

# **AGRICULTURAL EXTENSION**

## **SOCIO-ECONOMIC IMPERATIVES**



**AGRICULTURAL EXTENSION DIVISION**  
**INDIAN COUNCIL OF AGRICULTURAL RESEARCH**  
**KRISHI ANUSANDHAN BHAWAN-I, PUSA**  
**NEW DELHI**

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# Standardization and Validation of Scales for Measuring Socio-psychological Constructs Related to Risk Adjustment and Entrepreneurship Behaviors of Farmers

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## Introduction

Though the farmers have excelled in technology adoption and in improving the farm productivity level, they have not been successful in commensurate enhancement of their profitability. In present times, when the viability of small and marginal scale farming is dampening due to the rising cost of cultivation, declining market returns and degradation of natural resources; encouraging entrepreneurial behaviour has been seen as the critical component for upliftment of farming community. Entrepreneurship development in agriculture has become an important area of research investigation as well as policy and development initiatives. McClelland (1961) attempted to explain entrepreneurship by the need for achievement. Other studies have also noted other traits of successful entrepreneurs like internal locus of control, low aversion to risk taking, aggressiveness, ambition, over-optimism, desire for autonomy, personal values and need for power. The socio-psychological factors like age, education (Pandya (1996), achievement motivation, risk taking ability, innovativeness etc. have been reported to have a great bearing on entrepreneurial behavior of farmers. The studies on entrepreneurship suggest for a comprehensive theory to explain and predict entrepreneurship behavior. As measurement of psychological constructs has been an important but vulnerable area due to inadequate application of psychometric methods in scale development. Hence, in this research study an attempt was made to understand the characteristics of entrepreneurial farmers with the objectives of identifying concepts and constructs through case documentation and analysis of emerging social and behavioural dynamics in changing scenario of agriculture and





livelihood systems; developing and validating appropriate scales for constructs related entrepreneurship as well as risk adjustment behavior of farmers; and devise theoretical framework for entrepreneurship behavior of farmers with structural modeling.

## Methodology

With case analysis of entrepreneurs, review of literature, and interaction with experts in entrepreneurship salient constructs related to entrepreneurship behavior of farmers identified and prioritized. Factor-analytic and internal consistency methods were used for scale development to measure the salient constructs related to entrepreneurship. The obtained factor matrix of salient factors and their relations to entrepreneurial intention were validated through structural equation modeling (Confirmatory Factor Analysis). Using samples of 100 entrepreneurs and non-entrepreneurs each, Mann-Whitney test was conducted to identify the difference between them. Discriminant function analysis was employed to identify the predictors of entrepreneurship. The relative importance of each predictor was indicated by standardized canonical discriminate function coefficient.

## Results and Discussions

**Entrepreneurial traits of farmers:** The in-depth analysis of cases randomly selected from various parts of the country revealed achievement motivation (88%), risk taking willingness (58 %); self -esteem, (54%); Hope of success (54%); Information seeking behavior (44%); Entrepreneurship Intention (32%); adoption propensity (68%); innovativeness (28%); resilience (4%); critical thinking (4%) as the most prominent attributes of entrepreneurs. Successful management of agribusiness calls for integration of innovative methods of production, processing, marketing and problem solving at various stages. It was very much evident that in majority of the cases, entrepreneurs successfully integrated various enterprises viz., crops with horticulture, dairy, bee keeping and machinery. Adoption of innovations was also seen in majority of the cases. The study also highlighted that success of agri-business is not only decided by agro-ecological factors but also by social skills such as organizing and mobilizing people to solve problems of production and marketing. The characteristics such as autonomy, desirability of business and expected utility of business explain the motivating factors contributing to the establishment, running and expansion of agri-enterprise. The motives include non-monetary incentives such as professional satisfaction, service to fellow-farmers and community and concern for environment.



