Archives of Agriculture and Environmental Science 7(1): 80-85 (2022)
https://doi.org/10.26832/24566632.2022.0701011

e-ISSN: 2456-6632

This content is available online at AESA

Archives of Agriculture and Environmental Science

Journal homepage: journals.aesacademy.org/index.php/aaes

ORIGINAL RESEARCH ARTICLE

Evaluating the parameters influencing agricultural productivity due to the limitations of smartphone-related knowledge among farmers

Prodipto Bishnu Angon[1*], Md. Mahbubur Rahman Khan[2], Md. Shafiul Islam[1], Rucksana Parvin Suma[1] and Ummya Habiba[1]

[1]Faculty of Agriculture, Bangladesh Agricultural University, Mymensingh, BANGLADESH
[2]Department of Food and Process Engineering, Hajee Mohammad Danesh Science & Technology University, Dinajpur, BANGLADESH
[*]Corresponding author's E-mail: angonbishnubau@gmail.com

ARTICLE HISTORY

Received: 12 January 2022
Revised received: 23 February 2022
Accepted: 19 March 2022

Keywords

Farmer development
Farmer knowledge
Modern technology
Smartphone use

ABSTRACT

The use of smartphones has improved individuals significantly in this age of information technology. Yet farmers cannot use this smartphone due to a lack of proper knowledge. Where smartphones could easily be used by farmers to solve their agricultural problems. The aims of the study to improve the daily life of a farmer as well as to gain skills in the use of smart phones. Nine characters have been selected to find out the relation between knowledge of farmers' use of smartphones in agriculture. The data are collected through interviews from 128 farm families from Mymensingh of Bangladesh. A semi-structured questionnaire is distributed for collecting data. Those data were pre-arranged and categorized by using M.S. Excel. Spearman's Rank Order were used to create correlations among the characteristics of farmers. Among the selected farmers 56% have low knowledge and only 3% of farmers have high knowledge about the use of smartphones in the agricultural sector. Among nine characters ages and firm experience have a strong negative significant correlation (-0.548* and -0.541*, respectively). On the other hand, extension media interaction has a strong positive relationship (0.588*). From this output, farmers will be able to gain a complete understanding of smartphones to solve the agricultural problems with proper training and experience.

Citation of this article: Angon, P. B., Khan, M. M. R., Islam, M. S., Suma, R. P., & Habiba, U. (2022). Evaluating the parameters influencing agricultural productivity due to the limitations of smartphone-related knowledge among farmers. *Archives of Agriculture and Environmental Science*, 7(1), 80-85, https://dx.doi.org/10.26832/24566632.2022.0701011

INTRODUCTION

One of the most important aspects of modern life is the mobile phone (Niu, 2022). Mobile phones are now in almost everyone's hands, thanks to the advancement of information technology (Corrocher and Zirulia, 2009). A smartphone is a more advanced form of a mobile phone (McKay *et al.*, 2018). There is no task that can't be achieved with a smartphone nowadays days. However, not everyone is capable of adequately utilizing it. To run it properly, one needs depth knowledge (Vanhoof *et al.*, 2018). The focus of this research is to find out the factor which affects the level of smartphone knowledge among all farmers engaging in agricultural activities. Because there is no other way to run up with the current state of the globe than to utilize a smartphone (Russo *et al.*, 2018, Rodríguez-García *et al.*, 2020). In this aspect, farmers are much behind. Worldwide, 6.37 billion people use mobile phones in 2021, of which 7.10 billion use smartphones (Turner, 2021). Which is approximately 80.63% of the world's population (Turner, 2021). As the days go by, the number of smartphone users is increasing (OBERLO, 2021). In terms of smartphone usage, Bangladesh is ranked 18th in the world in the Global Mobile Market Report 2021. which is 32.4 % of the total individuals in this country (Wikipedia contributors, 2021). 25% of people use the phone to provide information on agricultural work in Kenya (Krell *et al.*, 2021). In developing countries, 94% of farmers use phones (Folnovic, 2020) just for communication. Many of them are unaware of the phone's more useful features. As a result, farmers are deprived of various knowledge

related to agriculture.

