

# Mobile Phone Impact on Agriculture and Price Information among Farmers

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## Abstract

**Objectives:** The objective of this research is to study on the awareness regarding behaviour intention and effect of mobile phone for agriculture, marketing and weather information among farmers in Sindh, Pakistan. **Method:** The quantitative method was applied and data was collected from 1500 farmers from ten districts of Sindh, Pakistan. The total 150 respondents were randomly selected from each district for data collection. **Findings:** The result indicated that more than 97% of the farmers have their own mobile phones while 23.3% of the respondents use internet on their mobile phone to get different information. Information and communication technologies have improved the life of common men and different sectors of society are getting more benefit from it. Farmers are one of the backward communities in underdeveloped nations and most of the farmers are unaware about technologies in the development of the agriculture. The study showed that farmers did not properly use mobile phone for connected market and call buyers to sell their produce in good price while majority of the farmers did not have contact numbers of agriculture officers as well as meteorological department to get latest information of weather. Moreover, farmers did not discuss agriculture issues and problems with agriculture officers. However, majority of the farmers were significantly agree to use mobile phone in future for agriculture information. **Improvements:** Now there is a need that government should provide more facilities to farmers and create awareness on agriculture development in Sindh, Pakistan through mobile phone usage.

**Keywords:** Agriculture Mobile Phone Marketing and Price Information

## 1. Introduction

One of the most important developments in the past decade was the rapid growth of the mobile phone use around the world. Mobile phones have empowered developing countries to spread information networking coverage in the remote areas and rural areas are getting great benefit out of it. Different studies showed that general application of mobile phones has improved the living standard of poor farmers in developed nations<sup>1</sup>.

In India, Bangladesh, Pakistan, Malaysia, Indonesia, Philippine, Vietnam and Srilanka, the extensive use the technology has made direct contribution to agricultural productivity as well as income of small holders farmers. Nowadays, remote sensing, satellite system and geographical information system GIS enhance the capacity of farmers in remote areas. In this context, influence of ICT brought changes in efficiency of market

to improve the productivity, easy access and approach to contact with buyers in market<sup>2</sup>.

According to <sup>3</sup>the farmers' agricultural information and economic conditions have been improved after using some communication technologies. Now smallholders were saving much amount to use transport to reach market for getting the information and price of their product and only one dial using mobile phones and obtaining latest information on spot. Improving the information, communication, business, and Internet resources available to farmers and to the markets, organizations, and institutions they interact with is essential to making smallholder agriculture more productive. The proper use of information and communication technologies (ICT) is central to this improvement. Information and communication technologies also played a role in business and large scale of agriculture related services as well as these technologies provides weather and

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irrigation system information. It was showed that different elements of the communication networks have improved transaction in developing countries for instance in Ghana ICT helped network of rural banking and increased their efficiency and expand their services and overall population of farmers. Similarly, it was also indicated that ICT has provided facilities of different business models for offering economic and financial service to smallholders. ICT is the tool of different system, which has brought a remarkable change in daily life of people. Information communication technology has created new revolutionary changes in organizations and introduced new ways of doing in business and makes an innovative thing. This technology played venerable role in developing countries and stable the economic conditions of poor farmers. There is no doubt that communication technology used very frequently among farmers and it empowers the resources of poor farmers and provided latest updates regarding agriculture information and their related issues. Furthermore, by mobile phone farmers are touch with market and obtained trends of price, weather information<sup>4</sup>.

The features of communication technologies can be found its quality and timeliness which can make farmers enable to use agricultural information effectively the study was conducted in India also found that mobile phone plays an important role in the contribution of farmers' productivity and able to find good price of their product. While another study revealed about Kenya that in the flood situation mobile phone SMS service also played key role to save the crop of farmers and send alert messages to each others. Furthermore, in Nigeria the picture about the information communication technologies and agriculture information among rural farmers provided new access to reach at agricultural extension agents, researchers and buyers to communicate and get latest information about their product from experts to increase their income and productivity<sup>5-6</sup>.

Information technologies also reducing the risk of farmers and providing more opportunities to access the market and also providing place to communicate with customers directly through mobile phones. The world is speedily transferring information about everything of the society and people are connected with each other globally. Information and communication technologies plays a role of bridge among different communities such as farmers now can get easily information about their

produce by internet from any place of the world. In the context of the Nigeria government facilitating farmers and providing easy access and information of market from mobile networking services in remote areas. In modern information and communication technologies such as 3G 4G internet, email Facebook, Twitter and many other social media can also have provided lot of information about the agriculture even there are many online programs are available where farmers can get benefit and also apply such applications and methods in their own land for better product of crops. YouTube is also one of the best sources of getting latest information about agriculture development. Unfortunately, farmers have no proper knowledge and education about techniques and use of technologies in their working places.

