A structural equation modeling study on corporate entrepreneurship: The case of Iranian agricultural sector organizations

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Abstract
This study contributes to a better understanding of the relationship between corporate entrepreneurship and organizational performance by developing and testing a normative model, which clarifies the nature of the influences of corporate entrepreneurship and its individual, environmental and organizational antecedents on organizational performance. In fact, the purpose of this paper is to identify the key dimensions of corporate entrepreneurship and determine how antecedents influence the corporate entrepreneurship and organizational performance. The empirical paper is based on questionnaire survey and statistical analysis. Mailed structured questionnaire data for this study were collected from agricultural extension organizations in Iran (315 usable responses). Structural equation modeling was used to analyze the collected data. According to the results, individual, organizational and environmental factors are the most important antecedents of corporate entrepreneurship and hypotheses on the relationships among these factors and corporate entrepreneurship were mainly and significantly supported across this study.

Key words: Entrepreneurship, corporate entrepreneurship, agricultural sector, Iran

Introduction
Despite increasing urbanization, the majority of people in developing countries such as Iran still live in rural areas or depends on rural activities for large parts of their livelihoods. Agriculture is their main source of economic support, especially in the case of the majority poor. In Iran, almost 30% of the population live in rural areas, and they depend either directly or indirectly on agriculture for their livelihood and survival. Agriculture is an important sector of any economy, because it feeds the population and therefore carries a certain strategic importance. This sector also provides the raw materials required to drive some of the key manufacturing industries. Agriculture plays an important role in economic growth, food security, poverty reduction, livelihoods, rural development and the environment. Growth in the agricultural sector stimulates higher rates of growth in the economy through forward linkage activities such as processing and transportation, and backward linkages like the provision of services to the sector, with further growth spurred as a result of spending incomes earned from all these productive activities.

Despite this, agricultural sector is one of the most sluggish and inefficient sectors in Iran. The main reasons are excessive rural population, low skills and knowledge of these people about new methods and technologies of agriculture, and inefficient farm management. In addition, other related problems, such as the lack of adequate innovation and pro-activeness, change capacity and properly trained staff, are all limiting agricultural sector capacity to respond to these changing global and national priorities. As a result, many agricultural organizations in developing countries have a declining impact on agricultural productivity, farm income and/or the sustainable use of natural resources.

The changes within the agricultural sector of our technological society require that the major effort of agricultural sector focus upon preparing individuals for work and for entrance into the entrepreneurship. Entrepreneurship for agricultural and rural communities is therefore a crucial tool in the fight against poverty and the battle to achieve food security. Entrepreneurship helps to open up and provide opportunities for poor people. It helps them to actually make use of opportunities and to shape their own life. With these challenges and increasing pressures, agricultural sector managers must learn from the emerging field of entrepreneurship in organizations (corporate entrepreneurship) and agricultural organizations have to explore entrepreneurship development as a key tool towards innovation in all levels of organization. Hence, we can say that corporate entrepreneurship in agricultural sector is an important issue in Iran, and policy makers, researchers, farmers’ unions and advisory services are all working on the development of entrepreneurship in agriculture.

This study takes these areas of research as a starting point and attempts to integrate these areas in constructing corporate entrepreneurship model within agricultural sector organizations. The purpose of this paper was to identify the key dimensions and antecedents of corporate entrepreneurship and determine how corporate entrepreneurship influences the organizational performance in Iranian agricultural sector organizations based on
previous studies. In this paper conceptual background is provided, in which corporate entrepreneurship, and its key dimensions, antecedents and consequence of corporate entrepreneurship are reviewed and discussed. The process of item generation, pre-testing and data collection for exploratory factor analysis is followed by the description of scale purification and validation. For the construct validation process, the second round of organization survey was conducted and confirmatory factor analysis was applied by using the LISREL method and structural equation model. Based on exploratory factor analysis and confirmatory factor analysis, three different dimensions of corporate entrepreneurship were identified empirically.

