Entrepreneurship Engineering: A Structural Perspective at Manufacturing Companies in Yazd City, Iran

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ABSTRACT

Corporate entrepreneurship (hereafter abbreviated as CE) plays a major role in promoting the performance of the small and medium sized enterprises(SMEs). To compete in the global market, it is imperative that company must know and understand the business environment (Zhang & Li,2007). It is believed that companies that behave entrepreneurially and respond to the changing environment will perform better (Nybakk & Hansen,2008). Entrepreneurship can also be conceptualized, however, as a process or activity within the organization, distinct from specific individuals. To encourage creativity, flexibility, and to support risk, it is a process of organizational renewal. This article hypothesized that more textile companies in Yazd city in Iran are encouraged to devote efforts towards identifying entrepreneurship engineering (here after acronym as EE), and determining which factors may affect the nature of this concept. The study employed the survey method using structured mail questionnaire. By quantitative methods, several textile companies in Yard city in Iran were examined in relation to EE. Data from twenty-five respondents in several carpet companies were analyzed. The findings show that EE as an important component can play vital role for improving organizational performance. Finally, the selected criteria have been assessed according to their relative importance by utilizing AHP approach and Expert Choice software program.

Keywords: Entrepreneurship, Corporate Entrepreneurship, Entrepreneurship Engineering, Analytical Hierarchy Process (AHP)

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INTRODUCTION

Recently, there has been a growing concern in the use of entrepreneurship as a way for organizations to raise the innovative capabilities of their employees and simultaneously, increase firm success through the creation of new firm ventures. However, formation of entrepreneurship activity is difficult since it creates complicated set of challenges both the practical and theoretical level. On a practical level, firms need guidelines to lead resources toward establishing effective strategies. On a theoretical level, researchers need to consecutively reevaluate the components that predict, illustrate, and shape the environment in which entrepreneurship engineering flourishes. On the other hand, EE is an important contributor to company's performance.

Problem Statement

As competition increases, the process for carrying out the expansion mission is being challenged(Damanpour,1996). Varieties of forces have put extreme pressure on all industrial factories to become more dynamic. These pressures include swift development in the accessibility of information, expectations of faster reply time to problems, greater demand for stakeholder inclusion in decision-making processes, and a changing funding portfolio. In a rapidly changing world, firms need to recognize new opportunities beyond existing competencies if they are to survive(Zahra,1993). This strategy is understood to take them beyond competition and help them create a series of new developments such as businesses, productions, markets, and directions for improvements of their existing business.

Research Objective

The specific objective of this paper is to examine the relationship between EE and organizational performance. In addition, the relative priorities of organizational factors influencing EE are determined.

LITERATURE REVIEW

Literature review begins by providing a brief definition of CE. The second section describes the recognized need for EE in the organizations and in particular for relationship between Corporate Entrepreneurship and Firm Performance.

EE and CE

EE is an important part in CE. Covin and Miles (1999) named the concept of CE as the entrepreneurial strategic stance of an organization. They affirmed that organizations are entrepreneurial if they have the following dimensions namely innovative, proactive, and risk taking.

These three dimensions have been taken by most previous studies to define e ntrepreneurship(e.g.Dimitratos,Lioukas,&Carter,2004;Frishammar& Horte,2007; Madsen,2007).

Lumpkin and Dess (1996) depicted CE as the procedure, and decision-making activity that directs to new entry. Corporate entrepreneurship can be described as the entrepreneurial processes that managers act entrepreneurially, whereas entrepreneurship can be defined as new entry. They described five dimensions of CE containing competitive aggressiveness, autonomy, innovativeness, risk taking, and proactiveness, which underlie almost all entrepreneurial processes.

Kreiser et al. (2002) explained the psychological properties of CE. They also supported the modeling of CE with three sub-dimensions involving innovation, proactiveness, and risk taking, and revealed that these three dimensions can vary independently of one another in different situations.

The Relationship between CE and Organizational Performance

Several previous studies have shown the relationship between CE and organizational performance.

Lumpkin and Dess (1996) and Wiklund (1999) claimed that the relationship between CE and organizational performance is specific and they established the integrative framework for examining this relationship between these two dimensions.

Chow (2006) examined the relationship among CE, marketing orientation, and organizational performance, and showed that CE is directly related to increase organizational profit. Dess, Lumpkin and Covin (1997) explored the nature of CE and its relationships with strategy, environment, and organizational performance.

RESEARCH METHODOLOGY

The study employed the survey method using a structured mail questionnaire. The questionnaire used in this study was divided into three sections. Each section covered questions related to the respondent's personal information and company background, perception of EE concepts, and perception of organizational performance.

