

Corporate Entrepreneurship in Bulgarian Software Companies

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Abstract - This paper presents the results of an empirical study of corporate entrepreneurship (CE) in Bulgarian software industry. The study assesses the levels of entrepreneurial intensity and the internal organizational climate for corporate entrepreneurship among the employees of established Bulgarian-owned software companies. The CE factors validated by the study are management support, autonomy /work discretion and rewards/ reinforcement. The relationships among the factors of the organizational climate for CE and entrepreneurial intensity (EI) are tested and a model for the CE factors explaining EI is presented.

Keywords - corporate entrepreneurship (CE), entrepreneurial intensity (EI), software industry, management support, rewards and reinforcement, work autonomy, Bulgaria

1. Introduction

The high level of uncertainty and the changing environment are an everyday challenge for modern business organizations. Companies are in a constant search for innovations and new strategies that can make them more competitive in a marketplace where clients can easily access products and services from around the world.

Many companies that have reached a certain growth and maturity stage have difficulties to timely integrate entrepreneurial practices in too bureaucratic and hierarchical company structures. The need for academic studies of the phenomena of corporate entrepreneurship is a result from observed problems in the large corporations including stagnation and bankruptcy during times of market crises and market restructuring.

Corporate entrepreneurship (CE) is a practically achievable path for business transformation that aims to establish sustainable competitive advantages and beneficial opportunities for innovation. In the same time, there are insufficient number of empirical

studies of established companies that evaluate the need for and the results of corporate entrepreneurship strategy and practices. The presented results form an empirical study of Bulgarian software industry aim at contributing to the practical knowledge and application of corporate entrepreneurship.

The primary objective of the presented research is to assess corporate entrepreneurship levels and entrepreneurial intensity among the Bulgarian software companies. The main developments in the academic field of corporate entrepreneurship are reviewed. The characteristics of the Bulgarian software industry are presented outlining the context of the study.

2. Corporate entrepreneurship definitions and measurement instruments

There is a lack of general consensus among scholars on a single approach of definition of CE. Guth & Ginsburg (1990) point out that CE includes two main phenomena: the creation of a new venture from the existing organization and transformation of the existing organization through strategic renewal. Zahra (1991:262) claims that "CE can be formal or informal activity aiming to create a new business in established companies through product and process innovation and market development. Those activities can be carried out at organizational, divisional, functional or project level – the common goal is to improve the competitive position and the financials of the company". CE is also regarded as an internal process that supports and encourages entrepreneurial behavior inside the organization (Echols & Neck, 1998).

CE builds on the fundamentals of management as a behavioral style that challenges bureaucracy and encourages innovation (Barringer & Bluedorn, 1999). CE is responsible for stimulating innovation in the organization through exploration of new opportunities, acquisition of resources, introduction,

exploitation and commercialization of new products and services (*Guth & Ginsburg, 1990; Kuratko, Hornsby & Montagno, 1990*). Zahra (1991) claims that CE encompasses various mindsets and actions that increase the organization's potential for risk-taking, opportunities exploitation and innovation. Sathé (1989) defines CE as a process for strategic renewal of the organization. CE can be active in various organizational aspects that makes it difficult to establish a consensus for a general definition of that phenomena.

Lumpkin and Dess (1996) argue that a key dimension of an entrepreneurial orientation is an emphasis on innovation. Antonich & Hisrich (2003) state that intrapreneurship is happening in companies despite their size. Hitt, Ireland, Camp and Sexton (2001:484) also indicate that there is a strong relationship between innovation and entrepreneurship. According to Ireland, et al. (2006a:10) innovation takes place in businesses in the form of new products and processes, new administrative structures and processes to help the firm operate efficiently and effectively.

Morris, et al. (2008:20) state that remaining competitive is very different from achieving sustainable competitive advantage. The quest for competitive advantage requires the businesses and the managers to continually reinvent themselves. Advantage derives from five key company capabilities: adaptability, flexibility, speed, aggressiveness and innovativeness. Ireland, et al. (2006a:15) state that sustainable corporate entrepreneurship is more likely in businesses where all individuals' entrepreneurial potential is sought and nurtured and where organizational knowledge is widely spread. A strategic approach towards CE assumes a certain level of purpose and intention towards the development of entrepreneurial initiatives, encouraging entrepreneurial behaviour among employees and building internal environment that supports CE (*Ireland, Covin & Kuratko, 2009*).

