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Influence of Proximity Distance and Route Map in M-Shopping Applications on Consumers' Behavior in Nairobi Metropolitan

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Abstract

A consumer's mobile shopping behavior heavily depends on several factors including, but not limited to gender, age, literacy, occupation, marital status and available communication technology. Ubiquitous technology has significant influence on behavior that is convenient for mobile shoppers. This research sought to study the influence of proximity distance and route map in m-shopping applications on consumers' behaviour in Nairobi Metropolitan. A cross-sectional research design was adopted and a sample size of 106 respondents determined using a simple random sampling technique. The primary data was collected through structured survey questionnaires, after which, STATA software was used for analysis. The study established a statistically significant relationship between the convenient in m-shopping applications and consumer's m-shopping behaviour ($\chi2=6.370a$, $p=.041<0.05$). A statistically significant relationship between the proximity in the current m-shopping applications and consumer's m-shopping behaviour was also noted ($\chi2=13.234a$, $p=.001<0.05$). Further, findings indicated a positive statistically significant relationship between the route map in the current m-shopping applications and consumer's m-shopping behaviour ($\chi2=72.192^a$, $p=.000<0.05$). Analyzing the influence of proximity distance on consumer's behavior revealed that, consumers tend to favor businesses located closer to their current location when making buying decisions through m-shopping applications. Further, provision of vendor-consumer real-time navigation assistance would enhance consumer's behavior. Despite the high deployment of mobile shopping applications, less attention is given to the proximity distance and route map aspects in the mobile shopping landscape. Consequently, this negatively impacts on the consumer's m-shopping behavior. This study serves as an intervention target for improving the consumer behavior. It is therefore recommendable that the developers of m-shopping applications adopt a holistic and consumer-vendor centered approach to mobile applications. In addition, implementation studies should be employed to model this and identify other factors that may be useful to effectively improve m-shopper's behavior.

Keywords: *M-shopping, Route-map, Proximity distance, M-shopper, Vendor*

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1.0 Introduction

Mobile shopping, the practice of using mobile devices such as smartphones and tablets to purchase goods and services, has rapidly become an integral part of daily life in Nairobi metropolitan, Kenya. In the digital era, technology has significantly transformed various aspects of our daily lives, including how we shop. Mobile shopping applications, commonly known as M-Shopping applications, have revolutionized the shopping experience for consumers in Nairobi Metropolitan and beyond.

Globally, M-shopping is one of the most popular online pastimes, with e-commerce sales reaching 4.28 trillion US dollars. In 2020 revenues were projected to reach 5.4 trillion US dollars in 2022 (Chevalier, 2021). However, online shoppers may use online convenience, proximity and route map as a factor to locate things they desire without having to physically visit. Consumers, similarly, view the search feature as the main obstacle to efficient and convenient online buying according to Almarashdeh et al. (2019). Kumar and Kashyap (2018) adds that the customers' need for convenience and route map has grown as they spend less time buying and more time engaging in other activities, which has centered their interest on online shopping.

With the advancement of technology and the wide spread availability of smartphones, consumers in this region are increasingly turning to their mobile devices to browse, compare, and purchase goods and services. This shift towards mobile shopping has had a profound impact on the retails landscape in Nairobi, as businesses strive to adapt to this new trend to stay competitive in the market. These applications provide convenience and accessibility to a wide range of products and services to consumers. One key aspect that influences consumer behavior within M-Shopping applications is the proximity distance and route maps integrated into these platforms.

M-Shopping applications leverage proximity distance by utilizing location-based services to offer personalized recommendations to users based on their proximity to stores or products. Proximity distance plays a crucial role in influencing consumers' decision-making process within these applications. Moreover, proximity distance also impacts consumers' preferences within M-Shopping applications. Consumers tend to favor products or stores that are geographically closer to them due to factors such as convenience, delivery time, and familiarity with local offerings. By understanding consumer preferences influenced by proximity distance, businesses can tailor their marketing strategies and product placement within M-Shopping applications to effectively target their desired audience, as seen in Figure 1.

