infrastructure assistance, and grants.

5.4.2 Managerial Recommendations

Numerous managerial implications can be deduced from the findings of this research. First, the implication for shoe manufacturing companies in Kenya is that consumer characteristics, product characteristics, marketing activities done by the company, competitors' activities, external factors, and macroeconomic factors should be taken into consideration to ensure accurate forecasting of products. The second recommendation for shoe manufacturing companies in Kenya is that when forecasting demand they need to segment their target consumers by their lifestyle and gender. They should also invest time and effort to understand how well their brand is known to their consumers and collect data from different sources to create a comprehensive view of consumers' wants and demands. This can be achieved through customer surveys. Thirdly, manufacturing companies in Kenya should structure the development of prices, assess products' perceived quality, and understand the brand image and country of origin image which can be done through reviews, customer feedback, and product returns. They should also invest time and effort to analyse the product lifecycle stage. Additionally, these companies need to monitor and evaluate the performance of their marketing activities by tracking past sales during promotional periods and social media sentiments about products. Shoe manufacturing companies in Kenya should also be more up-to-date on their competitor's activities, and gaining insights into their competitive edge will improve the accuracy of the forecast. A more accurate forecast of product sales at shoe manufacturing companies in Kenya will be determined if the company refers to weather information, school calendars, and factor in dates of festive seasons when forecasting. Moreover, shoe manufacturing companies in Kenya need to be up-to-date with the economic and political situation of the country to realise accurate forecasts. Another recommendation for these companies is to invest in training their employees in order to enhance their forecasting skills. Shoe manufacturing companies should also invest in acquiring computing technologies in order to improve their forecasting accuracy. This implies that shoe manufacturing companies in Kenya

should invest in technology to retrieve the information required to calculate the sales growth rate of various products. They should also have forecast review meetings on a monthly basis to improve the accuracy of future forecasts. Moreover, there is the need for shoe manufacturing companies is that they should establish effective communication channels both internally and externally to facilitate the exchange of information among various stakeholders in the supply chain and be able to find ways to validate the reliability of information obtained from suppliers.

5.4.2 Theoretical Recommendations

From the findings, an overall model can be recommended to understand how demand forecasting accuracy can be improved. Based on the results of this study, demand forecasting accuracy can be enhanced by considering market factors, external factors, forecasting methods, and forecasting resources. The findings of this research validate the conceptual framework that developed for this study.

5.5 Study limitations

A limitation of this study is that use of self-report measures for forecasting accuracy. Respondents provided their estimates for forecasting accuracy rather than using the actual forecasting accuracy. Another limitation of this research is the small sample size, which poses limitations regarding the extent to which the findings can be generalized. While the sample was adequate considering the population size, the size of the sample was still small.

5.6 Area for further research

An area for further research is to examine the factors influencing demand forecasting accuracy in other sectors besides shoe manufacturing. The study examined the factors, resources and methods that affect forecasting at shoe manufacturing companies in Kenya. Since this study was only focused on Shoe manufacturing companies in Kenya, a similar study should be undertaken in manufacturing companies in other sectors.

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APPENDICES

APPENDIX I – LETTER OF INTRODUCTION

Dear Participant,

My name is Kunal Narandass and I am undertaking a Master in Business Administration at Strathmore University Business School. Currently, I am doing a research project titled **Demand forecasting in shoe manufacturing companies in Kenya: An assessment of factors affecting its accuracy and its impact on supply chain performance**. I am requesting your participation in this study by filling out the questionnaire.

The questionnaire(s) is/ are expected to take approximately 40 minutes of your time. No risk is involved if you agree to participate in this exercise and all information that you give in the questionnaire will remain confidential. Participation is strictly voluntary and you can opt to withdraw at any time you wish to.

