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Evaluation of Sales Forecasting Methods Used by Neighbourhood Stores in Ago Palace Way, Okota, Lagos

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Abstract: *This study evaluated forecasting methods used by neighbourhood stores in Ago Palace Way, Okota, Lagos, Nigeria. The purpose was to ascertain the accuracy of the method(s) used and to recommend ways to improve the method(s). The study employed a quantitative research design. Structured interview and questionnaire were the instruments used to collect data. The data collected were analyzed using descriptive statistics. The findings revealed that the neighbourhood stores studied employed elementary qualitative forecasting techniques to manage their inventory and predict future demand. Sources of information used for forecasting demand were the experience of sellers and information from suppliers. The study recommended the use of the simplest quantitative forecasting techniques (Time Series Analysis) because it could provide a more accurate sales forecast relative to the elementary forecasting techniques being used by the neighbourhood stores.*

Keywords—Forecasting methods, Neighbourhood stores, Sales forecast

Introduction

The application of sales forecasting to estimate sales revenue and make business decisions on production, operations, and marketing strategies has become more germane in the increasingly complex and volatile environment of today's business world where organisations are seeking optimal sales performance, better profit margins, and improved customer service. Sales forecasts have become important for understanding market share, and competition, planning future production needs, and the determinants of sales, pricing, and distribution. Mentzer and Bienstock (1995) have stated that sales forecast influences various decisions at the organizational level because it is relied upon for making decisions in various organizational functions such as marketing, sales, production/purchasing, as well as finance and accounting.

Whilst sales forecasting is predominantly used in manufacturing organisations to predict future demand and facilitate making decisions on business operations, it is also applicable to retail businesses. Chu and Zhang (2014) aver that the majority of retail businesses depend on forecasting future demand for planning and operations. Sales forecasting forms an integral part of retail decision-making (Kumar and Dalgobind, 2014). It has been discovered that successful inventory management depends to a large extent on the accurate forecast of retail sales (Barksdale and Hilliard, 1995). Sales forecasts can be used to determine optimal inventory level requirements and avoid the problems of overstocking or understocking. This assertion is underscored by Thall (1992) and Agrawal and Schorling (1996) who observed that accurate demand forecasting plays a crucial role in profitable retail operations and poor forecasting would result in overstocking or understocking that could impact revenue and customer satisfaction.

Statement of the Problem

Neighbourhood shops are faced with the task of balancing inventory levels of the array of products they stock in their stores and the needs of the customers they serve so as not to overstock or understock the products they offer for sale. This could be a herculean task when sales forecasting methods are absent in place, or the methods being used are not reliable enough to guarantee accurate forecasting. The absence of sales forecasting methods or the use of poor forecasting methods could result in loss of revenue, tied-up working capital due to overstocking, loss of customer patronage and goodwill due to stockouts, and sometimes, public embarrassment and sanction from government agencies. For example, a national newspaper, The Guardian reported in the edition of April 4, 2023, that the Lagos State Consumer Protection Agency (LASCOPA) sealed up a neighbourhood shop in the Lagos metropolis for stocking expired products. Probably, the operator did not apply any forecasting method to estimate future demand before stocking those products, or made use of poor forecasting methods which produced inaccurate results. The consequence was the stock of expired products on the shelves which not only attracted sanction from an agency of government but could discount customer confidence in the neighbourhood shop. All of these could result in a loss of revenue and a poor image in

the eyes of the public. Guerts and Kelly (1986) argued that accurate sales forecast assists in sales and inventory management, and aids management to make decisions on appropriate levels of inventory management as well as valuable input into a company's operating and financial planning system. Similarly, Barksdale and Hilliard (1975) opined that successful inventory management depends to a large extent on the accurate forecasting of retail sales.

Poor forecasting methods have a negative impact on organisations' ability to accomplish their goals, it can lead to problems such as increased stock costs and inability to meet demand, which in turn can result in loss of market share (Agrawal and Schorling, 1997).

Despite the importance of sales forecasting and by extension, accurate sales forecasting, it has been asserted that sales forecasting is hardly utilized by neighbourhood shops in Nigeria, and the few that do, rely on qualitative sales forecasting techniques such as experience, opinions, and judgment of sales to determine sales forecast(Obamiro, et al, 2022). The authors stated further that the Naïve forecasting method is the most commonly used by grocery retailers in situations where quantitative forecasting technique was employed because of non-familiarity with quantitative techniques or inability to appreciate the benefits. (Obimaro et al, 2022).

