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**Gender and Innovativeness of the Enterprise: the Case of Transition Countries**

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**Abstract**

Little knowledge exists on difference in innovation behavior of men and women leading the SMEs in transition countries. This paper estimates whether there is a gender gap in SMEs innovation actions. Results show that propensity to innovate is higher among female owners and this finding preserves for 5 measures of innovativeness. Thus, female involvement in business might be beneficial for the innovative sustainable development of economy. Estimation of the gap in performance of implemented innovations did not reveal any strong prevailing gender in terms of efficiency.

**Keywords:** Small and medium enterprises, innovation activities, gender differences

**JEL Classification:** O31, O32, J16, L25

Belarusian Economic Research and Outreach Center (BEROC) started its work as joint project of Stockholm Institute of Transition Economics (SITE) and Economics Education and Research Consortium (EERC) in 2008 with financial support from SIDA and USAID. The mission of BEROC is to spread the international academic standards and values through academic and policy research, modern economic education and strengthening of communication and networking with the world academic community.

## **1. Introduction**

Role of SMEs is rising permanently lately and they are considered as one of the main engines of economic growth (Radas and Botic, 2009), the backbone of economy (Duarte, 2004; Lucasc, 2005; WIPO, 2006) and the largest contributor to country's employment (Arokiasamy & Ismail, 2009; Meghana et al., 2011; Garikai, 2011). At the same time sustainable economic development is in need of competitive industries, which are only possible in case of being innovative (Hall, 1999; Kaizer et al., 2002; Verspagen, 2005; Kaplan and Waren, 2007; Liao et al., 2009; Ramadani and Gerguri, 2011). Innovativeness of the economy depends on the actions of not only the large companies, but also the SME sector and individual entrepreneurs. Indeed, the latter are often argued to be more dynamic and more ambitious force (Chalmers, 1989; Li and Rama, 2015).

The decision whether company follows innovative strategy depends on company's leader, experience and other managerial characteristics. However, experience is not the only factor affecting managerial actions. The role of gender also matters (Daunfeldt and Rudholm, 2012). Absence of clear answers and lack of knowledge on female managerial characteristics together with their innovativeness (Alsos et al., 2013) make it difficult to evaluate their role in modernizing business society and to distinguish their competitive advantages or disadvantages over male managers and business owners. This question becomes even more ambiguous for SME sector as before that innovations were only associated with the technological developed and capital-intensive industries (Dauzenberg, 2012; Marlow and McAdam, 2012) while SME sector was almost uncovered (Radas, 2009; Umidjon et al., 2014) and requires additional analysis. This also explained lack of focus on gender factor, as men (usually dominate capital-intensive industries (Ljunggren et al., 2010). At the same time studies on innovativeness of SMEs focus on developed world (Busolt and Kugele, 2009; Danilda and Thorslund, 2011) or a single country (Radas, 2009) without coverage of the transition post-communist economies. This paper makes a special focus on the case of transition countries and CIS block in particular for the certain reason. The labor market under communism and in USSR explicitly officially provided equal rights to women. However, in practice women were treated differently than men. On the one hand they had

to do the same work that men did. On the other hand, the patriarchal society remained and all the housework and childcare were fully considered as female and resulted in existence of the so-called “double burden” for women (Katz, 2001). However, despite the official equality men were still assessed as main decision makers and this explained under presence of women in the top-managerial positions and that they had weaker business ties and networking (Welter et al., 2004).

The consequences of it are still observed in post-communistic labor market. The collapse of the Eastern block and USSR revealed unequal treatment of women. This occurred because of two main factors. First, the requirements for the work force became more severe. Increased competitiveness in the market, attraction of foreign investments and technologies requires additional skills and knowledge and consequently additional time spent on accumulation of this knowledge. Second, again, prevalence of patriarchal society stereotypes makes women in the labor market less attractive than men. Thus, in general, likely women feel more vulnerable and that forces them to stick to the job they have instead of doing risky steps in their career path.

However, current report of Centre of Entrepreneurs (2013) conducted with the support of Barclays Bank showed that difference in risk taking between men and women in business does not necessarily mean that women are more risk averse. It is all about distinction between opportunities and blank risk due to overconfidence and this is more a weak point of men than women according to report. Later on Humber and Brindley (2015) showed heterogeneous nature of women-entrepreneurs demonstrating significant relationship between attitude to risk and the socio-economic role and responsibilities of women.

Taking into account recent studies, this paper aimed to expand knowledge on gender differences in innovativeness of SMEs with a focus on transition economies and CIS block in particular. The purpose of the paper is to estimate whether there is a gender gap in SMEs innovation actions and the efficiency of implemented innovations. This is done using 5 different indicators of innovativeness, which are implementation of a new good/service, business process, marketing strategy, managerial method and spending on R&D activities.

The paper uses data from the 5<sup>th</sup> wave of the Business Environment and Enterprise Performance Survey (BEEPS) conducted by the World Bank and European Bank for Reconstruction and Development (EBRD) in 2012-2013. It covers SMEs from the 30 transition

countries and includes both manufacturing and services sectors. The conceptual framework of the analysis is similar to one presented by Crepon, Duget, and Mairesse (1998) and the estimation procedures are based on probit choice and Heckman selection models.

The results show that propensity to innovate is higher among female owners and this finding preserves for 5 measures of innovativeness. Thus, female involvement in business might be beneficial for the innovative sustainable development of economy.

Estimation of the gap in efficiency of implemented innovations showed slight differences in terms in strength of impact on performance but did not reveal any strong prevailing gender in terms of efficiency.

The paper contributes to the existing research in several directions. First, it follows (Dautzenberg, 2012) and confirms the positive effect of gender diversity of owners on innovativeness. It also highlights the need in promotion of female entrepreneurship and SMEs in particular. Second, the previous literature mostly focuses on the developed economies; I provide the estimations for the transition block and CIS in particular. The results reveal that the communistic past of the countries together with the peculiarities of the labor market under “gender equality” do not negatively affect on the innovative behavior of the women owners. Third, availability of BEEPS data allows using 5 different indicators of innovativeness that cover product and organizational innovative activities while previous literature mostly focused on innovation input in a form of R&D spending.

The rest of the paper is organized in the following way. Section 2 provides an overview of the related literature. Section 3 explains the methodological approach of the analysis. Section 4 shows how data was constructed and describes it. Section 5 presents estimates results. Section 6 summarizes the paper.

## **2. Literature**

### **2.1 Determinants of Innovativeness**

There are several ways to measure innovative performance. In general, this could be a process that transforms concepts and ideas into a final good (Thornhill, 2006; Baregheh et al., 2009). In particular, innovativeness could be implementation of a new good or service (Smith, 2005; Langley *et al.*, 2005; Romero and Martinez-Roman, 2012). Innovation products of the organization may also be presented in a form of patents which were obtained by the company. However, the results here might be contaminated because patents are more an

intermediate product and not the final original one, besides some new ideas, strategies and products cannot be patented (Kemp, et al., 2003). Another way is to measure new business process and knowledge, or modification of management and marketing strategies in the organization (Garud et al., 2013).