In the field of CE there are few measuring instruments that measure various aspects of entrepreneurship in the organization. In 1990 Kuratko, et al., developed the intrapreneurial assessment instrument (IAI), later called corporate entrepreneurship assessment instrument (CEAI). The CEAI was developed to identify the factors within organizations that foster intrapreneurial activity (Kuratko, et al., 1990:54).

The Entrepreneurial Performance Index (EPI) was developed by Morris (1998). The items in this instrument capture the degree and frequency of entrepreneurship, as well as the underlying factors of innovativeness, risk-taking and proactiveness. In a later version, Morris and Kuratko included product, service and process innovation measurement (Morris and Kuratko, 2002:291).

Ireland, et al. (2006b) developed a health audit to assess corporate entrepreneurship and innovation levels in a company. This instrument can be used to assess the degree to which businesses' employees are prepared to engage in entrepreneurial behaviour as exercised through innovation, risk-taking and proactive actions. As a first step, the organization's level of entrepreneurial intensity is determined. Then the internal work environment is examined to understand the factors contributing to the degree of entrepreneurial intensity measured at a point in time. The results of the audit show the areas for potential improvement that can influence the level of entrepreneurial behaviour and intensity in the company so that a CE strategy can be successfully implemented.

The study presented in this paper utilizes the CE health audit Instrument developed by Ireland, et al. (2006b) to assess the corporate entrepreneurial and innovative levels among the Bulgarian software companies.

3. Characteristics of the Bulgarian software industry

The Bulgarian software industry exhibited a double-digit growth for the past five years (2011-2015) while 65% of the revenues are generated by export-oriented software business. The industry has sustainable growth that outpaces significantly the the Bulgarian GDP growth. In the period 2012-2015 3000 new jobs were created in the software industry but jobs growth is restricted by the shortage of qualified specialists. In 2014 approximately 100 new software companies were established in Bulgaria. (BASSCOM. Annual report on the State of the Software Sector in Bulgaria. 2013-2015).

According to a report by the Royal Danish embassy in Sofia (2014) on IT and telecommunications sector in the country, Bulgaria ranks third in world for certified IT professionals per capita and eight in the world in terms of absolute numbers. Among key advantages of the industry is highly qualified workforce, competitive pricing,

many talented students majoring in IT and long traditions in the industry. Positive factors for the continual growth and stable development of the industry are strategic geographic location and stable political and macroeconomic environment.

In recent years, approximately 40-50% of total IT spending has been generated by the government sector including municipalities. Some manufacturing enterprises and private companies, particularly from the trade and tourism sectors, represent growing sources of demand, as well as water and power suppliers. Numerous Bulgarian companies are not only working in the outsourcing industry, but also develop and offer their own software solutions and products which are present and sold on the EU market and in the USA. Bulgarian software firms have refocused their business during the past ten years – from outsourcing contractors into developers of own products and value-added services. The software market shows that 90% of the software produced in Bulgaria is customized and only 10% is off-the shelf application. Ten companies hold the majority of the market, but it is estimated that there are approximately 200 smaller software-developing companies. These companies are often working on sub-projects for larger international enterprises (Royal Danish Embassy in Sofia. 2014. Bulgaria – The IT and Telecommunications Sector).

So far the sector was primarily concentrated on development of tailored software applications for computer systems, network and Web design, CAD/CAM/CAE, Telecommunications and wireless connections, various applications and firmware. Experts expect that the annual rate would be steadily increasing with 6.7% for the next 5 years, while among the customers security remains the biggest concern. Several leading international IT companies (Hewlett-Packard, VMware, SAP, Software AG, IBM, and etc.) have already established subsidiaries or cooperation with Bulgarian companies (BASSCOM, Annual report on the State of the Software Sector in Bulgaria, 2014).

4. Methodology of the study

The CE audit instrument (CEAI) of Ireland, Kuratko & Morris (2006b) consists of 78 items (closed-type questions) on a Likert scale (1 “completely disagree” – 5 “completely agree”) divided in two parts:

(1) questionnaire measuring entrepreneurial intensity (EI). The instrument consists of 21 items.

The first 12 items measure a business’s degree of entrepreneurship and the remaining items – the frequency of entrepreneurship.

(2) CE climate instrument (CECI). The questionnaire measuring CE has five sections of questions – each section represents a CE climate factor: management support, autonomy/work discretion, rewards/reinforcement, time availability, organizational boundaries, plus a section with specific climate variables and control questions.

