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The Innovation - Corporate Performance Relationship in Emergent Countries

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Abstract

Innovation has become a highly actual topic. The main goal of this study is to identify the existence of any possible impact of innovation on companies' performances in the case of companies from 115 emergent countries, based on data provided by the World Bank. Thus, using the methodology of principal components analysis, we proposed two composite indexes: a multidimensional composite index measuring the corporate sector's innovation and another composite index measuring the companies' performances for selected countries.

In the case of innovation, four different dimensions were taken into consideration oriented towards the company's endeavor in obtaining the recognition of its products' quality and accounting practices and also in enhancing its visibility on market and improving communication with business partners using information and communication technologies. Also, corporate performances were described by four measures regarding the dynamics of the annual sales and labor productivity and the company's propensity towards investing in fixed assets or in employee's formal training.

The main output of this paper is that, using the generalized linear model in order to identify the relationship between the proposed two composite indexes, the innovation described by the selected dimensions has a significant influence on companies' performances measures in selected countries.

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1. Introduction

In the context of current economic environment innovation represents a burden topic for academics, researchers and practitioners as well. Comprehensive research studies on the innovation topic have highlighted its major role both for the survival of companies, and also for increasing their performance and development (García-Morales, Jiménez-Barrionuevo & Gutiérrez-Gutiérrez, 2012; Azubuike, 2013). For the future evolution of a company, regardless how small the extent of corporate innovativeness is, it is preferable instead to lack of innovation.

Although there is a wide literature attempting to unravel the relationship between innovation and corporate performance, there is no full consensus of views on the impact of innovation on company's performance. The research studies on this direction are taking into account different dimensions of innovation process and also different measures for company's performance and therefore the results are very different.

Gopalakrishnan (2000) reveals that some researchers are focusing on innovation magnitude, while other researchers are highlighting the innovation speed. And also some research studies are focusing on corporate performance from a financial point of view, while other studies are taking into account the effectiveness perspective on performance. This is the reason why the research results regarding the relationship innovation – corporate performance are sometimes even divergent, depending on the different perspectives adopted.

But still it have been noticed some important views on the relationship between innovation and corporate performance. The classical studies on the relationship between innovation and the corporate performance have generally shown a positive effect of innovation on different measures of company's performance (Klomp &Van Leeuwen, 2001; Hashi & Stojcic, 2010). These studies usually measured innovation by referring to innovation input.

On the other side, a modern approach of the relationship between innovation and the corporate performance has emerged. This modern approach is based on models that suggest the need of focusing on the complex innovation process and also on the ways based on which the innovation effort can be superiorly harnessed into increased corporate performance. The basic pattern of this new trend is the four stages model of innovation process developed by Crepon, Duguet & Mairesse. (1998). The impact of innovation on company's performance may vary depending on broad contextual factors (Rosenbusch, Brinckmann & Bausch., 2011). The most revealed factors affecting the relationship between innovation and corporate performance are: the industry and its dynamism, the company's size and the nature of its activity and also the approached innovation types.

In his demarche of illustrating the relationship between innovation and company's performance in the context of industry dynamism, Thornhill (2006) showed that innovation is a determining factor for company's performance. Thus, Thornhill (2006) has highlighted that the industry dynamism drives forward to innovation in companies and further, innovation boosts the company's performance. He found that the level of company's performance is influenced by the company's knowledge, innovation and the level of industry's dynamism. Coad & Rao (2008) have revealed that regardless of the industry, no company will survive without innovating, but Mansury & Love (2008) have concluded that the innovation impact on firm performance is different depending on the industry in which it operates.

The effect of innovation on corporate performance is determined also by the nature of company's activity. Thus, analyzing the relationship between innovation and corporate performance, Freel & Robson (2004) have revealed that the effect of innovation activities on corporate growth performance is different in service companies compared to manufacturing companies. Their study emphasized that incremental innovation processes carried out in service companies increases the company's performance (measured by sales volume and productivity). Also, they have shown that, in a short-term view, product innovation processes implemented in manufacturing companies, either radical or incremental innovation, have a negative influence upon the evolution of sales volume and productivity, as measures of corporate performance. Damanpour, Walker & Avellaneda (2009) have conducted an analysis of the innovation activity of a panel of service companies from UK, trying to highlight the positive effect of innovation on company's performance. In their study they demonstrated that, in order to have a positive effect of innovation on the service company's performance, adopting several innovation types and also a continuously changing the mixture of innovation types will help. This will allow gaining distinctive competencies for service companies and will reduce the imitation risk for services. Atalay, Anafarta & Sarvan (2013) investigated the link between innovation and corporate performance in 113 Turkish companies operating in a highly innovative industry that is among the most competitive industries worldwide. Their research findings show that in order to increase the corporate performance,