I thank you for taking the time in assisting me in my educational endeavours. Useful information will be provided from the data in regards to improving demand forecasting accuracy and supply chain performance in shoe manufacturing companies in Kenya. Your participation in filling out the questionnaire will indicate your willingness to participate in this study. Should you require any additional information or clarification, please contact me at kunalchudasama@hotmail.com

APPENDIX II – PARTICIPANT INFORMATION AND CONSENT FORM

Title of the proposed study: DEMAND FORECASTING IN SHOE MANUFACTURING COMPANIES IN KENYA: AN ASSESSMENT OF FACTORS AFFECTING ITS ACCURACY AND ITS INFLUENCE ON SUPPLY CHAIN PERFORMANCE

SECTION 1: INFORMATION SHEET

Principal Investigator: Kunal Harishchandra Narandass

Institutional Affiliation: Strathmore Business School (SBS)

Mobile: +254735730860

Email: kunal.narandass@strathmore.edu

Supervisor: Dr. Ben Ngoye

Institutional Affiliation: Strathmore Business School (SBS)

Mobile: +254715395882

Email: BNgoye@strathmore.edu



SECTION 2: INFORMATION SHEET – THE STUDY

2.1. Why is this study being carried out?

This study is being carried out in partial fulfillment of the requirement for the award of Master in Business Administration at Strathmore Business School.

2.2. Do I have to take part?

No. Taking part in this study is entirely optional and the decision rests only with you. If you decide to take part, you will be asked to complete a questionnaire to get information

on the extent of how various factors affect demand forecasting accuracy, ways to improve demand forecast accuracy, and lastly how supply chain performance is influenced by demand forecast accuracy. If you are not able to answer all the questions successfully the first time, you may be asked to sit through another informational session after which you may be asked to answer the questions a second time. You are free to decline to take part in the study from this study at any time without giving any reasons.

2.3. Who is eligible to take part in this study?

All employees in the following departments of the Shoe Manufacturing companies in Kenya:

- Sales
- Marketing
- Procurement
- Production
- Logistics

2.4. Who is not eligible to take part in this study?

- Any person who is not employed in any department described in 2.3
- Any person who is under 18 years of age

2.5. What will taking part in this study involve for me?

You will be approached and requested to take part in the study. If you are satisfied that you fully understand the goals behind this study, you will be asked to sign the informed consent form (this form) and then taken through a questionnaire to complete.

2.6. Are there any risks or dangers in taking part in this study?

There are no risks in taking part in this study. All the information you provide will be treated as confidential and will not be used in any way without your express permission.

2.7. Are there any benefits of taking part in this study?

The information will be used to improve the demand forecasting accuracy which shall in turn improve the supply chain performance in Shoe Manufacturing companies in Kenya

2.8. What will happen to me if I refuse to take part in this study?

Participation in this study is entirely voluntary. Even if you decide to take part at first but later change your mind, you are free to withdraw at any time without explanation.

2.9. Who will have access to my information during this research?

Access to all the information obtained during this research will be restricted. All research records will be stored in securely locked cabinets. That information may be transcribed into our database but this will be sufficiently encrypted and password protected. Only the people who are closely concerned with this study will have access to your information. All your information will be treated as private and confidential.

2.10. Who can I contact in case I have further questions?

You can contact me, Kunal Harishchandra Narandass, at SBS, or by e-mail kunal.narandass@strathmore.edu, or by phone +254735730860. You can also contact my supervisor, Dr. Ben Ngoye, at the Strathmore Business School, Nairobi, or by e-mail bngoye@strathmore.edu, or by phone +254715395882.

If you want to ask someone independent anything about this research please contact:

The Secretary

Strathmore University Institutional Ethics Review Board,

P. O. BOX 59857, 00200,

Nairobi.

Email: ethicsreview@strathmore.edu

Tel number: +254 703 034 375

I, _____, confirm that all the issues confirm that all the issues about this study have been clarified. I further affirm that I have asked all the questions that I needed to ask and all of them have been answered to my satisfaction. I have read and understood the questions. I have been provided with the contacts of the person and institution that I need to contact in case issues arise and I need further clarifications.