Literature on determinants of innovativeness divides influencing factors into several groups, which are general firm characteristics, features of the leader and business environment. Firm size and age are among the characteristics of the company that impact on its innovative behavior. Literature mostly finds positive relationship between the size and the innovativeness (Moch and Morse, 1998; Lee and Sung, 2005; Laforet and Tann, 2006). However, there are also opposite findings (Audretsch, 1995; Stock et al., 2002; Gabsi, 2008). Level of competition and market structure mostly show that innovativeness and willingness to survive and compete with others are going together (Tang, 2006; Radas and Bozic, 2009), this also holds for positive effect of export orientation (Pla-Barber and Alegre, 2007; Radas and Bozic, 2009; Chiara, 2010). Other studies emphasize the importance of the individual characteristics of a leader for the company's innovativeness. Mohamed (2005) as well as Laforet and Tann (2006) showed that direct positive relationship between the educational level of the CEO and his willingness to train personnel and the number of innovations implemented by SMEs. Marcati et al. (2008) pointed on the importance of such psychological traits as openness to unknown, risk-taking and willingness to implement something new. Level of development of financial market and existence of financial constraints are strong significant factors that affect company's innovativeness. Difficulties in access to capital decrease the propensity of innovative actions of the company (Ayyagari et al., 2007; Canepa and Stoneman, 2008; Rocha et al., 2010; Gorodnichenko, 2013) while presence of foreign shareholder usually has an opposite effect (Braga and Willmore, 1991; Guadalupe et al., 2012). As for the corruption, there is no strong agreement on the direction of the effect and the results are ambiguous (Fisman and Svensson, 2007; Anokhin and Schulze, 2009; Kramer, 2013).

## **2.2 Innovativeness and Firm Performance**

There is large amount of research devoted to the relationship between innovative performance of the enterprise and its' performance. Initially the empirical studies used spending on research and development (R&D) as a proxy for innovative activities of the

company and mostly found positive impact of them on the effectiveness and success of the company. Grilliches (1986) shows that the larger amount is spent on research and development in the company the better it performs. Similar results were obtained by other authors focused on similar question (Bosworth and Rogers, 2001; Favre et al., 2002; Block, 2012). However, later on spending on R&D was criticized as a biased instrument that does not necessarily reflects the effect of innovativeness. The key issue of the critique was spending on R&D is using input information and does not fully cover the effect of innovativeness on the performance. The economy shrank from high-intense productions towards services where it is not a necessity to spend enormous sums of money on the technological research. Much higher importance started playing other innovative actions like development of the human capital. Thus, using just spending on R&D lacks information regarding other innovative outputs of the organization and may provide misleading results (Kemp et al., 2003).

Focus on innovation output is another way of measuring effect of innovativeness on the enterprise's performance. Appearance of the new product or service in the organization is vital because of not just potential to accumulate higher profits (Klomp and Van Leeuwen, 1999; Ighomereho et al., 2013) but also because this is a direct way to improve firm's position in the market and to gain competitive advantage (Ramadani and Gerguri, 2011). The effect of innovative activities on the overall performance of the enterprise was estimated by a number of studies and mostly revealed strong significant link between them (Coad and Rao, 2008; Anderson et al., 2009; Robson et al., 2009).

### **2.3 Gender and firm performance**

Statistics shows that there is still a significant gap between the growth rates of male and female participation in self-employed sector (Parker, 2004). The share of females involved in business is usually much lower compared with male rates (Minniti and Arenius, 2003). The number provided by the World Bank Enterprise Surveys<sup>1</sup> shows that on average only 35.2% of firms have females among owners and just 17.3% of the enterprises have female CEOs.

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<sup>1</sup><http://www.enterprisesurveys.org/Data/ExploreTopics/gender>

The literature in gender differences in business provides ambiguous results on whether male entrepreneurs perform better than women (Cooper et al., 1994; Du Rietz and Henrekson, 2000; Carter et al., 2003; Johnson and McMahon, 2005; Robb and Watson, 2011, Mahmood et al., 2012). In general, there are two main theories in the literature that explain possible differences in participation rates together with gap in performance of men and women (Fischer et al., 1993; Calixte et al., 2005). The first one is a theory of liberal feminism. Its' main idea is that initially men and women are the same and their level of effectiveness is similar. However, women are coping with larger number of obstacles because of discrimination through lack of experience, financial constraints (Cavalluzzo et al., 2002; Myravyev et al., 2008). This limits their possibilities and results in lower performance. Another opinion is expressed in the theory of social feminism. The main postulate of that theory is that socialization process of men and women is different, their attitude to risk is heterogeneous (Eckel and Grossman, 2008; Croson and Gneezy, 2009; Ahren and Dittmar; 2011) as well as motives that push or pull going into business (Boden, 1999; Georgellis and Wall, 2005; Arenius and Kovailanen, 2006) and as a result their values and perception of universe are not the same.

## **2.4 Gender and Innovation**

Despite the fact that there is no doubt regarding the importance of innovativeness in terms of its' further impact on firm's performance there is little knowledge on gender gap in innovative activities in business (Alsos et al., 2013). The question of gender and innovation in entrepreneurship just starts attracting attention. Earlier innovativeness was strongly connected and associated with high-tech companies. Thus, innovation research mostly focused on the technology-based and capital-intensive industries (Dauzenberg, 2012; Marlow and McAdam, 2012). This implied focus on large companies, which are able to provide sufficient funding to their R&D activities. As a result, innovation behavior in small and medium enterprises from less capital intensive industries were mostly out of scope of interest and require further analysis. This also explained lack of focus on gender factor, as men (usually dominate capital-intensive industries (Ljunggren et al., 2010). Besides, the geographical focus of research on gender and innovation is mostly describing situation in Scandinavian block (Petterson, 2007; Danilda and Thorslund, 2011) and Western world

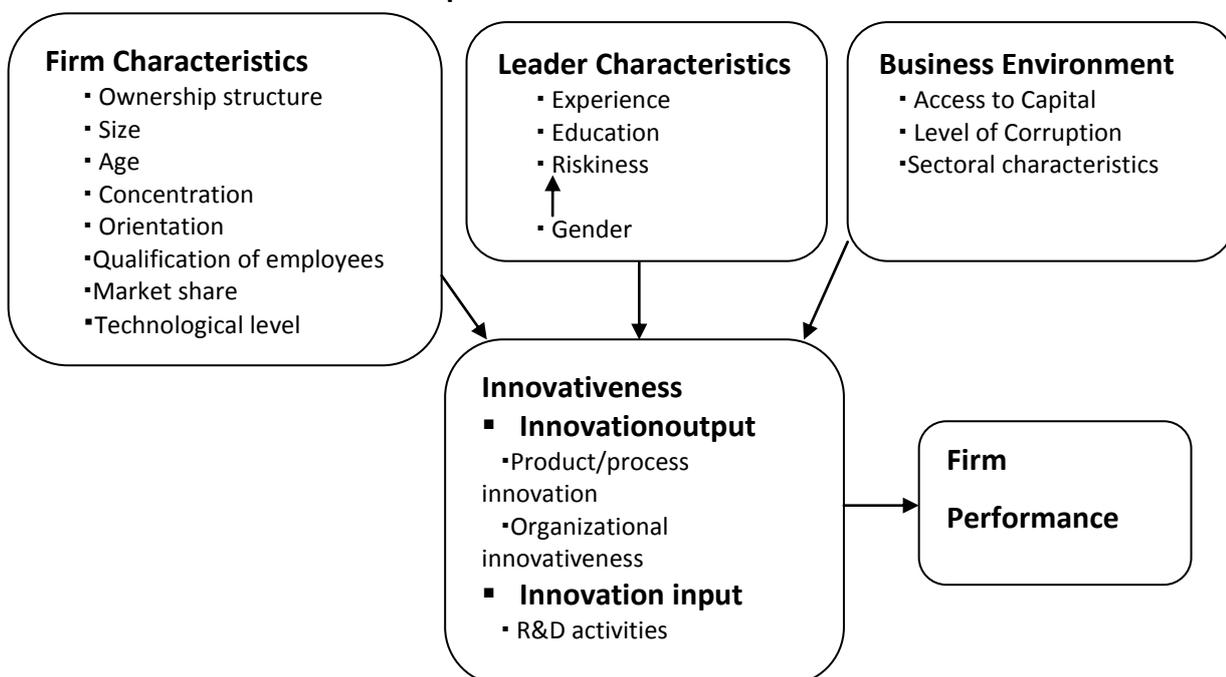
(Busolt and Kugele, 2009), while knowledge about transition countries and CIS block remains almost absent.

