RESEARCH NOTE

A Standardised Scale to Measure the m-Readiness of Farmers

C.P. Poornima[1] and A. Sakeer Husain[2]

1.Ph.D Scholar, 2. Professor, Agricultural Extension, Kerala Agricultural University, Vellanikkara, Thrissur

Corresponding author e-mail : poornima.balachandran@gmail.com

Paper Received on November 29, 2020, Accepted on December 25, 2020 and Published Online on January 01, 2021

ABSTRACT

Mobile phones have evolved as the most popular technology for communication. Mobile based technologies, if used properly has the highest development potential for the farming sector too, acting as an effective tool by decreasing the information gap. But it is necessary to understand and measure the mobile readiness of farmers before development and release of mobile based tools to support them for farming. Hence, it is aimed in this study to develop a scale to measure the m-readiness of farmers. m-Readiness in the study is operationally defined as the preparedness and ability of farmers to use mobile phone-based technologies. Here, to develop the scale, relevancy rating by the judges followed by the Kendall's coefficient of concordance was used. The final scale comprised of 60 statements fewer than four sub domains, i.e., *physical readiness, technological readiness, psychological readiness and economic readiness, with 15 items under each domain. The scale was standardised for administration and found to be valid and reliable. The final standardised scale has been presented in the paper.*

Key words: *ICT in agriculture; m-Readiness; e-Readiness; Mobile phones in agriculture; Scale construction;*

In most of the developing countries, agriculture is the main income source of the population. Communicating relevant information in timely manner is utmost important for the overall development of the farming sector and thereby economy. With the advent of technologies, the usage of different information and communication devices is also increasing in a rapid pace among farmers. There is realisation that Information and Communication Technologies (ICTs) should be combined to be efficiently used in agricultural development as assisting tool so as to have an impact in the lives of farmers. The role of ICTs to trigger the growth of agricultural sector, enhance food security and farmer's livelihoods is increasingly recognised and accepted at the World Summit on the Information Society 2003-2005 (*Steinen et al.,2007*). Mobile phone is such a tool which is capable to transform agriculture. The dynamic advances in mobile communication technologiesare creating opportunities in grassroot levelby reaching the unreached.

It is necessary to understand the m-readiness of farmers before introducing a mobile phone based technology to them. m-Readiness in the study is defined operationally as the preparedness and ability of farmers to use mobile phone-based technology. It includes the infrastructural or physical situation of the farmers, the knowledge and skill to use mobile phones and related technologies, their psychological readiness or attitude towards usage of mobile phones and the economic ability to access various hardware and software to use mobile phones. The study was undertaken with the objectives of constructing and standardising a scale to measure the m-readiness of farmers.

METHODOLOGY

Based on literature review and discussion with experts such as agricultural scientists, professors, planners and research scholars, a total of 159 statements reflecting the m-readiness of farmers were identified which were categorised in to four sub headings such as physical readiness, technological readiness, psychological readiness, and economic readiness. Due care was taken to cover all the dimensions of m-readiness. The statements were then edited using the criteria developed by *Edwards (1957)*. Finally, 131 statements were identified, after deletion of statements which were

unambiguous, irrelevant, and not confirming to the suggested criteria. There were 29, 42, 38, and 22 statements which represents physical, technological, psychological, and economic readiness of the farmers, respectively.

The statements were sent to a group of 55 judges comprising experts from Kerala Agricultural University, MPKV, Rahuri, NDRI, Karnal, and TNAU, Coimbtoor. Experts were asked to judge the relevancy of the statements to measure the m-readiness of farmers on a5-pointscale from 1 to 5, where 1 represented irrelevancy of the statement and 5 indicated high relevancy. Among them 34 judges returned the same of which four were incomplete/ unclear. So, responses from 30 judges were taken for the final measurement.

Kendall's coefficient of concordance (W) and mean value were computed to finalise the statements. W-value indicates the degree of association or agreement among different ranks or scores assigned by the judges on different objects or attributes (*Kendall et al.,1939; Kendall and Gibbon, 1990; Hardesty and Bearden, 2004*).

$$W = \frac{12S}{m^2(N)(N^2-1)}; \quad 0 \leq W \leq 1$$

S: $\sum d_i^2$

d_i: $R_i - A$, where R_i is the sum of ranks assigned to item *i* by *m* judges

m: Number of judges N : Number of objects/ statements

Therefore, a W value close to one indicates high agreement among 30 judges. The mean rank obtained through Kendall's coefficient of concordance was used to select the most relevant statements.

RESULTS AND DISCUSSION

The findings of the study have been presented here in different sub headings: mean ranks and Kendall's Coefficient of Concordance (W) values of the items, standardisation of the scale, and administration of the scale.

Mean ranks and W values of items : Mean rank of each item and W value of each domain were worked out and given in the table below (Table 1). The obtained mean ranks were arranged in descending order and 15 items with highest mean ranks were selected for the final scale.