**Conceptual Background**

**Corporate entrepreneurship:** Entrepreneurship plays an indispensable role in improving productivity and promoting economic growth. There are many definitions for corporate-level entrepreneurship, although all are based on the seminal papers of Miller 38 and Stevenson 56. Miller 38 points out that entrepreneurial behavior includes innovation, pro-activity and risk-taking. Stevenson 56 adopts a resources-and-skills perspective, and considers that entrepreneurial behavior is based on achieving and exploiting market opportunity. So, the literature defines this type of entrepreneurship as corporate entrepreneurship (CE) or entrepreneurship. Thus corporate entrepreneurship refers to the creation and development of an entrepreneurial culture within businesses in order to increase the organizations innovative capacity. This term is used by some authors 39, 52, 53 and there are many similar labels used by other authors: entrepreneurship 39, intrapreneurship 53, entrepreneurial posture 16, strategic posture 15, and entrepreneurial orientation 18.

According to Miller 38, corporate entrepreneurship can be defined as the activities that an organization undertakes to enhance its product-innovation, risk-taking, and proactive response to environmental forces. Then, many authors have suggested corporate entrepreneurship as a method to offer an organization a strategic option to refine its business concept, to meet changing customer needs and expectation, and to enhance its competitive position 8, 52, 53. As a firm-level phenomenon, corporate entrepreneurship is evolved from the idea generation, idea application and entrepreneurship programming literature 1, 9, 10. From a resource-based perspective, corporate entrepreneurship is a key means of accumulating, converting, and leveraging resources for competitive purposes and also overcoming barriers of entrepreneurship 19, such as developing and using product, process, and administrative innovations to rejuvenate and redefine the firm and its markets or industries 14. Churchill 12 and Menzel et al. 37 define entrepreneurship as the process of uncovering and developing an opportunity to create value through innovation and seizing that opportunity without regard to either resources or the location of the entrepreneur in new or existing organizations. Sharma and Chrisman 47 also define corporate entrepreneurship as the process whereby an individual or a group of individuals, in association with an existing organization, creates a new organization, or instigate renewal or innovation within that organization. In this study, corporate entrepreneurship has been generally classified into three dimensions 1,9,10: (1) idea generation, (2) entrepreneurship programing and (3) idea application.

**The antecedent of corporate entrepreneurship:** In terms of influencing corporate entrepreneurship, the literature has identified sets of antecedents: the individual ability, the external environment of the organizations, and the organizational factor 9.

**Individual characteristics:** The first set of antecedents that influences corporate entrepreneurship is individual characteristics. In terms of influencing corporate entrepreneurship, the individual characteristics have been viewed as a determinant of entrepreneurial activity at the organizational level 1, 32, 44. Intuition and anecdotal evidence lead us to suspect that – at least in an organizational setting – individual characteristics should have some impact on each person’s propensity to act entrepreneurially 44. Researchers in the innovation and entrepreneurship arena have begun to shed light on the way individual attributes shape that individual responses to innovation and entrepreneurship 44. Wanberg and Banas 51 found that certain personality characteristics are positively related to individuals’ general attitudes toward innovation and entrepreneurship. Similarly, Judge et al. 20 recently found people’s self-efficacy, creativity, need for achievement and positive affect (analogous to optimism) were strongly related to their capacity to cope with turbulence and instability. Entrepreneurship researchers have also associated self-efficacy, creativity, need for achievement and positive affect with the entrepreneurial condition empirically 11.

Our model incorporates individual characteristics because attributes such as personality and demographic characteristics are critical to understanding any modern organizational condition and affect corporate entrepreneurship 1.