Many difficulties in agriculture may now be solved quickly and easily due to the usage of smartphones (Mittal *et al.*, 2010). There are a variety of agricultural consultation articles available in various applications and websites (Delgado *et al.*, 2013; Bartlett *et al.*, 2015). Because of smartphones, the entire world is now in the palm of one's hand, and anything desired may be obtained in a short period of time. Farmers would be able to tackle agricultural problems if they were able to operate smartphones properly. Farmers, on the other hand, are unable to handle their own difficulties today due to a lack of proper smartphone expertise. The study seeks to identify the factors that cause farmers to become aware of the knowledge about smartphones. A questionnaire was used to collect information from 128 farmer families, and the data is then analyzed. All the characters of the farmers have been picked up through a questionnaire and compared with their smartphone knowledge. Although much work has been done on this subject area so far, there is not much research has been done on the reasons for the lack of knowledge about smartphones of farmers. The only way to do this research is to survey. We have been able to pick up and analyze the data through surveys.

In Bangladesh, most of the farmers are using mobile phones but they found that despite easy access to agricultural information, they are not taking advantage of it. Among the special reasons for this are high call rate, unconsciousness, apathy, etc. To conduct the research the data was collected using a structured interview schedule by them. Since most farmers feel comfortable getting information from local agricultural products dealers. Therefore, they highlight the benefits of getting accurate agricultural information using mobile phones through various training (Mamun-ur-Rashid *et al.*, 2019). Next, a study was conducted among some men and women in the Kamuli district of Uganda to find out who was more interested in using mobile phones in agriculture and how they are benefiting from it. The data were collected through semi-structured and interviews method. They identify that mobile phone can be used not only for social purposes but also as a tool for agricultural development. Men in this region use mobile phones more in agricultural activities than women. Therefore, they identify that more economic and social development is possible by encouraging women to participate equally in using mobile phones in agriculture in the development of agriculture there (Martin and Abbott, 2011). Another study conducted on Babati district in Tanzania was conducted for finding the benefits of using mobile phones in agriculture for the people, how their living standard and improving, and what difficulties they are facing was highlighted. They selected 13 villages in that Upazila and collected data from each village through interviews. Since it is a developing country all the farmers here cannot afford a mobile phone and faces so many problems when using it. So, we assume that for getting proper benefits from mobile phones government can take many steps such as microcredit loans, providing training in using mobile phones and enriching networking systems, etc. (Furuholt and Matotay, 2011). How much mobile phones are being used by farmers in agriculture in the Sub-Sahara region and how they are benefiting from it was described. While doing this research both quantitative and qualitative data were collected by questionnaire method from the farmers. It has been seen here that most of the young educated farmers are using mobile phones in agriculture and being benefited. But they are reluctant to take important information like weather through mobile phone. Which is very important in agriculture and helps to increase productivity (Ogbeide and Ele, 2015). Farmers in Africa are getting information about agriculture from there using the M- service of mobile phones and how it is used has been analyzed. The survey was conducted by interviewing 605 farmers in different parts of Africa. It found that if the M-service can be designed in such a way that all classes of farmers can use it then, everyone will get information from there and using it in agricultural work will lead to a better spread in agricultural development (Krell *et al.*, 2021). The mobile money transfer facility for buying and selling agricultural products has highlighted the impact it has had on the livelihoods of African farmers. A pre-tested questionnaire was used to collect data from the different farmers. It has been observed that most of the farmers there feel safe in mobile money transfers. This advantage has further improved their livelihood as theft and robbery are rampant in Africa (Kirui *et al.*, 2013). In this research, the problem was solved by studying the farmers' current life journey. Farmers will advance in the technology field as a result of this research. Our paper's major goal is to assist farmers in keeping up with modern periods and bringing the most up-to-date technologies to the sector of agriculture. This will enhance agricultural productivity and boost the country's economic vitality. Therefore, this study was conducted to find out the reason behind the lacking of knowledge about smartphone use among the village farmers, to visualize the farmer's behavioral pattern and livelihood that are greatly interconnected with the use of smartphones, acceptance of smartphones in farmer's life for the increase of agricultural production and to solve the problem by finding the appropriate way and taking the necessary steps, to improve agricultural productivity by improving the living standards of the farmers.