### 3. The Framework of the Model and Hypotheses

This project applies a structural model similar to one used by Crepon, Duget, and Mairesse (1998) and Camison (1999) (Figure 1). The model aims at estimating the factors that affect innovative behavior of the company and evaluating its impact on firm's effectiveness. Thus, first, various exogenous factors influence on company's decision to develop and implement innovations. Second, implemented innovations impact on the performance of the company. The main phases of the structural model are the following: 1. An agent decides to follow innovative behavior and puts an effort to produce any innovation either product or operational one. 2. Innovation activity occurs and a new product is implemented. 3. The implemented product affects performance of the company together with other influencing factors.

The research consists of two parts. The first part aims to evaluate the propensity to innovate by gender. Thus, it follows the literature on similar topic and uses discrete choice behavior model based on probit econometric techniques, as it allows estimating these propensities. This technique also helps taking into account other important influencing factors and individual characteristics, which likely affect the innovative decision.

**Figure 1. Structural Model of Determinants of Innovativeness, Implemented Innovations and Performance of the Enterprise**



The basic model specification is considered in the following form:

$$\text{prob}(\text{Innovate}_{zik} = 1) = \Phi(\alpha T_{ik} + \beta O_{ik} + \gamma X_{ik} + \varepsilon_{ik}) \quad (1)$$

where **Innovate**<sub>zik</sub> =1 in case firm i from country k declared innovative act z during the last three years. The innovative activity could be performed in several z ways, therefore not one, but a number of regressions is estimated. The forms of the innovative activity are the following: introduction of the new product or service, production process innovation, new marketing methods, organizational innovation and r&d activity. **T**<sub>ik</sub> is a gender of the top manager in firm I in country k, **O**<sub>ik</sub> – gender of the owner of the firm I in the country k. **X**<sub>ik</sub> – other characteristics of the firm I from country k that may affect the innovative decision.  $\Phi$  is the cumulative distribution function (CDF) of the standard normal distribution. The model is estimated for the whole dataset and separately for CIS and non-CIS region in order to see whether the decision to perform innovative activities is affected differently by gender and other independent variables in these two blocks of the transition world.

The dominant literature on gender, business and innovations demonstrates gap in results between women and men because of different reasons (Carter and Show, 2006; Bure, 2007; McAdam and Marlow, 2008; Busolt and Kugele, 2009). It forms the main hypothesis to be tested in the 1 part of the study, which is that innovativeness of women involved in business activities is different from men.

Therefore the **Hypothesis 1**: propensity to introduce new initiative varies by gender of the leader in the company.

The goal of the second part of the research is to look whether gender of the innovative leader determines the strength of effect of the implemented activity and how it affects firm's performance. Again, this part is estimated for the whole dataset and separately for CIS and non-CIS region in order to capture the regional variety. Busolt and Kugele (2009) state that the economic efficiency and social development are the reasons explaining that innovation impact of women in quantitative and qualitative terms lacks behind men's. Thus, the hypothesis to be tested here is that following the results of the previous research innovativeness of the enterprise managed by the female CEO or owner has different effect on the performance of the company compared with male managed and owned companies.

**Hypothesis 2:** Effect of female innovativeness on business performance is different to male.

The basic specification of the model is usual linear regression analysis

$$\ln Y_{ik} = \delta T_{ik} I_{zik} + \lambda O_{ik} I_{zik} + \gamma X_{ik} + u_i, u_i = N(0, \sigma^2) \quad (2)$$

where  $Y_{ik}$  - performance of the company  $I$  from country  $k$ .  $T_{ik} I_{zik}$  - the interaction term that captures innovative activity of the company  $I$  from the country  $k$  that is ruled by the female manager and  $O_{ik} I_{zik}$  interaction term, that captures innovative activity of the company  $I$  from the country  $k$  that is owned by female. Again, the innovative activity can be expressed in various forms described above, and  $X_{ik}$  - other control variables.

Possible serious problem here is endogeneity of SMEs innovativeness. Decision to innovate or not depends not just on the strategic vision of the CEO and owners and the perspectives of the company but also on other unobservable factors that affect the choice to follow innovative behavior or business performance. One of the potential unobserved influencing factors is availability of external financial resources in external sources. Probable sample selection problem exists in case of the rising market, where it is much easier to attract additional resources for the innovative activities and be productive. So, ignorance of potential endogeneity will lead to inconsistent and biased results.

Therefore, 2-stage Heckman correction technique is also applied in the paper allowing checking whether a selection bias is an issue. So, at first, the propensity to innovate is estimated using the probit econometric technique mentioned above. Second, the equation (2) is estimated based on the predicted values of probabilities, obtained during the first stage and free from the potential endogeneity. Estimation of inverse Mill's ratios during the first stage and inclusion of them into the final 2<sup>nd</sup> regression helps to correct for sample selection bias and to obtain consistent results.

#### 4. Data and Sample

The research is based on the data from the 5<sup>th</sup> wave of the Business Environment and Enterprise Performance Survey (BEEPS) conducted by the World Bank and European Bank for Reconstruction and Development (EBRD) in 2012-2013. BEEPS is a firm-level data that covers wide scope of issues including firm performance, business environment, access to finance and labor, innovativeness, corruption, infrastructure and other. The sample includes

30 transition countries from Europe and East Asia<sup>2</sup>. The data was collected through face-to-face interviews with the top managers and owners of the companies. In general the BEEPS data covers firms with up to 10000 employees. However, the focus of this project is on SME sector i.e. on the companies with a number of employees lower than 250. The classification of SME is based on the EBRD definition and standards of EUROSTAT<sup>3</sup>, where micro organization – is a company with a number of employees from 1 to 9, small – from 10 to 49 and medium – up to 250 employees. This was done because of several reasons. First, innovativeness in SME sector is still underestimated. Second, it is considered that women usually demonstrate worse performance in business than men (Gatewood et al., 2003). However, one of the possible reasons is that men mostly dominate in large and capital intensive industries and companies, while women prefer focusing in the services sector (Brush et al., 2004). Thus, their comparison likely leads to biased results. Therefore, I decided to restrict the dataset to SME sector in order to make the evaluation of gender effect and comparison of effectiveness more correct. The sectoral distribution is presented in Table 1 and it shows that the majority of SMEs (around 61%) is providing various services from retail and wholesale trade to recycling and the rest are operating in different manufacturing industries.