Research Framework

Based on the above discussion a research framework was developed as shown in Figure 1 . The organizational performance is the dependent variable while EE is independent variable.
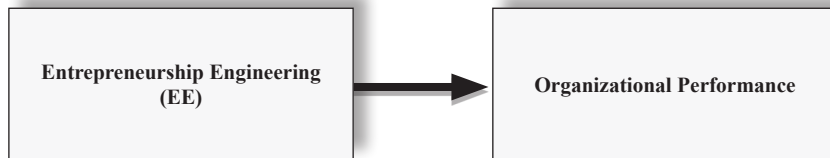

Figure 1 Research framework

Research Design

This study utilized a quantitative approach. In addition, survey approach was adopted because it is strong on representativeness with the ability to evaluate a large population using a relatively small sample. The units of analysis were carpet companies in Yazd city in Iran. This study employed a cross-sectional research design where the data were collected at a single point in time(Sekaran,2003). This approach was adequate to gather data within a limited time.

Population and Sampling

The respondents were carpet companies, in Yazd city in Iran, and the sample were randomly selected according to the distribution by sectors (Carpet and Rug) given in the sampling frame to ensure each sector, is represented in the sample. Forty carpet companies need to be selected as a sample in order to represent the overall population of 45 companies. The table of Krejcie and Morgan drew the sample size for this study. A set of questionnaire was formulated and design into a booklet format to collect data from the top managers as the respondents. All of the questions used in this questionnaire were closed questions and were sent to respondents through E-mail. Of the 40 questionnaires sent out, 25 useable responses were obtained representing a response rate of 62.5%.

Measures

An integrated questionnaire combining instruments and demographic questions has been developed specifically for this study. In the demographic questionnaire, the participants were asked to respond to several categories.

The survey questionnaire gathered information on the background of the company, extent of EE activities practiced. The items measuring EE were adopted from Covin and Miles (1999) and the responses were extracted on a 5-point scale ranging from "1' strongly disagree to "5" strongly agree. Percentage of sales growth over a five years period was used as an indicator of firm's performance.

Research Hypothesis

Drawing upon the literature review, a hypothesis has been formulated, which is to be tested in this study. The hypothesis in this study is as follows:

> H_1: *There is a positive correlation between EE and organizational performance in the textile companies.*

Reliability Analysis

The reliability was ascertained by finding the internal consistency of the measures by using the Cronbach's coefficient alpha ($\alpha = 0.78$). Alpha values greater than 0.60 are suggested as being adequate for testing the reliability of factors (Sekaran, 2003). Thus, it can be concluded that this instrument has high internal consistency and is therefore reliable.

RESULTS

The profile of the carpet companies participating in this study is presented in Table 1.

Table 1 Profile of companies

Demographic Variables	Categories	Frequency	Percentage (%)
Firm Age	≤ 10 yr	17	68
	10 to 20 yr	5	20
	20 ≤	3	12
Market	1. Domestic	16	64
	2. Export	9	36

A correlation analysis was conducted to assess the degree of correlation between the predictor and criterion variables.

Based on the table(2), the correlation coefficient of r =.654 and, the p-value is equal .0001 and less than alpha value (.005), meaning that we reject the null hypothesis (H0) or in another word we support the alternative hypothesis or(H1). So there is a positive correlation between EE and organizational performance in the textile companies.

This seems to imply that those carpet companies are more likely to be motivated to be creative and innovative due to their relatively high organizational performances.

Table 2 shows the correlation for the constructs of interests (EE and organizational performance).

Table 2 Correlations

			Y Organizational Performance	X EE
Y	Organizational Performance	Pearson Correlation Sig.(2-tailed) N	1 . 25	.654** .000 25
X	EE	Pearson Correlation Sig.(2-tailed) N	.654** .000 25	1 . 25

**.Correlation is significant at the 0.01 level (2-tailed).

ORGANIZATIONAL FACTORS INFLUENCING ON EE

The impact of entrepreneurial activities on successful company performance has attracted research into the organizational factors that can promote these activities. This study has sought to identify some of the key variables that can affect a company's pursuit of entrepreneurship, such as the company's incentive, culture, structure (Decentralization), and managerial support. Individually and in combination, these factors are believed to be important antecedents of CE efforts, because they affect the internal environment, which determines interest in and support of entrepreneurial initiatives within an established company (Zahra, 1993).

ANALYTICAL HIERARCHY PROCESS

Analytical Hierarchy Process (AHP) is a technique used for setting priority in a complex, un-anticipated, multi-criteria problematic situation which been developed by Thomas L.Saaty in 1970s. In addition, AHP is used in applied science and various managerial and decision-making related assignments (Saaty, 1982).

Here the aim of this method is determining the relative priorities of organizational factors influencing on EE .In AHP, relative weights are determined by interviewing managers to make paired comparisons using a preference scale that is shown in Table (3).This scale is used to give importance to factors according to each other up to nine times (Saaty,1982).

"Elements in each hierarchy are paired compared with respect to their importance to the decision-making. AHP uses a verbal scale, which enables the experts to incorporate subjectivity, experience and intuition in a natural way .A major strength of AHP is the pair-wise comparison as described in the following section where the influence of the elements of a particular level over those of a lower level is measured. The comparison is based on an expert's opinion and the experience gained from the observation and continuous learning of the system behavior "(Saaty, 1982,P.167).

