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Factors that influence the competitiveness of Czech rural small and medium enterprises

Josef ABRHÁM[1], Wadim STRIELKOWSKI[2], Milan VOŠTA[1], Jan ŠLAJS[1]

[1]*University of Economics, Prague, Czech Republic*
[2]*Charles University in Prague, Prague, Czech Republic*

Abstract: The paper focuses on determining the key factors that influence the competitiveness of rural small and medium enterprises (SMEs) in the Czech Republic. Rural SMEs play an important part in sustainable rural development, post-transformation processes, as well as in the integrated development of formal and informal rural institutions in the Czech economy. The research design is based on a questionnaire survey conducted with a sample of 1144 randomly selected Czech rural SMEs. There was applied a one-way error model expressed either by the fixed effects (FE) model and the random effect (RE) model with the error term consisting of two components: a time-invariant component and a remainder component that is assumed to be uncorrelated over time. It was also attempted to rule out the individual location effects in the econometric model by using the location variables (location dummies).The results also show that the success of the rural SMEs in the Czech Republic is mostly related to its manager and enterprise characteristics. The most significant determinants of rural enterprise's competitiveness are location within a region with competitive situation, the enterprise size, the enterprise age, and the fact whether the enterprise has some form of innovation. The results might have significant implications for both academics and stakeholders and can be used as a basis for the targeted rural enterprise policies in the Czech Republic and in the post-transitional Eastern and Central Europe.

Key words: rural development, SMEs, Czech Republic, Central and Eastern Europe

The work presents an empirically based analysis of factors influencing the competitiveness of rural small and medium enterprises (SMEs) in the Czech Republic. The authors focus is quite unique since as opposed to the relatively large literature dealing with the micro-enterprises in developing countries, we concentrate on rural enterprises in the post-transitional Eastern Europe.

The major research objectives of the paper are to analyse the theoretical and empirical literature relating to the enterprise environment in the rural Czech Republic and specifically the enterprise in the rural Czech Republic; to construct a profile of a typical Czech rural enterprise with regard to the characteristics internal to the firm and external to the firm, using an enterprise survey; to identify the factors that influence the competitiveness and innovation of Czech rural enterprises; to formulate policy implications for the policy-makers who want to enhance the success of rural enterprises using the results of this study.

Our results are based on the original sample of 1144 randomly selected Czech rural SMEs. According to our knowledge, this is the first empirical study of the determinants of competitiveness and innovations of the rural food processing enterprises in any of the European post-socialist countries. Our research therefore fills in the gap in the prevailing literature dealing predominantly either with the trade with agricultural products (Bielik et al. 2013), or the first world or the third world (Schreiner and Woller 2003; or Anik et al. 2013).

Our results confirm the related findings of Kadocsa and Francsovics (2011) or Toeroek and Tóth (2013), who researched Hungarian small enterprises in rural areas at the aftermath of the EU accession. The Hungarian small businesses did not capitalize on the competitiveness opportunities, did not make any effort to apply for patents and funds and did not attempt to penetrate new markets. Moreover, our results are in accord with the similar findings for the Czech regional development (e.g. Abrham 2011).

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Our analysis shows that the success of the rural enterprise in the Central and Eastern Europe is most related to its owner-manager and enterprise characteristics. The most significant determinants of the rural enterprise's competitiveness are the location within a region with the competitive situation, the enterprise size, the enterprise age, and some form of innovation in the enterprise. Our analysis also confirms that the profitability of Czech rural enterprises is positively correlated with the favourable micro- and macro-economic conditions differentiating between the rich and poor areas.