**Identification of constructs and development of scales:** Since the Kaiser-Meyer-Olkin (KMO) index was 0.80, and the Bartlett's test of sphericity was highly significant (chi-square = 10348 and  $P < 0.01$ ), PCA method was used to identify the factor model. Initial run of factor analysis revealed fifteen factors having Eigen value above more than 1, while seven factors had Eigen values more than 2. Therefore, to obtain further reduction of variables, factor analysis was redone extracting 7 salient factors explaining about 58 per cent of variance from 57 statements. The statements in the pattern matrix having factor loading more than 0.4 were retained and rest were removed and again the factor analysis with direct oblimin rotation ( $\Delta = 0$ ) was done. The statements having factor loading above 0.5 in each factor were selected and formed seven sub-scales (Table-1). The exploratory factor analysis showed 7-factor model of entrepreneurship. The internal consistency was measured through coefficient alpha. The reliabilities of all the seven factors were above the conventional level of acceptance of 0.70 (Nunnally, 1978), which showed that the items were internally consistent. The average Corrected Item-Total Correlation was above the threshold value (0.4). A rule-of-thumb is that these values should be at least .40 (Gliem and Gliem, 2003). Discriminant validity was assessed by examining the factor correlations. The correlations of the seven factors ranged from 0.05 to 0.438, which reflect discriminant validity of the scale.

**Assessing the degree of model fit and hypothesis testing:** The fit of seven-factor model of entrepreneurship (i.e. determining whether then seven scales were indeed distinct) was evaluated using the sample variance-covariance matrix as input and a maximum likelihood solution using LISREL 8.80 software. Goodness of fit measures such as significant chi-square value ( $P < 0.01$ ), unequal *chi-square* and degree of freedom value, higher Root Mean Square Residual ( $> 0.08$ ) and greater Root Mean Squared Error of Approximation ( $> 0.1$ ) sufficiently indicated a poor fit of the original model. The model was revised as per the modification indices obtained by analytics. Though the revised model had a significant chi-square value ( $P < 0.05$ ), it met all other criteria of Goodness of fit. Considering the most accepted *chi-square* to degree of freedom ratio of 5 (Bollen and Long, 1993), the obtained *chi-square* to degree of freedom ratio of less than 5 (i.e. 2.55) supported the model to be fit. Root Mean Square Residual (0.03) being less than the standard values of 0.08, Root Mean Squared Error of Approximation (0.098) being less than 0.1, and the Goodness of Fit index (0.97) as well as the adjusted Goodness of Fit index (0.9) being either greater than or equal to 0.9, amply support the revised model to be a good fit. It means the 7-factor model of entrepreneurship is validated. The next step in evaluation of



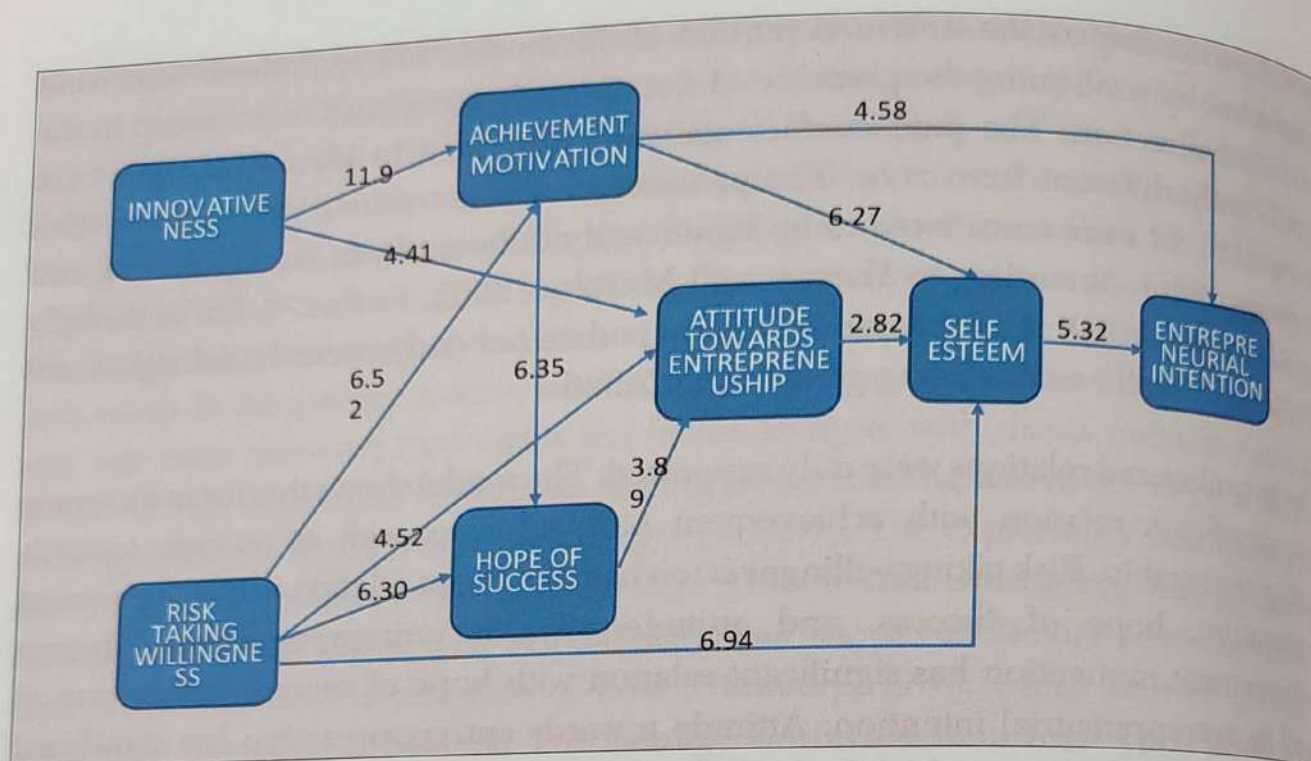
model was to inspect the structural portion of the model. The hypothesis tests were conducted by confirming the presence of a statistically significant relationship in the predicted direction. The path coefficients were examined to identify if they were significantly different from zero. The parameters whose  $t$ -values were greater than or equal to  $\pm 2$  were considered to be significantly different from zero (Joreskog and Sorbom, 1986). According to Harnett and Murphy (1985),  $t\text{-value} > 2.326$  is strongly significant at  $P < 0.01$ . For this model, the hypothesized paths were found significant ( $P < 0.01$ ) with all  $t$ -values being greater than 2.326.

