Original Research Article

DEVELOPING A TEST TO MEASURE THE KNOWLEDGE LEVEL OF FARMERS TOWARDS MARKET INTELLIGENCE

Abstract:

Background: Market intelligence is a technique for predicting what will happen in the near future. We must proceed from market data to information, and finally to market intelligence, in order to complete this process.Market information refers to current and up-to-date information that allows farmers to bargain with marketers and secondary value-chain actors from a position of strength.

Place & duration of study: This study was conducted as the part of the course work in Tamil Nadu Agricultural University between June and August of 2021.

Aim: This study was attempted to develop a scale for measuring knowledge level of farmers in market intelligence.

Methodology: Relevant items were gathered that covered all aspects of farmer's market intelligence in agriculture.30 items were initially selected for this study and administered to 42 non-sample respondents. Item analysis has been carried to all the items. The present study revealed that based on the difficulty index, discrimination index and point-biserial correlation, 12 items were finally selected for the administration of the test.

Comment [MSA1]: What method was adopted to select the 30 items?
Combine these two sentences as one stating the method.

Results: This test was found to be highly reliable (0.65) and valid. This may be used by social science researchers to assess farmer'sexpertise on market information. It can assist the extension professionals in developing a good strategy to capitalize on the farmers' strong areas of knowledge while developing their poor areas of knowledge in terms of market intelligence.

Key words: Market intelligence, Item analysis, Difficulty index, Discrimination index, Knowledge test, Farmers.

1.Introduction:

Market intelligence and information are critical for farmers and dealers to make informed decisions about what to grow, when to harvest, where to market the produce, whether to store it or not. Market intelligence is an important part of every firm's marketing strategy. It is critical to have market information available at the correct moment and to lead farmers in the proper path. (Angles, 2018). Market intelligence was introduced with the goal of providing valuable information to stakeholders and guiding them in the right direction in decision making in areas such as understanding customers' needs, competitors' actions, successes and failures, anticipating changes and providing decision support. (Anthony, 2005). According to Victoria (2012), market intelligence is more than merely gathering statistics and data. Regardless of audience size, visitor region, or device, market intelligence gives insights into the competitive online scene through impartial, near real-time performance rating and audience demographic profiling of audited web and mobile sites and video streaming activities. (Nielson, 2009). Market intelligence is the information acquired to aid in the making of business choices. (Harrison & Cupman, 2011). Keeping

in view the importance of market intelligence, the present study was attempted to develop a test for the measurement of knowledge of farmers towards market intelligence.

2. Materials and methods:

Knowledge was characterizedas behaviors and test scenarios that emphasized the remembering of concepts, information, or phenomena through recognition or recall. (Bloom *et al.,* 1956). In this study, knowledge of farmers on market intelligence was focused to develop a standardized test. This study was conducted during 2021 as the part of the research work in Tamil Nadu Agricultural University.

Procedures followed for developing this knowledge test:

a)Collection of items:

In the area of research, items concerning market intelligence were acquired from relevant literature, group discussion, personal experience, and pilot projects. Initially 45 items were collected for this research.

b) Selection of items:

After screening it from judges opinion, 30 items were selected for the development of knowledge test. The appropriate measures were taken to ensure that the items were based on farmer's knowledge of market intelligence.

c) Item analysis:

Item difficulty index, item discrimination index, and point-biserial correlation are three types of information that may be obtained from an item analysis. (Yadav

et al., 2009). The item difficulty index indicates how difficult an item is, whereas the discrimination index indicates how much an item discriminates between well-informed and poorly-informed people. Point-biserial correlation coefficient was calculated for establishing internal consistency of each selected items.A pilot study was conducted with 42 non-sample respondents who were not included in the administration of the test.The response from the respondents was two point continuum. Based on the response, for each item it was scored either '0' or '1'. After getting the score for each respondent, they are arranged in descending order of highest to lowest in six equal groups (G1, G2, G3, G4, G5 and G6). For item analysis, the middle two groups, i.e., G3 and G4 were eliminated. Only four extreme groups with high and low scores were considered for computation of item difficulty and item discrimination indices. (Bloom *et al.,* 1956).