There are also several reasons why this research is both important and timely. First of all, the role of Czech rural enterprises in the process of job-creation and the economic stabilization of the Czech Republic has long been recognized. Notwithstanding this fact, little data on micro-enterprises, in particular the micro-enterprises in rural areas, exists in the Czech Republic. This research might provide a clear picture of Czech rural enterprises and the innovation in these enterprises. Second, the previous analyses have mainly focused on the Czech SME sector in general. No distinction between the rural and urban enterprises has been incorporated into these works, and the issues of rural enterprises were not segregated from those of the urban ones. On the contrary, this study focuses solely on rural firms. Third, the previous analyses have been based on qualitative descriptions of the micro-enterprise data without distinguishing the factors that might have an impact on the competitiveness of Czech rural enterprises. This work provides an econometric analysis of those factors: first through screening the data on the sample enterprises in general, and second using various econometric techniques in order to select the most significant determinants of the rural enterprises' competitiveness. Finally, it should be stressed that the current research uses a random selection of rural enterprises, providing a better sample of enterprises than the one obtained through the enterprise databases constructed from the agency lists or business directories (in which the probability of the selection bias is greater).

All in all, our results provide an interesting insight into the competitiveness of Czech rural SMEs, use first-hand data and sources, and employ non-trivial statistical tools and the econometric analysis to deliver valuable results and provide insights and policy implications that might have an impact on the rural development policies and strategies of the Czech Republic.

THE ROLE OF RURAL ENTERPRISE IN THE DEVELOPMENT OF THE REGION

The basic feature of a rural enterprise that distinguishes it from the whole class of enterprises in general is its spatial context: a rural enterprise is a micro, small or medium enterprise involved in non-agricultural activities in rural areas. According to some authors, rural enterprises have several specific characteristics which differentiate them from the rest of SMEs (urban SMEs). North and Smallbone (1995) conducted a study of mature rural SMEs in remote rural areas of the United Kingdom, identifying four most important characteristics of rural enterprises. They found that the majority of rural enterprises aim to achieve sustainability and a good living in the rural environment, rather than to make profits. The second characteristic of rural enterprises is that they have a higher survival rate (mainly due to the smaller rate of the competition in rural areas and the absence of the threat from "urban" SMEs). In addition, rural SMEs tend to experience a successful transition from the regional to national markets (the growth-oriented SMEs in remote rural areas were able to expand their scope of activities without any serious financial or administrative complications). Finally, it has been noticed that the most successful growing SMEs in rural areas appear to be able to optimize their competitive advantages and to overcome the local environmental constraints at the same time (Janda et al. 2013).

Some other studies (see for example Zahra 1996) highlight other basic traits which are characteristic of rural enterprises, including the scale, labour and capital intensiveness, the access to capital, the market orientation and flexibility.

Strielkowski (2013) explains the existence of rural enterprises in capitalist economies using the "transitional" and "survival" models. Following the transitional model, rural SMEs are represented by the family-based, self-sufficient producers who do not end up in autarky because of various market interactions (such as selling the abundant products). This model seems to be contradicted by the current existence of a considerable number of small enterprises (an obvious advantage of being a rural SME that attracts other entrepreneurs). On the other hand, the survival model, which is said to be largely based on gender and patriarchy relations in the rural family, comes with the following explanation: the non-wage labour production in rural SMEs can survive in the capital-

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ist economy either because of its protected status as a cheap labour source or due to its capacity for the self-exploitation and reproduction.

In general, it should be noted that rural areas are characterised by a great diversity of economic activity: agriculture in its purest form, the services surrounding agriculture, and the non-agricultural business activities. It is the small and medium enterprises, particularly the micro-enterprises that are the basic ingredients of entrepreneurship in rural areas. This explains why there is so much attention attributed to the small business in the context of rural development in both scientific literature and in mass.

The concept "rural" has many layers: from a strictly geographical point of view, it can be something that is non-urban, or, from another perspective, it can describe the relations and interactions among people. The two main conventional approaches to this issue define "rural" in either the descriptive or the socio-cultural terms. Rural development as a subset of the spatial development aims to ensure that these regions would have the same level of economic development and equal opportunities as the rest of the (non-rural) economy.

The specifics of SMEs in rural areas make them among the most crucial factors in the sustainable rural development. A special stress is put on their reinforcement in the traditionally agricultural regions, usually characterized by a high rate of unemployment, where the definite possibility of the mass job creation exists through employing workers to fulfil simple tasks at relatively low financial costs.