the companies from highly innovative industries have to focus mainly on product and process innovation. Due to the specific features of these industries, non-technological innovation in companies operating in highly innovative industries is not able to induce the corporate performance growth. (Atalay, Anafarta & Sarvan, 2013).

The specific features of the link between innovation and corporate performance for the manufacturing companies were analyzed also by Hassan,, Shaukat, Nawaz & Naz (2013). Their research showed that in the case of the manufacturing companies the corporate performance improvement may be achieved by enhancing innovation activities in companies. Thus, their findings reinforce the conclusions of Gunday, Ulusoy, Kilic & Alpka (2011) regarding the positive influence of innovation on corporate performance in manufacturing industries.

The company's size and the approached innovation types are also influencing the effects of innovation on corporate performance. Klomp & Van Leeuwen (2001) have highlighted the crucial role of the innovation process on the company's overall sales performance and productivity. Rosli & Sidek (2013) brought new arguments supporting the theory regarding the major role of innovation in increasing the company's performance. They proved that innovation is a key factor for increasing the small and medium size companies' performance, and not just for large companies. Their research results showed a positive influence of product and process innovation on the company's performance. Further, an insignificant effect of marketing innovation on company's performance in a competitive business environment was pointed out, at least in the case of small and medium size companies.

By the other hand, Kemp, Folkeringa, de Jong, & Wubben, (2003) have mentioned opposite results to the formerly referred. Based on their research findings, in the case of SMEs any impact of innovation neither on the corporate productivity nor on the corporate profitability cannot be shown. In the same time, their research conclusions highlighted a small positive impact of innovation on turnover and employment growth. Palangkaraya, Spurling & Webster (2014) have revealed that the impact of innovation on corporate performance may be very different, depending on company size and the different types of innovation approached. They have showed that in the case of SMEs, innovation increases productivity with a significant percent over the next four years. Thus, the strongest impact on the corporate performance of SMEs was highlighted in the case of organizational innovations, managerial innovations and science based innovations. In the case of large companies, in order to increase the corporate productivity, innovation must be accompanied by an effective corporate management. Masso & Vahter (2007) found in their study conducted in an emerging country, that the corporate productivity is strongly positively influenced by process innovations, while the product innovations have no impact on the corporate performance.

In the attempt to unravel the link between innovation and corporate performance, in literature there are highlighted many and varied relevant variables for measuring innovation activity in companies and also, other variables for measuring corporate performance. Thus, Abazi-Alili (2014) noted that the most commonly used measures for innovation at the company level are: R&D expenditure - measuring innovation by referring to innovation input, patents - measuring innovation by referring to output, and introducing a new product/process - measuring innovation by referring to output accepted by the customers. The corporate innovativeness is closely related to human resource training. Baldwin (1999) has revealed that most innovative companies are more likely to be involved in formal training than other companies that are less innovative.

Kemp, Folkeringa, de Jong & Wubben. (2003) based on the research findings of Sirelli (2000), argued that the most frequently used measures of corporate performance are: growth rates of sales, sales per employee, export per employee, total employment, total assets value, operation profit ratio and return on investment. Moreover, Hashi & Stojcic (2010) taking into consideration the research results of Loof & Heshmati (2002), Bessler & Bittelmeyer (2008), have strengthened the argument that the most commonly used measures of corporate performance are productivity, sales, export revenues, return on assets and profit.

Based on the wide literature, there is a very complex relationship between innovation and corporate performance. Each of innovation dimensions is closely linked to different measures of the corporate performance (Gopalakrishnan, 2000). Therefore, in the attempt of perceiving more of the complex link between innovation and the corporate performance, Subramanian & Nilakanta (1996) suggest that innovation must be approached from a multidimensional perspective.