## 2. Problem Statement

It was showed that illiteracy is one of the big problems among rural farmers to use smart phone most of the farmers do not have any knowledge and information about how to use their touch screen and enter the digits. Similarly, farmers do not use mobile for getting the latest information about marketing, weather and use of proper pesticides in their field. Farmers can use the SMS and voice message delivery system to get the information regarding agriculture issues and problems in different regions. It is easy to use for the farmer, but same time uneducated farmers are not using this service while it is possible that this problem can be solved through training the farmers about use of mobile phones and SMS. In a study conducted in the North Senatorial zone of Kaduna State of Nigeria showed that around 78% of the respondents asked the main problem of high cost of subscription charges, poor quality of mobile phone and its accessories and power problem, to be major constraints<sup>7</sup>. While other issues were also identified such as high cost of maintenance, poor network and inadequate skill for its operation<sup>8</sup>.

However, it was revealed that due to lack of knowledge and information about the agriculture marketing information of sell their product most of the farmers sell their product at low price in developing countries such as Pakistan, Bangladesh and in India. Farmers link with different sources likes as traders, processors and traders farmers sell their agricultural products to buyers at wholesale price. While after getting the product at low

price, traders and buyers resell the products to processors at higher price. Therefore, mobile phones are one the best source to communicate directly with market and get latest information of their product and sell it at good price<sup>9</sup>.

Nowadays farmers are using different methods and technologies to increase their productivity and trying to reduce traditional methods. In the perspective of the China in the growth of economy farmers are also playing an important role in the contribution of Grass Domestic Product GDP of the country. To improve and increase the agriculture produce farmers are accessing and getting more information from different sources of technologies like an internet mobile phone and for find location using Global Positioning System (GPS). Furthermore, china has invested lot of amount on information communication technologies to provide best opportunities to farmers and spread more information around the country<sup>10</sup>.

It was showed that ICT has played an important role in various sectors of the society and has increased the information system in different communities. Information technology in agriculture also more popular where farmers can easily get latest information of weather by using internet and directly check the market information of different crops. In developing countries such as Pakistan India, Bangladesh and South African countries agriculture is a major contributor of economy and the Gross Domestic Product (GDP). Nowadays farmers are more aware about communication technology tools such as computer, Internet and mobile phone and improving their living sandard<sup>11</sup>. Mobile phones have decreased the cost of expenses in rural people. However, it was showed that mobile phone has given different opportunities, knowledge and information regarding different agricultural issues, problems and its solutions for agriculture development and knowledge among farmers. Furthermore, mobile phone use in agricultural extension services has provided information of market, weather, transport and agricultural practices to communicate with related department.

### 3. Mobile Use and Agriculture Information

Mobile phones are one of the key tools of information communication technology which promoting the economics conditions as well as reducing the poverty<sup>12</sup>. It is rapidly spreading in rural areas and farming are getting

more benefit from it. Farmers directly communicate customers and sell their produce in good price and sharing their experience with each other's in their different areas. Mobile phone nowadays one of the strong tool of communication and make close communities. Use of mobile phone very easy for farmers either is educated or uneducated. In remote areas farmers were not expecting that mobile phone would change their lives and it bring happiness and knowledge of agriculture. Mobile phones provided confidentially nearby any time and anywhere and users carries personal item. Mobile phone services to support farmers in developing countries differ from one country to another country.

Mobile phone one of the best tool of ICT and every person of the society is getting benefit from it. In developing countries mobile phone played an important role in the terms of economic and significantly has reduced the gap among communities. The rate of mobile call is not more expensive and people especially poor farmers are using it frequently in remote areas of developing countries. Similarly, in developing countries farmers are using mobile phone for marketing information in the context of Ethiopia farmers keep up to date about marketing rates by mobile phone. It was also showed that mobile phone speedily spreading in remote areas and improving its service where farmers easily can connect with market<sup>13</sup>.

