Scale to Measure ICT Operational Self-Confidence of The Farmers

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Paper Received on November 01, 2020, Accepted on December 10, 2020 and Published Online on January 01, 2021

ABSTRACT

Realizing the significance of ICT in the development of farmers in the present situation of Science and Technology, nowadays, it is expected that farmers should have enough ICT operational or working self-confidence for taking advantages of ICT for their development. To encourage the farmers to make use of ICT, it is essential to study ICT operational self-confidence of them. There was no any tool to measure such self-confidence of the farmers. Realizing this, a scale to measure ICT operational self-confidence of the farmers was developed based on "Scale Product Method" which combines the Thurston's technique of Equal Appearing Interval Scale for selection of the items and Likert's techniques of summated rating for ascertaining the response on the scale. A tentative list of 24 statements was drafted keeping in view the applicability of statements suited to the area of study. The collected statements were edited in the light of the suggested criteria. The score of each individual item on the scale was calculated by summing up the weightage of the individual items. Scale and Q value were calculated by using Thurston and Chave inter-quartile range. Finally, 12 statements whose median (scale) values greater than Q values were selected. However, when a few statements had the same scale values, statements having lowest Q value were selected by arranging the scale value in an order. Reliability was tested with 20 farmers and its value was 0.8116 and validity of the scale was examined.

***Key words**: Self-confidence; ICT; Reliability; Validity;*

The public and private actors are looking for effective solutions to address challenges in agriculture, including how to address the abundant information needs of farmers and make agriculture profitable for them. Farmers need updated information to empower themselves in taking research to land, avail timely and adequate credit, seek and act on market intelligence reports and access market and negotiate prices. This critical information may increase farmer's productivity, income as well as protect their food security and livelihoods. Using Information and Communication Technology (ICT) in innovative ways through ICT-enabled services helps in disseminating timely information on agricultural advisories, financial services, agricultural marketing and risk transfer to the farmer to improve their capacity and mitigate risks. Understanding significance of ICT in the development of farmers in the present situation of Science and Technology, nowadays, it is expected that farmers should have enough ICT operational or working self-confidence for taking advantages of ICT for their development. Realizing the fact, it is high time to understand the farmers' ICT operational or working self-confidence; however policymakers have no any methodologically developed tool to measure such feelings. In this regard, effort was made to construct and standardize the scale to measure the ICT operational self-confidence of the farmers with following objective :

To develop and standardize the scale to measure ICT operational self-confidence of the farmers

METHODOLOGY

Among the various techniques available for the construction of the scales, the technique chosen to construct the scale was "Scale Product Method" which is combination of the Thurstone's technique of equal appearing interval scale for selection of the items and Likert's technique of summated rating for ascertaining

the response on the scale as proposed by *Eysenck and Crown (1949)*.The procedures followed by *Gulkari and Chauhan (2014), Patel and Chauhan (2015),* and *Khatri and Chauhan (2018)* were used.

Item collection : The items making up a self-confidence scale are known as statements. A statement may be defined as anything that is said about a psychological object. As a first step in developing the scale, 24 statements were collected from the relevant literature, consulting academician, researchers and extension educationists. The selected statements were edited on basis of the criteria suggested by *Thurstone and Chave (1928), Wang (1932), Likert (1932)* and *Edward and Kilpatrick (1948)* before judgement.

Judge's rating : In order to judge the degree of 'Unfavorableness' to 'Favorableness' of each statement on the five point equal appearing interval continuum a panel of 50 judges was selected. The judges selected for the study comprised extension educationist, experts from IT (Information Technology) College of Anand Agricultural University, economist and statisticians from different agricultural university. The judges were visited personally along with letter of instructions to guide them for rating the statements in desired manner for each set of the statements.

Determination of scale and quartile value : The five points of the rating scale were assigned, ranging from 1 for most unfavorable and 5 for most favorable. On the base of judgment, the median value of the distribution, and the Q value for the statement concerned was calculated, the inter-quartile range for each statement was also worked out for determination of ambiguity involved in the statement from the following formulas.

$$S = L + \frac{0.5 - \sum Pb}{Pw} \times i$$

Where,

S = Median or Scale value of statement

L = Lower limit of the interval in which the 50th centile falls

ÓPb = Sum of the proportion below the interval in which the 50th centile falls

Pw = Proportion within the interval in which the 50th centile falls

i = Width of the interval, which was assumed as equal to 1.0

Thurstone and Chave (*Edwards, 1957*) used the inter-quartile range Q as a means of the variation of the distribution of the judgments for a given statement. To determine value of Q, two other point were measured, the 75th centile and 25th centile. The 25th centile was obtained by the following formula:

$$C25 = L + \frac{0.25 - \sum Pb}{Pw} \times i$$

Where,

C25 =25thcentile value of the statement

L = Lower limit of the interval in which the 25th centile falls

ÓPb = Sum of the proportion below the interval in which the 25th centile falls

Pw = Proportion within the interval in which the 25th centile falls

i = Width of the interval, which was assumed as equal to 1.0

$$C75 = L + \frac{0.75 - \sum Pb}{Pw} \times i$$

Where,

C75 = 75th centile value of the statement

L = Lower limit of the interval in which the 75th centile falls

ÓPb = Sum of the proportion below the interval in which the 75th centile falls

Pw = Proportion within the interval in which the 75th centile falls

i = Width of the interval, which was assumed as equal to 1.0

Then the inter quartile range or Q value was obtained by taking the difference between C75 and C25 thus,

$$Q = C75 - C25$$

Final statements for scale : When there was a good agreement among the judges, in judging the degree of agreement or disagreement of a statement, Q was smaller compared to the S value obtained, when there was relatively little agreement among the judges it was reverse. Only those items were selected whose median (scale) values were greater than Q values. However, when a few items had the same scale values, items having lowest Q value were selected (*Thurstone, 1946*). Based on the median and Q values, 12 statements were finally selected to constitute ICT operational self-confidence scale.