After analysing the data, the Kendall's coefficient of concordance (W) value was found to be 0.759, 0.698, 0.740 and 0.691 for the categories of physical, technological, psychological and economic readiness

Table 1. Mean ranks and W values of the items

Particulars	Mean rank
Physical readiness (W value = 0.759)	
Availability of power supply	21.77*
Accessibility of mobile phones	20.88*
Accessibility of smart phones	21.98*
Accessibility to smart-phone service centers	22.08*
Availability of accessories and additional fittings	5.20
Customer care services	21.68*
Network coverage	21.50*
Internet connectivity	21.55*
Availability of technical support, if needed	21.43*
Availability of spare parts	21.95*
Availability of sim cards	21.92*
Availability of phones with long battery life	21.78*
Recharging facilities	21.15*
Availability of SD cards	06.52
Accessibility of phones with enough storage facility	20.17*
Accessibility of phones with good camera	6.68
Accessibility of phones with video call facility	9.57
Accessibility of phones with scanning facility	6.73
Availability of phones with multiples sim slots	11.07
Availability of wi-fi facility	21.82*
Availability of phones which supports wi-fi	7.98
Availability of phones which supports all m-apps	6.23
Ability to move hands / locomotive ability	4.07
Ability to speak	11.80
Ability to read	12.67
Ability to hear	4.87
Free from health issues that prevents mobile usage	19.85*
Ability to type in speed	14.80
Hand and eye coordination	5.30
Technological readiness (W value = 0.698)	
Make calls in smart phones/ touch screen phones	34.07*
Receive calls in smart phones/ touch screen phones	15.48
Send SMS / text messages	33.57*
Saving contacts	15.22
Switching on smart phones	12.33
Switching off smart phones	17.00
Insert a sim card	13.52
Insert an SD card	15.88
Recharge mobile phones	13.88
Browse internet in mobile phones	33.92*
Use of m-apps	34.48*
Search useful applications related to agriculture	12.80
Download an application (m-app)	12.52
Install an application (m-app)	34.73*
Update an application (m-app)	34.70*
Uninstall an application (m-app)	34.45*

Use of e-mail in mobile phones	32.75*
Group messaging services	12.55
Use of virtual groups using social media	34.77*
Using GPS services	13.17
Watch videos in mobile phones	33.63*
Mobile financial transaction	12.08
Mobile marketing	13.22
Online agricultural sales	14.02
Online agricultural purchases	15.00
Change the phone settings according to need	15.92
Send information in different formats	35.85*
Receive information in different formats	13.78
Technical terms associated with the use of phones	35.95*
Ability to use English language in mobile phones	12.92
Different network providers in your area	13.68
Different brands of mobile phones	19.82
Adaptability towards changing technologies	15.35
Text the messages in English	33.85*
Text the messages in vernacular	35.25*
Conference calling	13.80
Taking good quality photos	13.48
Video recording	13.00
Scanning using mobiles	11.95
Audio recording	19.05
Video calling	14.88
Use of mobile phones without the help of others	34.73*
Psychological Readiness (W value = 0.740)	
I like to use mobile for making and receiving calls only	31.72*
I don't feel that mobile are necessary for a life only	11.32
I don't want to spend money on smart phones	13.23
Wherever I go I carry my mobile phone with me	31.30*
I depend mobile phone for all my transactions	11.62
I feel mobile are the symbol of a standard life style	11.50
I can reduce the money to travel by using mobile	14.23
I use mobile phone for all my communications	31.78*
I'm not use mobile as many features are uncomfortable	31.10*
Mobile phones are not user friendly	10.27
Mobile phones can save a lot of time	12.67
I don't use smart phones as old model are sufficient	31.47*
Old model phones easier to use	11.62
I don't feel to use mobile as it leads to health problems	10.98
People who don't know English cannot use mobile	11.27
I prefer to use mobile to avail updated info. on Agri.	30.12*
I want to learn to use of mobile without the any help	30.58*
Mobile phones are very useful in daily lives	11.68
I'm ready to use mobile as a good learning tool	30.78*
Mobile serve as a handy tool to gather information than computer-based services	11.40
Mobile is an ideal tool to exchange info. between people	11.15
Mobile phones allow more contact among farmers	11.60
Mobile phones improve interpersonal relationship	14.10
Mobile assist to get agricultural information quickly	13.98
Mobile phones can overcome time barriers	12.28
Mobile phones can overcome space barriers	13.48
I don't want to use mobile as it consumes a lot of time	14.03
I am afraid to use mobile phones	29.88*
I am afraid to do mobile financial transactions	13.20
Mobiles phones are very easy tool to pay bills	11.35
I find it difficult to remember the operations in mobile	31.02*
I need mobile phone for my own even if others in my family owns it	30.38*
Mobile phones are meant for the young generation	29.88*
I prefer face to face discussion rather than using mobile phones to gather information as it reduces the clarity of information	10.45
I think knowledge on mobile phones and internet is essential for farmers	30.13*
I prefer mobile to gather information rather than a printed source	30.28*
I am eager to learn about various mobile applications	30.32*
Info. provided through online sources are confusing	12.83
Economic Readiness (W value = 0.691)	
I cannot afford an ordinary mobile phone	13.85*
I cannot afford a smart phone	14.55*
I cannot afford a high-end smart phone	15.93*
Everyone in my house owns a mobile phone	16.03*
I can afford the use of internet facility	14.43*
Paid apps are unaffordable for me	14.93*
Call rates are affordable	14.55*
I prefer to change my mobile rather than repairing it	15.12*
Repairing charges of mobile phones are very high	14.90*
Spare parts are unaffordable	3.80
Phones requires spare parts frequently which makes it unaffordable for me	3.63
Accessories are affordable	15.13*
Unavailability of mobile phones through installment payment causes difficulty in buying	15.83*
Tariff plans are affordable for me	14.72*
Ext. storage facilities are available at affordable rates	14.87*
A lot of unforeseen charges are taken by service providers	4.40
High SMS charges	14.73*
High MMS charges	04.97
Many useful apps are paid which makes it inconvenient to use them	3.90
Mobile financial transactions are costly	4.10
Mobile marketing is unaffordable due to my impulsive buying behaviour	4.45
I like to change my mobile phone when new models with updated features arrives in market	14.17*

