

A Scale to Measure the Perception of Attributes of an Innovation

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ABSTRACT. *The measurement of perception of attributes of innovation by the farmers is one of the important areas of research on which not much work has been done. Hence a scale for this purpose was developed using semantic differential technique. The scale consisted of four concepts with five bipolar adjectives under each concept on a seven point continuum. The maximum and minimum score obtainable by a respondent were 140 and 20, respectively. The scale was tested for its validity and reliability and used for the measurement of the perception of attributes relating to five improved varieties. Relative advantage was found to be related to innovativeness of farmers in adopting these varieties.*

INTRODUCTION

The diffusion of innovations is a social action process, in which the new ideas are accepted and practised by the ultimate users resulting in increased benefits to the adopters. For any innovation to diffuse faster, it should possess certain characteristics and these characteristics are known as Attributes of Innovation. Rogers (1962) identified five attributes of an innovation considering exhaustive review of literature for its faster diffusion. These attributes are relative advantage, compatibility, complexity, divisibility and communicability. After Rogers, eventhough few of them have given the attributes of innovation, they are all the same lines of Rogers and the attributes given by Rogers are most widely accepted all over the world.

Relative advantage is the degree to which an innovation is superior to what it supersedes. Compatibility is the degree to which an innovation is consistent with existing values and past experiences of the adopters. Complexity is the degree to which an innovation is relatively difficult to understand and use. Divisibility is the degree to which an innovation may be tried on a limited basis. Communicability is the degree to which the results of

innovation may be diffused to others. All these attributes of an innovation, as perceived by members of a social system affect its rate of adoption.

It matters little whether or not an innovation has a great degree of advantage over what it is replacing. What does matter is whether the individual perceives the relative advantage of the innovation. Likewise, it is the potential adopter's perceptions of the relative advantage, compatibility, complexity and divisibility of the innovation that affect its rate of adoption. Thus, Rogers has emphasized the need for a suitable instrument to measure the differential perception of individuals about the attributes of innovation. Scales on measuring attributes of a particular innovation were developed by Ramegowda (1983) and Ramakrishna Rao (1994). Keeping this point in view, an attempt has been made in this study, to construct and standardize a scale using semantic differential technique which can be commonly used for a number of innovations under varied agro-climatic conditions.

Semantic differential stems from a desire to give quantitative measurement to meaning. Osgood (1964) opined that measurement of meaning is of paramount significance to a social worker, extension personnel or a change agent. How a person behaves in a situation depends upon what that situation means or signifies to him. The semantic meaning refers to what people mean by an object to which they are associated. It is obvious that semantic meaning varies from individual to individual or group to group. The object serves as stimulus which in a given situation regularly and reliably produces a predictable pattern of behaviour. Semantic differential technique has been used more commonly in psychological tests to measure perception. Shivamurthy (1994) used this technique to measure the perception of drudgery, involved in various sericultural practices adopted by farm women.

In order to measure the different meanings attached by different individuals to a particular object or situation, semantic differential scales are ideal. In this study, various innovations/varieties are considered as objects and the attributes of innovation as qualitative dimensions to which different meanings are attached by farmers based on their previous experiences of various innovations. Thus, a semantic differential scale was developed following the steps/procedures suggested by Osgood (1964) to measure the perception of attributes of innovation.

The specific objectives of the study are :

- I) To construct and standardize a scale to measure the perception of an innovation using semantic differential technique.

- ii) To find out the relationship between perception of attributes of ar. innovation with innovativeness.

MATERIALS AND METHODS

Steps in development of the instrument

Choosing the concepts

A sample of concepts must be judiciously chosen to represent some part of the semantic space. These concepts must have a potential for different reactions by people holding different attitudes. The concept must be capable of selecting varied responses and thus, large variance. Therefore, based on review of literature, four concepts, that is, relative advantage, compatibility, complexity and practicability were selected to measure the attributes of innovation.

Selection of appropriate scales or adjective pairs

Under each concept, suitable bipolar adjectives should be framed with five, seven or nine point scales. But, according to Osgood (1964), seven point scales are found to be very effective.

Under each concept, several components were formulated and this list of components was given to eighty five judges from various disciplines like extension, psychology and sociology, to determine the relevancy of various components. The responses were received from sixty three judges. The components which were marked as relevant by more than eighty percent of the judges were considered for the scale. After considering the level of relevancy, five components were retained under each concept. For each of these components, bipolar adjectives with a seven point scale were formulated in consultation with the experts in the fields of psychology, sociology and other social sciences.