MATERIALS AND METHODS

Study area selection

The study was ensued in the Mymensingh district under Bangladesh. Mymensingh district was established in 1787. Later on, it was divided into six districts (Tangail, Jamalpur, Mymensingh, Kishoreganj, Sherpur and Netrokona). Mymensingh Sadar upazila is divided into 13 Union Parishads. Among them, Boyra was selected for our research purposes. Boyra made studying simpler for us because we were able to stay for a few days and it is a prominent village in Mymensingh. The people here were also very hospitable which makes it easy for us to conduct our study.

Population selection and sampling procedure

Boyra union under the Mymensingh district was selected for our

research purposes. On Jan 10, 2021- Boyra union consists of 24,353 population, 14.89 km^2 total population and population density is 1636/km^2 (BOYRA, 2021). The Union consists of almost 200 farm families. Among them, we randomly selected 128 farm families (64% of the total farm families). The research was done through face-to-face interview method (one farmer from one farm family) and we tried to select all categories of farmers (Young, middle-aged, old aged) according to their ages (18-68). Literally, we selected various categories of ages just to get accurate and appropriate results for our research. We have chosen the age of 68 just because they were very experienced in farming and they actually know about the importance of smartphones for Agricultural purposes. At the age of 68, he normally did his farming without any modern technology. So, in the current situation, when he gets extra benefits through modern technology, he actually understands, this is really beneficial for farming. On the other hand, we also have chosen the age 18 as regarded as Young, just because they were very expert in using scientific method or instruments or something like for more yield in less time. So, they actually understand the importance of mobile phones in using Agricultural issues. Besides, we have chosen 128 farm families from almost 200. We have chosen randomly. We tried to choose all categories of farmers like young-aged, middle-aged, old-aged, illiterate, literate, very poor farmers, almost rich farmers, landless farmers, etc. for getting the valid and accurate results of our research.

Development of questionnaire and method of data collection

For collecting information, we prepared a questionnaire and we selected some characteristics of the farmers who are directly involved in the research. And these characteristics are (A) Personal: 1. Age, 2. Level of education, 3. Household size, 4. Farming experience, 5. Farm size, 6. Annual family income, 7. Training received on different agricultural issues, 8. Extension media Contact, 9. Challenges in using a mobile phone during securing agricultural services, and 10. Level of knowledge about available services and the use of mobile phones. All these characteristics were selected through a standard value and we categorized them and arranged them in the tables. From the tables, we discussed and interpreted the result. In the tables, we categorized and arranged tables in Number, frequency, percentage, mean and Standard deviation for statistical description.

Age: We tried to select all categories of farmers according to Their age: Young (<35), Middle-aged (35-50) and Old aged (more than 50). Level of education: We categorized farmer's education: Illiterate (0), Can sign only (0.5), Primary level (1-5), Secondary level (6-10), Higher Secondary (11-12), Higher studies (>12). Household size: We categorized them according to the family members (Small, medium, large). Farming experience: This was categorized according to the farming experiences of the farmers (less, medium, large). Farm size: Farm size was categorized according to the standard value. Landless: <0.02 acre, Marginal: .02-0.20 acre, Small: .21-1 acres, Medium: 1.01-3 acres, and Large: >3 acres. Annual family income: This characteristic was categorized into low (Up to 250000), medium (251000 – 450000) and high (>450000). Training received on different agricultural issues: This was categorized depending on the training received days by farmers, low (Up to 5 days), medium (6 – 10 days) and high (>10 days). Extension media contact: This was done based on the media contact by the farmers. Which Possible score range is between 0 to 48 is characterized by low (up to 16), medium (17-32) and high (more than 32). Challenge: It included all the challenges in using mobile phones during securing agricultural services with 0 to 42 Possible score range. Knowledge: This included farmers' knowledge about the use of smartphones in the agricultural sector with a possible score of 0 to 22. The research was done through the face-to-face interview method. We prepared an interview schedule for collecting accurate and appropriate, valid information from the farmers from 3 October to 13 November 2021.

Data analysis

IBM SPSS Statistics 25 and Microsoft Excel were used to evaluate the data obtained through questionnaires. The correlation among multiple variables was analyzed using Spearman's rank correlation coefficient ***"ρ"*** [15]. Microsoft Excel 2019 was used to evaluate the percentages, mean, and standard deviation.