Please tick the boxes that apply to you;

Participation in the research study

- I AGREE to take part in this research
- I DON'T AGREE to take part in this research

Storage of information on the completed questionnaire

- I AGREE to have my completed questionnaire stored for future data analysis
- I DON'T AGREE to have my completed questionnaire stored for future data analysis

Participant's signature: _____ Date: ____/____/____
(DD/MM/YY)

Participant's name: _____ Time: ____ : ____ (HH/Mins)
(please print name)

I, KUNAL HARISHCHANDRA NARANDASS certify that I have followed the SOP for this study and have explained the study information to the study participant named above, and that s/he has understood the nature and the purpose of the study and consents to the participation in the study. S/he has been given the opportunity to ask questions which have been answered satisfactorily.

Investigator's signature: _____ Date: ____/____/____

Investigator's name: Kunal Harishchandra Narandass Date ____/____/____

APPENDIX III – STRATHMORE UNIVERSITY ETHICAL REVIEW
COMMITTEE AUTHORIZATION



29th August 2022

Mr Narandass, Kunal
kunal.narandass@strathmore.edu

Dear Narandass,

REF: SU-JERC1473/22 (AMENDMENT) PROPOSAL “Demand Forecasting in Shoe Manufacturing Companies in Kenya: An Assessment of Factors Affecting its Accuracy and Its Influence on Supply Chain Performance”

I refer to your application for the approval of a proposed amendment submitted on 18th August 2022. We acknowledge receipt of the following submitted documents for amendment.

- a) Amendment Cover letter dated 18th August 2022.
- b) Amended Study Proposal dated 7th October 2021.
- c) Amended Study Questionnaire dated 18th August 2022.
- d) Informed Consent Form and document outlining participation conditions.
- e) Study budget.
- f) CV of Investigator

The committee noted the following amendment(s)

Questionnaire:

The following changes were made to the questionnaire:

- 1) Change of aspects of factors, methods, and resources***
- 2) Information regarding Forecast accuracy added***
- 3) Changes in aspects of supply chain performance***

Data Analysis:

Data collected from pilot cannot be analysed due to missing component in the questionnaire.



The Committee concluded that the suggested amendments are justified and will not result in increased risk to the participants. The proposed changes have therefore been granted **approval** for implementation. You may continue with your study.

You are required to submit any further changes to this version of the protocol to SU-IERC for review and approval prior to implementing any additional changes.


Yours sincerely,


A handwritten signature in black ink, appearing to read "Ben Ngoye".

for: **Dr Ben Ngoye,**
Secretary; SU-IERC

Cc: Prof Fred Were,
Chairperson; SU-IERC


APPENDIX IV – NACOSTI PERMIT


REPUBLIC OF KENYA


**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION**

RefNo: 262784 **Date of Issue: 15/September/2022**


RESEARCH LICENSE




This is to Certify that Mr. Kunal Harishchandra Narandass of Strathmore University, has been licensed to conduct research in Mombasa, Nairobi on the topic: DEMAND FORECASTING IN SHOE MANUFACTURING COMPANIES IN KENYA: AN ASSESSMENT OF FACTORS AFFECTING ITS ACCURACY AND ITS INFLUENCE ON SUPPLY CHAIN PERFORMANCE for the period ending : 15/September/2023.

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APPENDIX V – Questionnaire

This questionnaire aims at collecting information regarding the various factors that are considered when forecasting the demand for shoes. The employees working in sales, marketing, production, procurement and logistics departments of Shoe manufacturing companies in Kenya have been selected to form part of this study.

Please answer the following questions.