Administration of the scale

The scale consisting of twenty bipolar adjectives, under four components, was administered to fifty farmers. A group of ten farmers were selected for each innovation and thus the respondent number was fifty. The

respondents were requested to respond to each item in terms of the degree to which it influences their adoption of that particular innovation by marking at a particular cue point. They were asked to follow the same procedure while marking for all the four concepts. The scale was validated by establishing the reliability and validity and the details are given under results and discussion.

Innovativeness

Innovativeness is the degree to which an individual is relatively earlier to adopt new ideas than the other members of his social system. Hence, this was measured based on the year of adoption. Based on the mean year of adoption and standard deviation, adopters were classified into four groups. The adopters coming under the first category were given an innovativeness score of four, subsequently, adopters coming under second, third and fourth category were given innovativeness scores of three, two and one, respectively.

RESULTS AND DISCUSSION

The scale developed using the semantic differential technique, is given below :

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Note: Please check the cue point which you perceive as related to the particular innovation.

Attributes of innovation

Relative advantage

1.	Initial Cost	Cheap	$\frac{7}{\quad} \frac{4}{\quad} \frac{1}{\quad}$	Expensive
2.	Net profitability	Meagre	$\frac{1}{\quad} \frac{4}{\quad} \frac{7}{\quad}$	Exorbitant
3.	Consistency of profits	Regular	$\frac{7}{\quad} \frac{4}{\quad} \frac{1}{\quad}$	Irregular
4.	Saving of time	Time	$\frac{1}{\quad} \frac{4}{\quad} \frac{7}{\quad}$	Time saving

5.	Multiple use potential	Multiple benefits	$\frac{7}{-} \frac{4}{-} \frac{1}{-}$	Single benefit
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Compatibility

1.	Situation compatibility	Feasible	$\frac{7}{-} \frac{4}{-} \frac{1}{-}$	Infeasible
2.	Cultural compatibility	Non-acceptable	$\frac{1}{-} \frac{4}{-} \frac{7}{-}$	Acceptable
3.	Physical compatibility	Necessary	$\frac{7}{-} \frac{4}{-} \frac{1}{-}$	Unnecessary
4.	Social compatibility	Non-recognition	$\frac{1}{-} \frac{4}{-} \frac{7}{-}$	Recognition
5.	Relational compatibility	Independent	$\frac{7}{-} \frac{4}{-} \frac{1}{-}$	Dependent

Complexity

1.	Cognitive complexity	Simple	$\frac{7}{-} \frac{4}{-} \frac{1}{-}$	Complex
2.	Application complexity	Unadaptable	$\frac{1}{-} \frac{4}{-} \frac{7}{-}$	Adaptable
3.	Resource complexity	Abundant	$\frac{7}{-} \frac{4}{-} \frac{1}{-}$	Scarce
4.	Reversibility	Irreversible	$\frac{1}{-} \frac{4}{-} \frac{7}{-}$	Reversible
5.	Labour efficiency	Saves labour	$\frac{7}{-} \frac{4}{-} \frac{1}{-}$	Consumes labour

Practicability

1.	Communicability	Communicable	$\frac{7}{-} \frac{4}{-} \frac{1}{-}$	Non-communicable
2.	Visibility	Invisible	$\frac{1}{-} \frac{4}{-} \frac{7}{-}$	Visible
3.	Demonstrability	Demonstrable	$\frac{7}{-} \frac{4}{-} \frac{1}{-}$	Not demonstrable

4.	Triability	Not triable	$\frac{1}{\text{---}}$ $\frac{4}{\text{---}}$ $\frac{7}{\text{---}}$	Triable
5.	Point of Origin	Reliable	$\frac{7}{\text{---}}$ $\frac{4}{\text{---}}$ $\frac{1}{\text{---}}$	Unreliable

Scoring pattern

The scores are simply the numbers 7 to 1 assigned from one end to the other end of the bipolar adjective.

Example: Cheap 7 6 5 4 3 2 1 Expensive

If an individual checks the second cue point from the left in a positive-negative adjective pair (left -right direction), he is given a score of six. The scoring system was reversed in negative-positive adjective pairs. The total score of five components under each concept is the final score for that particular concept. The minimum score obtainable by the respondent is twenty and maximum 140 for an innovation.

