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Investigating Entrepreneurial Orientation and Firm Performance in the Iranian Agricultural Context

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ABSTRACT

An explanatory survey was carried out in 2008 to investigate the relationship between Entrepreneurial Orientation (EO), environmental factors, human capital and organizational characteristics *vs.* entrepreneurial performance among entrepreneurial firms in Iranian agricultural sector. Data were obtained from a sample of 120 Iranian agricultural establishments, using an interview-oriented questionnaire. The hierarchical regression analysis revealed that: although there is a positive direct relationship between EO and entrepreneurial performance in an agricultural business setting, applying main-effect or contingency models only, provides a distracting picture of entrepreneurial performance in agricultural settings. It was also found that configurational approach may better explain the relationship between EO, environmental factors, human capital and organizational characteristics *vs.* entrepreneurial performance over and above contingency and above main- effect models.

Keywords: Agriculture entrepreneurship, Entrepreneurial orientation, Firm performance, Iran, Small business.

INTRODUCTION

Despite the growing importance of entrepreneurial activities in Iran's economy, large-scale investigations on this topic, particularly agricultural sector, are scarce. Most research on entrepreneurship in Iran focuses on topics in industrial sector (Eskandari, 2006). In addition, there is a lack of empirical research examining the level and effect of Entrepreneurial Orientation (EO) on a firm's performance in agriculture. Although numerous international scholars have studied EO, they have considered agricultural firms as part of their sample and not as an independent one. In this study, it is strived to fill the gap by examining the relationship between EO and firm performance from a national survey aspect of entrepreneurship in agricultural sector, in Iran.

The conceptual framework for the study was adopted from Lumpkin and Dess (1996). This framework which has been applied in many research work in the field of entrepreneurial orientation, discusses factors that may affect a firm's entrepreneurial performance (Figure 1). Based on a detailed review of the entrepreneurship literature, Lumpkin and Dess (1996) identified five dimensions of EO, namely: autonomy, innovation, risk taking, proactiveness, and competitive aggressiveness.

Innovation is at the heart of entrepreneurship, taking many such forms, as the introduction of a new product or service, process and procedure, technology, system, and/or technique (Kraus *et al*, 2012). *Risk-taking* behavior represents a firm's

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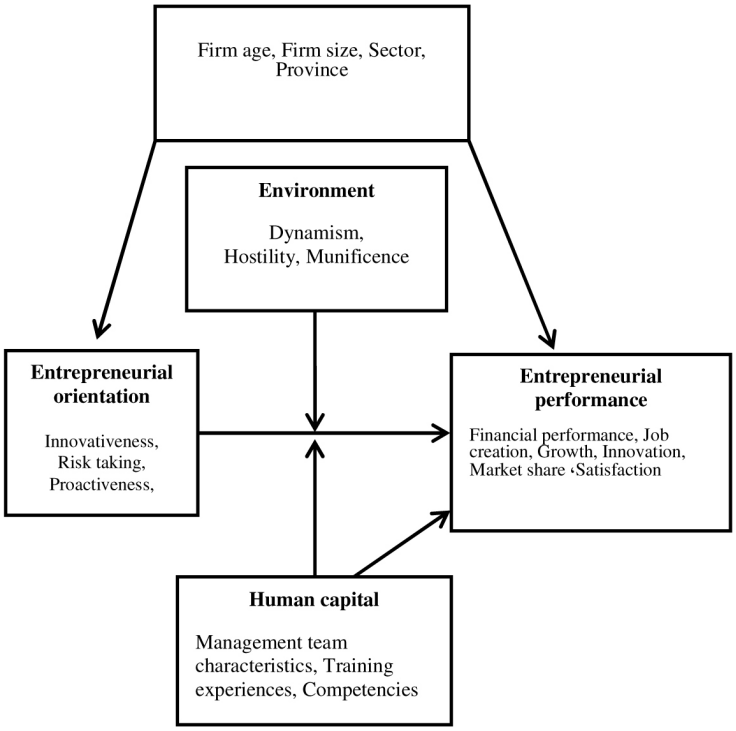