The instrument has been proven to be valid and reliable (Ireland, et al., 2006b:22). The instrument can be used to evaluate industries, single businesses and different parts of the organization. The CEAI has been shown to be psychometrically sound as a viable means for assessing areas requiring attention and improvement in order to reach the goals sought when using a corporate entrepreneurship strategy. Ireland et al. (2006b:28) point out that low scores of the CEAI suggest the need for training and development activities to enhance the businesses readiness for entrepreneurial behavior as well as successful use of a corporate entrepreneurship strategy.

5. Reliability and validity of the measurement instrument

The questionnaire was adapted from English to Bulgarian language by following a procedure for translation and re-translation to ensure the original meaning is reflected in the Bulgarian version. The reverse translation procedure confirmed the validity of the instrument.

A pilot study was conducted in the period March – May 2013 with the goal to determine the reliability of the research instrument CEAI in Bulgarian context. CEAI has been proven reliable in previous studies in the USA, Canada, Slovenia and Romania (Antoncic & Hisrich, 2001; Hornsby, Kuratko, & Montagno, 1999; Antoncic & Scarlat, 2005).

The questionnaire was e-mailed to 162 employees from 15 software companies. The respondents were 74 from 9 companies with response rate 46% of the employees and 60% of the companies. In order to assess the reliability of CEAI, reliability analysis is performed using SPSS ver. 21 where Cronbach Alfa (α) values are used to determine the reliability of the instrument. Threshold level of reliability is determined at 0.7. The results of the reliability tests are shown in table 1 where

Cronbach α for the whole instrument (CEAI) is 0.91 for the pilot study and 0.93 for the main study.

Table 1. Reliability of the study instrument

Items / Factors	Cronbach α Pilot study, n=74	Cronbach α Main study, n=317
CEAI	0.91	0.93
Items for EI:	0.75	0.81
Items for CECI	0.92	0.90
Management support	0.94	0.88
Autonomy/ work discretion	0.81	0.77
Rewards /reinforcement	0.73	0.74
Time availability*	0.4	0.31
Organizational boundaries*	0.66**	0.52**

*not reliable as a factor, the items are analyzed per se

** value after removing two or more items

The reliable factors are management support, autonomy / work discretion and rewards / reinforcement.

6. Research type and sample

The researcher uses empirically collected information analyzed through statistical methods. The conducted empirical research is a single time-period study. The sample is collected through a two-step selection: non-random purpose sampling on the first step – by applying certain criteria to company selection and simple random sampling on the second step.

The reason to use specific criteria for the companies in the study serves the goal of the research. The initial selection included the following criteria:

□ Bulgarian software companies – 100% Bulgarian ownership, excluding branches, offices and subsidiaries of multinationals – focusing the study on Bulgarian practices and culture.

□ The companies must be registered before 2010 – the assessment of CE assumes availability of established structure and management practices in the studied organizations (some level of maturity).

□ Employees from all organizational departments and levels participate in the study.

Initially, 75 companies with total of 1571 employees were identified that matched the research criteria. The questionnaire was sent to all companies; 317 valid questionnaires were received from 34 companies. The response rate was 20% of the employees and 45% of the companies. According to the study design, the results are representative for established Bulgarian software companies.

The questionnaire was prepared in electronic format by using Google Forms and links to the survey were sent to the companies. The results were processed and analysed with SPSS ver. 21. The data was collected in the period October 2013 – April 2014. The Likert scale values (1 to 5) scale are interpreted in three ranges in the study results: 1 to 2.33 – low level; 2.34 to 3.66 – moderate level; 3.67 to 5 – high level.

7. Results of the study

7.1 Profile of the respondents

317 filled questionnaires were received from 34 companies: 65% men/ 35% women with average age 31 yr.o. (all respondents' age is in the range 22 – 46 yr.o.).

In terms of length of employment in the company: 20% have worked for less than 1 year in their company; 29% have worked 2-3 years and 30% over 5 years. Current job position: 60% work for more than 3 years on their current position, 21% less than 1 year. Conclusion: approx. 20% are on entry level in their company; 30% are permanently settled for over five years in the company or on their current position.

Job position and scope of work: The job positions are also ranked in terms of scope of work from very narrow specialist to broader profile specialist to generalist. Specialists: web developers are 41%; the sum of all type of developers is 53% of the respondents. Generalists (marketing, creative,

administration, management) are 32% of the respondents. The distribution of the respondents by job position gives valuable information about the structure of the sample. The sample is dominated by young under 30 yr.o., job position 'developer', mostly men, and hierarchy level 'specialist' or 'senior specialist'.

