Entrepreneurial competency and self-efficacy among the agricultural graduates of Tamil Nadu Agricultural University

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ABSTRACT

Nurturing entrepreneurship among students has become an important issue in universities as well as in other such organizations. For getting into the entrepreneurial society it is very important to have entrepreneurial competencies. Therefore this study attempted to investigate the entrepreneurial competencies and career self-efficacy among the agricultural students. Data were collected from 250 UG agricultural students of all the campuses of Tamil Nadu Agricultural University viz Coimbatore, Tiruchirappalli, Madurai and Killikulam. The entrepreneurial competencies were analyzed using factor analysis and the results comprised three dimensions such as management competency, opportunity competency and personal competency. In case of career self-efficacy, 70 per cent of the sample students had medium level of career self-efficacy followed by 18 per cent having low level. Among these management competency (F= 64.301) and opportunity competency (F= 58.953) were found to be important dimensions in discriminating the two groups such as students with low and high career self-efficacy. Therefore efforts must be made to improve the managerial competency among the students and they may be offered the personality development programmes as their career development process.

Keywords: Entrepreneurial competency; self-efficacy; agriculture; students; career

INTRODUCTION

The business operation is considered to be very complex in a competitive business environment which is constantly changing with fast technological advancement. An entrepreneur is expected to interact with these environmental forces which require him to be highly competent in different dimensions like intellectual, attitudinal, behavioral, technical and managerial aspects. Entrepreneurs are therefore always challenged to deploy a set of competencies to succeed in their entrepreneurial endeavors.

Baum and Locke (2004) distinguished between specific competency and general competency. Specific competency consists of industry skills and technical skills while general competency includes organization and opportunity recognition skills. Entrepreneurial competencies are defined as underlying characteristics possessed by a person which result in new venture creation, survival and/or growth (Bird 1995). These characteristics include generic and specific knowledge, motives, traits, self-images, social roles and skills that may or may not be known to the person (Boyatzis 1982). Priyanto and Sandjojo (2005) divided entrepreneurial competency into four dimensions viz management skills, industry skills, opportunity skills and technical skills. These characteristics may be even unconscious attributes of an individual. Some of these competencies are innate while others are acquired in the process of learning, training and development.

Man et al (2002) defined entrepreneurial competencies as higher-level characteristics encompassing personality traits, skills and knowledge which can be seen as the total ability of the entrepreneur to perform a job successfully. Six major competency

areas were identified in their work viz opportunity, organizing, strategic, relationship, commitment and conceptual competencies.

Developing entrepreneurial competencies in students has become a priority in order to get more self-efficacy because competencies represent the main modality of connecting academic life to socio-economic and professional life. It becomes more and more important for students to learn and work in a community organization, to benefit from the support of the community, to learn from other people's experience and to actively get involved (Millican and Bourner 2011).

Although the agricultural graduates are exposed to various practical classes which help them to improve their technical knowledge on the potential avenues like beekeeping, mushroom cultivation, poultry, food processing, silk worm rearing etc yet limited attention is given to start their own enterprise. Therefore it is significant to study entrepreneurial competencies and the level of self-efficacy among the agricultural students in order to take steps to implement the strategies which can improve the agricultural students' self-efficacy on entrepreneurship. Recent studies have shown that most of the students choose the entrepreneurship as their career choice (Brenner et al 1991, Fleming 1994, Kolvereid 1996) than the professional employment in businesses (Kolvereid 1996). For getting into the entrepreneurial society it is very important to have entrepreneurship competencies. Many researchers evaluated the importance of entrepreneurial competencies in relation to successful start-up and survival in business (Bird 2002, Onstenk 2003). Therefore this study was conducted to determine the dimensions of entrepreneurial competency and level of self-efficacy (perceive self-employment as a viable career choice) among the agricultural graduates and identify the relationship between self-efficacy and entrepreneurial competency

METHODOLOGY

The population for this research comprised undergraduate agricultural graduates of Tamil Nadu Agricultural University, Tamil Nadu. Non-probability method was chosen for the study. Among a variety of non-probability sampling methods, the quota (proportionate) sampling technique was used to select the participants from each campus (stratum). The students were selected from four campuses of TNAU. From Coimbatore campus 69 out of 90, from Killikulam 57 out of 74, from Tiruchirappalli 54 out of 70 and from Madurai 69 out of 90 students were selected. Thus out of 324 total undergraduates, 250 proportionate sample students were selected randomly.