Neighbourhood stores are small-scale retail outlets situated within a neighbourhood that present convenience to customers living within the neighbourhood as they do not have to travel a long distance to get their grocery needs. Tatum (2024) stated that "neighbourhood stores are locally owned businesses designed to meet the demand of consumers who live near the establishment"

Given the essential role neighbourhood stores play in attending to the grocery needs of consumers in the neighbourhood and the importance of accurate sales forecasting to achieving their organizational goals and satisfying the demands of their customers, the focus of this study was to evaluate the forecasting method(s) used by neighbourhood stores to forecast sales, determine the accuracy of those methods, and to see what actions could be taken to improve the accuracy of the forecasting methods.

Literature Review

There are several studies in the literature that have documented the different methods used in sales forecasting; from the fairly simple ones to complex hybrids, to model sales data to forecast future sales (Aras, et al, 2017), Armstrong and Brodie (1999) divided the methods into two (2) broad groups of judgmental and statistical forecasting. According to the authors, the methods based on judgment are intentions, role-playing, expert opinions, Conjoint Analysis, and judgmental bootstrapping whilst the methods based on statistical sources are extrapolation, rule-based forecasting, analogies, expert systems, multivariate, time series methods, and econometric methods. Obamiro et al (2022) in their opinion stated that various forecasting methods could be either qualitative or quantitative. Methods that use personal experience, value, intuition, and judgment are grouped under qualitative techniques whilst the ones that use sales trend analysis, causal, time series, moving average, and exponential smoothing are grouped under quantitative techniques (Obamiro, et al 2022).

There have been arguments on which of the broad methods – qualitative or quantitative delivers accurate forecasting results. Some authors believe that the qualitative methods tend to be subjective and bias because of lack of scientific proof, and that they are mostly used when data are not available or are insufficient or are known to be unreliable (Kumar and Dalgobind, 2014). Proponents of quantitative forecasting methods argue that quantitative methods use historical data to estimate future demand by creating mathematical models which are used to predict future sales and to that extent, the results tend to be more accurate than that of the qualitative technique.

The question as to which of the methods results in accurate forecasting has led to the conduct of a number of laboratory studies to compare judgmental forecasting (Qualitative method with computer-aided models (Lawrence, M. et al, 2000). The comparison showed that judgement is about as accurate as the best quantitative technique (Lawrence, M, 1985) and Makridakis, S. (1993).

However, despite an attempt to make a case for qualitative forecast techniques, a lot of the literature on sales forecasting are biased towards the quantitative sales forecasting methods. This could be due to the fact majority of the literature emanated from the developed economies where appropriate record keeping and availability of information and communication technology have influenced the preference for quantitative methods. Though the pattern observed in the literature is the combination of various quantitative models to achieve accurate forecasting. For example, Aras et al (2017) employed a combination of quantitative models – state spatial model, Autoregressive Integrated Moving Average (ARIMA) and Autoregressive Fractional Integrated Moving Average (AFRIMA) models, Artificial Neural Networks (ANN), and Adaptive Network-based Fizzy Inference System (ANFIS) to conduct sales forecast for a furniture company. Also, Luis and Richard (2007) deployed a combination of ARIMA and ANN models to forecast sales for a Chilean supermarket and the results showed that the combination techniques can help firms make correct decisions.

The conclusions that could be drawn from the literature are that, the quantitative forecasting techniques are preferred to the qualitative techniques because of the guaranty of accuracy. However, it seems no single method can guaranty accuracy hence the use of combination and hybrid methods.

Research Objectives

The primary research objective was to evaluate the sales forecasting methods used by neighbourhood stores in Ago Palace Way, Okota, Lagos.

The secondary objectives were to

- Ascertain the accuracy of the forecasting methods
- Suggest ways to improve accuracy of the methods

Research Methodology

The quantitative research design was used to conduct the study. A census of all neigbourhood stores located in Ago Palace way, Okota, Lagos, was carried out. The sample used for the study were neighbourhood stores with Point-of – sale (POS) terminals. The reason being that they should have rich data about customer purchase patterns which could facilitate the prediction of demand. All the neighbourhood stores sampled stock similar items. A total of seven (7) neighbourhood stores satisfied the criteria. They are:-

E-Mart Supermarket
Genesis Supermarket
Best Choice Supermarket
Globus Supermarket
Koddys-Mart Supermarket
Tripod Supermarket
Penny Mart Supermarket

Data collection was through direct interviews using pre-determined questions. The respondents were the store managers of the various outlets. Respondents were first asked to comment on how inventory was managed in their outlets. Open ended questions were used to ascertain the use of sales forecasting methods, the frequency of use of the forecasting methods, and the level of accuracy.

The data collected was analyzed using descriptive statistical methods (multiple response analysis and tables)

Results

Based on the analysis of the data collected, all the respondents claimed that they made use of one form of forecasting method or another to support decision making in inventory management and replenishment of stock.