The innovation is acting systemically, embracing all the areas of companies' activity. From R & D to personnel, all the business's activities are under the impact of innovation. Its scale and deployment is different, depending on the nature of business. The areas where the innovation is the most intense are those that are at the forefront of

renewal, such as research and development and technology. However, regardless the intensity of innovation impact in different activities, its approach must be global, based on a multidimensional perspective.

2. Data and methodology

Given the contradictory results of studies so far, we have tried expanding the meaning of the relationship between innovation and corporate performance, connecting other dimensions of innovation, less addressed until now, with different measures of corporate performance.

Based on a multidimensional approach of innovation and corporate performance, this paper contains two main stages, in order to identify the possible influence of innovation on companies' performance. In the first stage, using the methodology of principal components analysis, were developed two composite indexes. The first one is a multidimensional composite index measuring the innovation activities in companies relied on four dimensions of innovation proposed by World Bank. The second one is a composite index quantifying the corporate performance based on four different measures of company's performance used also by World Bank. In this regard was used a dataset composed with data provided from World Bank databases (www.enterprisesurveys.org and www.data.worldbank.org). The dataset contains information regarding companies from 115 emergent countries of Africa, Asia, Central and Eastern Europe and Latin America, covering a period of 13 years, from 2002 to 2014. In order to achieve the long-run trend in case of all proposed variables were calculated averages over the time span. Both of those composite indexes were created basing on relevant variables for each field of analyse.

In the literature, there are various multidimensional indexes measuring innovation at countries' level based on a relatively large number of complex indicators. Unlike the existing multidimensional indexes measuring innovation, the framework for building the proposed multidimensional composite index measuring the innovation activities is based on continuity and a constant character for the methodology and the dataset over the entire 13 years period taken into account.

Thus, the multidimensional composite index regarding innovation is developed based on variables taking into account different dimensions of innovation (as proposed by World Bank) such as "percent of firms with an internationally-recognized quality certification" (IN1), "percent of firms having their own Web site" (IN2), "percent of firms using e-mail to interact with clients/suppliers" (IN3) and "percent of firms with an annual financial statement reviewed by external auditors" (IN4).

Companies with an internationally-recognized quality certification are oriented towards innovations concerning fulfilling customers' quality requirements and continually enhancing their satisfaction, the quality improvement of processes developed in company and also regulatory compliance. Focusing on this type of innovation is able to induce continually improvement of business performance. Companies having their own webpage reveal an orientation towards innovation to make them more visible on market. Having their own webpage will increases online sales volume for these companies, will enable better connections with customers and will provide openness for these companies (Barone, 2011). Companies using e-mail to interact with clients/suppliers prove their focus on innovations improving communication with business partners. Using e-mail to interact with partners enhances communications, removes geographical boundaries and allows better networking for companies with customers and suppliers. This faster and more cost effectively way of communication may grow the productivity, it enables a better communication between the company and the market, hastens the perceiving of changes in customers' requirements, and allows faster solving of the customer demands (Acevedo, 2016; Kooser, 2016). Companies with an annual financial statement reviewed by external auditors highlight that they are concerned with innovations aimed at improving the company's image and strengthening relationship with stakeholders. These company's financial statements reviewed by external auditors provide credibility to shareholders, investors, financial institutions and reinforce the company image in dealing with business partners.

As well, the composite index measuring the companies' performance was build considering different measures of corporate performance used by World Bank, both financial and non-financial variables, such as 'real annual sales growth' (CP1), 'annual labour productivity growth' (CP2), 'percent of firms buying fixed assets' (CP3) and 'percent of firms offering formal trainings' (CP4) (Table 1). In terms of building the composite index quantifying the corporate performance, the framework was also based on the continuity and steadiness of the methodology and dataset used for the 13 years period considered.

The real annual sales growth and the annual labour productivity growth are both recognized by literature as

significant measures for corporate performance. (Kemp, Folkeringa, de Jong & Wubben, 2003; Sirelli, 2000; Hashi & Stojcic, 2010; Loof & Heshmati, 2002; Bessler & Bittelmeyer , 2008).

Companies wired for innovation keep pace with technological evolution and require continuous renewal of equipments. Capital investment by acquiring fixed assets is an expression of company' performance (Brynjolfsson & Saunders, 2010). Companies that innovate focusing on high quality products and services require highly skilled employees. Training employees in order to develop the human capital of the company is an expression of corporate performance. (Baldwin & Johnson, 1995; Baldwin, 1999).