#### **4.1 Dependent Variables**

The main variable of interest in the first part of paper is the innovativeness of the enterprise. The V wave of BEEPS questionnaire devoted a separate section to the question of innovation activities. The respondents had to answer several related questions and this allows using a number of indicators which work as a proxy for innovation. The measures of implemented innovative activities are: 1) whether the firms introduced a new product or service during the last 3 years; 2) whether there was any new production process implemented; 3) whether there were any spending on research and development; 4) whether there was introduction of the new marketing strategy and method and 5) whether an enterprise implemented new methods in operational management.

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<sup>2</sup>Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, AHKMacedonia, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Tajikistan, Turkey, Ukraine and Uzbekistan.

<sup>3</sup><http://www.ebrd.com/downloads/policies/sector/msme.pdf>

Usage of 5 indicators instead of one allows measuring not just innovative input but output and seeing if there is any specific feature in innovative behavior by gender. All 5 indicators are binary variables which equal to 1 in case introduction of novelty occurred and 0 in case it did not.

As for the dependent variables in the second part that looks at the strength of innovative effect on firm's performance, two measures of performance are used. These are labor productivity and growth of labor productivity over the last 3 years. Unfortunately all the information in the dataset is subjective and represents the vision of the managers who answered the questions. However, in the absence of objective information usage of this type of measures is valid (Kellermanns et al., 2010).

#### **4.2 Independent Variables**

The BEEPS dataset allows us getting information on various control variables that likely affect our variables of interest. This information includes individual characteristics of the firm's leaders as well as other firm's characteristics which have an impact on firm's innovativeness and performance. The list of control variables includes information on gender of the CEO and whether at least one of the owners of the company is female. Unfortunately, data lacks information on number of owners. This does not allow estimating the clear gender effects and limits the analysis to the effect of gender diversity among owners. The data also covers information on a number of years of experience of the CEO and the age of the firm that is measured by abstracting the year of foundation from the year the survey was implemented. Type of ownership includes three possible options: private, state and foreign. Company is evaluated as private in case more than 50% of the shares belong to private owners. A firm is considered as foreign in case more than 10% of its capital belongs to the foreign owner. Following Dinc (2005) firm is considered as state in case public ownership in capital structure is at least 20%. The data also allows controlling for the usage of foreign technologies and international certification standards by the companies. It also provides information on whether the company's goods and services are oriented on the external or local markets. It covers information on the share of skilled labor force as well as the share of females in the organization. The effects of external consulting services and training of employees on innovativeness and performance are also taken into account as well as access to financial sources and informal payments.

The summary statistics is presented in Table 2. It presents and compares averages of companies' characteristics operating in the whole dataset and CIS and non-CIS region. While analyzing the companies' and managerial characteristics a number of significant differences between the two groups of countries were revealed. The companies dealing in the CIS block on average show higher efficiency expressed in natural logarithm of labor productivity (13.55 vs. 12.5) and growth of labor productivity (0.21 vs. 0.14). This goes in line with the study on "Eurasian growth paradox" (Aslund and Jenish, 2006). The main result of that research is that despite the absence of large-scale reforms and authoritarian regimes in CIS countries the significant reduction of public spending was a factor that allowed them grow faster compared with the CEE countries. The share of women, who belongs to business owners or is a Top Manager in the company does not depend on the country block and is around 33% and 20% respectively. Firms in CIS region are younger (12.6 years vs. 16.3) with less experienced management (14.4 years vs. 19.1). It is less common to companies operating in CIS block to attract external consulting services than to their counterparts from non-CIS countries (15.4% vs. 27.4%). SMEs operating in CIS region are more concentrated on production of one good (83.6% vs. 78.7%) and less export oriented (10.5% vs. 32%).

Usage of foreign technologies (10% vs. 17.5%) and international certification standards (13% vs. 30.8%) is significantly lower in CIS region, which likely can be partly connected with the availability of financial resources in a form of bank loans and state subsidies. Just around 24.5% of SMEs operating in CIS region managed to attract commercial bank loans and only 4% received a state support, while similar numbers for the SMEs from non-CIS block are 44% and 12.4% respectively. At the same time the rate of informal payments is higher in CIS block (17.1% vs. 13.2%). As for the innovativeness, on average the share of SMEs from CIS block that reported introduction of any type of innovative activity is lower compared with their non-CIS counterparts.

## **5. Results and Discussion**

### **5.1 Gender and Innovativeness**

This part of the paper presents the estimation results of the analysis of the effect of leader's gender and other influencing factors on innovation activities of the SMEs. The estimation procedure was performed for all five indicators of innovativeness described above and results are robust to alternative model specifications. Table 3 presents the effect

of gender of the leader as well as other exogenous influencing factors on company's innovativeness expressed in a form of implemented new good or service. The results are presented in a form of marginal effects allowing numerical interpretation.

The findings reveal that on average having a female as one of or the only owner increases the propensity of the company for going into uncertainty and the implementation of a new good/service by 5.2%. The effect for the SMEs operating in non-CIS block is even higher and amounts to 7%. This finding contradicts the literature on gender differences in riskiness (Wagner, 2001; He et al., 2007; Eckel et al., 2008; Croson and Gneezy, 2009) that mostly demonstrates that women are more risk-averse compared with men. Surprisingly, the effects of firm's age insignificant or almost negligible, and does not support the literature focusing on that issue (Khan and Noreen, 2012). The direction of effect of other exogenous factors does not look surprising. The level of concentration of the company's production has a strong negative and significant effect on the innovative activities. The possible explanation here is that having a stable financial inflow from one particular good demotivates the company's leaders from looking for any new ways of improvement and decreases the probability that SME will introduce a new good or service by 13% or 12.5% for CIS and 14.7% for non-CIS region respectively. Exports works oppositely and on average stimulates innovative actions by 6.7%. At that the strength of effect of exports is slightly higher for the CIS region (7.9% vs. 6.5%). Attraction of external consultants influences positively impacts on SMEs innovativeness and raises it by around 10%. Similarly influence usage of foreign technologies and international certification standards. Access to finance and subsidies has significant and positive impact on innovative behavior of SMEs and goes in line with the literature (Gorodnichenko and Schnitzer, 2012) who claim that financial constraints negatively affect innovative actions of the organizations. Having gender diversity among employees is a strong and significant factor that stimulates innovative behavior of the SME sector. This follows Diaz-Garcia et al. (2013) who showed that heterogeneity among R&D teams adds dynamics to decision-making and research process and fosters innovations.

The impact of gender of the leader together with other exogenous factors on the introduction of innovative business processes provides similar results (Table 4). Again, having a female owner positively affects on SME's propensity to innovate in general and is valid both for CIS and non-CIS countries. The women managerial role in terms of innovation still is insignificant. Concentration, usage of external consultants, foreign technologies and

certification, access to external financing significantly affect the innovation actions with the expected sign and their effect does not change much compared with the influence on the introduction of a new good or service. Introduction of trainings for the employees starts having significant and positive influencing power for all data samples and raises the propensity of innovative behavior by around 9%.

That concerns implementation of the new marketing strategies (Table 5), the picture changes slightly. Again, women owners are keeping being more innovative than men. However, having both owner and CEO females starts negatively affecting the innovativeness in CIS region and decreases the propensity by 7.5%. This finding actually goes in line with Dautzenberg (2012) who showed that gender diversity of decision makers in the organization is a plus for its innovativeness.