7.2 Hypothesis tests

For the test of H1 the Student t-test is performed. H2, H3 and H4 are tested by using correlation analysis with 5% level of significance. For H2 a regression analysis is performed for additional clarification of the nature of the statistical relationships between EI and the CE climate factors resulting in a regression model.

H1: The average levels of EI and of the factors of organizational climate for CE (management support, autonomy / work discretion, rewards / reinforcement) are high.

$$H_0 : \mu \leq 3.66 \text{ and } H_a : \mu > 3.66$$

Table 2. Mean values of tested variables

	Mean*	Std. deviation	Std. error mean
Entrepreneurial intensity (EI)	3.49	.44	.02
Management support	3.47	.55	.03
Autonomy	3.52	.59	.03
Rewards	3.53	.69	.04

*N = 317

Table 3. T-Test results for evaluation of the mean values of EI and the CE factors

	t*	Lower**	Upper**
EI	-7.08	-.22	-.13
Management support	-6.22	-.25	-.13
Autonomy	-4.23	-.21	-.07
Rewards	-3.28	-.20	-.05

*Test value = 3.66; df=316; Sig. (two-tailed) = .000

** 95% conf.int. of the difference

The confidence intervals for each mean are calculated to reach a conclusion about the hypothesis statement.

Table 4. Results of H1 test

Tested variables	Confidence interval population mean	Value of the population mean
EI	(3.44; 3.52)	Moderate
Management support	(3.41; 3.53)	Moderate
Autonomy/work discretion	(3.46; 3.58)	Moderate
Rewards /reinforcement	(3.45; 3.61)	Moderate

Based of the presented results, the statement of H1 is not confirmed (that the tested parameters are with high values). It can be concluded that EI is at moderate level; the factors for CE (management support, autonomy/work discretion and rewards/reinforcement) are at moderate level.

The characteristics of the software industry assume high levels of EI and high values of the factors of the internal environment supporting CE. A further analysis is performed to clarify the results by dividing the sample into sub-groups by: gender, age, education, job position, level in hierarchy.

- In the sub-groups divided by gender, education and number of years on the current job no differences in results from the general sample are observed for the level of EI and the factors for CE – all results remain in the moderate range.
- In the sub-group filtered by age: for the age group 36-39 yr.o. high levels are observed for CE factors "autonomy /work discretion" and "rewards/ reinforcement". For the age group of over 40yr.o. the factor "rewards/ reinforcement" has value in the high range of the scale.
- In the sub-groups divided by job position there are high levels of EI and the factors for CE for the positions "design and creative solutions", "project and quality management", "company

management”. For “marketing and sales” the levels for all CE factors are in the high range.

- For the sub-groups by hierarchy level there are high levels for EI and all CE factors for top and middle management levels.

Thus, it can be concluded that there is no shared understanding for internal entrepreneurship across companies’ functional departments and hierarchy levels. The sub-group analysis has practical value for preparing specific recommendations for the companies participating in the study: on which levels and functions in the organization they can focus to increase EI and improve specific CE factors.

H2: EI depends on the factors of organizational climate for CE (management support, autonomy / work discretion, rewards / reinforcement).

$$H_0 : r = 0 \text{ and } H_a : r \neq 0$$

The correlation analysis in table 5 directly shows the solution for the hypothesis.

Table 5. Correlation between EI and CE factors

Tested variables**	Correlation Spearman's rho	Relationship
EI – management support	0.56	Moderate positive
EI – autonomy / work discretion	0.56	Moderate positive
EI – rewards / reinforcement	0.43	Weak positive

** Correlation is significant at the 0.01 level (2-tailed). N=317.

The null hypothesis can be rejected for all tested relationships thus accepting the alternative hypothesis as $r \neq 0$.

Therefore, there is a statistically significant relationship among tested variables and hypothesis 2 is confirmed: EI depends on the factors for CE – management support, autonomy/ work discretion, rewards/ reinforcement.

In order to determine the nature of the relationship between EI and the factors for CE, a regression analysis is performed. Step-by-step multiple regression is used to assess the influence of the CE factors (independent variables) on EI

(dependent variable). In order to eliminate multicollinearity – the factor rewards / reinforcement was excluded from the model.

Table 6. Stepwise regression model summary

Model*	R	R Square	Adj. R Square
1	.588 ^a	.346	.344
2	.658 ^b	.433	.430

a. Predictors: (Constant), Management support

b. Predictors: (Constant), Management support, Autonomy and work discretion

*Sig. F Change for model 1, model 2 = .000; Std. error of the estimate: model 1 = .356, model 2 = .3316.