The mobile phone has provided many opportunities to farmers and traders to sell their goods within a time to avoid from waste their product. Moreover, mobile phone has also given new thinking among farmers to decide regarding sell their produce, which offer provided by buyers or directly call market to get latest information of their crops. The study showed that when the mobile phone network was not available in Ghana most of the brokers stay at farmers working places and buy banana on the spot and beard lot of amount in the shape transportation to reach market where traders could not get appropriate price from market. ICT has also provided easy access to extension workers to reach at farmers and give advises for agriculture development. In the context of India farmers explored the use of a voice message forum to provide communicating and access to appropriate and timely agricultural knowledge and information from experts by use of mobile phone. Now rural communities in India are adopting mobile phones. <sup>14</sup>Result showed that adapters and owners of mobile phone in different countries such as Bangladesh, Pakistan, India, Srilanka and Thailand are young users and it was showed that mobile phones have

improved their social and economic conditions while same time mobile provided easy access to communicate with family and friends in emergency time.

Diffusion of information communication technologies in remote areas of developing countries are playing an important role in the agriculture development. Nowadays it was showed that mobile phone is not so expensive in developing countries and every person can buy it even low income farmers have also mobile phone and farmers communicate market and getting good price from customers. The study showed that in developing countries such as Dominican Republic, Guyana and Swaziland rural areas around 60 percent of farmers have their own mobile phone and using for market information<sup>15</sup>.

The development and increasing in different information technology tools have brought changes in daily life of people especially nowadays farmers are getting advantage from it and by using mobile phone connected with market. It was showed that the farmers who use mobile phone are more aware about market and their produce price. Most of farmers sell their goods on time without waste time. The proper use of mobile has increased the economic conditions of farmers and improves their living standard. Although in many places still it was lack of services showed but farmers are taking more efforts to connect with market and world and keep up to date every time<sup>16</sup>.

Information and communication technologies especially mobile phone play a role of game changer in agriculture development and brought a positive impact on smallholder farmers in developing countries. In different places of rural areas farmers directly communicate with customers and sell their produce and get good benefit from it. Mobile phone connected links of farmers with buyers and now farmers helping each other to reduce the risk of wastage their good and reached it on time. The information communication technologies applications have provided many opportunities to solve the problems and issues of rural communities and same time have enhanced the capacity of agriculture production and related information. Nowadays farmers are participating in different programs about use of technologies in agriculture knowledge and techniques for development of agriculture and their goods. Furthermore, farmers are focusing to use ICT for commercial purposes. Communication technology could empower the farmers and extension workers to spread the information about agriculture for farmers in rural areas of developing

countries. It is very important to empower the farmers and provided latest information about their agriculture produce timely where farmers can earn good money and reduce the poverty by using communication technology tools<sup>17-20</sup>.

## 4. Material and Methods

The quantitative method was applied for this research and total 1500 respondents randomly were selected from ten districts Ghotki, Larkana, Khairpur, Badin, Thatta Sijawal Benzairabad, Jamshoro, Matiari and Tando Allahyar of Sindh, Pakistan. Total 150 respondents randomly were selected for data collection. The list of the respondents was obtained from the Agriculture Department Government of Sindh and Sindh Irrigation Drainage Authority (SIDA). Three enumerators were appointed for data collection and all data was collected at farmers working places. Before collecting the data the researcher written letter to Government of Sindh and Sindh Irrigation Drainage Authority (SIDA) to obtain the list of farmers and similarly agriculture extension officers were also informed about data collection. While data was analysed by using computer software Statistical Package for Social Sciences (SPSS).

## 5. Demographic Profile

The demographic profile described regarding the respondents gender, age, education, occupation, farming experience, monthly income and household size. The result showed that 1500 respondents 100% participated in this study. It was showed that all were the male respondents participated in this study although women were also working in agriculture but culturally and traditionally women did not participate in this study. The result about age of the respondents revealed that 41.3% of the respondents age was 31-40 years old while 29.3% of the respondents age was 20-30 years however 19.2% of the respondents age was from 41-50 years and 6.8% of the respondents age was more than 50 years old only 3.4% of the respondents age was less than 20 years old with the mean value of M-2.99 SD, .995 (refer table 1).

The respondents were also asked about their education level the result indicated that 35.1% of the respondents were uneducated while 22.8% the primary education level of the respondents was 13.4% while intermediate 12.5%

of the respondents education level was middle 9.4% of the respondents education level was high school pass while 6.8% were bachelor and Master degree holders the mean value was (M- 4.10 SD= 2.42). It was showed that most of the respondents' education level was low but were able to access and dial the number of mobile phone and memorize it by sign of symbols. The marital status of the respondents was showed that 76.6% of the respondents were married and 23.4% of the respondents were single with the mean value of M-1.77 SD= 424.