It is expected that individual characteristics will be positively related to corporate entrepreneurship. This previous research is the basis of the following overall hypothesis and its sub-hypotheses. H1: Individual characteristics will have a positive effect on corporate entrepreneurship. Corporate entrepreneurship dimensions will be positively related to H1A personality characteristics and H1B demographic characteristics;

**Environmental factors:** The external environment is the second antecedent and has historically been viewed as determinant of entrepreneurial activity at both the individual as well as organizational level 16. Researchers building contingency models to explain and predict corporate entrepreneurship and its outcomes tend to incorporate, in addition to internal variables, a set of external environmental variables 52. In terms of influencing corporate entrepreneurship, the external environment is an important determinant 16, 38. Certain environmental characteristics, such as technological opportunities, industry growth, and demand for new products may cause firms to engage in entrepreneurial behavior 4. It is expected that environmental factors will be positively related to corporate entrepreneurship. This previous research is the basis of the following overall hypothesis and its sub-hypotheses H2: Environmental factors will have a positive effect on corporate entrepreneurship. Corporate entrepreneurship dimensions will be positively related to H2A technological opportunities; H2B industry growth and H2C Demand for new products.

**Organizational factors:** The third set of antecedents that influences corporate entrepreneurship is intra organizational factors 20, 24, 54. Previous research has focused on the type of intra-
organizational environment impediments as well as the benefits of developing entrepreneurship in organizations. Organizational and management support, control mechanisms, organizational values and rewards are the main organizational factors that can be strongly conducive to corporate entrepreneurship.

It is expected that organizational factors will be positively related to corporate entrepreneurship. This previous research is the basis of the following overall hypothesis and its sub-hypotheses. H3: organizational factors will have a positive effect on corporate entrepreneurship. Corporate entrepreneurship dimensions will be positively related to H3A organizational and management support; H3B control mechanism; H3C organizational values and H3D rewards.

**Organizational performance:** It is quite essential to understand the corporate entrepreneurship and organizational outcomes relationship because of the fact that the desired end result of entrepreneurial activity in the organization is improved performance. Organizational performance can be considered the most important consequence of corporate entrepreneurship. Improved organizational results, usually in terms of growth and profitability and creation of new value are thought to be a result of entrepreneurship in established organizations.

Corporate entrepreneurship has been promoted as a characteristic of successful organizations. Hough and Scheepers asserted that corporate entrepreneurship in organizations has various outcomes, such as the new products, services, processes or business development. Corporate entrepreneurship was found to be related to organization growth, performance in hostile environments and creation of new values. Also new product or service development (innovation) can be considered a critical success factor that differentiates successful from unsuccessful companies.

Corporate entrepreneurship may result in “new” organizations being created as spin-out ventures, product innovation or it may involve the restructuring and strategic renewal within an existing enterprise.

It is pointed out that the reason for increasing interest in studying entrepreneurship is not only for improvement of performance in established organizations, but also for increasing the welfare of a country through positive macroeconomic results of entrepreneurship activities. Many researchers like Pinchot, Covin and Slevin, Lumpkin and Dess and Antoncic and Hisrich think that corporate entrepreneurship is an important vehicle of successful enterprises. Entrepreneurial activities are very much related to growth, innovation and profitability in business organizations. With attention to the literature review in this study, organizational performance concluding: (a) growth; (b) innovation; (c) profitability; and (d) new values creation.

So it can be said that organizations that engage in entrepreneurial activities are expected to achieve higher levels of growth and profitability than organizations that do not. The overall evaluation of the corporate entrepreneurship is that the organizations involving entrepreneurial endeavors see more increased growth and profitability levels than organizations that do not attempt to do any entrepreneurship activities. Consequently, it can be said that the entrepreneurship level of organizations is positively related with the level of organizational growth, new values creation, innovation and profitability.

It is expected that corporate entrepreneurship will be positively related to organizational performance. This previous research is the basis of the following overall hypothesis and its sub-hypotheses. H4: Corporate entrepreneurship will have a positive effect on organizational performance. Corporate entrepreneurship dimensions will be positively related to H4A growth; H4B innovation; H4C profitability and H4D new values creation. The conceptual research model for this study is shown in Fig. 1.

**Methods**

**Data collection:** Data for the study were collected using a questionnaire survey administrated during 2010. The sample for this study was taken from approximately 1152 agricultural extension managers and experts who participated in continuing education and training programs in entrepreneurship and corporate entrepreneurship for managers and experts conducted by a Ministry of Agricultural Jihad in Iran. Participation in the survey was voluntary and approximately 30% of those eligible (350 individuals) chose to do so. Thirty-five surveys were incomplete and were discarded, leaving a usable sample of 315.