According to some authors (Zahra 1996, Bielik et al. 2013), the creation of micro-enterprises in rural areas is closely connected with generating new job opportunities. In this way, unemployment is reduced, a new class of small owners is formed and, as a result, a change in the social and professional structure of those regions is achieved. By increasing the employment levels in rural areas, the micro-enterprises can ease the social tensions and contribute to the reduction of high social costs of the transformation (such as the mass firing due to restructuring in the industrial and agricultural sectors). Moreover, this new class of entrepreneurs is created together with the provision of major guidelines by which everyone can achieve a change of the status and to improve their lives. SMEs and micro-enterprises promote the creation of the vertical and horizontal integration and cooperation ties, i.e. the ties between rural producers and the processing industry, between the production and marketing groups, which all lead to the consolidation of local communities.

Small rural enterprises significantly contribute to the budgets of townships and rural communities, enabling the local governments to expand their abilities in promoting the sustainable regional and rural development. By combining the dispersed private capital with the public funds and dividing the risk burden, the rural enterprises can undertake quite a broad scheme of investments, starting from the infrastructure and ending with the eco-tourism and nature protection. The decline of unemployment and the rise in the investment incentives lead to an improvement in the quality of life, and generally speed up the economic convergence, which is especially relevant in the case of the Central and Eastern European countries that joined the EU in 2004 (Jeníček 2013).

The creation of SMEs and micro-enterprises in rural areas increases the rural regions' potential and makes them more immune to the changes in production, market failures and economic cycles. By looking for new and undeveloped production opportunities, those enterprises often expand their supply of rural products (including regional differences and specifications). Another important feature of rural enterprises is the smaller negative impact they have on the local environment compared to large enterprises. This aspect is gaining importance, especially in the light of the sustainable development principles widely applied in the EU countries. SMEs are easy to include in the communal and energy cycles. Using rural products for processing, SMEs are close to the ecologically neutral, closed production cycle.

However, while speaking of the importance and positive outcomes of rural enterprises, the barriers to their growth should not be forgotten. The most critical of these obstacles are those connected with the financial support of SMEs and the creation of a healthy environment in which they can prosper. Although the governments of most CEECs declare their support for their own rural SME sectors, and numerous governmental programs have been implemented in order to promote the rural SMEs, the entrepreneurs still have doubts concerning the governmental support and their own fragile futures.

Generally, the development of enterprises contributes to the changes in the social and economic structure and the functioning of the given area through the following:

– initiating and prompting new forms of economic activity;

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– creation of new jobs and thus a limitation of unemployment;
– prevention of large-scale rural migrations;
– increasing the population's income and creating new forms of income;
– opening new export markets;
– full use of local resources;
– changes in the life conditions and consumption patterns of the local populations;
– development of infrastructure in rural areas, and, as a result, raising the area's attractiveness for the FDI;
– stimulation of economic growth in the region and the country;
– creation of the entrepreneurial activity and instigation of economic development.

The growing importance of micro-enterprises in the development of economic systems is expressed in the growth of employment, its positive impact on the regional development (via the multiplication effects), improvements in the inhabitants' qualifications and knowledge, the exchange of information, the creation of initiative, and the stress on innovation. Small businesses contribute to the creation and strengthening of the market economy, and often play a catalytic role for the innovation and competition.

Rural enterprises are different from their counterparts in urban locations; these differences range from their approach to the environment to the production processes used. It has been long understood that rural enterprises can significantly contribute to the integrated development of rural areas by solving such acute problems as unemployment and the lack of competition.

CZECH RURAL SMES

Even though the Czech Republic (and before that the Czechoslovakia) has never been an SME economy as such, the rural SMEs constitute its backbone both in the microeconomic and macroeconomic realm (see e.g. Abrham 2011). Small rural firms in the Czech transition were the main cause of the low unemployment and accounted for the majority of newly created jobs. They conclude that the retained profit of small firms was a major determinant of new investments.

Although it includes subjects of all sizes, we can assume, according to the above mentioned proportionality, that it represents mainly the SMEs. The average birth rate between 2005 and 2011 was 110 101 subjects a year. The average death rate, influenced by a sharp increase in 2009, was 59 229. Without this peak year, it is relatively stable 52 289. The increase in the death rate was caused by the economic crisis which caused the Czech GDP to decrease by 4.7% (Czech Statistical Office 2012) and the unemployment to rise from 4.4% to 6.7%.