Figure 1. The conceptual framework of factors influencing entrepreneurial performance.

tendency to take calculated business-related risks with regard to strategic actions in the face of uncertainty. Entrepreneurial firms are characterized by tolerance for risks that lead to new opportunities (ibid). *Proactiveness* gives a firm the ability to anticipate changes or needs in the market, make them happen and be among the first to act on them rather than wait for changes to happen then react to them (Rauch *et al*., 2009; Lumpkin and Dess, 2001). *Autonomy* is defined as independent action by either an individual or a team aimed at grasping a business concept or vision, carrying it through to completion (Lumpkin and Dess, 2001). *Competitive aggressiveness* represents the strength of a firm's efforts to outperform competitors (ibid).

Autonomy and competitive aggressiveness were excluded from the study. Because as Lumpkin and Dess (2001) posit, although researching several EO dimensions and their effect on performance at the same time may increase accuracy in the description of the EO construct, it might result in a corresponding loss of parsimony. In addition, analyzing the data and the subsequent interpretation would be very complex and awkward.

Research studies consistently show support for a positive relationship between EO and firm performance and sales growth (Feifei, 2012; Zahra and Covin, 1995). Empirical results provided evidence of a strong relationship between EO and profitability and revenue generated by the firm (Yong-Hui *et al*, 2009; Zahra, 1993b), and such relationships increasing over time (Wiklund, 1999). Thus,

Hypothesis 1: EO is positively associated with firm's entrepreneurial performance.

Education and training play a crucial role in nurturing an entrepreneurial mindset. Professionals with prominent occupational and educational backgrounds would bring in more intellectual ability, knowledge, and social contacts that allow them to make strategic choices leading to performance (Li et al., 2009; Hitt et al., 2001). A firm's capability to involve in entrepreneurial

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activities depends upon its human capital and competencies, so human capital is fundamental for explaining entrepreneurial performance. Hence,

Hypothesis 2: Human capital in terms of training, management team characteristics and competencies will enhance EO and firm's entrepreneurial performance.

Hypothesis 3: Human capital in terms of training, management team characteristics and competencies will moderate the relationship between EO and a firm's entrepreneurial performance.

Numerous researchers have studied the relationship between the environment and entrepreneurial performance. Environmental heterogeneity, dynamism, and hostility were significantly and positively related to initiative, innovation, and risk taking (Miller, 1983). In a competitive, hostile environment, firms applying an entrepreneurial posture were more likely to gain higher performance (Covin *et al*., 2006). Becherer and Maurer (1997), and also (Covin *et al*. 2005) found that environmental hostility moderated the corporate entrepreneurship-performance relationship, i.e., the more dynamic, hostile, and complex the environment, the higher the level of innovation, risk taking, and proactiveness among successful entrepreneurial firms. All these studies suggest that entrepreneurial orientation influences firm performance depending upon the external environmental context. Zahra (1993b) provided evidence that environmental hostility has a moderating effect on the relationship between EO and financial performance. However, Becherer and Maurer (1997) found no evidence at all. This lack of consensus and the moderating influence of environmental variables need more investigation, particularly in the context of a transitional economy. Therefore, it is hypothesized that the relationship between EO and performance is likely to be moderated by the conditions faced by the organization. Thus,

Hypothesis 4: The business environment will moderate the relationship between EO and a firm's entrepreneurial performance.

Configurational research argues that firms, which are configured on many constructs, perform better than those that manage to align on two of the constructs. Therefore, in current study to test the propositions of the configurational perspective, in particular in agricultural context, the interaction of all three constructs were tested. Thus,

Hypothesis 5: Entrepreneurial performance is explained by configurations of EO, human capital, and environment.