**Measurement instrument:** The survey instrument included scales designed to measure the corporate entrepreneurship dimensions, antecedents and outcomes. In fact, the scale items that were previously employed by other researchers were used in this study for measuring the key concepts. Each of the multi-item measures was based on a 5-point Likert scale. Items from existing measuring instruments that proved reliable and valid in previous studies.
were used, where possible. These were enhanced by questions formulated by the researcher (based on the literature) to ensure that each variable in the measurement instrument was represented by at least three items.

**Corporate entrepreneurship:** Measurement of corporate entrepreneurship was performed across three dimensions (idea generation, entrepreneurship programming, and idea application) that were all measured by scales developed by researchers. Idea generation was measured by 4 items (α = 0.83), entrepreneurship programming was measured by 3 items (α = 0.80), and idea application was measured by 4 items (α = 0.79).

**Individual characteristics:** Individual characteristics were assessed across two dimensions: personality characteristics and demographic characteristics that were all measured by scales developed by researcher. Personality characteristics were measured by 6 items (α = 0.81), and demographic characteristics by 6 items (α = 0.83).

**Organizational factors:** In order to measure organizational antecedents, scales used by Zahra et al. 25 and Corporate Entrepreneurship Assessment Instrument (CEAI) 24 were selected to assess the organizational antecedents that foster corporate entrepreneurial activity within organization. Organizational and management support for corporate entrepreneurship was measured by 4 items (α = 0.85), rewards by 3 items (α = 0.79), organizational values by 3 items (α = 0.84), and control mechanisms by 4 items (α = 0.89).

**Environmental factors:** Environmental characteristics were assessed across three dimensions. Technological opportunities, industry growth, and demand for new products were all measured by scales used by Zahra 25. Technological opportunities were measured by 3 items (α = 0.88), industry growth was measured by 3 items (α = 0.85) and demand for new products by 3 items (α = 0.85).

**Organizational performance:** Organizational performance was assessed across four dimensions: growth, innovation, profitability, and new values creation were all measured by scales developed by researcher. Growth was measured by 3 items (α = 0.83), innovation by 4 items (α = 0.88), new values creation by 4 items (α = 0.91), and profitability by 4 items (α = 0.82).

**Data analysis:** The hypothesized causal relations were investigated using LISREL 8.5, a structural equation modeling (SEM) method. We used LISREL for explorative purposes as well as hypothesis testing. A structural model with LISREL has two components: the measurement model and the structural model. The measurement model specifies how latent variables, or constructs, are indicated by the observed variables and it describes the validities and reliabilities of the observed variables. The structural model is the definition of causal relations between the constructs in the model. The analysis is performed in two steps: The first step involves investigating whether the indicators are valid measures of the theoretically deduced constructs. For this purpose, the indicators are grouped according to theoretical assumptions. In the second step, the causal relations between the constructs are analyzed according to the hypothesized structural model.

**Results**

This study was designed to investigate the antecedents, dimensions and consequence of corporate entrepreneurship. The research hypotheses were examined using several statistical procedures: descriptive analysis, correlation analyses; confirmatory factor analysis; and an analysis of the simultaneous interrelationships among variables using the linear structural relationship (LISREL) program.

**Descriptive and correlation statistics:** Table 1 reports the descriptive statistics of variables such as the means (M), standard deviations (SD), and Spearman correlation coefficients. Table 1 indicates that the level of corporate entrepreneurship in agricultural sector organizations is low (2.35 mean) and not good. Rewards have the highest mean value (3.76) among the organizational factors. Personality characteristics have the highest mean value (2.96) among the individual factors and industry growth has the highest mean value (3.57) among the environmental factors. The correlation matrix shown in Table 2 was used to determine associations between constructs in order to answer the sub-hypotheses.

The first set of hypotheses looks at the relationships between corporate entrepreneurship and individual characteristics (personality characteristics and demographic characteristics). As indicated in Table 1, the corporate entrepreneurship is strongly, positively and significantly related to personality characteristics and demographic characteristics. These results support the sub-hypotheses H1A and H1B, indicating that individual characteristics tend to be a good direct predictor of corporate entrepreneurship.

