NAVIGATING DIGITAL FRONTIER: CONSUMERS' WILLINGNESS TO PURCHASE FRESH VEGETABLES THROUGH MOBILE COMMERCE IN PAKISTAN

Manan ASLAM[1,2], Zhiwen LI[1], Muneeb Ahmad GUJJAR[3], Mubashar FAROOQ[4], Muneeb Ahmad ANSARI[2], Daniyal HASSAN[5], Rao Izhar ul HAQ[6]

[1]Jiangsu University, School of Management, Zhenjiang, Jiangsu, China, E-mails: manan.aslam@mnsuam.edu.pk, zhiwenli@ujs.edu.cn
[2]Muhammad Nawaz Shareef University of Agriculture, Department of Agribusiness and Entrepreneurship Development, Multan, Pakistan, E-mails: manan.aslam@mnsuam.edu.pk, muneebmart1@gmail.com
[3]Muneeb Academy, Khanewal, Pakistan, E-mail: muneebg553@gmail.com
[4]University College of Management and Sciences (UCMS), Khanewal, Pakistan, E-mail: mubasharfarooqtanoli@gmail.com
[5]Government College University, Faisalabad (GCUF), Faculty of Economics and Management Sciences, Lyallpur Business School (LBS), Faisalabad Punjab, Pakistan, E-mail: daniyalhassan799@gmail.com
[6]Muhammad Nawaz Shareef University of Agriculture. Department of Outreach and Continuing Education (DOCE), Pakistan/WWF-Pakistan, Multan, Punjab, Pakistan, E-mail: raoizhar96@gmail.com

Corresponding author: zhiwenli@ujs.edu.cn

Abstract

The study seeks to develop understanding of determinants affecting consumers' buying behavior for fresh vegetables through information and communication technology (ICTs) mainly the use of mobile application in the study area. In this regard, those drivers which trigger consumer's willingness to purchase these vegetables by using mobile commerce were identified. It might be greatly reduced the intermediate links of vegetable distribution and simplify the food purchasing in people's daily life. This application of mobile technology would have an enormous potentials in marketers, food industries, farming community, decision makers, and consumers. Enabling consumers more informed about the novel innovative technologies for receiving and sharing information about market trends, prices, and avenues, among the ICTs smart phone applications are usually considered a quick method to approach markets, attain information about agricultural commodities and their prices in an effective and desired manner. In order to assess consumers' willingness to pay for the fresh produce by using mobile commerce as it is critical to understand factors that affect its consumption. A sample size of 600 respondents including two metropolitan cities of Punjab viz. Lahore and Multan were selected purposively. According to the findings of research, income of the consumer, education of the consumer, distance of fresh vegetable from store outlet/mart, advertisement of fresh vegetables, prices of fresh vegetables, cognition of mcommerce and availability of fresh vegetables were significantly influencing consumers' willingness to buy fresh vegetables by using mobile commerce whereas taste of fresh vegetables, age of consumer, no use of synthetic pesticide residue on fresh vegetables, availability of produce were affecting non significantly towards consumers willingness to buy fresh vegetables in the study area. There is a dire need to inculcate the importance of technology as well as the benefits of purchasing fresh vegetables to consumers through proper advertisement by employing information and communication (ICTs) gadgets.

Key words: market potential, mobile commerce, fresh vegetables, ICTs gadgets, consumer's willingness to purchase, synthetic pesticide residue

INTRODUCTION

Agriculture is the one of the leading sectors as well as considered as pillar of the country's economy. Beside the structural modifications in the agrarian economy, since the Pakistan's independence, contribution of this sector in Gross Domestic Product (GDP) is decreasing but it remains the leading sector & accounting for almost 24.0 percent towards GDP. Almost it accounts for 40.0 percent of the workforce employment [2]. Main responsibility of

agriculture sector is food crops harvesting and production. Vegetables are the main source of the fibers and nutrition, helping the country's population to live healthy [2, 3].

Food security is priority agenda for the economies and important issue of almost all countries in the world. The trend is changing as consumers have concerns related to food safety, as well as these concerns have also observed in Pakistan. Market of natural food has been growing and is more popular rapidly [2, 6]. Carbon-based agricultural is helps to maintain supportable environment because it avoids the usage of reproduction organic fertilizers insecticides that produces healthy crops and livestock [3, 19].