MATERIALS AND METHODS

The data used to test the hypotheses were obtained through an explanatory survey, using questionnaire, among Iranian agricultural entrepreneurs in 2009. As there was no specific source of information available on different aspect of agricultural business ownership in the country, a two-stage sampling technique was applied through the following process: the whole country has been divided into 8 regions by the Ministry of Agriculture based on agro-ecological and socio-economic factors with each region benefiting from almost the same conditions. At the first stage, 8 provinces were randomly chosen, one from each of 8 regions. During the second stage, the research team visited the selected provinces and tried to find as much businesses as possible. To this end, the research team searched such multiple potential sources of information (at the provincial level) as Agricultural Organization, Rural Cooperatives Organization, Business Affair Department, Center for Small and Medium Industries, as well as Agricultural Bank. The snow-ball sampling method was also utilized to find more and more business establishments. By use of these two approaches it was possible to identify 120 successful businesses with 160 top management team members. For data related to firm human capital, all the top

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management team members from each firm were included in the study, resulting in a collection of 160 questionnaires on human capital measure (see the next section on independent variables). For other variables in the study (see the next two sections on variables), as they were firm- level data, one respondent from each participating firm completed the survey questionnaire, resulting in a gathering of 120 questionnaires.

Independent Variables

The variables in the present study include environment (dynamism, munificence, hostility) organization (firm size, firm age), human capital (management team training experience, characteristics, and competencies), industry sector (greenhouse-based activities, animal husbandry, horticulture, farming, animal husbandry related services, agricultural support services, and aquaculture), province, and EO. Firm size was evaluated by the number of employees and branches. The firm's age was operationalized by the number of years since it started operation. Human capital was assessed using self- reported data on management team competencies (in terms of different entrepreneurial competencies), training experiences (in terms of hours and numbers of courses experienced) as well as certain entrepreneurial characteristics. Entrepreneurial competencies and characteristics were assessed utilized 5-point Likert-type scales (Alpha amounted to 0.88 and 0.85 respectively). Training experience was evaluated by multiplying the hours of training by the number of courses taken by each member in the management team of the firm. For each firm, top management team members were asked to fill out the questionnaire for these three measures. Then for each firm the summation for each measure was evaluated. Later, as the three measures carried different units, they were normalized and aggregated to be utilized as human capital variable for further analysis. EO was evaluated, applying items from the scale developed by Miller (1983). The scale consisted of 14 items regarding firm's behavior toward innovativeness, risk-taking propensity, and proactiveness using a 5-point Likert-type scale (Alpha= 0.82; Mean= 3.65). utilization was made of the aggregated measures of EO, with a higher score meaning a higher level of EO. The business environment was operationalized using items from the scale created by Miller (1983). The scale contained nine items regarding dynamism, hostility and munificence applying a 5-point Likert-type scale (Alpha= 0.80, Mean= 2.12). Appendix 1 is addressed to for a detail of EO and Environmental measures.

Dependant Variable

Most researchers have employed the following items as measures of firm's entrepreneurial performance: rate of sale and benefit during a 3-5 year course of time, economic growth in terms of sale, benefit and market share, rate of job creation in terms of the number of employees, and satisfaction on these items (Paige, 1999; Solymossy, 1998). In addition to applying the above mentioned measures to operationalize entrepreneurial performance, the following dimensions were as well used in the study: organizational growth in terms of increase in the number of human resources and in the number of branches and units founded since the foundation year (Ahmadpour-e-Dariani, 2000; Solymossy, 1998), rate of product, service, process and procedures' innovation (5-point Likert-type scale) and its effect on performance (Ahmadpour-e-Dariani, 2000), success in entering new markets and its effect on performance (ibid). As all the firms investigated in the study were private establishments, their owners were not obligated to provide the research team with their objective data. As a result, self-reported measures become the acceptable substitute.

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As size and age of firm, business sector, and geographical location may exhibit different organizational and environmental characteristics, which in turn may influence performance, these variables were treated as controls.

As Petrin (1994) posits, rural and agricultural entrepreneurship in its substance does not differ from entrepreneurship in urban and other areas. Therefore, entrepreneurship conventional approach was utilized throughout the research in operationalizing the variables. However, for all variables, the phrasing of the individual scales was modified slightly in order to accurately evaluate the same construct in an agricultural setting. To check face validity, questions were examined by agricultural economic and extension specialists to determine question clarity and scale relevance. Following modifications, a small sample group of agricultural entrepreneurs were asked to read through the questions and provide comments. Following pilot testing of the survey instrument, changes were made to the survey to improve the relevance and readability of the scales.