The second set of hypotheses examined impacts of organizational factors in the model. Organizational and management support was hypothesized to have a direct (H2A) effect on corporate entrepreneurship. Control mechanism was found to have a strong, significant and negative direct association with corporate entrepreneurship (standardized coefficient -0.84). Coefficients were also significant for the relationships between the organizational values and corporate entrepreneurship interaction (s. coef. 0.41), but were not significant for the impact of reward interaction on corporate entrepreneurship (s. coef. 0.12).

The third set of hypotheses examined impacts of environmental factors in the model. Demand for new products was hypothesized to have a direct effect on corporate entrepreneurship. In addition, a strong and significant direct association was found between industry growth and corporate entrepreneurship. Coefficients were also significant for the relationships between the technological opportunities and corporate entrepreneurship. This is in partial support of the sub-hypotheses H3A, H3B and H3C. These findings suggest that technological opportunities can be an important factor in directly impacting corporate entrepreneurship.

The fourth set of hypotheses examines the impact of corporate entrepreneurship on performance elements in the model. As indicated in Table 1, corporate entrepreneurship is strongly, positively and significantly related to growth (standardized coefficient 0.69), innovation (s. coef. 0.62), profitability (s. coef. 0.35), and new values creation (s. coef.0.37). These results support the sub-hypotheses H4A, H4B, H4C and H4D, indicating that
corporate entrepreneurship tends to be a good direct predictor of growth, as well as profitability, new values creation and innovation.

Structural equation model: The structural equation model was used to determine associations between constructs in order to answer the main hypotheses. A structural equation model with LISREL has two components; the measurement model and the structural model.

Measurement model: A confirmatory factor analysis using LISREL 8.5 was used to test the measurement model. According to the diagnostic indices (Table 2), the measurement model demonstrates a fairly good fit in that all of its model-fit indices surpassed common acceptance levels. This suggests that the structural model represents a good fit. Thus, the path coefficients of the structural model can be examined.

Structural model: The second step of the empirical investigation involved testing the hypothesized structural model of causal relations. Fig. 2 depicts the model of relations amongst variables. Based on the results of the SEM analyses presented in Fig 2 and summarized in Table 3, all of the overall hypothesized relationships were supported. The results indicate that corporate entrepreneurship is positively related to individual, organizational and environmental antecedent. All of the correlations were significant at different levels and in the predicted direction. The hypotheses for the relationships were tested using their associated t-statistics greater than 1.64, 1.98, were considered to be significant at the 0.05, and 0.01 levels, respectively.

Hypothesis H1, the path coefficient for individual factors and corporate entrepreneurship, was 0.56 and statistically significant at the 1% level. The findings regarding the positive correlation between individual factors and corporate entrepreneurship were also supported by previous empirical findings. For instance, Karimi et al., Rutherford and Holt, and Ahmadpour Daryani reported the positive effect of individual characteristics on corporate entrepreneurship.

Hypothesis H2, which dealt with the direct relationship between organizational factors and corporate entrepreneurship, was tested using the results in Fig. 2 and Table 3. This hypothesis revealed that organizational factors have a positive correlation with corporate entrepreneurship. The standard path coefficient for these variables was 0.46 and significant at the 1% level.
this finding is supported by several studies that consistently found a positive impact of organizational factors on corporate entrepreneurship. For example, Souder et al., Schollhammer, Kanter and Hornsby et al. found that organizational factor has a positive impact on corporate entrepreneurship.

Hypothesis H3, the standardized path coefficient for the path between environmental factors and corporate entrepreneurship was 0.41, and it was significant at the 1% level. Environmental factors were a significant predictor of corporate entrepreneurship. Thus, it could be concluded that environmental factors all have a direct positive effect on corporate entrepreneurship. The findings regarding the positive correlation between environmental factors and corporate entrepreneurship were also supported by previous empirical findings. For instance, Miller, Covin and Slevin, and Zahra reported the positive effect of environmental factors on corporate entrepreneurship.