RESULTS AND DISCUSSION

Selected characteristics of the farmers

Farmer's age ranged from 26 to 74 years. The mean and standard deviation of respondents were 44.41 and 10.66, respectively (Table 1). It is seen that most of the farmers belong to middle aged category and it was 53% of the total respondents. On the other hand, young farmer was 25% and old aged farmer 22% that were almost half percent of the middle-aged farmer. Farmer's education score ranged from 0-16 with mean and standard deviation were 6.774 and 4.52, respectively (Table 1). Most of the farmers were in secondary level category (50%). On the other hand, 9.33% were in illiterate, can sign only and graduate level education category, respectively. From the data it is also seen that 22% farmer were in primary level of education category and no farmer was in the higher secondary level. Household size of the farmers. The household size was categorized into small, medium and large. It was range from 3 to 8 ha and its mean and standard deviation were 4.96 and 1.33, respectively (Table 1). Most of the farmers had medium-size household area (59%). This table also shows that 41% respondent had small household area and no farmer had large household. Farmers had 5-60 years of farming experience. Their average farming experience was 23.37 years and standard deviation was 12.41 (Table 1). The maximum of 53% farmers in this area had up to 20 years farming experience. It also shows that 3% farmers had more than 40 years farming experience and 44% of farmers had 21 to 40 years. Farm size of this research area. It was ranged from 0.0097- 4.23 ha. The average farm size was 1.42173 and standard deviation was 1.38. Most of the farmers belong to small category (31%) and lowest number of farmers

Table 1. Ordination of farmers based on the selected characteristics.

Characteristics	Categories		Respondents N=128		Score Range		Mean	SD
Age	Level	Value	Number	%	Min.	Max		
	Young	≤35	32	25				
	Middle aged	36-50	68	53	26	74	44.41	10.66
	Old aged	>50	28	22				
Educational Level	Illiterate	0	12	9.33				
	Can sign only	0.5	12	9.33				
	Primary	1-5	28	22				
	Secondary	6-10	64	50	0	16	6.774	4.52
	Higher secondary	11-12	0	0				
	Graduate	>12	12	9.33				
Household Size	Small	≤4	52	41				
	Medium	5-8	76	59	3	8	4.96875	1.33
	Large	>8	0	0				
Farming Experience (Years)	Low	≤20	68	53				
	Medium	21-40	56	44	5	60	23.375	12.41
	High	>40	4	3				
Farm Size (Hectare)	Landless	<0.02	4	3				
	Marginal	0.02-0.2	26	19				
	Small	0.21-1	40	31	0.0097	4.23	1.42173	1.38
	Medium	1.01-3	36	28				
	Large	>3	24	19				
Annual Income (*Thousand BDT)	Low	≤250	60	47				
	Medium	251-450	28	22	30	700	326.781	200.81
	High	>450	40	31				
Training Experience (Days)	Low	≤5	120	94				
	Medium	6-10	4	3	0	13	0.84375	2.57
	High	>10	4	3				
Extension Media Contact	Low	≤16	56	44				
	Medium	17-32	60	47	0	37	17.531	9.99
	High	>32	12	9				
Challenges	Low	≤14	16	12.5				
	Medium	15-28	96	75	13	33	22.375	5.87
	High	>28	16	2.5				
Knowledge	Low	≤7	72	56				
	Medium	8-16	52	41	0	17	7.07812	4.04
	High	>16	4	3				

were in landless category (3%) while 19% in marginal category and 28% in medium category and 19% were in large farm size category. Annual income of the farmers of this area was 30-700 BDT (000'tk). The average annual income was 326.78 and standard deviation was 200.81 (Table 1). The maximum number of respondents belong to Low category (47%). On the other hand, 22% in medium category and 31% in high category.

Training experience is categorized into low, medium and high. Here observed score range was 0-13 days. It was seen that average training experience of the respondent was 0.84375 with a standard deviation of 2.57 (Table 1). Most of the farmers have received less than 5 days training that is in small category (94%) while 3% farmers in medium and high category, respectively. The score of media contact is showed in the Table 1. The score ranged from 0 to 37. The average score of media contact was 17.53 and standard deviation was 9.99 in which 44% farmers in low category, 47% in medium category and 9% Were in high category. Distribution of farmers according to their challenges in which possible and observed score ranged from 0-42 and 13-33, respectively. The average knowledge score 22.37 with a standard deviation 5.87. Here 75% of farmers that was highest in number belong to medium category and 12.5% farmers were in low and high category respectively.