Analysis Procedure

Hierarchical linear regression analysis was applied to examine the effect of predictors on entrepreneurial performance of the firms and to test which model would best fit the data

RESULTS

Entrepreneur and Firm Characteristics and Demographics

Table 1 reflects a diverse area of entrepreneurial activity related to the sample, with greenhouse-based enterprises accounting for 25 percent of the sample size. Other areas of specializations constituting the sample were: animal husbandry and related services (28.3 percent of the sample), horticulture (14.2 percent), farming (13.3 percent), agricultural support services (10.9 percent), and finally aquaculture (8.3 percent).

As reflected from the Table 1, the highest share of the sample belonged to Tehran Province (28.3 percent or 34 enterprises)

Table 1. Summary information on respondents and enterprises.

Variable	Frequency	Percent
Area of entrepreneurial activity		
Greenhouse-based activities	30	25
Animal husbandry	20	16.6
Horticulture	17	14.2
Farming	16	13.3
Animal husbandry related services	14	11.7
Agricultural support services	13	10.9
Aquaculture	10	8.3
Location (Province)		
Tehran	34	28.3
Hamedan	14	11.7
Isfahan	15	12.5
Fars	14	11.7
Gilan	12	10
East- Azarbaijan	12	10
Kerman	10	8.3
Ilam	9	7.5

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while the lowest belonging to Ilam (7.5 percent or 9 cases). The shares of other provinces in the sample according to the table were as follows: Isfahan 12.5 percent (15 cases), Hamedan and Fars each 11.7 percent (14 enterprises each), Gilan and East-Azarbaijan each 10 percent (12 enterprises each), and Kerman 8.3 percent (10 cases).

The Mean, S.D., and correlations among variables are presented in Table 2. As observed from the table, the correlations among the independent variables are relatively reasonable, ranging from -0.09 to 0.27. As indicated in Table 2, there is a positive significant correlation between EO and human capital (r= 0.21, P< 0.05). This finding provides support for part of Hypothesis 2. In terms of organizational characteristics, EO shows significant positive correlation with firm age and size (P< 0.05).

Table 3 displays data related to the hypotheses testing. The data in the table indicates that of four control variables (firm size, firm age, sector and province), firm size and age exert positive significant effects on firm's entrepreneurial performance in agricultural setting while sector and province do not. (R^2= 0.09 and P< 0.01). This finding is similar to that in the literature; therefore one can deduce that even in a transitional agricultural economy, firm size and age could affect entrepreneurial performance. The next step of the analysis addresses the universal influence of EO, human capital, as well as environmental variables on entrepreneurial performance as over and above the base model. These three variables account for an additional 17% of the variation in entrepreneurial performance, as displayed in the third column of Table 3 (P< 0.01). Both EO and human capital indicate a statistically significant positive relationship with entrepreneurial performance; i.e., higher entrepreneurial performance is associated with greater access to human capital (P< 0.01) and greater EO (P< 0.05), whereas environmental factors show no significant direct effect on entrepreneurial performance (P> 0.05). The findings confirm Hypotheses 1 and 2.

Evaluation of the incremental R^2 for the contingency model indicates that this model does not significantly increase the level of explained variance (P> 0.05), and only one of the two-way interactions, of EO and human capital, is proved statistically significant (P< 0.05). Thus, while Hypothesis 3 is supported by the data, Hypothesis 4 is but rejected. However, the addition of the three-way interaction term, presented in column 5, significantly increases the explained variance evaluated by incremental R^2 (P< 0.01). This suggests a configuration of EO, environment, and human capital, supporting Hypothesis 5.

The impact of EO on entrepreneurial performance (considering the three main effects, the two two-way interactions, and the

Table 2. Mean, SD, and correlations among dependent and independent variables of the study.