*Statements which are selected for the final scale

respectively. These high values indicate a good agreement among the judges. Based on the mean ranks obtained, 15 items having the highest values were selected from each of the four categories making an m-readiness scale consisting of 60 statements.

Standardisation of the scale : A scale should measure what it is intended to measure. Similarly, it should be consistent in its measurement. Hence, a scale has to be standardised before it is administered or recommended as a final scale by testing its validity and reliability. Here, the m-readiness scale was tested for the reliability and validity.

Reliability of the construct : Reliability of the scale is defined as the degree to which the measure of that construct is consistent or dependable. Here, Cronbach's alpha is used to measure the reliability of the scale. It measures the internal consistency of the scale (*Cronbach, 1951*). It was calculated as :

$$\alpha = \frac{N\bar{c}}{\bar{v} + (N-1)\,\bar{c}}$$

Where,

α : Cronbach's alpha value N : Number of items

c : Average inter item correlation v : Average variance

Cronbach's alpha (α) value less than 0.6 indicates a poor/unacceptable level of reliability. A value of more than 0.7is considered acceptable (*Taber, 2018*). The obtained á value in the study was 0.990 which indicates excellent reliability of the construct. Hence, the scale is said to be reliable.

Validity of the construct : An instrument or a construct is said to be valid if it can measure what is intended or desired to measure. The validity of the scale was tested trough content validation method. Content validity refers to the degree to which an assessment tool is relevant to, and representative of, the construct it is designed to measure (*Rusticus,2014*). As the statements were identified through extensive literature review and discussion with experts in the specific area, the present scale covered all aspects regarding m-readiness. Based on this, it is assumed that the scale satisfied the content coverage. Thus m-readiness scale is said to be valid.

Administration of the scale : The final scale consisted of 60 statements. It can be presented to the respondents in four different categories, *i.e.*, physical, technological, psychological and economic readiness with 15 statements in each of the categories. The respondents shall be instructed to mention their opinion in the form of agreement or disagreement towards the statement on a five-point scale from one to five, where one indicating complete disagreement and 5 indicating strong agreement. The final m-readiness score of a farmer can be worked out by calculating the sum of the scores obtained in each category.

CONCLUSION

A scale was developed and standardised here to measure the m-readiness of farmers. The constructed scale was found to be reliable and valid. The present study will be useful for social science researchers for the measurement of m-readiness of farmers to know their preparedness and ability to use mobile phones as a communication and information gathering device. Before developing any mobile based technology, it is needed to measure the m-readiness as it will be an indicator to predict the utilisation of the developed technology by the target group.

REFERENCES

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, **16** (3), 297–334.

Edwards A.L. (1957). Techniques of Attitude Scale Construction. Appleton Century Crofts Inc. NewYork. 272p.

Hardesty, D. M., and Bearden, W. O. (2004). The use of expert judges in scale development: implications for improving face validity of measures of unobservable constructs. *J. Bus. Res.* **57**: 98-107.

Kendall, M. G., and Gibbons, J. D. (1990). Rank correlation methods. Oxford University Press, NewYork. 272p.

Kendall, M. G., Smith, B., and Babington (1939). The problem of m rankings. *Ann. Math. Statist*. **10** (3): 275-287. [Online available: https://projecteuclid.org/euclid.aoms/ 1177732186 [12 Oct 2020]

Rusticus, S. (2014). Content Validity. In: Michalos, A. C. (Ed.), Encyclopedia of Quality of Life and Well-Being Research). Springer Netherlands, pp. 1261–1262.

Steinen, J.; Bruinsma, W. and Neuman, S. (2007). How ICT can make a difference in agricultural livelihoods. *The Commonwealth Ministers Reference Book*. pp 2-4.

Taber, K.S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Res Sci. Edu.* **48**:1273–1296.

• • • • •