Pakistan has been blessed by fertile land and compatible climate to produce more vegetables and meet the growing demand of dispensation manufacturing. The main problem has been faced by the farmers is reasonable price during production season due to abundance/flooded supply. Increase usage of insecticides and biochemical composts in manufacturing of the produce is also main concerns for consumers now a days.

The natural agricultural production is an environment and eco-friendly as it prevents usage of those elements that are danger to human health [2]. Environmental threats and food safety are encouraging customer to buy fresh foodstuffs. [3] concluded that usage of organic commodities is the best for fitness as compared to usage of non-organic foodstuff. Thus, there should be an existence of proper marketplace of fresh foodstuff mainly of vegetables so that the interested customers may buy the required foodstuff from the market [22].

Vegetables are an important food items as they provide us vital nutrients, minerals, and vitamins to humans [2, 3, 23, 24]. Every actor in the supply chain of vegetables, right from production, transportation, value addition, and distribution to consumers, influences the efficacy and gains of the entire movement process to a various extent. Final consumers, as the last player of the entire vegetable circulation process, are of distinct significance, and their requirement orientation will remarkably restrict the conduct of the

arduous of the supply chain. Though, the large number of players in the vegetable supply chain process, including farmers, commission agents, pharias, wholesalers, retailers and then consumers [2, 15, 24] creates concerns such as an inefficient vegetable movement, high supply chain cost and ultimately existence of bad connectivity between production traceability and marketing [14].

Moreover, the seasonal physical characteristics of vegetable farming are evident, and quantity and type of vegetables cannot be efficiently assured during the off-season [4]. Nonetheless, making complete employment of advanced information technology to build mobile commerce (mcommerce) and other online trading techniques [24] may dissolve the conventional vegetable growing and distribution model, abridge the distance of vegetables from the production origin or farm to the fork, and improve the efficiency of vegetables supply chain to cater the diverse requirements of vegetable customers for various seasons and locations of the vegetables [3].

With the expansion and commercialization of the internet and the advancement of information technology mainly mobile commerce [23], all over the world's fresh food electronic commerce has altered rapidly. The fast-food e-commerce industry has a large amount of financing in the world but the frequency of customers employing vegetable electronic commerce to buy vegetables is not as great as expected [8]. As, fresh food electronic or mobile business also cope with challenges as inferior-quality commodities, payment security, provision of inefficient and insufficient logistics facilities [7, 8, 21].

Same is the case with Pakistani electronic or mobile commerce vegetable marketing system. Vegetable mcommerce, as a new marketing channel for the vegetables [9], is also confronting the same concerns, which has led to the deterioration of customers' trust in, and therefore, the less motivation of opting vegetable mcommerce. Therefore, there is a dire need to explore the critical factors that affect the consumers' willingness to adopt mcommerce vegetables is the key to resolve this concern. For this purpose, the technology

specific model namely, technology acceptance model (TAM) has been mainly employed to observe customers 'acceptance of knowledge systems. The behavior of technology usage is checked by the probability to accept technology and the behavior probability is manipulated by the attitude to adopt or employ; two major factors that influence technology adopt attitudes are the perceived usefulness as well as perceived ease of adoption. On the other way around, the theory of planned behavior (TPB) suggests that the true behavior of the customer is observed by the behavioral intention while attitude, subjective norms and perceived behavioral control are the three major factors that describe the consumer's behavioral intention [13], characteristics of family, vegetable mcommerce cognition [9], quality cognition [23] as well as the subjective norms along with the external forces. [21] analyzed that electronic commerce, or e-commerce, was the practice of purchasing and reselling goods online. [1] discussed that it was apparent that with the improvement of versatile innovation, m-commerce had changed the internet-based business scene of the world. In their study [23] investigated the preferences of consumers while purchasing fresh agricultural products online. Fresh agricultural products were now purchased online through a variety of commerce platforms. Pakistan, which is predominantly driven by the proliferation of mobile gadgets, indicating an increase of use of ICTs [20]. It is observed that the online shopping trend has been increased in Pakistan. Considering such technological advancement, the food stores and marts have begun to utilize online forums to augment its service quality [1]. The crops are grown as well as marketed in the traditional way in the country, yet with innovation in technology and alterations in the consumer preferences, the fashion of prudent, healthy, and nourishing food is enhancing gradually with by employing mcommerce. The primary vegetables are grown in the country viz. potato, capsicum, onion, garlic, carrot, tomato, chilies etc. Though organic production in Pakistan is done on a minor scale as the situation is altering in response to accelerating the significance of the fresh produce as these vegetables are considered better in terms of quality as compared to traditionally grown vegetables as these vegetables are also considered prudent for healthy life, safe and nutritious [10].