The respondents were also inquired about their monthly income the result showed that more than half 50.3% of the respondents monthly income was less than ten thousand rupees while 30.3% of the respondents income was 11 to 15 thousand rupees 14.7% of the respondents income was 16 to 20 thousand only 4.6% of the respondents income was more than 20 thousand the respondents income more than 20 thousands were government employers and some have their own business including farming. Furthermore, respondents were asked about their occupation the result showed that more than half 66.5% of the respondents were farmers 17% of the respondents were doing government job as well as farming while 16.5% of the respondents were doing their own business and farming the mean value was M-1.50 SD = 761. The farmers were also inquired regarding farming experience the result showed that 35.6% of the respondents have 6 to 10 years in farming experience while 26.9% of the respondents were doing farming last 11 to 15 years however 23.9% of the respondents were more than 16 years were experience in farming only 13.6% of the respondents were less than 5 year experience in farming.

Data from Table 1 showed that those respondents have government job have less experience in farming the mean value was M-1.50 SD= .761. Furthermore, respondents were also inquired about family member in house the result revealed that 37.1% of the respondents were 6 to 8 family members in house 29.7% of the respondents were 9-11 family member 19.8% of the respondent were less than 5 members lives in their home. While 13.3% of the respondents were more than 12 family member were in house only However, it was showed that most of the respondents were joined family system where his mother, father, sister and brothers also live together in same house with mean value of M-271 SD= 1.16.

**Table 1.** Demographic profile

Variables	Frequency	Percentage
<b>Gender</b>	<b>0</b>	
Male	1500	100
Female	0	0
<b>Age</b>		
< 20	51	3.4
20-30	440	29.3
31-40	619	41.3
41-50	288	19.2
51-60	73	4.9
> 60	29	1.9
<b>Education</b>		
Illiterate	526	35.1
Primary	342	22.8
Middle	188	12.5
High	141	9.4
Intermediate	201	13.4
Bachelor	83	5.5
Master	19	1.3
<b>Marital Status</b>		
Single	351	23.4
Married	1149	76.6
<b>Monthly income</b>		
< 10 thousand Rupees	755	50.3
11-15 thousand	455	30.3
16-20 thousand	221	14.7
More than 20 thousand	69	4.6
<b>Occupation</b>		
Farming	998	66.5
Govt job & Farming	255	17.0
Farming & Own business	247	16.5
<b>Farming Experience</b>		
< 5 years	204	13.6
6 -10 years	534	35.6
11-15 years	403	26.9
16-20 years	213	14.2
> 20 years	146	9.7
<b>Household Size</b>		
< 5	297	19.8
6-8	557	37.1
9-11	446	29.7
12-14	159	10.6
More than 15	41	2.7

In Table 2 the respondents were asked about land ownership where result showed that 41% of the respondents was their own land while 38.6% of the respondents was not land and 20.4% of the respondents have land on contract. Furthermore, the respondent those their own land were two to five Acre while others have in hundreds where majority of farmers works on land under big landlords. While most of the farmers depends on landlords either they give them land to cultivate or not. However, 20.4% of the respondent take land on contract and cultivate different variety of crops. In Sindh, Pakistan labour force is very cheap and people are not getting sufficient amount of their work therefore the condition of the farmers is not good as compare to other communities.

**Table 2.** Land ownership

Variable	Frequency	Percentage
Yes	615	41.0
No	579	38.6
On Contract	306	20.4

**Table 3.** Crops Cultivation

Variables	Frequency	Percentage
Wheat	1343	89.5
Cotton	1060	70.7
Sugarcane	421	28.1
Banana	325	21.7
Mangoes	29	1.9
Vegetable	335	22.3
Rice	336	22.4
Others	72	4.8

Sindh is agriculture province and majority of the people are related with agriculture and major source of income is also agriculture. Data from Table 3 result indicated that cultivation majority 89.5% of the respondents was cultivate wheat in ten districts of Sindh, Pakistan. However, 70.7% of the respondents cultivate cotton this crop farmer mostly cultivates in middle and lower districts of Sindh. While 28.1% of the respondents cultivate sugarcane in all ten districts of Sindh. Furthermore, 22.4% of the respondents cultivate rice it was showed that majority of the farmer cultivate rice in upper district of Sindh such as Ghotki, Larkana and Khairpur. The respondents were also asked about different vegetables such as tomato, potato onion, chilies and others the result showed that 22.3% of the respondents cultivate vegetable in their land. The

result about mangoes showed that 1.9% of the respondent cultivate mangoes in this regarding it was showed that most people cultivate mangoes in Tando Allahyar district. While 4.8% of the respondents cultivate different crops. (Refer table 3).