	Mean	SD [a]	1	2	3	4	5	6	7	8	9
1. Performance	56.87	19.65	1								
2. EO	3.94	1.89	.27	1							
3. Environment	8.81	3.21	-.15	-.14	1						
4. Human capital	5.33	1.66	.25	.21	.08	1					
5. Firm size	8.46	12.2	.20	.16	.11	.08	1				
6. Firm age	18. 7	16.2	.22	.13	-.20	.07	-.09	1			
7.EO * Environment			-.22	.09	.03	-.33	-.63	-.12	1		
8. EO * Human capital			.17	.05	-.11	.02	.15	.21	.1	1	
9.Environment * Human capital			.11	.07	.11	.01	.1	-.07	-.21	.08	1
10. EO * Environment * Human capital			.48	.44	.47	.54	.3	.12	.2	.22	.30

Correlations>0.10 *i*ndicate P< 0.05.
[a] Standard Deviation of each variable.

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Table 3. Hierarchical regression for factors affecting entrepreneurial performance .

	Control Variables		Universal model and control variables		Contingency model		Configurational model	
	β	S.E.		S.E.	β	S.E.	β	S.E.
Firm size	.23**	.03	.18**	.03	.21**	2.76	.22**	.02
Firm age	.21**	.02	.17**	.02	.16*	2.32	.16*	.01
Sector	.17	.04	.13	.04	.09	.93	.23	.03
Province	.14	.06	.12	.06	.08	.87	.21	.02
EO			.28**	.15	.55**	2.65	1.75**	.87
Environment			.12	.12	.32	1.78	.46	.54
Human capital			.21**	.17	.39**	2.13	1.24*	.65
EO * Environment					-.21	-.98	-1.48*	.43
EO * Human capital					.48**	2.32	1.57**	.21
Environment * Human capital					-.28	-1.09	-.38	.32
EO * Environment * Human capital							1.72**	.12
R^2	.09**		.26**		.28**		.36**	
Adjusted R^2	.07**		.23**		.24**		.31**	
ΔR^2	.09**		.17**		.02		.08**	

In the presence of higher-order interactions, the coefficients for the lower-order terms of the higher-order terms convey no meaningful but possibly misleading information (Cohen and Cohen, 1983).
* $P< 0.05$, ** $P< 0.01$.

three-way interaction term) were plotted for certain values of environment and human capital, based on the regression coefficients. This study adhered to the procedure suggested by Cohen and Cohen (1983). Therefore, values of environment and human capital were set at 1 SD. above and below the mean and a range of values for EO entered. This produces a total of four plots, as illustrated in Figure 2. The result indicates that at low levels of EO, firms working in a dynamic, hostile agricultural environment and considerable access to efficient human capital are relatively high performers. Those in a stable, uncompetitive environment with lower access to efficient human capital are the worst performers. All lines slope upward, indicating that regardless of environmental conditions and access to productive human capital, performance increases with increased EO. This provides additional support for Hypothesis 1 and validating the findings from previous research on the universal positive influence of EO. Entrepreneurial performance increases with increasing EO at the highest rate for those in a dynamic, hostile environment and with high access to efficient human capital. That is, in Iranian agricultural context the highest-performing configuration is high EO, high environmental dynamism and hostility, as well as high access to efficient human capital.

DISCUSSION

The findings in this article suggest that in Iranian agricultural context, business owners who posit a higher entrepreneurial orientation in terms of pro-activeness, innovativeness, and risk taking, will favor a higher entrepreneurial performance in the market. This finding is very attention attracting as the Iranian agricultural sector has recently been facing institutional changes which require more entrepreneurial action by those who wish to start a business in any area concerning agricultural activities. Starting from early 90s, the Iranian agricultural sector as a whole and individual entrepreneurs in particular, now have to challenge with such issues as market deregulation, sudden termination of government support to producers, open and increasingly competitive domestic as well as world markets, decreasing terms of trade, government intervention in the agricultural