Reliability of the scale

The reliability refers to the extent to which repeated measurements produces the same result. The newly constructed scale has to be tested for its reliability before it is used. The reliability of the innovation attribute scale was determined by the test - retest method.

Test - Retest reliability

Responses were obtained from ten randomly selected adopters for each of the five innovations in non-sample area (non-sample area refers to the area other than the area where the final sample was selected to measure the attributes of selected five innovations). Thus, the total responses were fifty. The second administration took place two weeks after the first administration. In conducting test-retest reliability, Pearson Product Moment Coefficient of Correlation was used for two sets of scores. The 'r' value obtained was 0.746, which was found to be significant at one percent level of significance, indicating high reliability of the developed scale.

Validity of the scale

To ensure that obtained test scores measure the variables they are supposed to do, validity of the scale has to be observed. Content validity, according to Kerlinger (1973), is the representativeness or sampling adequacy of the contents, the substance, the matter and the topics of the measuring instrument. He further stated that content validation consists essentially of a judgement of the representativeness of the item.

Content validity of the scale was established in two ways : firstly, the items selected for inclusion in the scale were based on extensive review of literature. Secondly, the opinion of the panel of judges was obtained to find out whether the items suggested were suitable for inclusion in the scale.

Extent of perception of attributes of innovation

The developed scale was used to measure the extent of perception of the attributes of the following five innovations : Indaf-9 ragi, Mandya Vijaya paddy, TTB-7 redgram, Kaveri coffee and Mudigere-1 cardamom. The scale had maximum scores of 35 on each division and the total score for one innovation is 140. In case of Indaf-9 ragi, all the four attributes were perceived equally. But in case of Mandya Vijaya paddy, practicability was perceived to a larger extent, among the four dimensions as it was 22.85 percent to the total perception score. In case of TTB-7 redgram also, practicability was considered as most important followed by compatibility whereas in case of Kaveri coffee, compatibility and complexity were the attributes perceived better. Finally, in the case of Mudigere-1 cardamom, complexity and practicability were the two attributes which had highest perception scores.

Relationship between innovativeness and perceived attributes of innovation

The results in Table 2 indicate that there was positive significant relationship between innovativeness and relative advantage, whereas there was no significant relationship between innovativeness and other three attributes, that is, compatibility, complexity and practicability.

The relative advantage alone had contributed nearly 47 percent of the variation in the innovativeness of farmers. Hence, this attribute may be considered an important factor contributing to the innovativeness of farmers.

Table 1. Perception of attributes of innovations.

Innovations	Mean Perception Score of Attributes of Innovation				
	Relative advantage	Compatibility	Complexity	Practicability	Total
Indaf-9 Ragi	28 (20)	31 (22.1)	30 (21.4)	32 (22.9)	121 (86.4)
Mandya Vijaya Paddy	29 (20.7)	22 (15.7)	30 (21.4)	32 (22.9)	113 (80.7)
TTB-7 Redgram	22 (15.7)	27 (19.3)	22 (15.7)	30 (21.4)	101 (72.1)
Kaveri Coffee	20 (14.3)	31 (22.1)	31 (22.1)	22 (15.7)	104 (74.3)
Mudigere-1 Cardomom	26 (18.6)	30 (21.4)	33 (23.6)	34 (24.3)	123 (87.9)

Figures in parentheses indicate percentages.

Table 2. Regression analysis of innovativeness of farmers and their perception attributes of innovation.

Attributes of Innovation	r value	R ²
Relative advantage	0.0978 **	
Compatibility	0.0001 NS	0.4675
Complexity	0.0079 NS	
Practicability	0.0196 NS	

** = Significant at 1 %

NS = Non-significant

Relative advantage is a characteristic of an innovation in economic terms, mainly its profitability. Hence, if the adopters are assured of the profitability of an innovation, they are more likely to adopt it in shorter time. This characteristic outweighs the other attributes namely compatibility, complexity and practicability.

CONCLUSION

A scale was developed in this study to measure the extent of perception of attributes of innovation and to find out the relationship between perceptions of attributes of innovation by farmers and their innovativeness.

There is a positive and significant relationship between relative advantage and innovativeness. Thus, researchers should ensure that any innovation has a high relative advantage. Also, the extension workers should always highlight the relative advantage of an innovation in order to increase the rate of adoption.

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