Furthermore, in Table 4 the respondents were also inquired about use of internet on mobile phone the result showed that 63.3% of the respondents did not use internet on their mobile phone it was also revealed that farmers economic condition was not good and monthly income was very low and did not afford to buy smart and android mobile phones. Some of farmers were also unaware about Internet. However, 23.3% of the respondents were used Internet on mobile phones and check different information on it. The study showed about the Internet use among farmers in Sudan that very small number of farmers uses Internet and it is slowly developing among farmers (Musa, 2011). In Sindh Pakistan it was also showed that due to lack of education and awareness farmers not use Internet frequently. The respondents whose education was higher and income was good properly use Internet on mobile phones and 13.5% of the respondents use Internet some time just for listening music with mean value of M-190 SD= 598.

Data from Table 4 showed further information about what kind of information respondents get on Internet the result indicated that 20.7% of the respondents use Internet for entertainment such as film, songs and dramas while 13.0% of the respondents watch and listen the news of different national channels. Only 7.5% of the respondents see the information about agriculture such as price of product, seeds and near market information and 5.1% of the respondents see information of different movies actress and actresses release of new dramas and movies. Use of social media in Sindh Pakistan is very common and educated people frequently use it the respondents were also obtained information regarding use of social media result revealed that 25.4% of the respondents use Facebook on their mobile phone and do messaging friends on it. However, 1.9% of the respondents use Twitter on their mobile phone these respondents were more interested to follow the politicians, media anchors and famous personalities of country on twitter and result about We chat showed no body use it on mobile phone 3.7% of the respondents use WhatsApp on their mobile and do communication with family and friends by messaging and direct calling. (Refer table 4).

**Table 4.** Use of Internet on mobile phone

Variables	Frequency	Percentage
Do you use internet on mobile phone		
Yes	349	23.3
No	949	63.3
Some time	202	13.5
What kind of information do you get on internet by mobile phone		
Agriculture	112	7.5
Entertainment	310	20.7
News	195	13.0
Others	76	5.1
Do you use social media		
Facebook	381	25.4
Twitter	29	1.9
LinkedIn	2	.1
Wechat	0	0
Viber	21	1.4
Whatapp	56	3.7

Table 5 indicated the results regarding the plan to use mobile phone for agriculture information in future by farmers showed highly significant but correlation with different dimensions of UTAUT. According to the results, use of mobile showed a positive and significant ( $r = .286$ ,  $p < 0.001$ ) influence in daily life of farmers as it helps to keep farmers in touch with their family and friends. Use of mobile phones also facilitate farmers to communicate with their suppliers and buyers of their inputs and produce, hence they can increase their profit margins. Moreover, mobile phones also assist to keep in touch with agriculture officers to get updated and related information regarding their farming, expand their network with other farmers and marketing channels to disseminate their agriculture production information.

**Table 5.** Correlation between "plan to use mobile phone for agriculture information in future" with UTAUT dimensions of Performance Expectancy, Efforts Expectancy, Social Influence and Facilitating Condition

R	Plan to use mobile for agriculture information in future	P
Dimension of UTAUT		.000
Performance expectancy	.286	.000
Efforts expectancy	.289	.000
Social influence	.295	.000
Facilitating condition	.203	.000

Results further revealed that use of mobile phones to get agricultural information in future has also a positive, weak but highly significant relationship with UTAUT dimension of effort expectancy ( $r=0.289$ ,  $p < 0.001$ ). It showed that considering the advantages of mobile phone in various agricultural sectors, farmers took efforts to exploit the use of mobile phones to further enhance their knowledge and marketing techniques to get higher rewards. A highly significant, positive and weak correlation ( $r=0.295$ ,  $p < 0.001$ ) was also recorded for the use of mobile phones in agricultural sector and UTAUT dimension of social influence as family members and close friends and relatives of the farmers advise them to increase the use of mobile phones in their agricultural business. In doing so, family and friends not only think that they will be in close in touch with their farmers but also farmers can keep themselves up to date with the latest farming technologies to get higher profit margins.