After a matrix has been created, the relative weights of each component need to be extracted. The relative weights of the elements of each level with respect to the element in the adjacent upper level are computed as the components of the normalized Eigenvector associated with the largest Eigenvalue of their comparison matrix. "The composite weight of the decision alternatives is then determined by aggregating the weights through the hierarchy following a path from the top of the hierarchy to each alternative at the lowest level and multiplying the weights along each segment of the path. The outcome of this aggregation is the normalized vector of the overall weight of the options" (Rahman, & Shrestha,1991,P.123).

Table 3 Saaty's 1-9 Scale for AHP Preference

Verbal Judgment of Preference	Numerical Rate
Equal Importance	1
Weak importance of one over another	3
Essential or strong importance	5
Demonstrated importance	7
Absolute importance	9
Intermediate values between the two adjacent judgments	2,4,6,8

AHP Priority Vector Method

The method uses the paired comparison of the relative impact of factors taken two at a time and arranged in the form of a matrix.

If we denote the relative influence ith factor with respect to jth factor by aij, then, 1/aij shows the relative impact of jth factor with respect to ith factor.

The (n×n) reciprocal judgment matrix [Aij] obtained by arranging these pairwise comparison ratios is used to compute the priority vector. The principal Eigenvector of [Aij] is computed by solving the Eigenvalue problem of Eq. (1):

$$\begin{pmatrix} 1 & a_{12} & \dots & a_{1n} & W_1 \\ 1/a_{12} & 1 & \dots & a_{2n} & W_2 \\ 1/a_{11} & \dots & \dots & 1 & W_n \end{pmatrix} \begin{pmatrix} W_1 \\ W_2 \\ W_3 \end{pmatrix} = \lambda \max$$

e, λmax is the principal or largest real Eigenvalue of [Aij]. λmax is computed by solving the characteristics by the following equation:

$$\Delta(A - \lambda In) = 0 \tag{2}$$

where, Δ is the determinant and In is the n×n identity matrix.

The existence of a real positive Eigenvalue of λmax is assured by the Perron_Frobenius theorem for a reciprocal matrix such that λmax ≥ n. The vector obtained by normalizing the elements of wi by imposing the constraint $\sum W_i = 1$ is the priority vector, which gives the relative influence of the n factors. For a consistent (n×n) reciprocal matrix [Aij], containing pair-wise comparison ratios, all Eigenvalues are zero except one, which is n. Therefore, in the case of inconsistent matrix, the average magnitude of the smaller Eigenvalues is an appealing measure of the deviation from consistency. This measure of inconsistency, termed as the consistency index (Ci) is defined as:

$$Ci = (\lambda \max - n)/ (n - 1) \tag{3}$$

One important parameter that needs to be considered is the inconsistency index given by:

$$ICi = (\lambda \max - n)/ [(n - 1) - Ri] \tag{4}$$

where, Ri is the random index which depends on matrix size and is equal to 1.3 and 1.49 for 6×6 and 10×10 matrices, respectively. If the inconsistency index is less than 0.1 then the judgments are considered satisfactory (Rahman & Shrestha, 1991).

AHP Results

However, Expert Choice software helps to decrease time and effort for applying this approach. Expert Choice software company develops this software and it helps user in displaying hierarchical structure of decision problems and determining relative importance of measures. User can chose numerical, verbal, or graphical comparison in the program.

In this study, 25 manufacturing firms in the carpet sector were examined. The main aim is to determine the relative importance of main factors that is quoted.

However, AHP results (see Table 4) show that, organizational Structure (Decentralization) with weight of 0.424 and management support with weight of 0.23 are more important factors for the companies than culture and incentive. In the other word from viewpoint of textile companies, organizational structure (Decentralization) and management support have more influence on EE inside firms. After the assessment by the Expert Choice software program, the results are discussed with managers in order to determine their applicability and whether they are as expected or not. Table 4 shows the weights of different factors that can affect a company's pursuit of entrepreneurship.

Table 4 Organizational factors' weights

Factor	Weight
Organizational Structure	0.424
Management Support	0.23
Culture	0.195
Company's Incentive	0.151
	$\sum W_i = 1$

CONCLUSION

The major purpose of this investigation was to examine the effects of the entrepreneurship engineering (EE) as an independent variable, and organizational performance as a dependent variable. Analysis of hypothesis showed a positive correlation coefficient of 0.654. It that indicates that as the organizational performance (Y) increases so do EE (X). In addition, the results show that the Iranian textile companies in Yazd city have recognized a vital need to promote and implement EE. They have strategic plans to promote and implement product entrepreneurship and production process entrepreneurship.

Furthermore, this study aimed to determining relative importance of organizational factors that have influence on EE. Therefore, these companies should focus on those factors according to their importance to improve manufacturing process. These factors and especially the most important one, organizational structure (Decentralization), should be included in their manufacturing strategy, which they intend to implement in the future.

This study examined only the textile industry in carpet sector. Hence, the findings of this study might not be generalized to other industries. The study on different kinds of industries can provide better picture on the different level of EE among different firms.

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