NOTE: Information collected will be treated with due confidentiality and will be used for academic purposes only

SECTION A: Demographic information

1. Gender:

Male Female

2. Age:

Below 24 years 41 – 45 years
24 – 30 years 46 – 50 years
31 – 35 years Above 50 years
36 – 40 years

3. Designation: _____

4. How long have you worked in the firm?

Less than 1 year 7 to 10 years
1 to 3 years More than 10 years
4 to 6 years

SECTION B: Market and Macro factors

5. In the last financial year, rate the extent to which the following **factors** were considered when forecasting the demand for shoes in Kenya using a five-point scale where,

1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high

	1	2	3	4	5
Consumer Characteristics					
Consumer Lifestyle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consumers' Fashion and trends preferences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consumers' Brand awareness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consumer's gender	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Product Characteristics					
Perceived quality of shoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design & style of shoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Price of products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brand Image	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Country of Origin Image	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Product life cycle stage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marketing activities					
Promotion type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visual merchandising	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Price discount	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social media marketing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competitor activities					
Competitors' price	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competitors' products brand image	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competitors promotion activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	1	2	3	4	5
Competitors visual merchandising	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

External factors

Weather data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public holidays	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School Academic calendar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Festive season - Christmas & Easter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Macroeconomic factors

Employment Rate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interest rate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Currency value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
US Dollar availability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Political environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION C: Resources used when forecasting

6. In the last financial year, rate the extent to which the following **resources** were considered when forecasting the demand for shoes in Kenya using a five-point scale where,

1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high

Resources

	1	2	3	4	5
Use of historical data to observe trends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of computer software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of employees who have the right skills in forecasting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collaborating with capable managers when forecasting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Using a five-point scale, rate the extent to which you agree that the following aspects of resources improve the forecasting accuracy where,

1 = Highly; 2 = disagree; 3 = neutral, 4 = agree, 5 = highly agree

	1	2	3	4	5
Providing training to employees to provide accurate and reliable information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Providing training to managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of computer software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of historical sales data provides insights of trends and seasonality that helps to improve the forecast accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION D: Methods used for forecasting

8. In the last financial year, rate the extent to which the following **methods** were considered when forecasting the demand for shoes in Kenya using a five-point scale where,

1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high

	1	2	3	4	5
Yearly forecast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quarterly forecast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monthly forecast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Factoring sales growth rate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adjusting theoretical forecast due to intuition/ gut feeling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collaboration with suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collaboration with wholesalers and retailers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	1	2	3	4	5
Collaboration with other departments in your organisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Rate the extent to which you agree with the following statements regarding the forecasting time horizons using a five-point scale where,

1 = very low; 2 = low; 3 = moderate, 4 = high, 5 = very high

	1	2	3	4	5
Performing short-term (1-3 months) forecasts provides more accuracy than long-term forecasts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Performing monthly reviews of the long-term forecasts improves accuracy of future long-term forecasts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A short-term forecasting horizon provides a better insight of factors that need to be considered when forecasting, hence improving its accuracy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Consideration of both short-term and long-term horizons are important for forecasting accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Rate the extent to which you agree with the following statements regarding supply chain collaboration when forecasting using a five-point scale where,

1 = Highly disagree; 2 = disagree; 3 = neutral, 4 = agree, 5 = highly agree

	1	2	3	4	5
Improving collaboration between various					

functions in the Supply chain improves
forecasting accuracy

Improving collaboration between the
company, suppliers, retailers and wholesalers
of products improves forecasting accuracy

SECTION E: Forecasting accuracy

11. Mean Absolute Percentage Error (MAPE) for a forecasted period is calculated using the formula:

$$MAPE = \frac{|Actual\ sales - forecast\ sales|}{Actual\ Sales} \times 100$$

In the last financial year, what was the forecast's MAPE in your organization?