Now days, smart technologies are being adopted by the consumers to buy commodities. Basically, consumer's awareness has been improved due to social media and access to global markets. Consumers have access to various applications for identifying and buying the premium quality vegetables. It is also noticeable that with the advancement of mobile technology, mobile commerce has transformed the online business terrain of the world. To cultivate consumers' consumption habits, enhance the supply chains of fresh agricultural products, meet consumers' demands, and encourage the further development of commerce, it was necessary to comprehend the characteristics of consumers' preferences for online shopping. In this context, it appears logical to understand consumers 'willingness to consume fresh vegetables. through Mobile Commerce in Punjab, Pakistan.

MATERIALS AND METHODS

The study was processed mainly in two stages. Firstly, consumers were interviewed for their perceptions and experiences of buying fresh vegetables via mcommerce in Pakistan. Then at second stage, consumers awareness's were studied, and factors were identified which are affecting willingness to consume these vegetables by using mcommerce. Both qualitative and quantitative research techniques were employed for better understanding consumers' perception and willingness to purchase fresh vegetables vie mcommerce in the selected regions. Data was gained through structured, semi-structured and non-structured in depth-interviews. The purposive sampling method were employed to get sample or data because it is ideal in the cases having small and diverse audience. A sample size of 600 respondents including two metropolitan cities of Punjab viz. Lahore and Multan including 300 from Multan and 300

consumers from Lahore were selected purposively [2].

The detailed explanation of the model is given as; Consumer willingness to pay for fresh vegetables by using mcommerce. The relationship between the selected dependent and independent drivers is given below:

$$WTP = f(Xi, Zj) \quad \dots\dots\dots (1)$$

where:

WTP = Willingness to pay for the fresh vegetables by using mcommerce (Rs. per kg)

Xi = Vector of quantitative drivers i = 4

Zi = Vector of qualitative drivers j = 7

In more particular way, equation (1) might be written as:

$$WTP = \beta o\, Xi\, \beta i\, Zj\, \beta j\, e\, \mu \quad \dots\dots\dots (2)$$

Taking ln on equal sides of the equation then equation (2) might be written as:

$$lnWTP = \beta o + \beta 1 lnX1 + \beta 2 lnX2 + \beta 3 lnX3 + \beta 4 lnX4 + \beta 6 lnZ1 + \beta 7 lnZ2 + \beta 8 lnZ3 + \beta 9 lnZ4 + \beta 10 lnZ5 + \beta 11 lnZ6 + \beta 12 lnZ7 + \mu \quad \dots\dots\dots$$
$$\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

where:

Categorical representation of the data of given independent drivers will be gained by employing five-point Likert scale as Very high=5; high=4; medium=3; low=2; and very low=1 Xs & Zs are the independent variables where:

X1 = age of the consumer
X2 = education of the consumer
X3 = income of the consumer
X4 = distance of vegetable store
Z1 = advertisement of fresh vegetables
Z2 = prices of fresh vegetables
Z3 = taste of organic vegetables
Z4= no synthetic pesticide residue of fresh vegetables
Z5= availability of fresh vegetables
Z6 = information of fresh vegetable
Z7 = useful cognition of mcommerce
βo=intercept; βs = are the elasticities; μ = error error

RESULTS AND DISCUSSIONS

The relationship between dependent variables (Consumer WTP for fresh vegetables using mcommerce) and independent variables (age of the consumer, education of the consumer, income of the consumer, distance of vegetable store, advertisement of fresh vegetables, prices of fresh vegetables, taste of fresh vegetables, no synthetic pesticide residue of fresh vegetables, availability of fresh vegetables, information of fresh vegetables, useful cognition of mcommerce) was estimated by using a regression model.