Results on implementation of the new managerial methods (Table 6) do not contradict the results on other indicators of innovativeness used in the paper. Again, female CEO does not play significant role in pushing forward introduction of new activities and methods, while women owners keep stimulating their implementation. The direction of effect of other exogenous factors preserves. Availability of financial sources, external consulting services, upgrade of personnel's qualification, usage of foreign technologies keep significantly affecting the propensity to innovate in an expected positive way.

As for the spending on R&D (Table 7), the gender effect of the owner keeps being significant while there is no difference between the innovativeness of the top management personnel. However, like it was mentioned above, using R&D as a proxy for innovativeness is criticized for its' bias (Kemp et al., 2003) and moreover spending on R&D are hardly correlated with the size of the company (Vossen & Nooteboom, 1996) and its' capital intensity (Kemp et al., 2003). Thus, spending on R&D by SME companies especially in services sector likely less useful and important compared with the larger and technology-dependent companies.

Thus, hypothesis 1 is supported using all 5 measures of SMEs innovativeness. There is a gender difference in the innovative behavior of the SMEs owner and having the only or at least one female owner positively affects on the company's innovativeness and raises the propensity of implementation of any product or operational innovation and this effect is larger among firms decided to focus on product innovations. As for the regional differences,

the results show that innovativeness of the leader does not change much depending whether the company comes from CIS or non-CIS block.

## **5.2 Innovativeness Gender and Performance**

Tables 8-9 provide results for the difference in innovativeness effect on the company's indicators of performance. Sample selection bias and potential endogeneity of SMEs innovativeness is a reason for usage of Heckman correction procedure during this stage of the research.

The main variables of interest here are the innovation actions and whether their efficiency is different by gender of the CEO and owner of the company. The results show that in general SMEs labor productivity (in logarithmic form) is positively affected by introduction of a new marketing strategy and its implementation leads to a 20.8% growth of labor productivity. At that the effect for the non-CIS countries is even higher (28.6%), while no evidence of significant effect for the SMEs operating in CIS block was found. In turn, for SMEs operating in CIS block, introduction of a new product or service raises labor productivity by 17.8% to a 17.8% growth of labor productivity. Both results support the literature on positive effect of innovativeness on performance (Coad and Rao, 2008; Anderson et al., 2009). There is certain evidence of difference in impact of leader's gender on the effectiveness of the innovations. New managerial methods implemented under control of female owner are showing lower performance compared with the same innovations implemented by male owners. At the same time the efficiency of marketing strategies implemented by female owner in CIS block is showing better results than male. Thus, this supports the Hypothesis 2 that there are differences in strength of innovations implemented by male and female leaders.

The results showed that mostly level of experience does not play any significant role on the performance of SME. One possible explanation is that the dynamic atmosphere of SME sector together with unstable environment and volatility probably diminishes importance of the previous experience (Tuan, 2012). Companies managed by female CEO in non-CIS block are showing lower level of labor productivity compared with their counterparts managed by men. This might indicate that male and female CEOs are following different strategies (Tuan, 2012) or that female CEOs are facing certain barriers while ruling the company. Younger firms tend to be more effective in both regions. This

finding is similar to Storey (1994) and could mean that with age companies become less dynamic and less motivated for improvements in their efficiency. Younger firms tend to be more effective in both regions. This could mean that with age companies become less dynamic and less motivated for improvements in their efficiency.

The effect of innovation actions on growth of labor productivity is presented in Table 9. The picture here has some peculiarities compared with effect of exogenous factors on labor productivity. First, almost none factors are having a significant influencing power indicating that likely there are other unobserved factors that affect on the dynamics of change in labor productivity indicator. Second, innovativeness of female owners through implemented business processes is demonstrating lower performance compared with similar innovative results of male owners. Again, this supports the hypothesis about the gender difference in leader's efficiency of innovativeness.

Finally, the effect of innovative behavior on growth of sales (Table 10) shows positive effect of new business process introduction of the dynamics of sales. However, no significant difference in efficiency of innovative behavior by gender is revealed. Implementation of a new product raises sales only in CIS region, while new managerial methods positive affect annual revenues in both CIS and non-CIS blocks. Again, there is diversity in the direction of gender effect depending whether there is female CEO or owner in the company, which does not allow us to support the hypothesis that women innovativeness is less efficient compared to men. The other factors influence in the expected way without any surprising evidence.

Finally, the effects of innovativeness on dynamics of performance indicators (Table 9 and Table 10) again reveal different direction of effect of women innovativeness on the effectiveness indicating that it is not correct to provide strong arguments for or against effectiveness of female CEOs and owners in business and their innovation actions, which contradicts the results of similar study (Tonoyan and Strohmeier, 2006).

## **6. Conclusions**

This paper looked at gender differences in innovation behavior of the SMEs leaders and the gap in efficiency of implemented innovations in transition countries. It employed the firm-level data (5260 establishments from 30 countries using the data from the 5<sup>th</sup> wave of BEEPS survey) to investigate these issues.

The results showed that having a female owner or gender diversity in ownership structure positively affects the propensity of the organization to follow innovative behavior and strategy for most of the indicators of innovations. The results are holding for all five measures of innovative behavior. Therefore, promoting female entrepreneurship and presence of gender diversity in ownership is a plus for innovativeness of the company and economy in general and in both CIS and non-CIS block. In terms of other factors that promote innovativeness, companies with the access to external consulting services, financial funds, foreign technologies and export oriented and focused on product diversification tend to be more innovative.

The results also demonstrate that the effectiveness of innovations implemented by female and male leaders is different. At the same time it is not possible to explicitly distinguish whose innovations are more efficient. It depends on the type of proxy for innovativeness as well as indicator of SME's performance. Thus, the results do not go in line with other related studies (Tonoyan and Strohmeier, 2006) claiming that it is not necessarily men who perform better in terms of effectiveness of innovation behavior. Thus, achievement of gender equality in the SMEs sector will be beneficial for both for the innovativeness and efficiency of the sector. At the same time I found no evidence of regional difference, meaning that transformation period and business environment have similar effect on the performance despite whether the firm belongs to CIS or non-CIS block.

The results of this paper allow developing several implications for the development of SMEs sector. Stimulation of women involvement in SME sector can be beneficial for the whole economy. Official and public support and assistantship to women in business will provide additional stimuli to the overall growth of SMEs innovativeness. At the same time it is important to provide SMEs with sustainable assistance in the access to foreign technologies, external consultancy and various financial sources. The policy makers should also keep in mind the necessity in skills upgrading of SMEs managers in order to make their experience applicable. This could be done through provision of various seminars or business trainings that can bring additional knowledge and upgrade qualification of the leaders.

There are also a few limitations in this paper due to the available data. First, the data does not allow distinguishing between effect of explicit women ownership and the diversity in the ownership structure. Hence, having that information will allow making the analysis more accurate. Second, I can only use labor productivity and sales as indicators of

performance. Additional information on assets as well as share of innovative sales will enhance the analysis significantly. Altogether getting rid of these limitations and extension of the analysis will allow having more robust results and will be complement to the current paper.