Table 1. The variables used in the estimated model regarding innovation and companies' performance

Innovation quality variables	Corporate performance variables
"Percent of firms with an internationally-recognized quality certification" (IN1)	"Real annual sales growth" (%) (CP1)
"Percent of firms having their own Web site" (IN2)	"Annual labour productivity growth" (%) (CP2)
"Percent of firms using e-mail to interact with clients/suppliers" (IN3)	"Percent of firms buying fixed assets" (CP3)
"Percent of firms with an annual financial statement reviewed by external auditors" (IN4)	"Percent of firms offering formal training" (CP4)

Source: Authors' design based on World Bank database http://www.enterprisesurveys.org

The framework of the principal component analysis was used in developing both indexes in order to retain the most relevant variables. This methodology suppose that co-variation of proposed variables is explained by the existence of one or several latent variables – factors – that has a causal influence on the analysed variables. The primary rationale for selected methodology consists in supposing that variables are highly correlated and as well in intention to decrease the dimension of the interrelated variables preserving as much as possible the variation of dataset (for details see Dima, Ionescu & Tudoreanu 2013; Jolliffe, 2002).

After configuring these two proposed indexes, in order to identify the impact of the multidimensional composite index regarding innovation on the companies' performance composite index, the second stage of the paper is based on the methodology of generalized linear model (GLM), which consists in a flexible proposal for the ordinary least squares regression (for details see Nelder & Wedderburn, 1972; Wedderburn, 1974). In implementation of generalized linear model, considering the characteristics of the dataset, was used the Gaussian distribution, typical in case of random variables with unknown distribution. As well, we selected an Identity link function and assumed the relevance of Newton-Raphson method in order to check the strength of empirical results. In addition, in order to check the robustness of our assumption the model contains two control variables: money and quasi money growth and, also, the proportion of private foreign ownership in a company.

3. Results

The results of principal components analysis in case of variables related to innovation are illustrated in Table 2. Thus, the first section of the table reveals information regarding the number of retained components and the second section summarizes the situation regarding eigenvectors. These results show that the first principal component accounts 56% from the total variance of the proposed variables, while the second principal component describes 21% of the variance. In this regard, the first two principal components in case of variables describing innovation dimensions explain 77% of the global variance of the group. This situation can be considered adequate in order to construct an informational synthetic index considering the proposed explanatory variables.

As well, in the second section of the table is revealed the linear combination of coefficients for the first component. Thus, it can be observed that in the case of this component there is a roughly equal linear combination of all four variables related to innovation, which allows us to consider this a relevant indicator in order to define the innovation for selected observations.

Table 2. Principal Components Analysis in the case of innovation variables (dimensions)

Eigenvalues: (Sum = 4, Average = 1)				
Comp.	Amount	Diff.	Percentage	Cumulative percentage
1	2.24	1.39	0.56	0.56
2	0.85	0.15	0.21	0.77
3	0.70	0.49	0.18	0.95
4	0.21	-	0.05	1.00
Eigenvectors (loadings):				
Variable				PC 1
IN1				0.45
IN2				0.57
IN3				0.58
IN4				0.37

Notes: Included observations: 115; Computed using: Ordinary (un-centred) correlations; Extracting 4 of 4 possible components.

Source: Authors' calculation

Following the application of the same methodology in case of variables related to companies' performance, the results are highlighted in Table 3. In this context, it can be observed that the first principal component describes 53% of the global variance, while the second component contributes with 37%. Thus, the cumulative proportion of the first two components is a considerable one, totalling 90% of the global variance, which allows us to consider this result significant in order to build an informational index related to companies' performance. Moreover, the second part of the table shows positive and close values in case of the linear combination of coefficients, enhancing the intention to consider this like a representative indicator in case of corporate performance.

Table 3. Principal Components Analysis in case of variables related to corporate performance

Eigenvalues: (Sum = 4, Average = 1)				
Comp.	Amount	Diff.	Percentage	Cumulative percentage
1	2.12	0.64	0.53	0.53
2	1.48	1.15	0.37	0.90
3	0.33	0.27	0.08	0.98
4	0.06	-	0.02	1.00
Eigenvectors (loadings):				
Variable				PC 1
CP1				0.60
CP2				0.59
CP3				0.39
CP4				0.38

Notes: Included observations: 115; Computed using: Ordinary (un-centred) correlations; Extracting 4 of 4 possible components.