Collinearity is an unsuitable situation. This situation persists if when the correlations between or among the independent factors are strong with each other. The tolerance is a statistical term employed to check how much these independent factors are linearly correlated with each other (multicollinear).

Table 1. Multicollinearity Statistics of Factors

Factors	Tolerance	Variance Inflation factor (VIF)
Age of the consumer	.379	3.880
Education of the consumer	.342	2.592
Income of the consumer	.207	2.881
Distance of vegetable store	.132	3.663
Advertisement of fresh vegetables	.352	1.456
Prices of fresh vegetables	.751	2.934
Taste of organic vegetables	.367	1.856
No synthetic pesticide residue of fresh vegetables	.786	1.987
Availability of fresh vegetables	.432	1.334
Information of fresh vegetables	.450	2.798
Useful cognition of mcommerce	.789	1.559

Source: Authors' own calculations.

The VIF is the reciprocation of the tolerance test. If VIF rises, so does the differentiation of the variable coefficient, becoming it an unstable estimation. High VIF value indicates the problem of collinearity, i.e., a number higher than 10.00 portrays the issue of collinearity. In our results, all digits or

numbers regarding VIF are low than 10.00 which depicted that no issue of collinearity presented in the given set of data.

The value of R^2 in our results was 0.59, which stated that all independent factors collectively explained 59% change in the given dependent variable, i.e., willingness to pay for fresh vegetables. This number also stated that few other factors also caused to change in it i.e. 41% variation in the dependent factor, the impact of which could not be described by the taken model and data set. The adjusted R^2 value was 0.61, which is also significant according to results of research. The adjusted R^2 portrays that all taken independent factors described that 61% variation in the taken dependent factor by considering all other variables constant.

The F-value depicts that all independent factors are significant ones/insignificant ones causing fluctuation in the suggested dependent factor. The F-ratio in the results was 17.86 (p < 0.05), which was fairly significant and depicted the appropriateness of the given model. According to the results, it might be stated that willingness to pay for fresh vegetables might be rupees five hundred and fifty rupees (550) per maunds without an impact from the independent factors.

Results shown in Table 2 show that a 1 percent rise in age means a rise in consumers' willingness to pay for fresh vegetables by 0.27 percent. There is a positive sign between both variables but it is significant. So, according to our results age does not guarantee or effect on the consumers' buying towards fresh vegetables by using mobile commerce. The value of coefficient of education is described as that for one unit change or increase in the education, there is 0.58 unit increase in consumers' willingness to pay for fresh vegetables by 0.58 percent by adopting mcommerce technology. This factor is significant at 5% percent significance level in the estimated model. Justification behind this effect, education plays an important role in creating awareness and then buying of fresh vegetables by selected consumers.

The value of coefficient of income of consumer is described as that for one unit

increase in the income of consumer, there is 0.97 unit increase in consumers' willingness to pay for fresh vegetables by 0.97 percent. This factor is significant at 5% percent significance level in the estimated model.

Table 2. Econometric Analysis (Consumers' Willingness to Pay for Fresh Vegetables by using Mobile Commerce)

Factors	Coefficient	Standard Error	t-stat	p-value
Age of the consumer	0.27	0.056	2.348	0.77 NS
Education of the consumer	0.58	0.057	2.991	0.034**
Income of the consumer	0.97	0.091	1.867	0.055**
Distance of vegetable store	-0.25	0.064	-1.442	0.05**
Advertisement of fresh vegetables	0.19	0.089	1.854	0.003**
Prices of fresh vegetables	-0.59	0.042	-1.469	0.001*
Taste of fresh vegetables	0.23	0.084	3.444	0.75 NS
No synthetic pesticide residue use on fresh vegetables	0.29	0.098	2.926	0.89 NS
Availability of fresh vegetables	0.18	0.023	1.625	0.89 NS
Information of fresh vegetable	0.55	0.047	1.745	0.042**
Useful cognition of mcommerce	0.37	0.078	1.952	0.054**
(Constant)	5.50	0.771	77.68	0.85
R^2	0.59			
Adjusted R^2	0.61			
F- Value	17.86			

Source: Authors' own calculations.
* = Significant at 95% level of confidence, ** = Significant at 90% level of confidence, and NS = non-Significant

Justification behind this effect, family income and consumer willingness to purchase fresh vegetables by using mobile phone are positively correlated with each other.