Knowledge about smart phone

This study seeks to find out how much knowledge farmers have about smartphone usage. For what purpose are they using mobile phone more and whether they know about the applications used in agriculture or not, it has been known by analyzing on various subjects. The study highlights how much farmers know about the various services of modern agricultural technology available through smartphones and which categories of farmers know more about it. Farmer's knowledge of the study area ranged from 0-17 that is showed in the Table 1. The average knowledge score was 7.07 with a standard deviation of 4.04. Most of the farmers were in low level of knowledge category (56%) while 41% in medium and 3% in high category.

Table 2. Correlation between the Farmers knowledge about use of smartphone in agricultural section and selected characteristics (significant at 0.05 level of probability).

Farmer's characteristics	Concentrated parameter	Coefficient of Correlation
Age	Knowledge about smartphone	-0.548*
Education		0.079
Household size		0.149
Farming Experience		-0.541*
Farm Size		0.237
Annual Family Income		0.244
Training		0.029
Extension media Contact		0.588*
Challenges in using a smartphone		-0.235

*Strong significant correlation

Relationship between selected characteristics and selected problem

Correlation coefficient (Spearman's Rank Order) is used to establish a relationship between Farmer's selected characters and their knowledge of smartphones use. The results of the correlation show that there is a relationship between our selected problem with age, firm size, firm experience, annual family income, extension media contact, and challenges in using a mobile phone. In which the ages and firm experience have a strong negative significant association. Extension media interaction, on the other hand, has a strong positive relationship (Table 2). As a result of these findings, it is easy to conclude that effective communication with extension media and officers can improve knowledge of mobile use in agriculture. Farmers will be able to gain a thorough understanding of smartphones with proper training and experience. We have studied the use of smartphones and their use in agriculture. On the other hand, our reviewed papers have shed light on mobile or cell phones (Mamun-ur-Rashid *et al.*, 2019. Ogbeide and Ele, 2015). Their main objective was to make the farmers interested in using mobile phones. On the other hand, the main goal of our paper is to find out where the farmers are lagging behind in the use of smartphones and the steps required to know the correct way about smartphones use.

Conclusion

There is no substitute for current technology for improvement in the agricultural sector. In this paper, we have focused on one of the major discoveries of current technology (smartphones). The study is organized because farmers need to know about smartphones. We have come up with some reasons behind the lack of knowledge of farmers about smartphones. According to the findings, farmers' extension media contact, farmers' age, and farming experience all have a substantial correlation with farmers' smartphone-related knowledge, which influences their agricultural productivity. It is natural that older people should have less idea about current technology. The only thing that can increase this lagged idea is the promotion of accurate knowledge about smartphones. Extension media contact appears to have a strong positive correlation with smartphone knowledge, which can be improved through discussion and idea-sharing via smart devices. Different types of extension media such as television, radio, posters, rural agricultural fairs, result demonstrations, method demonstrations, contact with extension agents can give farmers the right idea about smartphones. Occasional agricultural fairs should be organized in the villages where the requirements and rules of the use of smartphones will be taught through constructive exhibitions. Attaining a smart agricultural environment utilizing smartphone is the future objective of this study.

ACKNOWLEDGEMENT

Authors are very gladfully acknowledge the farm families for giving the information. Without their sincere participation this study would have been impossible.

REFERENCES

Bartlett, A. C., Andales, A. A., Arabi, M., & Bauder, T. A. (2015). A smartphone app to extend use of a cloud-based irrigation scheduling tool. *Computers and Electronics in Agriculture*, 111, 127-130, https://doi.org/10.1016/j.compag.2014.12.021

Corrocher, N., & Zirulia, L. (2009). Me and you and everyone we know: An empirical analysis of local network effects in mobile communications. *Telecommunications Policy*, *33*(1-2), 68-79, https://doi.org/10.1016/j.telpol.2008.10.003

Delgado, J. A., Kowalski, K., & Tebbe, C. (2013). The first Nitrogen Index app for mobile devices: Using portable technology for smart agricultural management. *Computers and electronics in agriculture*, *91*, 121-123, https://doi.org/10.1016/j.compag.2012.12.008

Folnovic, T. (n.d.). Smart Agriculture on Smartphones. AGRIVI. Retrieved December 27, 2020, from https://blog.agrivi.com/post/smart-agriculture-on-smartphones