Source: Authors' calculation

Based on the construction of these two proposed composite indexes, the second stage of the paper analyses the influence of the innovation composite index on the corporate performance composite index, using the framework of generalized linear model. As well, in order to test the proposed hypothesis in the model were included two control

variables such as Annual money and quasi money growth (%) and Proportion of private foreign ownership in a company (%). It must be noticed that these two control variables were calculated as well as an average value for the same period - from 2002 to 2014 - and we expect ex-ante positive coefficients in both cases. In this context, in Table 4 are highlighted the empirical results provided by GLM estimation of the innovation impact on corporate performance.

Table 4. GLM estimation of the innovation influence on companies' performance

Variables	Dependent variable: Corporate Performance Composite Index	
	Coefficients	Robust standard errors
Innovation Composite Index	0.37***	0.09
Money and quasi money growth (annual %)	0.05***	0.01
Proportion of private foreign ownership in a firm (%)	0.06***	0.02
Number of observations	115	
Pearson SSR	184.84	
Log likelihood	-190.46	
Modified Akaike Information Criterion	3.38	
Bayesian Information Criterion	-341.85	
Pearson statistic	1.67	

Notes: *** and ** represent statistical significance at 1%, 5%, and 10% level. Generalized Linear Model a) Family: Gaussian; b) Link function: Identity; c) Optimization algorithm: Newton-Raphson.
Source: Authors' calculation

The results reveal that the Innovation Composite Index has a positive and strong impact on companies' performance, being statistically significant at a level of 1%. Moreover, it can be observed that both control variables – Proportion of private foreign ownership in a firm and Money and quasi money growth – exercise a strong positive influence on corporate performances, being also statistically significant at 1%. In this regard, considering the values obtained in case of estimated coefficients and t-statistics, we can appreciate that the research hypothesis is confirmed and innovation is a significant exploratory factor for companies from emerging countries in order to improve their performance. However, the companies' performance growth is accelerated in the most innovative fields, especially for companies having highly skilled employees. Thus, the importance of providing formal training to employees is obvious (Baldwin & Johnson, 1995; Baldwin, 1999).

4. Concluding remarks

As Masso & Vahter (2007) have shown, the most studies on the relationship between innovation and corporate performance are relating to highly developed countries and there is a need for such research studies regarding emerging countries, especially from Central and Eastern Europe.

The present paper is addressing this challenge, analysing the possible influence of innovation on companies' performance using a dataset of companies from 115 emerging countries from a more extended geographical area, comprising Africa, Asia, Central and Eastern Europe and Latin America. Based on the contradictory results of studies so far, this research study extended the meaning of the relationship between innovation and corporate performance.

The main contribution of this study at the existing literature results is represented by the proposal of connecting other dimensions of innovation, less addressed until now, with different measures of corporate performance. Thus, this research study proposes an approach based on four new dimensions for innovation mainly focused on the company's relationship with customers and other stakeholders. These new dimensions of innovation expand the classical perception and propose perceiving innovation in the light of company's efforts for improving its visibility

on the market, enhancing the communication with business partners, fulfilling customers' quality requirements for continually enhancing their satisfaction and also improving the company's image and strengthening its relationship with stakeholders.

Taking into consideration these four new dimensions of perceiving innovation, in this research study a multidimensional composite index is developed to further test the influence of this composite index on companies' performance. Thus, the main output of this research supports the hypothesis that in emergent countries the corporate performance is significantly influenced by the companies' propensity to innovate.

The model brings new evidences and reinforces the theory that innovation is a very important factor for companies' performance growth, making the difference between companies with fast increase trend of their performance and companies with slow increase or without any improvement of corporate performance (Baldwin, 1999). Innovation is happening in all spheres of activity, not only in high technology fields. In most areas there are opportunities of innovating and the innovative companies have the best chance to improve their corporate performance (Coad & Rao, 2008; Thornhill, 2006).

Companies that have achieved higher performance through innovation will spend more on innovation activities to achieve even higher performance. If higher performance is achieved, the importance given to innovation in companies will rise. By the other hand, on long term no company will survive without innovating, regardless of its area of activity or development level.

Developing and supporting innovation is the only way by which the power of innovation induces maximization of the ratio between the risk of assumed strategy and the resulting benefits, providing a permanent base for the corporate performance's growth.

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