Comment [MSA2]: Please mention the responses against score 0 and 1.
May be No and Yes?

Item difficulty index:

The item difficulty index was calculated as the percentage of farmers who correctly answered each item. The difficulty index reflects the extent to which the item is difficult.

$$P_i = n_i / N$$

Where, P_i=Difficulty index for i^{th} item**,** n_i=Number of respondents who correctly answered the i^{th} item**,** N=Total number of respondents to which ith item was administered to the sample(42 respondents). Item difficulty index ranging from 0.2 to 0.8 were selected for study.

Item discrimination index:

The item discrimination index indicates how effectively an item distinguishes between well-informed and poorly-informed respondents.Item discrimination index was calculated by the formula,

$$E^{1/3} = \frac{(S1 + S2) - (S5+S6)}{N/3}$$

Where, $E^{1/3}$ = Discrimination index for i^{th} item, S1, S2, S5 and S6 are the frequencies of correct answers given by groups G1, G2, G5 and G6 respectively. N = Total number of respondents selected for item analysis. Item discrimination index ranges from 0 to 1. The items with discrimination index ranging from 0.2 to 0.8 are finally selected for the study.

Point-Biserial Correlation (r_{Pbis}):

The primary goal of calculating point-biserial correlation was to determine the items' internal consistency, or the relationship between the overall score and a dichotomized response to any particular item. (Garret, 1966)

$$rp_{bis} = \frac{MP - MQ}{SD} \sqrt{pq}$$

rp_{bis} = Point-biserial correlation; MP = Mean of the total scores of the respondents who answered the item correctly; MQ = Meanof the total scores of the respondents who answered the item wrongly; SD = Standard deviation of the entire sample; p = Proportion of respondents giving correct answer to the item; q = Proportion of respondents giving wrong answer to the item. Items having significant point-biserial correlation either at 1 per cent or 5 per cent probability was considered for the final selection of study.

Comment [MSA3]: Please mention the analysis tool you have used for this study.
E.g. MS Excel, or SPSS or any other.

3. Findings and Discussion:

The 30 items were subjected to item analysis at 12 items were selected based on the items with difficulty index and discrimination index ranging from 0.2 to 0.8 and the items which are having significant point biserial correlation either at 1 per cent or 5 per cent probability (Srinivas *et al.,* 2019). The difficulty index, discrimination index and point biserial correlation of all items are listed in the table 1.

Reliability of the test:

Split half method is employed to find out the reliability of the knowledge test. Total 30 items were divided into two equal halves by having odd numbered items in one half and even numbered items in other half. Both halves are administered to the same group of 30 respondents who will not be included in the administration of test. The association between the two halves was identified using Spearman Brown prophecy formula which was given below.

$$r_{11} = \frac{2\ (roe)}{1 + roe}$$

Where, r_{11} = the reliability coefficient of entire test, roe = reliability coefficient of both odd and even half items. Reliability coefficient of the knowledge test was found to be 0.65. This indicates that the test is reliable.

Comment [MSA4]: Citation is required for such method.

Comment [MSA5]: Please indicate the acceptable range of reliability coefficient for Split Half method.

Validity of the test:

Validity of this test was employed using two methods. i.e. Content validity and Construct validity. Content validity was first tested by submitting each item to a panel of experts who assessed the test's representation of the universe, as well

as its relevance and appropriateness. For identifying Construct validity, Point-biserial correlation was calculated. It was also used to find out the internal consistency of all the items.

Comment [MSA6]: Further discussion is needed based on the findings.
Which item had the highest and lowest difficulty index? What was the average difficulty index score of the farmers?

Same goes for discrimination and point biderrial correlation.

What do these findings suggest? Who will be benefitted with this test score and how?