Figure 1

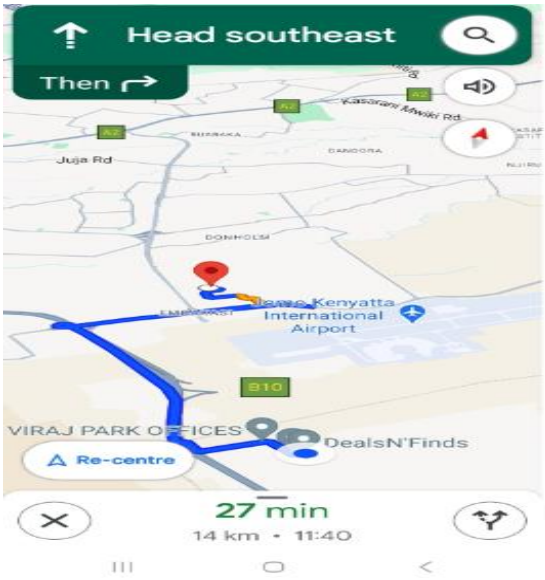
Modelled Proximity distance

Route maps integrated into M-Shopping applications play a significant role in shaping consumers' behavior as well. These maps provide users with optimized routes for

navigating through stores or picking up online orders efficiently. By offering real-time navigation assistance, route maps enhance the overall shopping experience for consumers by reducing search time and providing clear directions within large retail spaces or complex urban environments. See Figure 2

Figure 2

Modelled Route map



There are several internet marketing pages and electronic business platforms in Kenya, like the E-commerce platforms that are commonly disregarded in Kenya, even though there are several benefits to e-business adoption (Nthullih et al., 2020). Nevertheless, up until now, not many research have examined how customer experience on proximity distance and route map through the M-shopping mobile app affects customer behavior. These two factors remain green in the research landscape while they continually affect consumer's mobile m-shopping behavior.

"The paper found that, despite the numerous mobile shopping applications deployed, less attention is given to the consumer-vendor proximity distance and route map to improve their transactions"

2.0 Material and Methods

Research Design

A descriptive cross-sectional survey was adopted for research design. The target population comprised all m-shoppers in Nairobi metropolitan region who had consented to participate in the study. All mobile shoppers above the age of 18 years and who possess smartphones were considered for inclusion. Whereas, the m-shoppers who reside outside the Nairobi metropolitan were excluded from the study as they did not lie within the area of study.

Sampling procedure

The research utilized convenience sampling to gather primary data via questionnaires. This method involves collecting data from readily available population members, chosen for their easy accessibility. Convenience sampling was selected to meet the necessary sample size within time constraints (Saunders et al., 2019). Additionally, the researcher employed simple random sampling to select the required number of respondents for the study

Sample Size

As there are no statistics available on the population of m-shoppers in Nairobi who use m-shopping apps, the population for this

study remains unknown. While convenience sampling does not provide the statistical rigor of probability sampling methods, it can be justified in certain research contexts where the ease of access, resource constraints, and preliminary nature of the study are critical factors.

Commonly used confidence levels in research include 90%, 95% and 99% (Smith, 2013). For this particular study, a confidence level of 90% was applied, with a corresponding Z-score of 1.645. Moreover, the standard deviation of the sample size was unknown, thus, assumed to be 0.5 and 8% margin of error:

$$n = \frac{z^2 x\ \ stdx(1 - std)}{e^2}$$

Where;

n is the sample size

z-score (**z**) = 1.65

Standard deviation (**std**) of the sample assumed to be = 0.5

Margin of error (**e**) = 8%

$$n = \frac{1.645^2 x\ 0.5\ x(0.5)}{0.08^2} = \mathbf{106}$$

Methods of data collection and Analysis

The primary data was collected using internet-mediated self-administered closed-ended questionnaires which were distributed through social media platforms. These questionnaires were designed to capture information related to consumer's mobile shopping behavior, proximity distance, and route map features on mobile shopping applications. Data analysis was done using STATA software and the descriptive analysis techniques such as frequencies and percentages were employed to summarize the findings.