The value of coefficient of distance from store is described as that for one unit increase in the distance from store outlet, there is 0.25 unit decrease in consumers' willingness to pay for

fresh vegetables by 0.25 percent. This factor is significant at 5% percent significance level in the estimated model. High distance means high delivery charges to pay by the consumer although there is a significant but negative relationship.

The value of coefficient of advertisement of fresh vegetables is explained as that for one unit increase in the advertisement of fresh vegetables, there is 0.19 unit increase in consumers' willingness to pay for fresh vegetables by 0.19 percent. This factor is significant at 5% percent significance level in the estimated model. High advertisement of fresh vegetables means high willingness to purchase fresh vegetables by using m commerce in the study area.

According to the findings, the value of coefficient of prices of fresh vegetables is stated that for one unit decrease in the prices of fresh vegetables, there is 0.59 unit increase in consumers' willingness to pay for fresh vegetables by 0.59 percent. This factor is highly significant at 1% percent significance level in the estimated model. Decrease in prices of fresh vegetables lead the customer to buy more & more vegetable items by employing m commerce in the selected area.

Considering the findings, the value of coefficient of taste of fresh vegetables, it is stated that for one unit increase or improve in the category of taste of fresh vegetables, there is 0.23 times increase in consumers' willingness to pay for fresh vegetables by 0.23 percent. This factor is non significant in the estimated model.

As per findings of our research, the value of coefficient of no synthetic pesticide residue use on fresh vegetables, it is stated that for one unit increase or improve in the category of no synthetic pesticide residue use on fresh vegetables, there is 0.29 times increase in consumers' willingness to pay for fresh vegetables by 0.29 percent by using mcommerce. This factor is non significant in the estimated model.

According to the findings of our research, the value of coefficient of availability of fresh vegetables, it is stated that for one unit increase or improve in the category of availability of fresh vegetables, there is 0.18

times increase in consumers' willingness to pay for fresh vegetables by 0.18 percent by using mcommerce. This factor is non significant in the estimated model.

Considering the findings, the value of coefficient of information of fresh vegetables, it is stated that for one unit increase or improve in the category of taste of fresh vegetables, there is 0.55 times increase in consumers' willingness to pay for fresh vegetables by 0.55 percent. This factor is significant at 5% significance level in the estimated model.

The value of useful cognition of mcommerce of fresh vegetables is explained that for one unit increase or improve in the category of useful cognition of mcommerce of fresh vegetables, there is 0.37 times increase or improve in consumers' willingness to pay for fresh vegetables by 0.37 percent in the study area. This factor is significant at 5% percent significance level in the estimated model. Highly useful cognition of mcommerce for fresh vegetables implies that high willingness to purchase fresh vegetables by employing mcommerce in the study area.

The research was performed to identify the determinants affecting consumers' purchase intentions for the fresh vegetables by employing the technology of mobile commerce. In this way, consumer has gained more bargaining power in context of product quality and rupees. The results showed that was a positive but non significant relationship exist between the age and consumer's buying intentions by using mobile commerce. It might be due to reluctant behavior of usage of novel technologies by the older consumers. This result is supported by the studies of [1, 2, 7].

Generally, improvement in qualification level of the consumers lead towards buying intentions of consumers for the fresh vegetables with the help of mobile applications. In our research work, this theory is also supported as increase in educational status of the consumers direct them to purchase fresh vegetables with the means of smart phone applications. The education creates awareness among the consumer community about the health benefits of using

fresh vegetables as well as usage or adoption of smart phone technologies for buying their fast moving consumer goods as well as fresh vegetables and fruits. This result is in line with the studies of [2, 5, 23].

Income or consumer purchasing power is taken as main component of the buying process. The improvement in this variable leads towards improvement or increase in buying behavior of consumers for fresh vegetables by employing cellular phones. According to our findings, this variable is significant with positive sign, which implies that the increase in income of the selected consumers navigate them to buy fresh vegetables by using mobile commerce technologies. This finding is supported by the research work of [2, 7, 8 14, 15, 22].