Reliability of the scale : A scale is reliable when it consistently produces the same result when applied to the same sample. In the present study, split-half method of testing of reliability was used. The 12statements were divided into two halves with six odd numbered in one half and other six even numbered statements in the other. These were administered to 20 farmers. Each of the two sets of the statements was treated as a separate scale and then these two sub-scales were correlated. The co-efficient of reliability was calculated by the

Rulon's formula (*Guilford, 1954*), which came to 0.6830. As reliability is directly related with the length of the scale when we split the scale on odd and even number items. The reliability coefficient which has been calculated is the value of half size of the original scale. Thus correction factor is calculated by using Spearman Brown formula (*Naveenkumar and Chauhan, 2020*).

$$rtt = \frac{2 \times roe}{1 + roe}$$

Where,

rtt = Coefficient of reliability of original test

roe = Reliability of coefficient of odd and even score

Table 1. Calculation of S values and Q values to measure ICT operational self-confidence of the farmers

Statements	S-value	Q-value	Decision
I am fully confident in operating smart phone.	1.5	1.1	Selected
I can easily operate computer.	1.6	1.2	Selected
I feel nervous while doing on-line financial transaction.	3.3	2.2	Selected
I am enough skillful in purchasing online farm inputs.	2.6	2.7	Rejected
I feel fear of losing my personal information while using internet.	1.9	1.6	Rejected
I am confident in operating online social media.	2.0	2.3	Rejected
I always enjoy getting useful farm information from social media.	1.8	1.2	Rejected
I am skillful to utilize information available on online soil health card.	2.0	1.2	Rejected
I feel confident while using Kisan Call Center.	1.9	0.9	Selected
I have enough skill to use Kiosk to find information.	2.1	1.3	Selected
I confidently use smartphone to solve various farm issues.	2.1	1.4	Rejected
I am self-dependent in using internet.	2.0	1.2	Rejected
I can get land records personally from online source.	2.3	1.9	Selected
I can train other farmer to use internet.	2.0	0.9	Selected
I confidently use farm information source like YouTube.	1.7	1.2	Selected
I feel confident while getting information from ikhedut.	1.8	1.0	Selected
Use of modern ICT in my life gives me tension.	3.4	2.2	Selected
I can easily exchange information through WhatsApp.	1.4	1.1	Selected
I feel that using internet is very unproductive work.	2.3	2.5	Rejected
ICT use to develop rural area is impossible affair.	2.5	3.0	Rejected
I have experienced that Google is my good friend.	2.4	1.9	Selected
I confidently use Kisan Credit Card.	1.9	1.0	Rejected
ICT has no place in my everyday practical life.	2.8	3.1	Rejected
Government should exchange farm information through ICT tools.	2.0	1.7	Rejected

Table 2. Final statements of the scale to measure ICT operational self-confidence of the farmers

Statements	SA	A	UD	DA	SDA
I am fully confident in operating smart phone. (+)					
I feel nervous while doing on-line financial transaction. (-)					
I can easily operate computer. (+)					
I feel confident while using Kisan Call Center. (+)					
Use of modern ICT in my life gives me tension. (-)					
I have enough skill to use Kiosk to find information. (+)					
I can get land records personally from online source. (+)					
I can train other farmer to use internet. (+)					
I confidently use farm information source like YouTube. (+)					
I feel confident while getting information from ikhedut. (+)					
I can easily exchange information through WhatsApp. (+)					
I have experienced that Google is my good friend (+)					

SA-Strongly Agree, A- Agree, UD- Undecided, DA- Disagree, SDA- Strongly Disagree

The coefficient of reliability was calculated by the Spearman Brown formula which came 0.8116 for ICT operational self-confidence of the farmers. Thus, the scale developed was found highly reliable.

Content validity of the scale : The content validity of the scale examined by determining how well content were selected by discussion with specialists, extension academicians, etc. and it was concluded that the present scale satisfied the content validity.

Scoring system : The selected 12 statements for the final format of the scale are randomly arranged to avoid response biases, which might contribute to low reliability and detraction from validity of the scale. The responses can be collected on five points continuum viz, strongly agree, agree, undecided, disagree and strongly disagree with respective weights of 5, 4, 3, 2, and 1 for the favorable statements and with the respective weights of 1, 2, 3, 4 and 5 for the unfavorable statements.

RESULTS AND DISCUSSION

The final scale was called to be the standardized one which consisted of 12 statements. The scale developed to measure ICT operational self-confidence, where responses had to be recorded on a five point continuum representing strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2, and 1, respectively. The self-confidence score of each respondent can be calculated by adding up the scores.

CONCLUSION

This scale was made to be standardized one to measure ICT operational self-confidence of the farmers while using the ICT tools and services. Such kind of device is not only helpful to measure the self-confidence of only farming community but it is helpful to measure such psychological variable for all the stakeholders or human resources involved in the agricultural development. This scale also aids in enabling the planners and policy makers in developing plans and polices for development of agricultural field through ICT tools and services by knowing the level of ICT operational self-confidence of individuals through such device/ scale.

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