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Table 1. Sectoral distribution of SMEs

Industry/sampling sector	Frequency	Percent	Cummulative
Tobacco products	23	0.15	0.15
Textiles	277	1.83	1.98
Garments	531	3.5	5.48
Tanning & leather	71	0.47	5.95
Wood	322	2.12	8.07
Paper & paper products	60	0.4	8.47
Publishing, printing and recorded media	371	2.44	10.91
Coke & refined petroleum	10	0.07	10.98
Chemicals	372	2.45	13.43
Plastics & rubber	294	1.94	15.37
Nonmetallic mineral products	625	4.12	149
Basic metals	79	0.52	20.01
Fabricated metal products	599	3.95	23.96
Machinery and equipment	505	3.33	27.29
Office machinery	21	0.14	27.43
Electronics	210	1.38	28.81
Communication equipment	25	0.16	28.97
Precision instruments	175	1.15	30.12
Motorvehicles	36	0.24	30.36
Other transport equipment	41	0.27	30.63
Furniture	331	2.18	32.81
Recycling	35	0.23	33.04
Construction	1268	8.36	41.4
Services of motor vehicles	411	2.71	44.11
Wholesale	2383	15.7	59.81
Retail	3512	23.14	82.95
Hotel and restaurants	614	4.05	87
Transport	307	2.02	89.02
Supporting transport activities	275	1.81	90.83
Post and telecommunications	156	1.03	91.86
IT	221	1.46	93.32
Other	3	0.02	100

Table 2. Descriptive statistics of all variables in the research

		All countries	Non-CIS countries	CIS countries	Difference Significance (CIS vs. non CIS)
Ln (labor productivity)	Ln (total labor force/total annual sales)	13.0327	12.4781	13.5531	***
Ln (growth of labor productivity over the last 3 years)	Ln (current labor productivity/labor productivity 3 years ago)	0.17207	0.13688	0.20846	*
Age of the company	Number of years since foundation	14.2755	16.3484	12.5581	***
CEO's experience (years)	Number of years	16.5146	19.0728	14.3860	***
Femaleceo	=1 if female	0.19781	0.19082	0.20321	
Female owner	=1 if female	0.33546	0.34233	0.32975	
Female ceo and owner	=1 if both owner and CEO are female	0.16130	0.15571	0.16596	
Share of exports	% of exports in total sales	0.20235	0.31954	0.10488	***
Monopoly	=1 if less than 4 competitors	0.12121	0.10753	0.13349	*
Level of concentration	% of main product in total sales	0.81335	0.78661	0.83558	**
Attracted subsidy from the state	=1 ifobtained a subsidy	0.07643	0.12363	0.03717	***
Attracted bank loan	=1 if attracted commercial loan	0.332498	0.43781	0.24490	***
Foreign company	=1 if more than 10% owned by foreign company	0.05798	0.07531	0.04357	*
State company	=1 if more than 20% belong to the state	0.00995	0.00334	0.01545	*
Private company	=1 if more than 50% belong to private owners	0.93041	0.91351	0.94447	
Independent	=1 if establishment is not a part of a larger firm	0.91901	0.91975	0.91840	
Usage of foreign technologies	=1 if there are foreign technologies	0.13574	0.17501	0.10307	**

ISO certification	=1 if there is ISO certification	0.21099	0.30880	0.12963	***
Share of female employees	% of females in the firm	0.16869	0.17141	0.16644	
Share of qualified employees	% of qualified laborforce	0.55125	0.55376	0.54877	
Official website	=1 if a company has a website	0.60061	0.67697	0.530718	**
Located in a large city or capital	=1 if firm is located in the metropol city or capital	0.32017	0.32332	0.31756	
Micro company	=1 if less than 5 employees	0.38844	0.41924	0.36282	*
Small company	=1 if number of employees from 5 to 20	0.50204	0.46756	0.45307	*
Medium company	=1 if number of employees from 21 to 100	0.18443	0.18052	0.18768	
Informal payment	=1 if firm made unofficial payments	0.15340	0.13278	0.17054	*
External consulting	=1 if attracted external consulting services	0.20822	0.27354	0.15389	**
Employees' training	=1 if there was training of employees	0.35753	0.37846	0.34013	*
Spending on R&D	=1 if during last 3 years there were spending on R&D	0.09910	0.12639	0.07640	*
Introduction of a new good	=1 if during last 3 years firm introduced new product	0.23517	0.26730	0.20845	*
Introduction of a new business process	=1 if during last 3 years firm introduced new production process	0.19069	0.20098	0.18213	*
Introduction of a new management method	=1 if during last 3 years firm introduced new methods in management	0.20235	0.22057	0.18720	*

Introduction of a new marketing strategy	=1 if during last 3 years firm introduced new methods in marketing	0.22298	0.24234	0.20687	*
Loan attracted by female CEO	=1 if company with female CEO obtained loan	0.05857	0.07589	0.04417	***
Loan attracted by female owner	=1 if company with female owner obtained loan	0.11373	0.15121	0.08255	***
Loan attracted by male CEO	=1 if company with male CEO obtained loan	0.27391	0.36192	0.20072	***
Loan attracted by male owner	=1 if company with male owner obtained loan	0.21876	0.28660	0.16234	***
Private company with a female owner	=1 if there is female owner	0.31477	0.31751	0.31249	*
Foreign company with a female owner	=1 if there is female owner	0.01746	0.02147	0.014121	*
State company with a female owner	=1 if there is female owner	0.00415	0.00145	0.00639	*

Table 3. Marginal effects of probit model for new good/service innovation

New good or service	All countries	CIS countries	non CIS countries
Female ceo	-0.0444	-0.0241	-0.0595
Female owner	0.0516***	0.0294	0.0699***
Female ceo and owner	0.0389	-0.00435	0.0738
CEO's experience (years)	9.81e-05**	-0.000123*	0.00490*
CEO's experience (years)^2	-0.000348	-0.000617	-8.18e-05
Age of the company	0.0334	0.0732**	-0.000229
Share of qualified employees	0.0194	0.0264	-0.00583
Share of female employees	0.120***	0.135***	0.0160
External consulting	0.0999***	0.108***	0.106***
Employees' training	0.0159	0.0325	0.0912***
Independent	0.00634***	0.00773***	-0.0118
Share of exports	0.0673***	0.0784***	0.0654***
Level of concentration	-0.130***	-0.123***	-0.140***
Foreign company	0.0210	0.0783*	-0.0107
Usage of foreign technologies	0.0771***	0.0616**	0.0918***
ISO certification	0.0430***	0.0220	0.0564***
Monopolist	0.0462**	0.0453*	0.0468
State company	-0.0431	-0.0294	-0.0314
Located in a large city or capital	-0.00798	-0.0121	-0.000800
Attracted subsidy from the state	0.0803***	0.0701***	0.0855***
Attracted bank loan	0.0665***	-0.0101	0.104***
Small company	-0.00151	-0.0331	0.0280
Micro company	0.0179	-0.0411*	0.0784***
Informal payment	0.0484***	0.0785***	0.000816
Industry dummies	yes	yes	yes
Country dummies	yes	yes	yes
R2	0.1479	0.1313	0.1832
Observations	5576	2828	2737

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4. Marginal effects of probit model for new business process innovation