The survey instrument developed at the Entrepreneurship Development Institute of India (EDII), Ahmedabad, Gujarat was adopted to collect the data on entrepreneurial competency.

Tools of analysis

Factor analysis: In order to understand the main factors causing entrepreneurial competency, factor analysis was done. Factor analysis is a statistical approach used to analyze interrelationships among a large number of variables and to explain the variables in terms of their common underlying dimensions (factors). The statistical approach involved finding ways of condensing the information contained in a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information (Hair et al 1998).

To start with 13 parameters that described the competency attributes of entrepreneurs were prepared based on the scale developed by the Entrepreneurship Development Institute of India (EDII), Ahmedabad, Gujarat. The 13 parameters pertaining to entrepreneurial competencies considered were entrepreneurial competencies, information seeking, concern for high quality of work, persistence, efficiency orientation, commitment to work contract, use of influence, self-confidence, see and act on opportunities, systematic planning, initiative persuasion, problem solving and assertiveness.

These responses of attributes that were perceived by the respondents were quantified in 5-point Likert's scale continuum namely strongly disagree, disagree, neutral, agree and strongly agree (from 1 for strongly disagree to 5 for strongly agree). Factor analysis was done using SPSS 16.0 package.

To test the sampling adequacy, Kaiser-Meyer-Olkin measure of sampling adequacy was calculated. Principal component analysis was employed for extracting factors. Orthogonal varimax rotation was applied. The variables whose communalities were greater than 0.50 were retained. The factors with

Eigen values greater than 1.0 were considered and the analysis was done.

Discriminant analysis: To identify the competency factors which helped to discriminate the students into entrepreneur and non-entrepreneur based on their ratings of the entrepreneurial competencies, career self-efficacy and discriminant analysis was done.

Discriminant analysis involves the determination of a linear equation like regression that predicts which group the case belongs to. The form of the equation or function is:

$$D= v_1X_1 + v_2X_2 + v_3X_3=.....v_i Xi + a$$

where D= Discriminate function, v= Discriminate coefficient or weight for that variable, X= Respondent's score for the entrepreneurial competency dimension, a= Constant, i= Number of predictor variables

This function is similar to a regression equation or function. The v's are unstandardized discriminant coefficients analogous to the b's in the regression equation. These v's maximize the distance between the means of the criterion (dependent) variable. Standardized discriminant coefficients can also be used like beta weight in regression. Good predictors tend to have large weights. What one wants this function to do is maximize the distance between the categories ie come up with an equation that has strong discriminatory power between groups. After using an existing set of data to calculate the discriminant function and classify cases, any new cases can then be classified. The number of discriminant functions is one less the number of groups. There is only one function for the basic two group discriminant analysis.

RESULTS and DISCUSSION

Dimensionality of entrepreneurial competencies among the agricultural graduates

An entrepreneurial competency could be higher-level characteristics encompassing personality traits, skills and knowledge which could be seen as the total ability of the entrepreneur to perform a job successfully. The competency approach has become an increasingly popular means of studying entrepreneurial characteristics. The ultimate goal of all entrepreneurial education is to develop entrepreneurial competencies among students. These competencies help the students in many ways to start their venture in a successful manner. Principal factor analysis was conducted to assess the dimensionality of the 13 competencies.

The Bartlett test of sphericity was significant (chi-square= 854.362, p <0.000) (Table 1). The Kaiser–Meyer–Olkin (KMO) overall measure of sampling was .866 indicating that data were suitable for the principal component analysis. The exploratory factor analysis with Varimax rotation of the 13 competency variables resulted in a three-factor solution that explained 53.349 per cent of the total variance. All three factors had Eigen values greater than 1 (Table 2).