UTAUT dimension of facilitating conditions also showed a highly significant, positive but weak correlation with use of mobile phones in agriculture in future ( $r=0.203$ ,  $p < 0.001$ ). According to results, most farmer respondents not only possess enough resources to purchase mobile but also know how to use mobiles properly, although most of the respondents were illiterate. In case of any difficulty to operate mobile phones, farmers can take guide from their family and friends to use mobiles properly. Farmers can also easily contact with agriculture officers to get updated information regarding their agricultural issues and problems from their work place. However, some of the respondent farmers said that agriculture officers are not cooperative in resolving agriculture issues and problems in their areas. Moreover, most of the farmers found the service facilities of mobile phones adequate in their areas. However, farmers have to travel to different cities from their working place to sale and purchase mobile phones.

Table 6 showed the results about the use of mobile phone for getting marketing information by respondents were positively significant with UTAUT dimension of performance expectancy ( $r=0.245$ ,  $p < 0.001$ ). It showed that majority of the farmers not only use mobile phone to get updated marketing information but also communicate with their family and friends to get in touch with them. UTAUT dimension of efforts expectancy also showed a positive, weak but highly significant correlation ( $r=0.224$ ,  $p < 0.001$ ) with use of mobile phones to get marketing information. The results showed that farmers did not take concrete efforts to use mobile phones to

get updated information from their suppliers, buyers or related government agencies to get information regarding their prices of their inputs, produce or meteorological. Use of mobile phones by the farmers has a positive, highly significant and weak relationship with UTAUT dimension of social influence ( $r=0.381, p < 0.001$ ). The results indicated that family and friends of the farmers although encourage them to use mobile phones to get related and updated marketing information from all the related agencies but not aggressively. They mostly left the decision of the use of mobile for getting marketing information with the farmers. Use of mobile phones to get marketing information was positively, weakly and significantly correlated with the facilitating conditions ( $r=0.210, p < 0.001$ ). It showed that despite low income of farmers, they still purchase mobile phones to get all possible marketing information from related agencies. However, facilities provided by the government are not adequate as they cannot easily sell and purchase mobile and its related accessories in their vicinities, instead they have to travel long distance to get their required mobile accessories. Another serious problem faced by the farmers is the poor network of the mobile companies, as many rural areas are still not provided the proper networks of the mobile service providers.

**Table 6.** Correlation between "I should use mobile phone for getting marketing information" with UTAUT dimensions of Performance Expectancy, Efforts Expectancy, Social Influence and Facilitating Condition

R	I should use mobile phone for getting a marketing information	P
Dimension of UTAUT		
Performance expectancy	.245	.000
Efforts expectancy	.224	.000
Social influence	.381	.000
Facilitating condition	.210	.000

Data in Table 7 showed the results about the relationship of the contact of farmers with buyers using mobile phones with different UTAUT dimension. The results indicated that UTAUT dimension of performance expectancy showed a positive, weak and highly significant relationship with the farmers strive to contact buyers using mobile phones ( $r= 0.231, p <0.001$ ). It showed that farmers did not use mobile phones to communicate

with large number of buyers to get variable market information regarding the price and delivery of their product. Instead, they only depend on the specific buyers and use mobile phones to communicate with them, hence did not get good and comparable price of their products. Efforts expectancy also showed highly significant but weak relationship ( $r= 0.214, p < 0.001$ ) with use of mobile phones to contact with their buyers because they are mostly focused on limited numbers of buyers and did not totally depend mobile phones to communicate with them. As farmers also different mode of communication to contact with their buyers, social influence of their family and friends was limited to encourage them to use mobile phones to access a diversified buyer range, hence showed significant, positive but weak correlation with UTAUT dimension of social influence ( $r= 0.248, p < 0.001$ ). Considering the lack of infrastructure facilities provided by the government and its related agencies to farmers to access a diversified buyer use of mobile to contact farmers with their buyers showed a very weak but significant relationship ( $r= 0.131, p < 0.001$ ). Among those lack facilities, one of the major hindrances in the use of mobile phones is the limited availability of mobile phone networks in the farmer's villages and vicinities.