Furuholt, B., & Matotay, E. (2011). The developmental contribution from mobile phones across the agricultural value chain in rural Africa. *The Electronic Journal of Information Systems in Developing Countries*, *48*(1), 1-16, https://doi.org/10.1002/j.1681-4835.2011.tb00343.x

Kirui, O. K., Okello, J. J., Nyikal, R. A., & Njiraini, G. W. (2013). Impact of mobile phone-based money transfer services in agriculture: evidence from Kenya. *Quarterly Journal of International Agriculture*, *52*(892-2016-65177), 141-162, http://doi.org/10.22004/ag.econ.173644

Krell, N. T., Giroux, S. A., Guido, Z., Hannah, C., Lopus, S. E., Caylor, K. K., & Evans, T. P. (2021). Smallholder farmers' use of mobile phone services in central Kenya. *Climate and Development*, *13*(3), 215-227, https://doi.org/10.1080/17565529.2020.1748847

Mamun-ur-Rashid, M., Karim, M. M., Islam, M. M., & Mobarak, M. S. B. (2019). The usefulness of cell phones for crop farmers in selected regions of Bangladesh. *Asian Journal of Agriculture and Rural Development*, *9*(2), 298-312, https://doi.org/10.18488/journal.1005/2019.9.2/1005.2.298.312

Martin, B. L., & Abbott, E. (2011). Mobile phones and rural livelihoods: Diffusion, uses, and perceived impacts among farmers in rural Uganda. *Information Technologies & International Development*, *7*(4), 17-34, http://itidjournal.org/index.php/itid/article/view/789.html

McKay, F. H., Cheng, C., Wright, A., Shill, J., Stephens, H., & Uccellini, M. (2018). Evaluating mobile phone applications for health behaviour change: A systematic review. *Journal of telemedicine and telecare*, *24*(1), 22-30, https://doi.org/10.1177/1357633X16673538

Mittal, S., Gandhi, S., & Tripathi, G. (2010). *Socio-economic impact of mobile phones on Indian agriculture* (No. 246). Working paper. http://hdl.handle.net/10419/176264

Niu, G., Yao, L., Wu, L., Tian, Y., Xu, L., & Sun, X. (2020). Parental phubbing and adolescent problematic mobile phone use: The role of parent-child relationship and self-control. *Children and Youth Services Review*, *116*, 105247, https://doi.org/10.1016/j.childyouth.2020.105247

OBERLO (2021). How many people have smartphones in 2021? Retrieved December 27, 2020, from https://www.oberlo.com/statistics/how-many-people-have-smartphones

Ogbeide, O. A., & Ele, I. (2015). Smallholder farmers and mobile phone technology in Sub-Sahara Agriculture. *Mayfair Journal of Information and Technology Management in Agriculture*, *1*(1), 1-19.

Rodríguez-García, A. M., Moreno-Guerrero, A. J., & Lopez Belmonte, J. (2020). Nomophobia: An individual's growing fear of being without a smartphone—a systematic literature review. *International Journal of Environmental Research and Public Health*, *17*(2), 580, https://doi.org/10.3390/ijerph17020580

Russo, M., Bergami, M., & Morandin, G. (2018). Surviving a day without smartphones. *MIT Sloan Management Review*, *59*(2), 7-9.

Turner, A. (2021). How many smartphones are in the world? BankMyCell. Retrieved December 27, 2021, from https://www.bankmycell.com/blog/how-many-phones-are-in-the-world

Vanhoof, M., Reis, F., Ploetz, T., & Smoreda, Z. (2018). Assessing the quality of home detection from mobile phone data for official statistics. *Journal of Official Statistics*, *34*(4), 935-960, https://doi.org/10.2478/jos-2018-0046

BOYRA. (2021, january 10). City Population. https://www.citypopulation.de/en/bangladesh/dhaka/admin/manikganj/568219__boyra/?fbclid=IwAR34-ZSOOcbL0VJo8IgEsvhUVRwW6D_3fBlGdTlk5NGjFVPWa4ekHMEmep4

Wikipedia contributors. (2021, November 16). List of countries by smartphone penetration. In Wikipedia, The Free Encyclopedia. Retrieved 09:24, December 27, 2021, from https://en.wikipedia.org/w/index.php?title=List_of_countries_by_smartphone_penetration&oldid=1055632092