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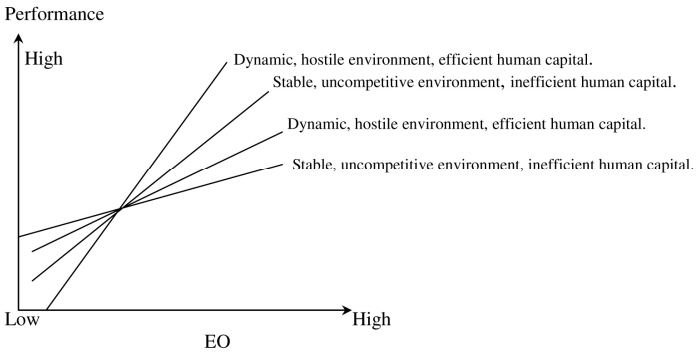

Figure 2. Plots for interaction between Entrepreneurial Orientation (EO), environmental factors and human capital.

labor market and a decreased fiscal support of agriculture sector. As a result, the business environment for practitioners is changing from a relatively stable condition to one full of turbulence. The Iranian agricultural entrepreneurs are increasingly becoming part of the global environment and therefore will have to adapt to this new environment in creative and innovative ways.

Entrepreneurial performance in Iranian agricultural context is also positively influenced by access to efficient human capital in terms of management team characteristics, training experiences as well as competencies. This reemphasizes the importance of education and training in entrepreneurial competencies for entrepreneurial success. However, entrepreneurial performance is not easily perceivable through paying only discrete attention to these factors, realizing that reliance only on these main effect relationships would give an imperfect picture of the entrepreneurial performance. A greater understanding can be gained by the simultaneous consideration of a configuration of EO, access to efficient human capital, and environmental dynamism as well as hostility. For instance, an interesting finding of this article is that when either a main-effects-only or a contingency model is employed, the influence of agricultural environmental dynamism and hostility on entrepreneurial performance of agricultural firms appears insignificant, which is inconsistent with those who suggest dynamic, hostile environments is able to enhance performance (Covin and Slevin, 1991; Zahra, 1993a). Nevertheless, it is only when a configurational approach is utilized that it is found that the relationship between environment and entrepreneurial performance in agriculture depends on EO and access to human capital. The results of the present study are consistent with the findings of Dess *et al.* (1997) and Wiklund and Shepherd (2005) who found a configurational model was more relevant than contingency models for studying the relationship between entrepreneurial strategy making *vs.* performance. The factors configured with EO in current research are different from the previous ones in the areas including human capital in terms of the value of training and competencies and as well in management team characteristics. Little empirical research has been carried out on the role of training and competencies on entrepreneurial performance, in particular in the area of agricultural entrepreneurship.

Contrary to the most prior research, the interaction of the environmental variables and EO had no significant influence on firm performance. This finding is consistent with the findings of Hau-siu Chow (2006). As explained by Hau-siu Chow (2006), who carried out a research in China, one may argue that the environment in the Iranian agricultural context is unique in its

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transitional phase, reinforcing the notion that a prior theory concerning entrepreneurship may not apply universally across various country and business area contexts. It also confirms the view of Hau-siu Chow (2006) who highlights the need to be prudent when interpreting research findings in different research settings. In fact, more studies are required, specifically in transitional economies, to generate theories regarding entrepreneurial behavior, specifically in agriculture.

There may be a question of whether our findings are specific to Iran (or perhaps the

Developing Countries) or they are more universal. It is also a question of whether these findings are specific to only the agricultural sector or applicable to other business contexts as well. Therefore, we strongly suggest scholars to conduct research in various countries and other areas of business to provide a deeper understanding as regards configurational approach in entrepreneurship.

The findings offer some practical implications to those who wish to pursue entrepreneurial behavior in Iranian agricultural sector. In conclusion, developing human capital along with creating a corporate culture and environment that nurtures and supports entrepreneurial behavior will inspire the establishment of the desired corporate entrepreneurship.

Appendix1: Items to measure EO and environmental variables

Entrepreneurial Orientation (Innovativeness, Pro-activeness, and Risk taking):

Innovativeness

We always try to apply new production methods and technologies in the performance of our activities.

We always apply new design for our products and services.

We always apply the modern and new agricultural marketing and sales strategies.

We have been changing our marketing strategies during the last 5 years to keep a higher rate of customer satisfaction and growth in sale.

We have been making improvement in quantity and quality of our products and services during the last 5 years.