Harman (1976) indicated that factors with loading score greater than 0.29 at 5 per cent level of significant could be considered. In this study the factors which had component loading greater than 0.5 were included to define the factor. The factor loadings of the items were clubbed and factors were identified (Table 3).

The three underlying dimensions resulted from the principal component analysis. The first dimension was labeled as 'managerial competency' that comprised seven competencies and explained 34.93 per cent of the total variance. The relatively large proportion of the total variance might be attributed to the fact that persistence, information seeking, concern for high quality of work, commitment to work contract, efficiency orientation, systematic planning and use of influence should be the required competencies in managing various functional areas so as to keep the firm operating efficiently. This group of competencies called for the ability to lead, control, monitor, organize and develop the external and internal resources towards the firm's capabilities through the entrepreneur's managerial competencies in different areas.

The second dimension labeled as opportunity competency comprised four attributes such as initiative, see and act on opportunities, assertiveness and persuasion were most important competencies for the successful entrepreneurs which explained 10.10 per cent of the total variance. One of the most important entrepreneurial roles was the ability to recognize and envision taking advantage of opportunities. This category of competencies comprised the entrepreneurial activities in spotting opportunities, actively seeking new opportunities and developing the opportunities. Hence this dimension was named as opportunity competency.

Table 1. KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy		.866
Bartlett's test of sphericity	Approx chi-square	854.362
	Degree of freedom	78
	Sig	.000

Table 2. Extraction of factors for entrepreneurial competence

Entrepreneurial competency	Eigen value	Percentage of variance	Cumulative percentage
Persistence Information seeking Concern for high quality of work Commitment to work contract Efficiency orientation Systematic planning Use of influence	4.541	34.933	34.933
Initiative See and act on opportunities Assertiveness Persuasion	1.312	10.095	45.029
Problem solving Self-confidence	1.082	8.321	53.349

Table 3. Identification of major factors influencing entrepreneurial competence

Entrepreneurial competency	Eigen value	Percentage of variance	Cumulative percentage	Factor/dimension
Persistence Information seeking Concern for high quality of work Commitment to work contract Efficiency orientation Systematic planning Use of influence	4.541	34.933	34.933	Managerial competency
Initiative See and act on opportunities Assertiveness Persuasion	1.312	10.095	45.029	Opportunity competency
Problem solving Self-confidence	1.082	8.321	53.349	Conceptual competency

The third dimension labeled as conceptual competency comprised two attributes namely problem solving and self-confidence which explained 8.321 per cent of the total variance. The ability in making cognitive and analytical thinking, learning, decision making and problem solving, sustaining temporal tension, innovating and in-coping with uncertainty and risk belonged to this category. They had a stronger linkage with entrepreneurial traits and were less directly observable. They involved high level of conceptual activities and are reflected in the entrepreneurs' behaviours when they conduct analysis, learn, make decisions and solve problems etc. Hence this dimension was named as conceptual competency.

It could be concluded from the results that the agricultural graduates' entrepreneurial competency comprised three dimensions namely managerial, opportunity and conceptual competency. The managerial competency dimension is the most important dimension which explained more percentage of the total variance.

Level of entrepreneurial self-efficacy

The level of entrepreneurial self-efficacy was measured using a five-point scale. The minimum and maximum values of self-efficacy of sample students were 1.80 and 5.00 respectively. The mean score and standard deviation for self-efficacy of sample students were 3.59 and 0.52 respectively. The self-efficacy of sample students was divided into three levels namely low, medium and high using the range formula mean plus or minus standard deviation.

The ranges and distribution of self-efficacy were analysed and the results are given in Table 4. The data show that 70.00 per cent of the students were in the medium level of entrepreneurial self-efficacy and 18 per cent were in the low level.

The relationship between self-efficacy and entrepreneurial competencies of the students

The discriminant analysis was used to know the contribution of the competencies towards self-efficacy by categorizing the students whose career self-efficacy value was more the mean value as high career self-efficacy group and that entrepreneurial self-efficacy value was less the mean value as low career self-efficacy group.