3.0 Results and Discussion

Response Rate

M-shoppers in Nairobi Metropolitan who utilize m-shopping apps served as the study's sample population. Table 1 displays the response rate

Table 3.1

Response Rate

Sample Size (n)	Response	Percentage
106	106	100%

The response rate for this study was 100% (106), as shown in table 3.1. The high response rate can be attributed to the researcher's adherence to appropriate data gathering procedures. The fact that most m-shoppers found the online platform easy for self-administering the questionnaire further contributed to the high response rate. An average response rate of 57% indicates that the study is relevant, according to Saleh and Bista (2017). Thus, the response rate obtained was significant for subsequent data analysis process.

Reliability Analysis

Reliability is defined as the consistency of estimation that provides similar results on repeated trails across time. Table 2 shows the results of the study's reliability test, which used Cronbach's alpha coefficient.

Table 2

Cronbach's Alpha

Variables	Cronbach's Alpha
Proximity distance	.946
Route Map	.937
Consumers' shopping behaviour	.709

According to Vaske et al. (2017), a Cronbach's alpha value greater than 0.7 indicates appropriate dependability. Dependability can thus be used to assess internal consistency. The coefficient increases the consistency and dependability of the data. Cronbach's Alpha was calculated for each objective that served as a scale in the research. This metric measures internal reliability and is considered dependable in social science studies when it is 0.70 or higher. Cronbach's Alpha values less than 0.70 indicate insufficient consistency, and the research tool may need to be updated. Cronbach's Alpha values in Table 3.2 were between .709 and .946, which is satisfactory. Thus, the data collecting technique was trustworthy.

Socio-Demographic Characteristics

The demographic information of the M-shoppers who were interviewed is examined in this section. The goal of this analysis is to learn more about the M-shoppers' backgrounds and their ability to supply the relevant data needed for this study.

Gender

The researcher aimed to ascertain the respondents' gender statistics. This was done to ensure that all genders were included in the study. Table 3 presents the findings.

Table 3

Gender of the Respondents

Gender	Frequency	Percentage
Male	74	69.8
Female	32	30.2
Total	106	100

The findings indicated that 69.8% (74) of participated were females and 30.2% (32) were males. This means that the study had equal representation of both genders, ensuring there was no bias. Additionally, this may suggest that the majority of M-shoppers in Nairobi are women. This is consistent with the results of Nthullih et al. (2020) which showed that more women than men preferred online shopping.

Age of the Respondents

Age impacts views and beliefs on different topics. Participants were requested to indicate their age, which was divided into four groups: 21-30, 31-40, 41-50, and older than 50. Table 4 displays the breakdown of ages among the study participant.

Table 4

Age of Respondents

Age	Frequency	Percentage
21-30 years	20	18.9
31-40 years	66	62.3
41-50 years	12	11.3
Above 50 years	8	7.5
Total	106	100.0

The study revealed that a majority (62.3%) of the respondents who participated in this study were aged between 31 and 40 years. Silver (2019) asserts that the millennials have the largest mobile phone ownership. The age range with the fewest number of respondents was at 7.5%, those above the age of 50 years, and a further 18.9% aged 21 to 30 years. Additionally, 11.3% of the respondents were between 41-50 years. The results show that all age categories were fairly well represented. Thus, the findings generated by this study are free of age bias. The age distribution of the responses suggests that young people made up the bulk of those who participated in online transactions, with the majority falling between the 18 to 40 age range (Olasanmi, 2019)

Marital Status of the Respondents

The study sought to establish the marital status of the M-shoppers. The data was analyzed as shown in Table 5.

Table 5

Marital Status

Marital Status	Frequency	Percentage
Divorced	8	7.5
Married	68	64.2
Single	17	16.0
Widowed	13	12.3
Total	106	100.0

The study revealed that a majority (64.2%) of the M-shoppers who participated in this study were married, 16% were singles and 12.3% were widowed. Further, 7.5% were noted to have divorced from their spouses. This implies that most of online shoppers are the family men and women. Families prefer online shopping so that they can be able to balance the many responsibilities they have (Goutam, 2020).