The distance of outlet also contributes towards buying of fresh vegetables by using mobile phone application. It also saves the time efforts for the consumers as well. So, there is a negative relationship prevail between distance from vegetable store/mart and consumer's intentions towards buying of fresh vegetables. As per findings of our research, it is depicted that there is negative but significant association exist between these two variables. The research result is aligned with the studies of [1, 2, 5, 22, 24].

Advertisement of products now days the use of social media/ICTs advertisement (Instagram, Facebook, What's app, We Chat, Cable TV, and TikTok) has been augmented. Advertisement is directly proportional to consumer's intentions of buying fresh vegetables via mobile commerce. The similar trend was observed in our research, there was a positive and profound relationship was found between the advertisement of fresh vegetables and buying intentions of consumers for fresh vegetables through mobile application. This finding is in line with the studies of [16, 23, 24]. Prices of agricultural commodities also adds towards consumer's buying decision/intentions towards online buying of fresh vegetables by using mobile applications. According to the findings of the study, there was a strong negative and considerable relationship existed between the prices of the fresh vegetables and

buying of these vegetables by performing mobile commerce tasks and applications. The result is supported by the studies of [10, 11, 12, 13].

Taste of fresh vegetables also lead towards buying intentions of fresh vegetables by using mobile phone applications. But in our case the value of this coefficient is positive but insignificant. This result is in line the research studies of [2, 3, 14, 15, 18].

No use of synthetic pesticide residue on fresh vegetables also navigate the consumers to buy fresh vegetables by using mobile commerce. Consumers have got more awareness and advantages of organic produce. The educated consumers prefer to buy the vegetables by exploring its traceability. In metropolitan cities of Pakistan, well-established and reputed outlets are dealing with marketing of organic food stuff mainly organic vegetables. The coefficient of this variable is positive but non significant. It is supported by the studies of [2, 3, 8, 9, 10].

The presence of fresh commodities also play an imperative role while the purchasing of the produce. If consumers know the availability of fresh vegetables then the consumer will prefer to buy these fresh vegetables. The similar trend was found in our research, there was a positive and significant relationship between the availability of fresh vegetables and the buying behavior of consumers. The result is in line with the findings of [2, 8, 13, 14, 16]. In actuality, the consumers who have appropriate information about the benefits and importance of fresh vegetables, this information will definitely direct towards consumer's buying intentions of fresh vegetables via mobile commerce. According to our research findings, there was positive and significant relationship existed between the availability of information for fresh vegetables and buying decisions of consumers for fresh vegetables through mobile applications. It is supported by the findings of [11, 17, 19, 20].

The useful cognition of mcommerce technology characteristics as relative advantage, compatibility, observability, complexity, trialability, data security, also enable the consumers to purchase fresh

vegetables by using mobile applications. The same trend was followed as positive and significant association prevailed between the cognition of mcommerce and buying intentions of consumers towards fresh vegetables in our research work. The result is in line with the studies of [2, 3, 4, 5, 15, 23, 24].

CONCLUSIONS

In Pakistan, the demand of fresh vegetables are growing rapidly by using the concept of mobile commerce, but a niche market exists, and consumers prefer and are ready to pay premium prices for fresh vegetables. The study investigated the impact of major determinants influencing consumers' willingness to pay for fresh vegetables via mcommerce in Punjab, Pakistan. In this regard, Lahore and Multan were selected purposively. A sample size of 600 fresh vegetable consumers was selected. Regression analysis was used to identify and evaluate the effects of consumers' willingness to purchase for fresh vegetables in the study area. As per findings of research study, income of the consumer, education of the consumer, distance of fresh vegetable from store, advertisement of fresh vegetables, prices of fresh vegetables, availability of fresh vegetables, cognition of mcommerce are significantly influencing consumers' willingness to buy fresh vegetables by using mobile commerce whereas taste of fresh vegetables, age of consumer, no use of synthetic pesticide residue on fresh vegetables, availability of fresh vegetables are influencing non significantly to consumers willingness to buy fresh vegetables in the study area. The results were helpful in developing room for maneuvering of major food super stores or markets regarding market potential of fresh production then ultimately these findings would be beneficial for these stores to cater the need of consumers who have interest to buy these vegetables via mobile commerce. It is a novel business approach that expands the frontiers of the mobile commerce.

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