We always keep focus on investment in research and development to keep pace with the modern agricultural market and industry.

Pro-activeness

Comparing with other businesses in our area of activity, we are always among the leading farms/ businesses in introducing new actions and strategies in the market place.

In comparison with our competitors, we are always among the leading establishments in applying new methods of production, customer service, marketing strategies and the like.

We always try to be among the leading establishments in the market place to change procedures of production and other activities in order to lead the market.

We respond more rapidly to the changes happening in the market than our competitors do.

Risk taking

We always tend to launch higher revenue making projects even though we know that they are very risky.

We prefer to apply methods and procedures which have already been tested in the market place and that they are not too risky.

When a new method of production or a new technology is introduced to the market, we will wait until other establishments try them to make sure that they are not of high risk. It is only then that we follow that method or technology.

We do not take any action in the market, unless we make sure it won't be risky at all.

Environmental variables (Dynamism, Munificence, and Hostility)

Dynamism

The rate at which products/ services are getting obsolete in the industry is very slow.

Demand and consumer tastes are fairly easy to forecast.

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The production/service technology is not subject to very much change and is well established.

Munificence

The governmental policy in agriculture is not supportive to the development of small businesses and entrepreneurship in the sector.

Red tape is causing many problems to the entrepreneurs in the process of founding and developing their businesses. It is not so easy to start and develop a small business in our area of activity.

The infrastructure in the region in which our firm is working, is appropriate it terms of transportation, road, logistics, and communications.

Hostility

The market of our area of activity is highly competitive in terms of product/service price.

The rate of change in product quality and novelty is very high in our market.

The environment causes a great deal of threat to the survival of our firm.

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گرایشات کارآفرینانه و اثرات آن بر روی عملکرد کسب و کارهای بخش کشاورزی ایران

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چکیده

به منظور بررسی رابطه بین گرایشات کارآفرینانه کسب و کارهای بخش کشاورزی ایران، عوامل محیطی اثرگذار بر عملکرد کارآفرینانه این کسب و کارها، سرمایه انسانی و خصوصیات سازمانی کسب و کارهای مذکور و تأثیر متغیرها و عوامل فوق بر روی عملکرد کسب و کارهای مورد نظر در بخش کشاورزی، این تحقیق پیمایشی در سال ۱۳۸۸ به انجام رسید. بدین منظور تعداد ۱۲۰ کسب و کار کارآفرینانه و موفق بخش کشاورزی ایران طی یک روش نمونه‌گیری دو مرحله‌ای انتخاب شد. در مرحلهٔ اول از هر منطقه تقسیم شده توسط وزارت جهاد کشاورزی ایران، یک استان به صورت تصادفی انتخاب گردید که به این ترتیب تعداد ۸ استان مورد مطالعه قرار گرفت. در مرحلهٔ بعدی با مراجعه به منابع مختلف کلیه کسب و کارهای موفق بخش کشاورزی هر یک از استانهایی انتخاب شده شناسایی و مورد مطالعه قرار گرفتند. برای گردآوری داده‌ها از پرسشنامه‌ای استفاده گردید که به صورت مصاحبهٔ

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رو در رو تکمیل شد. برای تجزیه و تحلیل داده‌ها از رگرسیون سلسله مراتبی استفاده گردید. نتایج نشان داد اگرچه رابطه مثبت و معناداری بین گرایشات کارآفرینانه کسب و کار و عملکرد کسب و کار در بخش کشاورزی وجود دارد؛ اما اکتفا به کاربرد اثرات اصلی و مدل رگرسیونی اقتضایی برای تحلیل این رابطه موجب تحلیل دقیق و کامل این رابطه نشده و تصویر نامناسبی از عملکرد کارآفرینانه و رابطهٔ آن با متغیرها و عوامل محیطی، سازمانی و گرایشات کارآفرینانه کسب و کارهای کشاورزی به دست می‌دهد. لذا نتایج نشان داد که استفاده از مدلهای چندوجهی و سلسله مراتبی مناسبتر بوده و بهتر رابطه بین متغیرهای پیش گفته را نشان می‌دهد.

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