New business process	All countries	CIS countries	non CIS countries
Female ceo	-0.0453	-0.0429	-0.0530
Female owner	0.0388**	0.0355*	0.0388*
Female ceo and owner	0.0213	0.00655	0.0377
CEO's experience (years)	0.00437**	0.00942***	-0.00107
CEO's experience (years)^2	-7.92e-05**	-0.000185***	2.49e-05
Age of the company	-1.69e-05	-0.000377	0.000331
Share of qualified employees	-0.0185	-0.00200	-0.0432
Share of female employees	0.0116	0.0117	0.0107
External consulting	0.0909***	0.138***	0.0558***
Employees' training	0.113***	0.129***	0.0895***
Independent	-0.0196	-7.31e-05	-0.0399
Share of exports	0.0462***	0.0211	0.0591***
Level of concentration	-0.0619***	-0.0950***	-0.0357
Foreign company	-0.00603	0.0215	-0.0248
Usage of foreign technologies	0.0487***	0.0533*	0.0488**
ISO certification	0.0485***	0.0387	0.0553***
Monopolist	0.00607	-0.0130	0.0370
State company	0.0344	-0.0209	0.209
Located in a large city or capital	0.0143	0.0129	0.0127
Attracted subsidy from the state	0.0872***	0.101***	0.0800***
Attracted bank loan	0.0541***	0.0425	0.0680***
Small company	-0.00206	-0.0123	0.00865
Micro company	-0.00433	-0.0363*	0.0274
Informal payment	0.0502***	0.0637***	0.0214
Industry dummies	yes	yes	yes
Country dummies	yes	yes	yes
R2	0.1551	0.1683	0.1392
Observations	5579	2828	2735

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 5. Marginal effects of probit model for marketing strategy innovation

New marketing strategy	All countries	CIS countries	non CIS countries
Female ceo	0.0328	0.0670	0.0168
Female owner	0.0487***	0.0359*	0.0635***
Female ceo and owner	-0.0478	-0.0750*	-0.0298
CEO's experience (years)	0.00316*	0.00580**	0.00147
CEO's experience (years)^2	-9.00e-05**	-0.000177***	-3.43e-05
Age of the company	0.000181	3.26e-05	-5.03e-05
Share of qualified employees	0.0132	0.0264	0.000176
Share of female employees	0.0247**	0.0334*	0.0150
External consulting	0.0736***	0.110***	0.0435**
Employees' training	0.120***	0.127***	0.101***
Independent	-0.0514**	-0.0578*	-0.0418
Share of exports	0.0385***	0.0557**	0.0242
Level of concentration	-0.0960***	-0.103***	-0.0941***
Foreign company	0.0211	0.0487	0.00339
Usage of foreign technologies	0.0561***	0.0680***	0.0464**
ISO certification	0.0406***	0.0135	0.0569***
Monopolist	0.0207	0.0291	0.00283
State company	0.0106	-0.0159	0.176
Located in a large city or capital	-0.0140	-0.00273	-0.0301*
Attracted subsidy from the state	0.0711***	0.0745***	0.0659***
Attracted bank loan	0.0309	-0.0254	0.0650***
Small company	-0.0109	-0.0106	-0.0148
Micro company	-0.0132	-0.0289	-0.00584
Informal payment	0.0572***	0.0840***	0.00988
Industry dummies	yes	yes	yes
Country dummies	yes	yes	yes
R2	0.142	0.1683	0.1392
Observations	5572	2828	2737

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 6. Marginal effects of probit model for managing method innovation

New managerial method	All countries	CIS countries	non CIS countries
Female ceo	0.00102	0.00853	0.00115
Female owner	0.0393***	0.0487**	0.0323
Female ceo and owner	-0.0276	-0.0397	-0.0258
CEO's experience (years)	0.00323*	0.00561**	0.000862
CEO's experience (years)^2	-6.85e-05*	-0.000143***	-5.44e-06
Age of the company	0.000226	0.000233	8.78e-05
Share of qualified employees	-0.00786	0.00714	-0.0247
Share of female employees	0.0208*	0.0163	0.0264
External consulting	0.0847***	0.120***	0.0540***
Employees' training	0.126***	0.122***	0.123***
Independent	-0.0558***	-0.0450	-0.0687**
Share of exports	0.0453***	0.0243	0.0568***
Level of concentration	-0.0547***	-0.0864***	-0.0310
Foreign company	0.00892	0.00250	0.0151
Usage of foreign technologies	0.0566***	0.0904***	0.0343*
ISO certification	0.0457***	0.0294	0.0606***
Monopolist	0.0280*	0.0312	0.0265
State company	0.00421	-0.00562	0.0547
Located in a large city or capital	0.0190	0.0282*	0.00788
Attracted subsidy from the state	0.0644***	0.0437**	0.0860***
Attracted bank loan	0.0367**	-0.0474*	0.0851***
Small company	-0.0104	-0.00524	-0.0211
Micro company	-0.0162	-0.0406**	0.00701
Informal payment	0.0587***	0.0868***	0.00942
Industry dummies	yes	yes	yes
Country dummies	yes	yes	yes
R2	0.1604	0.1816	0.1617
Observations	5579	2828	2735

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table7. Marginal effects of probit model for R&amp;D spending

R&D activities	All countries	CIS countries	non CIS countries
Female ceo	-0.0265	-0.0161	-0.0472
Female owner	0.0281**	0.00892	0.0437**
Female ceo and owner	0.00455	-0.00793	0.0233
CEO's experience (years)	0.00185	0.00388**	0.000596
CEO's experience (years)^2	-2.86e-05	-8.65e-05**	4.14e-06
Age of the company	-0.000191	-0.000402	-7.42e-05
Share of qualified employees	0.00494	0.0197	-0.0169
Share of female employees	0.0188**	0.0328**	0.00275
External consulting	0.0756***	0.0896***	0.0665***
Employees' training	0.0753***	0.0711***	0.0788***
Independent	-0.0222	-0.0225	-0.0275
Share of exports	0.0635***	0.0913***	0.0443***
Level of concentration	-0.0661***	-0.0618***	-0.0688***
Foreign company	0.00133	-0.00122	0.0108
Usage of foreign technologies	0.0582***	0.0584***	0.0616***
ISO certification	0.0367***	0.0118	0.0477***
Monopolist	0.00994	0.0152	-0.00512
State company	0.0416	0.111	-0.0566
Located in a large city or capital	0.00971	0.0333**	-0.0186
Attracted subsidy from the state	0.0118	0.0108	0.0174
Attracted bank loan	0.0231	-0.00882	0.0399**
Small company	-0.0195*	-0.0114	-0.0318**
Micro company	-0.0227**	-0.0186	-0.0306*
Informal payment	0.0223*	0.00872	0.0248
Industry dummies	yes	yes	yes
Country dummies	yes	yes	yes
R2	0.1578	0.1891	0.1536
Observations	5372	2627	2709

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8. Heckman correction results for effect of innovations on labor productivity