Respondents Level of Education

An individual's level of education is closely linked to their problem-solving skills and approach to challenges. Therefore, the study asked respondents to specify their highest level of education. The results are analyzed in Table 6.

Table 6

Level of education

Education level	Frequency	Percentage
No Certified Schooling	2	1.9
Primary School Certificate	3	2.8
High School Certificate	4	3.8
Diploma	14	13.2
Undergraduate	66	62.3
Post Graduate	17	16.0
Total	106	100.0

Most of the M-shoppers who participated in this study had either a diploma, undergraduate degree or post graduate degree (91.5%). This implied that education is a key factor when comes to online shopping. M-shopper with high level of education is able to navigate through the websites and apps while doing the shopping. The respondents' high level of education contributed to the collection of accurate and high-quality data for the study. McDolnald (2020) agree that education determines the level of interactions with technology, especially mobile tech.

Occupation

Additionally, the respondents were asked to specify their employment status. From the results, 64.2% were on a full time employment and 14.2% were on part-time employment. Table 3.7 presents the results.

Table 7

Occupation

Occupation	Frequency	Percentage Frequency
Full-time Employment	68	64.2
Part-time Employment	15	14.2
Self-Employed	14	13.2
Student	4	3.8
Unemployed	5	4.7
Total	106	100.0

Occupation data of the study participants reveals that more than half of the population, 64.2%, are engaged in full-time employment. Part-time employment and self-employment each account for 14.2% and 13.2% respectively, while students constitute 3.8%. Further, a number of individuals were unemployed representing 4.7%. Since most M-shoppers interviewed were on full time employment may imply the reason for online shopping since there is no time for physical shopping. Full-time employees often lead busy lives, which might increase the likelihood of engaging in mobile shopping due to its convenience (Omar et al., 2021).

Influence of M-Shopping Application Convenient on Consumer's M-Shopping Behaviour

To establish the convenience of m-shopping applications to assess the influence on

consumers' m-shopping behavior, respondents were asked to specify whether their m-shopping applications included the features listed in Table 8.

Table 8

M-Shopping Application Convenient

Statements	Responses Yes	No
M-shopping application give route-map features to the users	20.80%	79.20%
M-shopping application give vendor-consumer distance estimates to the users	23.60%	76.40%
M-shopping application has vendor's contacts	19.80%	80.20%
M-shopping application provides delivery/access time estimates based on the user's location	17.90%	82.10%
M-shopping application has location-based features that help in finding nearby vendors	17.00%	83.00%

Findings shows that most of the m-shopping applications did not have the essential features that would make M-shopping convenient. For instance, it is only 20.80% of the respondents who reported that M-shopping applications gave route-map features. Further, majority of the respondents reported that most M-shopping applications did not have vendor-consumer distance estimates, vendor's contacts and delivery time estimates as shown by 76.40%, 80.20% and 82.10% respectively. Findings also indicated that only 17% of the respondents who reported that M-shopping applications had location-based features that help in finding nearby vendors. These findings align with findings by Vyt et al. (2022) which notes that most consumers agreed that they preferred options that had ease of access. Moreover, Liao et al. (2020) also noted that location based features was used to grow the green food delivery rooting problem.

Further, Pearson Chi-Square was conducted to establish whether there existed any association between m-shopping application convenient and consumer's m-shopping behaviour. Results are shown in Table 9.

Table 9

Convenient Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.370[a]	2	.041
Likelihood Ratio	5.198	2	.034
N of Valid Cases	106		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 1.98.

The chi-square results in Table 9 indicated that there is a statistically significant association between the place convenient modelled in the current m-shopping

applications and consumer's m-shopping behaviour ($\chi 2=6.370a$, $p=.041<0.05$) (Vyt et al., 2022). This finding implies that a change in the level of m-shopping applications convenience affect consumer's shopping behaviour in Nairobi Metropolitan. Table 3.10 further, indicated a significant positive correlation between convenient modelled in the current m-shopping applications and consumer's m-shopping behaviour r (106) = 0.547, $p=.003<0.05$. Positive correlation implies that a positive change in the level of m-shopping applications convenience will result to a positive change in the consumer's shopping behaviour in Nairobi Metropolitan. One of the factors that affected the use of m-shopping applications by consumers was convenience in all aspects.