**Table 7.** Correlation between "I always try to contact with buyers by using mobile phone" with UTAUT dimensions of Performance Expectancy, Efforts Expectancy, Social Influence and Facilitating Condition

R	I always try to contact with buyers by using mobile	P
Dimension of UTAUT		
Performance expectancy	.231	.000
Efforts expectancy	.214	.000
Social influence	.248	.000
Facilitating condition	.131	.000

Table 8 showed the results regarding the relationship of farmers' prediction to use mobile phone to get updated information related to them with different UTAUT dimensions. Among UTAUT dimensions, except social influence that showed a moderate and highly significant relationship ( $r= 0.309, p < 0.001$ ), remaining dimensions showed a very weak but highly significant relationship with use of mobile phones. Overall results indicated that considering the low impact of the use of mobile phones on the improvement of farmer's performance and lack of infrastructure facilities by the government and allied agencies, farmers did not take efforts to use mobiles to get



updated information regarding agriculture and weather forecasts. The only factor responsible to encourage them for the use of mobile phones is the pressure and advises of their family and friends. In this circumstance it was showed that farmers depend on other source of information such as radio and television or face to face communication but did not use mobile phone getting latest information for sell their goods in near market.

**Table 8.** Correlation between "I predict to use mobile phone for getting a latest information of agriculture and weather" with UTAUT dimensions of Performance Expectancy, Efforts Expectancy, Social Influence, Facilitating Condition

R	I predict to use mobile phone for getting a latest information of agriculture and weather	P
Dimension of UTAUT		
Performance expectancy	.180	.000
Efforts expectancy	.240	.000
Social influence	.309	.000
Facilitating condition	.110	.000

According to the Table 9, use of mobile phones by the farmers to get information about the prices of crops from market only showed significant relationship with efforts expectancy ( $r = -0.122$ ,  $p < 0.001$ ) and social influence ( $r = -0.53$ ,  $p < 0.039$ ) but it was very and negatively correlated. Very weak and non-significant relationship of use of mobile phones by the farmers to get information about the prices of crops from market was recorded with performance expectancy ( $r=-0.050$ ,  $p < 0.051$ ) and facilitating conditions ( $r=0.001$ ,  $p < 0.974$ ). The overall results showed that the use of mobile phones did not add improve the performance of farmers to get higher prices of their crops, as most of the farmers in Sindh province are tenant farmers and depend on their landlords about the crop prices. Accordingly, farmers did not take serious efforts to use mobile phones to get updated information regarding the prices of their produce from various markets to obtain higher rewards. Instead, they mostly use mobile phones to communicate with their family and friends for their personal matters. Moreover, lack of infrastructure such as availability and easy access markets to the farmers and mobile networks are also some of the main reasons for the less use of mobile phones by the farmers to get updated information from markets about their produce (refer table 9).

**Table 9.** Correlation between use of mobile phone to get information about the price of crops from market with UTAUT dimensions of perform expectancy, efforts expectancy, social influence, facilitating condition

R	Use of mobile phone to get information about the price of crops from market	p
Dimension of UTAUT		
Performance expectancy	-.050	.051
Efforts expectancy	-.122	.000
Social influence	-.053	.039
Facilitating condition	.001	.974

**Table 10.** Correlation between "mobile calls by farmers to Agriculture officer to obtain information about use of pesticides in crops" with UTAUT dimensions of perform expectancy, efforts expectancy, social influence, facilitating condition

R	Mobile calls by farmers to Agriculture officer to obtain information about use of pesticides in crops	p
Dimension of UTAUT		
Performance expectancy	-.088	.001
Efforts expectancy	-.110	.000
Social influence	-.082	.002
Facilitating condition	-.021	.408

According to the Table 10, a highly significant but very weak and negative correlation was recorded between the use of mobile phones to call Agriculture officer to obtain information about the use of pesticides in crops with performance expectancy ( $r=-0.088$ ,  $p < 0.001$ ), efforts expectancy ( $r=-0.100$ ,  $p < 0.001$ ) and social influence ( $r=-0.082$ ,  $p =0.002$ ). A negative, very weak and non significant relationship was recorded between mobile calls to agriculture officer by farmers with the facilitating conditions ( $r=-0.021$ ,  $p =0.408$ ). Overall, due to lack of competency and the interest of agriculture officers to provide easy and timely guidance regarding the proper and safe use of pesticides against crops pests, farmers mostly did not rely on them. Moreover, neither officers nor government have taken initiatives to put relevant contact details of concerned officers on the notice boards of the departments or official websites. Therefore, farmers directly purchase pesticides from the retail pesticides shop and take guidance from unqualified shopkeepers about their usage. Accordingly, performance of farmers is

badly affected due to lack of facilitating conditions, hence, not only farmers were not interested to contact with agriculture officers, but their family and friends were not forcing to contact them. Considering the overall scenario, performance expectancy of farmers was seriously affected.