Ln (Labor productivity)	All countries	CIS countries	non CIS countries
Female ceo	-0.321	0.0446	-0.572*
Female owner	0.0377	0.0331	-0.0359
Female ceo and owner	0.0203	-0.188	0.203
CEO's experience (years)	0.0132	0.0186	0.00908
CEO's experience (years)^2	-0.000220	-0.000438*	-5.14e-05
Age of the company	-0.00583**	-0.00515	-0.00628*
Share of exports	0.210**	0.239*	0.126
Monopolist	-0.00841	-0.182*	0.150
Level of concentration	-0.248	-0.0909	-0.232
State company	0.221	0.129	0.335
Foreign company	0.363***	0.260*	0.469***
Usage of foreign technologies	0.311***	0.388***	0.144
Attracted bank loan	0.246***	0.227*	0.156
Attracted subsidy from the state	0.145	0.120	0.0504
ISO certification	0.241***	0.233***	0.235**
Informal payment	0.0308	-0.0161	-0.0274
Micro company	0.0891	0.0645	0.0854
Small company	0.137**	0.160**	0.108
Share of qualified employees	-0.177	-0.0318	-0.345**
Share of female employees	0.153*	0.160	0.114
Employees' training	0.268**	0.215	0.138
Independent	0.0981	0.0114	0.268
External consulting	0.241*	0.163	0.131
Introduction of a new good	0.0709	0.178**	-0.0283
Introduction of a new process	-0.0580	-0.0423	-0.0844
Introduction of a new marketing strategy	0.208***	0.116	0.286**
Introduction of a new managing method	-0.0140	-0.0148	-0.0418
R&D activities	-0.0472	-0.104	0.00366
Introduction of a new good*female CEO	-0.117	-0.293	-0.00649
Introduction of a new process*female CEO	0.101	0.183	0.0886
Introduction of a new marketing strategy*female CEO	-0.104	0.0126	-0.237
Introduction of a new managing method*female CEO	0.260	-0.0176	0.472
R&D activities*female CEO	-0.0706	-0.0920	-0.0573
Introduction of a new good*female owner	0.0650	0.130	0.0688
Introduction of a new process*female owner	0.0642	-0.00632	0.0554
Introduction of a new marketing strategy*female owner	0.191	-0.000804	0.351*
Introduction of a new managing method*female owner	-0.445***	-0.118	-0.733***
R&D activities*female owner	-0.00730	0.142	-0.0657
Industry Dummies	yes	yes	yes
Country Dummies	yes	yes	yes
Constant	12.71***	12.06***	13.76***
lambda	0.521	0.204	0.0824
Observations	5,132	2,585	2,547

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 9. Heckman correction results for effect of innovations on growth of labor productivity

Growth of Ln (Labor productivity)	All countries	CIS countries	non CIS countries
Female ceo	-0.0548	0.0897	0.475
Female owner	-0.117	-0.0967	-0.0377
Female ceo and owner	0.0811	0.0308	-0.127
CEO's experience (years)	-0.00594	-0.0136	-0.0162
CEO's experience (years)^2	0.000117	0.000240	0.000298
Age of the company	-0.00219	-0.00235	-0.00460
Share of exports	0.0482	-0.0156	-0.0906
Monopolist	-0.112	-0.103	-0.0541
Level of concentration	0.0589	0.0710	0.0535
State company	0.108	-0.195	-0.279
Foreign company	-0.110	-0.136	-0.0732
Usage of foreign technologies	-0.161	-0.106	0.0568
Attracted bank loan	-0.0980	-0.150*	-0.129
Attracted subsidy from the state	0.0249	0.116	0.304
ISO certification	-0.0820	-0.0474	-0.0411
Informal payment	0.144	-0.0209	-0.0980
Micro company	0.0186	0.0156	-0.00949
Small company	-0.113	-0.0768	-0.0192
Share of qualified employees	0.155	0.112	0.0816
Share of female employees	0.0178	0.0133	0.0547
Employees' training	-0.00696	-0.0395	-0.0312
Independent	-0.186	-0.0950	-0.0204
External consulting	0.0449	-0.0678	-0.148
Introduction of a new good	-0.00566	-0.0312	-0.0483
Introduction of a new process	0.0389	0.0769	0.0949
Introduction of a new marketing strategy	-0.0105	-0.0716	-0.118
Introduction of a new managing method	-0.124	-0.0248	0.101
R&D activities	0.0833	0.133**	0.173*
Introduction of a new good*female CEO	-0.226	-0.166	-0.211
Introduction of a new process*female CEO	-0.0708	-0.0192	0.0758
Introduction of a new marketing strategy*female CEO	0.0841	-0.105	-0.448*
Introduction of a new managing method*female CEO	0.325	0.197	0.00406
R&D activities*female CEO	0.181	0.152	0.0932
Introduction of a new good*female owner	0.132	0.151	0.190
Introduction of a new process*female owner	-0.103	-0.210*	-0.360**
Introduction of a new marketing strategy*female owner	0.0194	-0.0311	0.0514
Introduction of a new managing method*female owner	-0.0129	0.125	0.215
R&D activities*female owner	0.0514	0.00322	-0.128
Industry Dummies	yes	yes	yes
Country Dummies	yes	yes	yes
Constant	1.129	1.161	0.210
lambda	-0.440	-0.496	-0.229
Observations	2,385	4,705	2,320

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 10. Heckman correction results for effect of innovations on growth of sales

Growth of Ln (Sales)	All countries	CIS countries	non CIS countries
Female ceo	0.0719	0.0307	0.269
Female owner	-0.120	-0.0935	-0.0674
Female ceo and owner	-0.0142	0.00455	-0.143
CEO's experience (years)	-0.0192**	-0.0157	-0.0109
CEO's experience (years)^2	0.000308*	0.000279	0.000137
Age of the company	-.00652***	-0.00628**	-0.00926**
Share of exports	0.00734	0.0743	-0.0287
Monopolist	-0.0927	-0.0678	-0.0296
Level of concentration	0.0723	0.0242	-0.00197
State company	0.205	2.154***	-0.262
Foreign company	-0.203**	-0.161	-0.179
Usage of foreign technologies	-0.0893	-0.0998	0.0362
Attracted bank loan	-0.120	-0.0672	-0.0732
Attracted subsidy from the state	0.142	0.0510	0.381**
ISO certification	-0.0781	-0.119	-0.0573
Informal payment	-0.0415	0.118	-0.0806
Micro company	-0.0492	-0.0460	-0.0956
Small company	-0.0323	-0.0719	0.00689
Share of qualified employees	0.107	0.215	-0.00430
Share of female employees	-0.0832	-0.0110	-0.0708
Employees' training	-0.0824	-0.00341	-0.0703
Independent	-0.159*	-0.212*	-0.109
External consulting	-0.126	-0.0319	-0.0897
Introduction of a new good	-0.0548	0.0498	-0.155
Introduction of a new process	0.0598	-0.0289	0.142
Introduction of a new marketing strategy	-0.0488	0.0472	-0.157
Introduction of a new managing method	0.00548	-0.0196	0.0457
R&D activities	0.157**	0.112	0.174*
Introduction of a new good*female CEO	0.0429	0.0208	-0.0422
Introduction of a new process*female CEO	-0.103	-0.242	0.125
Introduction of a new marketing strategy*female CEO	-0.137	0.00326	-0.393
Introduction of a new managing method*female CEO	0.151	0.340	-0.0599
R&D activities*female CEO	0.0855	0.0355	0.0937
Introduction of a new good*female owner	0.138	0.0249	0.259
Introduction of a new process*female owner	-0.156	-0.0423	-0.277
Introduction of a new marketing strategy*female owner	-0.0101	0.144	-0.0770
Introduction of a new managing method*female owner	0.155	0.00255	0.282
R&D activities*female owner	-0.0643	-0.0378	-0.157
Industry Dummies	yes	yes	yes
Country Dummies	yes	yes	yes
Constant	1.706*	1.518	0.588
lambda	-0.676*	-0.534	-0.271
Observations	4,752	2,405	2,347

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1