Table 1: Whether Neighbourhood stores make use of any forecasting methods

Whether any forecasting technique is used	Responses (Frequency)	Percent
Yes	7	100%
No	0	
Total	**7**	**100%**

Table 2: Forecasting Methods used by the Respondents

Forecasting Methods used by Respondents	Responses (frequency)	Percent
Customers' expectations	1	14%
Retailers' Opinion	3	43%
Past experience	3	43%
Time series analysis	0	0%
Simple regression	0	0%
Advanced forecasting methods	0	0%
Total	**7**	**100%**

Retailers' opinion and past experience are clearly the favourite methods used in sales forecasting by the respondents. Customers' expectations was just 14%. It was observed that all the respondents made use of the qualitative methods of forecasting as the all the quantitative methods had zero responses.

Table 3: Sources of Information for Forecasting Demand

Sources of Information for Forecasting Demand	Responses (Frequency)	Percent
Experience of sellers	3	43%
POS data	1	14%
Information from suppliers	3	43%
Total	**7**	**100%**

Both the experience of sellers and information from sellers are the sources of information neighbourhood stores rely upon for making decision on future demand. POS data containing objective information about customers buying behaviour are hardly used to predict future demand. This revelation underscores the reason for the non-usage of quantitative methods of forecasting as revealed in Table 2 above.

Table 4: Factors Affecting Demand

Factors Affecting Demand	Responses (Frequency)	Percent
Price of the product	2	28.5%
Seasonality of the Product	1	14%
Brand of the product	2	28.5%
Quality of the product	2	28.5%
Total	**7**	**100%**

A number of factors may affect future demand. Some of the factors identified and frequency of consideration are shown on Table 4 above. Price (28.5%), brand (28.5%, and quality (28.5%) of the product equally are considered as some of the factors affecting demand.

Table 5: Frequency of Experiencing Out-of-stock Situation

Frequency of Experiencing Out-of-Stock Situation	Responses (Frequency)	Percent
Very often	2	29%
Often	5	71%
Not at all	0	0%
Total	**7**	**100%**

All the neighbourhood stores surveyed have experienced out of –stock situation on one occasion or another on some of the items they stock. However, they claimed that it is not very often, though they could not not provide information on the number of times they have experienced in a year. Moreover,

it was claimed that out-of-stock situations are sometimes caused by delay from suppliers even after orders have been placed for stock replenishment.

Discussions and Conclusion

The analysis reveals that the neighbourhood stores sampled in Ago Palace way, Okota claim they use sales forecasting methods for inventory management and stock replenishment; though all of them make use the qualitative techniques of retailers' opinion and past experience. Some authors are of the opinion that the qualitative methods are" subjective and biased due to lack of scientific proof" (Obamiro et al, 2022). Though in another study carried out in the laboratory, it was revealed that the judgmental method is about as accurate as the best quantitative technique (Lawrence et al, 1985) and (Makridakis et al, 1993).

Even though there is availability of objective customer purchase behaviour which could be obtained from the POS terminal, none of the respondents sampled is making use of quantitative forecasting techniques. Rather, neighbourhood stores rely on their experience and information from seller as sources of information for demand forecasting. Out-of-stock situation is often experienced on some items but are majorly caused by delay in supplying orders that have been placed.

Conclusion

The complexity and uncertainty in today's business environment have made forecasting an indispensable tool for businesses to predict the future and make decisions in the areas of production/purchasing, sales, marketing, finance and accounting.

The prevalent use of elementary qualitative forecasting techniques that relies on retailers' opinion and past experience may lead to inaccurate forecasts with all the consequences of overstocking or understocking.

Forecasting demand in retail stores requires choosing the appropriate forecasting methods and sources of information. With the nature of demand of consumer markets and the availability of customers' past sales, neighbourhood stores should adopt quantitative forecasting techniques such as time series analysis which is simple to use and can guaranty some level of accuracy.

Implications to Management. Forecasting is an important tool for management to make informed decisions in order to mitigate to challenges in the operating environment. However, success with forecasting is largely dependent on the accuracy of the forecast because inaccurate forecast could lead to overstocking or understocking with the associated consequences. So, management should adopt forecasting techniques that can guaranty appreciable level of accuracy.

Implications to sales. Stock outs as a result of poor forecasting techniques mean lost sales opportunity which could lead to loss of customers' patronage and goodwill. Conversely, overstocking could lead to price promotion or discounted sale which could reduce margins and halt profitability.

Implication to Researchers. Researchers are in a vantage position to recommend to small retail stores owners the benefits of adopting simple quantitative forecasting techniques that could improve their decision making process and boost profitability and customer service.

Implications to Practitioners. Practitioners now know that accurate forecasts is largely depends on the method (s) used and the source of information. This information is mostly available in the form of customers' past sales data which can be retrieved from POS terminals. So, consulting opportunities are available to practitioners to advice small business owners to adopt modern forecasting methods that will help grow their business.

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