The competency dimensions which discriminated the students between low career self-efficacy and high career self-efficacy were analyzed (Table 5). The students had all dimensions of competencies irrespective of the level of career self-efficacy of the students (Table 6). All the competency dimensions were statistically significant.

There was difference in the mean values of students' entrepreneurial competency dimensions such as managerial and opportunity competency dimension in the two groups of career self-efficacy. In the group of high career self-efficacy students, the mean values of managerial and opportunity competency dimensions were 18.08 and 17.09 respectively which were significantly higher than the mean score of managerial and opportunity competency dimensions (16.66 and 15.72 respectively) in low career self-efficacy students' group (Table 5). Thus the students in high career self-efficacy group preferred to develop competencies in the managerial and opportunity competency dimension.

Discriminant analysis maximizes between groups differences on discriminant scores and minimizes the within-groups differences. The Eigen value is one statistics for evaluating the magnitude of a discriminant analysis. It can be seen (Table 7) that the Eigen value was .528 with a canonical correlation of .588. Squaring the canonical function equals 0.345 which indicated that 34.5 per cent of the variability of the scores for the discriminant function is accounted for by the differences between the two groups of learners. Here the Eigen value is high which implies that the between-groups differences are much greater than the within-group differences. Wilks' lambda is the ratio of within group variance to total variance and its values lied between 0 and 1. A lower value of Wilk's lambda indicated a superior function. Data given in Table 8 show that the value of the Wilks' lambda was significant with chi-square distribution value of 104.460 and 3 degrees of freedom. This confirmed that discriminant model was significant.

Table 9 reveals the test of the multivariate normality of the data. The Rank 3 of the covariance matrix indicated that this was a 3 x 3 matrix, the number of constructs in the discriminant equation. The natural log of the determinant of low and high career self-efficacy covariance matrices were 1.578 and 2.451 respectively. Pooled within groups covariance matrix composed of the means of each corresponding value within the two 3 x 3 matrix of the low and high career self-efficacy students was 2.157. The Box's M value of 19.548 is a measure of multivariate normality based on the similarities of the determinants of the covariance matrices for low and high career self-efficacy students. The approximate F-value of 3.214 reveals that the determinants from the two levels of the dependent variable (low and high career self-efficacy students) differed considerably as the significance value was 0.004; thereby it suggested that the obtained data were not found to be multivariate normal.

The relative importance of the variables in discriminating between the two groups could be examined by the values of structure coefficient. In the structure coefficient, variables were ordered by absolute size of correlation within function. Data given in Table 10 show that managerial competency dimension (structure coefficient= .677) was the most important variable followed by opportunity competency (structure coefficient= .636) and conceptual competency (structure coefficient= .609).

The cut-off point for classification was obtained by taking the average of the two groups.

Table 4. Comparison of self-efficacy among students

Self-efficacy level	Range	Students	
		Number	Percentage
Low	Less than 3.073	45	18
Medium	3.074-4.09	175	70
High	More than 4.104	30	12
Total		250	100

Table 5. Group statistics

Career Self-efficacy		Mean	SD	Valid N (list-wise)	
				Un-weighted	Weighted
Low self-efficacy	OC	15.72	1.404	107	107.00
	MC	16.66	1.292	107	107.00
	CC	15.71	1.384	107	107.00
High self-efficacy	OC	17.09	1.518	143	143.00
	MC	18.08	1.544	143	143.00
	CC	16.99	1.480	143	143.00
Total	OC	16.50	1.616	250	250.00
	MC	17.47	1.604	250	250.00
	CC	16.44	1.571	250	250.00

OC: Opportunity competency, MC: Managerial competency, CC: Conceptual competency

Table 6. Tests of equality of group means

	Wilks' lambda	F	df 1	df 2	Sig
OC	.824	52.858	1	248	.000
MC	.805	59.978	1	248	.000
CC	.836	48.596	1	248	.000