4. Summary &Conclusion:

Knowing the importance of market intelligence to the farmers, knowledge test was developed to measure the knowledge level of farmers towards market intelligence. Initially 45 items were prepared. After screening it through judges opinion, it was confined to 30. The 30 items were subjected to item analysis (item difficulty index, item discrimination index and point-biserial correlation) to the group of 42 non sample respondents. The score for the correct and wrong response for each item was 1 and 0. After getting the responses, item analysis was performed. Items having difficulty and discrimination index ranging from 0.2 to 0.8 and items having significant point-biserial correlation either at 1 per cent or 5 per cent probability were selected for administration of test. Out of 30 items, 12 items were finally selected for the test. Standardization of the test was found out using reliability and validity. Split half method was employed to find out the reliability of the test. It has reliability coefficient of 0.65. Both content validity and construct validity was found out to test the validity of the test. The test was found to be reliable and valid.

Comment [MSA7]: State the limitations of the study
Recommendations for policy makers and future study is needed

Table 1: Difficulty, Discrimination index & Point-biserial correlation of all the items

Item no	Knowledge items	Difficulty Index	Discrimination index	Point-Biserial correlation	Selection (S)/ Rejection

					(R) of items
1.	Do you know about agricultural market related information?	0.9	0.1	0.202^{NS}	R
2.	Do you know about the prevalent price details of crops in your region?	0.7	0.4	0.312*	S
3.	Do you get agricultural market related information through Domestic and Export Market Intelligence Cell (DEMIC) and Agricultural Market Information System of TNAU?	0.3	0.4	0.179^{NS}	R
4.	Have you subscribed to get agricultural market related information?	0.2	0.4	0.183^{NS}	R
5.	Whether there exist excess intermediate marketing channels in agriculture?	0.8	0.4	0.399**	S
6.	Do you regularly update yourself regarding price of the crops?	0.5	0.8	0.373**	S
7.	Through market intelligence, one will get limited market information.	0.5	0	0.220^{NS}	R
8.	Agricultural prices are very unstable and fluctuate violently	0.9	0.1	0.163^{NS}	R
9.	The increasing instability in prices adversely affect farmer's income	0.9	0	0.075^{NS}	R
10.	The fixation of Minimum Support Price (MSP) is the step to reduce price instability	0.8	0.1	0.176^{NS}	R
11.	Do you have less reliance on price forecasting system?	0.2	0.1	0.299^{NS}	R
12.	Do you cultivate crops based on the market information?	0.4	0.7	0.328*	S
13.	Market Intelligence reduces the level of risks in decision making	0.9	0.2	0.243^{NS}	R
14.	Does market intelligence provide information about when to harvest?	0.7	0.1	0.280^{NS}	R

15.	Market Intelligence helps to establish what products are right for market.	0.8	0.7	0.691**	S
16.	Market Intelligence helps in deciding which channels of distribution is best	0.8	0.6	0.463**	S
17.	Whether market intelligence provides information to store the agricultural produce or not?	0.7	0.2	0.091^{NS}	R
18.	The privatized trade in agriculture is less in country like India	0.5	0.2	0.101^{NS}	R
19.	Market Intelligence helps in identifying areas for improvement as well as risks & opportunities	0.8	0.1	0.111^{NS}	R
20.	The poor market supply chain does not lead to cause high post harvest losses	0.5	0.1	0.203^{NS}	R
21.	Market intelligence isolates performance gaps in relation to competition	0.8	0.3	0.315*	S
22.	There is no need for the farmers to be aware about the varying price in order to prevent from price fluctuations	0.5	0.3	0.308*	S
23.	Market intelligence does not serve as the base of comparison between domestic and international markets	0.4	0.1	0.191^{NS}	R
24.	The information need to be accurate, timely and understandable that may favor the decision	0.9	0	0.075^{NS}	R
25.	Market intelligence consist of people, equipment and procedure to gather, sort, analyze, evaluate and distribute timely information	0.8	0.3	0.598**	S
26.	Whether farmers needed market led approach to get high income?	0.8	0.2	0.448**	S
27.	It helps in reducing the price risk	0.8	0.3	0.505**	S

	level at larger extent				
28.	Market information plays a vital role in reducing post harvest losses	0.9	0.1	0.037^{NS}	R
29.	Do you have interest to know about the market related information?	0.9	0.1	0.058^{NS}	R
30.	Market intelligence is the critical factor for strategy of getting higher returns	0.8	0.5	0.322*	S

*Significant at 0.05 level **Significant at 0.01 level NS – Non significant

5. References:

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