The hypothesized relations were duly supported. The model shows that innovativeness has significant relation with achievement motivation as well as attitude towards entrepreneurship. Risk taking willingness too has significant relation with achievement motivation, hope of success, and attitude towards entrepreneurship; whereas achievement motivation has significant relation with hope of success, self-esteem as well as entrepreneurial intention. Attitude towards entrepreneurship has significant relation with self-esteem, which had significant relation with entrepreneurial intention (Figure-1).

### **Factors affecting entrepreneurial intention**

With addition of four more factors namely critical thinking, resilience, subjective norm and normative belief to the above 7 factors, confirmatory factor analysis was conducted to identify the factors affecting entrepreneurial intention among the farmers. The modification indices suggested removal of critical thinking and resilience from the model. Achievement motivation, risk taking willingness and self-esteem had direct relationship with entrepreneurial intention, while achievement motivation had relationship with all the other factors viz., risk taking willingness, hope of success, attitude towards entrepreneurship, and self-esteem. Social norm and innovativeness were not related positively. Similarly, the normative belief was significantly but negatively related with innovativeness and achievement motivation. The relative importance of each predictor is indicated by standardized canonical discriminate function coefficient. Achievement motivation, with the largest coefficient (0.865) stands out as the strongest predictor for classification of respondents as entrepreneur or non-entrepreneur. As the structure matrix correlations are considered more accurate than the Standardized Canonical Discriminant Function Coefficients, the correlations of the each variables with each discriminate function is referred to identify the relative importance of the predictors. Using the cut-off value as 0.30, achievement motivation (0.833), risk taking willingness (0.572), attitude towards entrepreneurship (0.549),





**Fig. 1.** Path diagram of modified structural model of 7-factor entrepreneurship model

entrepreneurial intention (0.515), hope of success (0.419), self esteem (0.251), and innovativeness (0.175) are considered as important predictors.

Mann-Whitney U test revealed that entrepreneurs and non-entrepreneurs differed significantly with respect to achievement motivation, risk taking willingness, attitude towards entrepreneurship, entrepreneurial intention, hope of success, self esteem, and innovativeness.

## Conclusion

The factor analytic approach and structural equation modeling revealed a seven-factor model of entrepreneurship. The 35-item scale provides a reliable and valid tool to measure entrepreneurship behaviour of farmers. The model shows that innovativeness has significant relation with achievement motivation as well as attitude towards entrepreneurship. Risk taking willingness too has significant relation with achievement motivation, whereas achievement motivation has significant relation with hope of success as well as entrepreneurial intention. Attitude towards entrepreneurship has significant relation with self-esteem, which had significant relation with entrepreneurial intention. Achievement motivation, with the largest coefficient was found as the strongest predictor for classification of respondents as





entrepreneur or non-entrepreneur Therefore, for promotion of entrepreneurship these factors must be kept into consideration in intervention plan.

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