Table 10

Convenient Correlations

		M-shopping applications convenient	Consumer's m-shopping behaviour
M-shopping applications convenient	Pearson Correlation	1	.547
	Sig. (2-tailed)		.003
	N	106	106
Consumer's m-shopping behaviour	Pearson Correlation	.547	1
	Sig. (2-tailed)	.003	
	N	106	106

Influence of Proximity Distance and Route Map in M-Shopping Applications on Consumers' Behavior

Distance to the Shop

The study sought to establish how m-shopping application proximity distance influenced consumers' shopping behaviour. Respondents were requested to indicate the estimate distance to the nearest m-shopping shop. Table 11 shows the results.

Table 11

Distance to Shop

Distance to Shop	Frequency	Percentage Frequency
Less than 5Kms	20	18.9
6-15 Kms	13	12.3
16 -29 Kms	18	17.0
More than 30 Kms	14	13.2
Don't Know	41	38.7
Total	106	100.0

Results indicate that most (38.7%) M-shoppers did not know how far the M-shop was from their residence, with 13.2% indicating that the shops were over 30 kilometres away. On average, 18.9% of the respondents reported that the M-shops were within 5 kilometres radius, 12.3% reported 6 to 15 kilometres, while 17% of the respondents said that the shops were between 16 and 29 kilometres. These findings align with those in a study by Neger and Uddin (2020) that consumers prefer making purchases where it is convenient for them. Further, the respondents were asked to

indicate the time it takes to receive an order from M-shopping, with the findings presented in Table 3.12.

Respondents were asked to indicate the time it takes to receive an order from M-shopping as outlined in Table 12 below.

Time to Receive Order

Table 12

Time to Receive Order

Distance to Shop	Frequency	Percentage Frequency
In a day	14	13.2
in 2 - 4 days	70	66.0
in 5 - 7 days	15	14.2
More than a Week	7	6.6
Total	106	100.0

From the findings above, most (66%) M-shoppers said that they had always received m-shopping order in 2 to 4 days, 14.2% receive their m-shopping order between 5 to 7 days, and 13.2% of the M-shoppers take less than a day to receive their order. Some orders take long to be delivered, with 6.6% of the M-shoppers indicated that it took more than a week to receive the order. For the case of orders that delayed, most M-shopper did not know the reasons for the delay with some mentioning incorrect addresses, import delays, traffic and unknown locations as major reasons for m-shopping order delay. Koskinen (2021) agree that there are several factors that may cause delay of orders done through m-shopping. These include traffic, weather anomalies, global emergencies, supply chain disruptions and many more.

Pearson Chi-Square was conducted to establish whether there existed any relationship between m-shopping application proximity and consumer's m-shopping behaviour. Results are shown in Table 13.

Table 13

Proximity Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13.234[a]	8	.001
Likelihood Ratio	15.251	8	.034
N of Valid Cases	106		

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is 1.23.

The chi-square findings indicated that there is a statistically significant relationship between the proximity in the current m-shopping applications and consumer's m-shopping behaviour ($\chi 2=13.234a$, $p=.001<0.05$). This finding implies that distance to M-shops and time taken by vendors to deliver goods and services determines the consumer's shopping behaviour in Nairobi Metropolitan. M-shoppers, tend to shop more to the m-shopping closer to them and where delivery is done in a short time compared to long distances and where the order takes long time to be delivered. Therefore, the study rejects

the null hypothesis and concludes that there is a relationship between model proximity and consumers' M-shopping behavior**.** M-shoppers, or mobile shoppers, typically prioritize convenience and speed in their shopping experience. They tend to favor retailers that can offer fast delivery times and are located closer to their geographical area (Frey et al., 2017).