1 = Greater than 40% (very inaccurate forecast)

2 = 30% to 40% (inaccurate forecast)

3 = 20% to 30% (neutral forecast)

4 = 10% to 20% (accurate forecast)

5 = 0% to 10% (very accurate)

--- END OF QUESTIONNAIRE ---

THANK YOU

APPENDIX VI - List of shoe manufacturing companies in Kenya

1. Addison Industries Limited
2. Bata Shoe Co. (K) Limited
3. C & P Shoe Industries Limited
4. Umoja Rubber Products Limited
5. Walker Shoes (K) Limited
6. Kenafric Manufacturing Limited



APPENDIX VII: STATISTICS

1. Independent samples t-test for demand forecasting accuracy based on gender

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Forecast Accuracy (MAPE)	Male	39	3.9231	1.08542	.17381
	Female	31	3.6774	1.07663	.19337

Independent Samples Test

		Forecast Accuracy (MAPE)		
		Equal variances assumed	Equal variances not assumed	
Levene's Test for Equality of Variances	F	.063		
	Sig.	.802		
t-test for Equality of Means	t	.944	.945	
	df	68	64.710	
	Sig. (2-tailed)	.349	.348	
	Mean Difference	.24566	.24566	
	Std. Error Difference	.26025	.26000	
	95% Confidence Interval of the Difference	Lower	-.27365	-.27364
		Upper	.76497	.76496

2. One-way ANOVA - Demand Forecasting Accuracy by Age

Descriptives

Forecast Accuracy (MAPE)

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
24 to 30 years	15	4.3333	.89974	.23231	3.8351	4.8316	2.00	5.00
31 to 35 years	31	3.5484	1.09053	.19586	3.1484	3.9484	2.00	5.00
36 to 40 years	6	3.8333	1.16905	.47726	2.6065	5.0602	2.00	5.00
41 to 45 years	6	3.8333	1.16905	.47726	2.6065	5.0602	2.00	5.00
46 to 50 years	6	3.8333	1.16905	.47726	2.6065	5.0602	2.00	5.00
Above 50 years	6	3.8333	1.16905	.47726	2.6065	5.0602	2.00	5.00
Total	70	3.8143	1.08070	.12917	3.5566	4.0720	2.00	5.00



ANOVA

Forecast Accuracy (MAPE)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.242	5	1.248	1.075	.383
Within Groups	74.344	64	1.162		
Total	80.586	69			

3. One-way ANOVA – Demand Forecasting Accuracy by Department

Descriptives

Forecast Accuracy (MAPE)

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Sales	17	3.8235	1.13111	.27433	3.2420	4.4051	2.00	5.00
Marketing	17	3.7647	1.09141	.26471	3.2036	4.3259	2.00	5.00
Procurement	12	3.8333	1.11464	.32177	3.1251	4.5415	2.00	5.00
Production	12	3.8333	1.11464	.32177	3.1251	4.5415	2.00	5.00
Logistics	12	3.8333	1.11464	.32177	3.1251	4.5415	2.00	5.00
Total	70	3.8143	1.08070	.12917	3.5566	4.0720	2.00	5.00

ANOVA

Forecast Accuracy (MAPE)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.056	4	.014	.011	1.000
Within Groups	80.529	65	1.239		
Total	80.586	69			

4. One-way ANOVA – Demand Forecasting Accuracy by Years of Employment

Descriptives

Forecast Accuracy (MAPE)

N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
				Lower Bound	Upper Bound		

Less than 1 year	3	4.0000	1.00000	.57735	1.5159	6.4841	3.00	5.00
1 to 3 years	22	3.8182	1.22032	.26017	3.2771	4.3592	2.00	5.00
4 to 6 years	38	3.8158	1.03598	.16806	3.4753	4.1563	2.00	5.00
7 to 10 years	7	3.7143	1.11270	.42056	2.6852	4.7434	2.00	5.00
Total	70	3.8143	1.08070	.12917	3.5566	4.0720	2.00	5.00

ANOVA

Forecast Accuracy (MAPE)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.174	3	.058	.048	.986
Within Groups	80.412	66	1.218		
Total	80.586	69			