OC: Opportunity competency, MC: Managerial competency, CC: Conceptual competency

Table 7. Eigen values

Function	Eigen value	Percentage of variance	Cumulative percentage	Canonical correlation
1	.528[a]	100.0	100.0	.588

First 1 canonical discriminant functions used in the analysis

Table 8. Wilks' lambda

Test of function(s)	Wilks' lambda	Chi-square	df	Sig
1	.655	104.460	3	.000

Average value= (-0.835 + 0.626)/2= -0.105

If the unstandardized canonical discriminant score was greater than -0.105, it would be classified as high career self-efficacy whereas if the unstandardized canonical discriminant score value was less than -0.105, it would be classified as low career self-efficacy. It could further be concluded that the students' career self-efficacy was discriminated as high and low career mainly by managerial and opportunity competency dimensions (Table 11).

Thus it could be concluded from the discriminant analysis that estimated discrimination function was significant (Box's M= 15.344, Sig= 0.019%) and therefore was used for further analysis. The competency dimension with the largest effect on self-efficacy was managerial competency (.613) followed by opportunity competency (.539) and conceptual competency (.398) dimensions. The management (F= 64.301) and opportunity (F= 58.953) competencies were found to be important dimensions in discriminating the two groups such as students with low and high career self-efficacy. The discrimination between the low and high career self-efficacy based on entrepreneurial competencies was explained only 34.5 per cent [1 - .655 (Wilks' lambda value)].

CONCLUSION

The results comprised three dimensions of competency such as management competency, opportunity competency and personal competency using factor analysis. The managerial competency dimension was the most important dimension which explained more percentage of the total variance. It was found that overall mean value of the career self-efficacy was 3.59 and standard deviation was 0.52. Seventy per cent of the sample students had medium level of career self-efficacy followed by 18 per cent with low level.

The competency dimension with the largest effect on self-efficacy was managerial (.613) followed by opportunity (.539) and conceptual (0.398) competency dimension. Management competency (F= 64.301) and opportunity competency (F= 58.953) were found to be important dimensions in discriminating the

Table 9. Box's test of equality of covariance matrices

Self-efficacy	Rank	Log determinant	Box's M	Approx F	df 1	df 2	Sig
Low self-efficacy	3	1.578	19.548	3.214	6	3.61	.004
High self-efficacy	3	2.451					
Pooled within groups	3	2.157					

The ranks and natural logarithms of determinants printed of the group covariance matrices

Table 10. Standardized canonical discriminant function coefficients and structure coefficient

Competency	Standardized canonical discriminant function coefficient	Structure coefficient
	Function 1	
Managerial Competency	.613	.677
Opportunity Competency	.539	.636
Conceptual Competency	.398	.609

Table 11. Functions at group centroids

Cse	Function
Lower self-efficacy	-.836
High self-efficacy	.626

Unstandardized canonical discriminant functions evaluated at group means

two groups such as students with low and high career self-efficacy. The discrimination between the low and high career self-efficacy based on entrepreneurial competencies was explained only 34.5 per cent [1 - .655 (Wilks' lambda value)].

It can be suggested that the relatively large proportion of the total variance might be attributed to the fact that persistence, information seeking, concern for high quality of work, commitment to work contract, efficiency orientation, systematic planning and use of influence should be the required competencies in managing various functional areas in a firm so as to keep the firm operating efficiently. Hence steps must be taken to improve their management competencies dimension by exposing them more on hands on experience kind of academic activities. It was found that most of the students possessed medium and low level of career self-efficacy ie students hesitated to choose the entrepreneurship as their career choice. Exposure on the various business operations could improve their career self-efficacy which could be done by increasing the students' involvement in industry internship and linking them with Directorate of Agri-Business Development and incubation centres to observe the activities of the business incubates so that students could gain knowledge on startup's procedure and other operations so that ultimately the self-confidence on starting their own venture could also be improved. The managerial competency dimension played major role in discriminating high and low career self-efficacy among the students. Hence efforts must be taken to improve the managerial competency among the students and they may be offered the personality development programmes as their career development process.

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