The study also sought to examine the influence of route map in the current m-shopping applications on consumer's shopping behaviour in Nairobi Metropolitan. The results are presented in Table 14.

Table 14

M-Shopping Application Route Map

Statements	**Responses**	
	Yes	No
Does the application display in real-time the possible routes for the user in times of physical access/delivery?	14.2%	85.8%
Does the application display in real-time the traffic on the possible routes	17.0%	83.0%
Does the application suggest the shortest route possible to the access/delivery of goods/services?	14.2%	85.8%
Can users easily route in real-time to the location of their delivery/pickup/access points within the m-shopping	17.0%	83.0%

Table 3.14 shows that only 14.2% of the M-shoppers reported that m-shopping application displayed in real-time the possible routes for the user in times of physical delivery. Most M-shoppers also said that the applications did not display in real-time the traffic on the possible routes and most applications did not suggest the shortest route possible to access the goods and services as shown by 83% and 85.8% respectively. Majority (83%) of the M-shoppers also said that users cannot easily route in real-time the location of their delivery/pickup/access points within the m-shopping. Pick-ups and delivery problems come from not having specific time stamps in the applications, affecting the overall operation (Cherkesly & Gschwind, 2022).

To establish the relationship between the route map in the current m-shopping applications and consumer's shopping behaviour, a chi square analysis was carried out and results are shown in Table 15.

Table 15

Route Map Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	72.192[a]	2	.000
Likelihood Ratio	60.155	2	.000
Linear-by-Linear Association	13.291	1	.000
N of Valid Cases	106		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.42.

Results from the chi-square analysis show that there is a statistically significant relationship between the route map in the current m-shopping applications and consumer's m-shopping behaviour (χ^2=72.192[a], p=.000<0.05). This finding implies that m-shopping application with advanced route map technology, displaying in real-time the traffic on the possible routes influences the consumer's shopping behaviour in Nairobi Metropolitan. The findings aligns with findings by Cherkesly and Gschwind (2022) that having real-time on varied routes gives better consumer experience.

4.0 Conclusion

This study established a key takeaway that, despite the numerous mobile shopping applications deployed, less attention is given to the consumer-vendor proximity distance and route map to improve their transactions. Firstly, a great percentage of respondents indicated that the currently deployed mobile shopping applications lacked real-time location and routing features. This feature routes consumer to the vendor and vice-versa in real-time once they select good/service. Secondly, the currently deployed applications lacked proximity distance feature where a consumer/vendor would search for the needed good /service within preferable distance. In addition, the study found that there was a negative influence of the above parameters towards the consumer m-shopping behavior. Consequently, these findings underscore the significance of investing in developing mobile shopping applications with inbuilt proximity distance and route map features to support consumers in making informed decisions and improve their satisfaction. The influence of proximity distance and route maps in M-Shopping applications significantly shapes consumer behavior in Nairobi Metropolitan. Businesses operating within this market can leverage these insights to design targeted marketing campaigns, optimize store locations based on consumer preferences influenced by proximity distances, and enhance overall customer satisfaction through improved route mapping functionalities. The study serves as an intervention target for improving the consumer's satisfaction and m-shopping experience.

5.0 Recommendations

It is therefore recommended that m-shopping application developers should adopt a holistic and consumer-vendor centered approach to mobile applications. This will be realized by integrating proximity distance and route map features in their development. In addition, implementation studies should be employed to identify other factors that influence and, may be useful to effectively improve on the m-shopper's behavior.

Study contribution

Proximity distance and route map have been identified as the factors for intervention that would form a basis for quality improvement efforts towards improving mobile shopping applications. Future research opportunities lie in exploring advanced technologies such as augmented reality (AR) integration with route maps in M-Shopping applications or analyzing data-driven approaches for personalized recommendations based on both proximity distance and historical buying patterns. By continuously evolving strategies informed by consumer behavior analysis within M-Shopping applications, businesses can stay ahead in meeting the dynamic needs of tech-savvy consumers in markets like Nairobi Metropolitan, where digital innovation continues to drive forward the shopping trends.

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