The results are significant at <0.05 level and give the following two linear models:

Model 1:

$$EI = 1.85 + 0.47 * \text{Management support}$$

Model 2:

$$EI = 1.46 + 0.32 * \text{Management support} + 0.26 * \text{Autonomy and work discretion}$$

By comparing the two models it is evident that model 2 shows a better explanatory qualities and is further used to comment the results. The R square for model 2 indicates that 43% of the change in EI depends on the factors management support and autonomy/ work discretion.

It can be concluded that for the Bulgarian software companies 43% of the change in EI level is caused by changes in the levels of management support and autonomy/ work discretion. Within the framework of the model the most significant and contributing factor is management support – explaining 35% of the change in EI.

The results from the regression analysis have practical value for Bulgarian software companies, also indicating how businesses can influence the level of EI – by increasing the management support and enhancing the work autonomy among the employees. The two-factor linear model for EI has academic value for further research for more factors that contribute to the explanatory power of the model.

H3: EI depends on the following characteristics of the researched population: job position, number of years on the current job, hierarchy level.

$$H_0: r = 0 \text{ and } H_a: r \neq 0$$

The correlation analysis in table 7 directly shows the solution for the hypothesis.

Table 7. Correlation analysis for testing H3

Tested variables**	Correlation Spearman's rho	Relationship
Job position – EI	0.49	Weak positive
Number of years on current job – EI	0.15	Very weak positive
Hierarchy level – EI	-0.32	Weak positive

** Correlation is significant at the 0.01 level (2-tailed). N=317.

The null hypothesis can be rejected for all tested relationships thus accepting the alternative hypothesis as $r \neq 0$.

Hypothesis 3 is confirmed with the following specifics: there is a weak statistically significant relationship between: job position, number of years on the current job and hierarchy level on one side – and EI on the other. The moderate level of EI values and the sample structure dominated by developers probably contribute to the weak strength of the examined relationships.

H4: There is a relationship between the internal organizational factors for CE (management support, autonomy / work discretion, rewards / reinforcement) and the following characteristics of the researched population: job position, number of years on the current job, hierarchy level.

$$H_0: r = 0 \text{ and } H_a: r \neq 0$$

The correlation analysis in table 8 directly shows the solution for the hypothesis.

Table 8. Correlation analysis for testing H4

Tested variables**	Correlation Spearman's rho	Relationship
Job position – management support	0.58	Moderate positive
Job position – autonomy and work discretion	0.55	Moderate positive
Job position – rewards and reinforcement	0.34	Weak positive
Number of years on the job – management support	0.24	Very weak positive
Number of years on the job – autonomy and work discretion	0.19	Very weak positive
Number of years on the job – rewards and reinforcement	0.17	Very weak positive
Hierarchy level – management support	-0.47	Weak negative
Hierarchy level – autonomy and work discretion	-0.46	Weak negative
Hierarchy level – rewards and reinforcement	-0.34	Weak negative

** Correlation is significant at the 0.01 level (2-tailed). N=317.

The null hypothesis can be rejected for all tested relationships thus accepting the alternative hypothesis as $r \neq 0$.

Hypothesis 4 of the study is confirmed with the following specifics: there is an overall weak relationship between number of years on the current job and hierarchy level on one side and the CE factors. The strongest relationship is observed between job

position and the CE factors: management support, autonomy and work discretion.

8. Conclusion

The study results show that the EI and the factors for CE in the studied population are at moderate level. The extended recommendations to the participating software companies include initiatives for improving management support, autonomy and work discretion and rewards and reinforcement that will lead to increased levels of entrepreneurial intensity.

The results from the management and middle management positions lie within the high ranges of the measurement scale while responses from the employees lower in the hierarchy tend to be on the low levels of the scale. The same differentiation is present among different job positions – low levels dominating among developers that are 53% of the respondents. A special attention is needed from business managers in order to create shared vision and understanding of the strategy, processes and activities related to CE in the organization – at all company levels and for all job positions. From the regression analysis a conclusion can be made that companies can best influence the level of EI through enhancing management support and work autonomy.

The approbation of a well-known research instrument for studying corporate entrepreneurship in Bulgaria creates opportunities for cross-cultural research comparisons. The presented study results provide further basis for comparative studies and international cooperation in the field of corporate entrepreneurship.

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