Hypothesis H4, which dealt with the direct relationship between corporate entrepreneurship and organizational performance, was tested using the results presented in Fig. 2 and Table 3. This hypothesis revealed that corporate entrepreneurship has a positive correlation with organizational performance. The standard path coefficient for these variables was 0.32 and significant at the 1% level. Empirically, this finding is supported by several studies that consistently found a positive impact of corporate entrepreneurship on organizational performance. For example, Zahra, Covin and Slevin, Zahra and Covin and Antoncic and Hisrich found that organizational factor has a positive impact on corporate entrepreneurship.

As shown in Table 3, all path coefficients are significant at the 0.01 level in the structural model. The results indicate that the hypothesized relationships are supported. The explanatory power of the structural model can be evaluated by examining the amount of variance in the dependent variable which can be explained by the model. Squared multiple correlations (R²) computed for the dependent variables (corporate entrepreneurship and organizational performance) in model. The criterion, R² is critical in evaluating a structural model. In this study, the R² for ‘corporate entrepreneurship’ is 0.73, which means that about 73% of the changes in the corporate entrepreneurship is due to the three latent variables in the model. Also, the R² for ‘organizational performance’ is 0.64, which means about 64% of the changes in the organizational performance is due to the corporate entrepreneurship variable in the model.

**Discussion and Conclusions**

Currently, corporate entrepreneurship is essential to obtaining a long-term competitive advantage. The existing literature recognizes that the appearance of organizations to facilitate entrepreneurial initiatives is one of the best ways to increase entrepreneurship within a certain country, but more detailed analyses and empirical contributions are necessary in this area. The present paper contributes to this by empirically analyzing how the individual characteristics, organizational factors and environmental factors influence the development of the corporate entrepreneurial process. This study demonstrated that corporate entrepreneurship tends to be a good direct predictor of organizational performance such as: new values creation, profitability, innovation and growth. Also, corporate entrepreneurship antecedents (individual characteristics, environmental conditions and organizational factors) can have important influence on corporate entrepreneurship. Then, the primary goal of this research has been to investigate how the antecedents influence the corporate entrepreneurship of agricultural sector organizations in the Iran context.

Our results show that all hypotheses were supported in different ways. First results showed that idea generation, entrepreneurship programing and idea application are the main dimensions of corporate entrepreneurship. Second, the findings suggest that individual characteristics, organizational factors and environmental factors can be an important direct predictor of corporate entrepreneurship, as well as have indirect influence (through corporate entrepreneurship) on organizational performance.

In fact, the results supported the conceptual model presented in Fig. 1. In particular, the results were consistent with theory on
the association of individual, organizational, and environmental factors with corporate entrepreneurship in Iranian agricultural organizations.

This study sought to provide academic researchers and managers with evidence of the antecedents and consequence of corporate entrepreneurship, thereby contributing to a more comprehensive theory of organization and management in the agricultural organization field in particular.

This study has several limitations that the reader should take into account in interpreting the results. First, the sample for this study included only agricultural extension organizations and thus the findings obtained from this study may not be generalized to all organizations. Secondly, this study was a cross-sectional one. Thus, the data used in this research were only based on perceptions of the agricultural extension managers and experts, and it included neither their behaviors in the long term nor other registered data of the organizations.

Our results suggest that the deployment of individual, organizational and behavioral antecedents increases organizations ability to develop corporate entrepreneurship in the organizations. Specifically, investments in development and improvement of these antecedents enable the development of an organizational culture that supports corporate entrepreneurship in the organizations. Thus, our results suggest that these antecedents are the important factors that influenced corporate entrepreneurship in the agricultural organizations and these factors have indirect effects on organizational performance through the mediation of corporate entrepreneurship.

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References

10Carine, P. 2003. Organizational Competencies and Innovation Performances: The Case of Large Firms in Belgium. Institute of Innovation Research, Hitotsubashi University, Tokyo, Japan.
30Karamidehkordi, E. 2010. A country report: Challenges facing Iranian