**Table 11.** "Call meteorological department to get latest information of weather before use pesticides in crops" with UTAUT dimensions of perform expectancy, efforts expectancy, social influence, facilitating condition

R	Call meteorological department to get latest information of weather before use pesticides in crops	p
Dimension of UTAUT		
Performance expectancy	.035	.172
Efforts expectancy	.054	.035
Social influence	-.058	.024
Facilitating condition	.075	.004

Data from Table 11 result regarding the correlation of call by farmers to meteorological department to get latest information of weather before use of pesticides in crops showed a very weak and non significant relationship ( $r = 0.035$ ,  $p = 0.172$ ) with performance expectancy. It showed that farmers did not get adequate or timely information from meteorological department regarding the weather conditions in their areas to time their pesticide application. However, they still tried to get or search weather data of their vicinity either from their nearest meteorological departments or their official website to optimize the application of pesticides against pests to get better results. Accordingly, a positive, significant but very correlation was observed between call of farmers to meteorological department for weather information with efforts expectancy. However, UTAUT dimension of social influence showed a negative, very weak but significant correlation with calling of farmers to meteorological department for weather information. It indicated that as family and friends of the farmers consider the efforts of farmers useless and time wasting to get relevant weather information from meteorological department, they usually discourage them to consult with them. Although, farmers were not getting their desired meteorological information from concerned department, but government has established meteorological department in almost important agriculture regions of the province

from where farmers can get their desired information before application of pesticides on their crops. Therefore, a significant, weak but positive relationship ( $r=0.075$ ,  $p < 0.004$ ) of farmers calling to meteorological department for the relevant information was recorded with facilitating condition dimension of UTAUT.

Table 12 showed the results regarding the frequent use of mobile phone by the farmers at their working place with different dimensions of UTAUT. The frequent use of mobile phones by the farmers at their working place showed a very weak, significant but negative ( $r= -0.078$ ,  $p = 0.002$ ) correlation with performance expectancy. It showed that frequent use of mobile phones by the farmers at their working place negatively affect their performance because they did not focus on their farming assignments due to over use of mobile phones. Accordingly, farmers did not take efforts to use of mobile phones at their working place and hence exhibit a negative, very weak but highly significant relationship ( $r=-0.092$ ,  $p < 0.001$ ). A very weak, negative and non-significant correlation was also observed between the frequent use of mobile phones by farmers at their working place with UTAUT dimensions of social influence ( $r=-0.030$ ,  $p = 0.249$ ) and facilitating conditions ( $r=-0.013$ ,  $p = 0.609$ ). The such results showed that family and friends of the farmers did not force and encourage farmers for the use of mobiles at their working place as they think use of mobiles is not providing any benefit, instead, it was wasting their time and energy. Moreover, inadequate infrastructure facilities from networking companies and other stakeholders also were some reasons for the less use of mobile phones by the farmers at their working place to get relevant information regarding their agricultural issues.

**Table 12.** Correlation between "do you use your mobile phone frequently at your working place" with UTAUT dimensions of perform expectancy, efforts expectancy, social influence, facilitating condition

R	Do you use your mobile phone frequently at your working place	p
Dimension of UTAUT		
Performance expectancy	-.078	.002
Efforts expectancy	-.092	.000
Social influence	-.030	.249
Facilitating condition	-.013	.609

## 6. Conclusion

Overall result indicated that most of the farmers were using mobile phone but very limited use for marketing, weather and agriculture information and keep up to date each other's. While due to lack of education more than half of the respondents did not use Internet. Most of the farmers was not using mobile phone at their working places and connected with market. In different areas of Sindh, Pakistan mobile network was not good farmers are unaware about proper use of mobile phone for agriculture updates. Moreover, majority of the farmers were not have any contact of agriculture and meteorological department. However, farmers depend on their owner of the land to let to know farmers about weather and marketing information and use of pesticides in crops. Therefore, it is urgent need over there that farmers should provide technical education and proper information about use of technologies that farmers can get benefit and improve their living standard.

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