Czech SMEs provided employment for over 1.8 million people in 2010, a 60.88% share in the total number. Since 2007, when the number peaked at over 2 million, this is a 10% drop (Czech Statistical Office 2011). In 2009 and 2010, the SMEs saw the return of their revenues to 3.9 billion CZK and the total revenues were steadily growing since 2000 till 2008 when the economic crisis struck. The economic crisis and the recession brought a significant drop to all SMEs financial indicators.

One of the most important indicators of the SMEs' economic activity is their role in the international trade. It is good to know how the SMEs are doing, especially in the context of the new export- oriented strategy which has increased the number of exporters among the SMEs by 50% as one of its priorities. This strategy puts an emphasis on exports to the territories outside Europe, which means that the SMEs will eventually be forced to compete globally. So far, their share in the total Czech exports in 2010 was 51.3%, amounting to 1.29 billion CZK.

This number is steadily growing since 1997. The number has more than doubled between 2004 and 2001. The gap between the exports and imports has been shrinking over time, from almost 35% to above 4%. This is a clear sign that the Czech SMEs are able to withstand the competition in the foreign markets.

The data

The analysis of this paper is based on the survey of 1144 randomly selected Czech rural SMEs. In order to test the first version of our survey questionnaire, 30 random pilot surveys were conducted in April–May 2014 in all provinces of the Czech Republic. All pilot surveys were completed and no rejection was registered. The pilot survey has shown that the direct data (numbers) on the enterprises profits, incomes and turnovers are unavailable to obtain and the time horizon longer than three years creates problems for the surveyed. In accordance with this, two major adjustments were done: (i) the questions about profits, incomes and turnovers were re-arranged in such a way that the surveyed entrepreneurs would

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have to choose clusters (ranges) of the values and not the direct values, and (ii) the time horizon of three years (2010–2014) was selected for all the variables in the main survey. In addition to that, some minor re-wording and corrections have been done.

The face-to-face questionnaire with 52 questions, which was implemented between June 2014 and September 2014, consisted of six main sections. The main information section was used to get to know each enterprise better. The characteristics and motivation of the owner section were designed to obtain all relevant information about the enterprise owner/manager. Section three provided the in-depth view into the history and profile of the enterprise. Assets and sources of the capital sections gave an overlook of the enterprise most "sensitive" financial information. Section five was designed to obtain the information on the enterprise market position and competition. Section six is concerned with an overview of subjective factors of the enterprise development. The data obtained using the questionnaire have been used in order to construct the profile of a typical owner/manager of Czech rural micro-enterprise and a typical rural enterprise in this sector and to carry out an econometric analysis.

The scope of our questionnaire covered the main characteristics identified as the important determinants of success, the performance, profitability in the recent studies of microenterprises all over the world. For the representative most recent studies, see De Mel et al. (2008, 2009), Munoz (2010), Rankhumise and Rugimbana (2010), Adekunle (2011), Anim-Somuah (2011), Mmbengwa (2011), Mano et al. (2012) or Janda et al. (2013). Obviously, since the realities of Czech rural areas are very different from the predominantly African or Asian areas covered by the vast majority of literature, the set of the particular determinants of profitability in our paper is different from the determinants considered in the above presented literature dealing with the developing countries.

Of over 2000 enterprises contacted, 1144 surveys were obtained. Some surveys were not used (not complete for all variables) and the remaining cases were entered into the database. On the examination, it was found that 10 cases were not appropriate for the survey. This was either because the enterprise size was beyond the sample objectives or because the surveyed enterprises were not classified as strictly rural enterprises. In order to reach the samples objective, additional 10 surveys had to be done which finally made the sample complete.

Methodology and the empirical model

The previous economic analyses of enterprise success are mainly focused on the validity of the alternative stochastic growth models that hypothesize the effect of the enterprise size, age, legal form, and the like. Most of the studies that try to find the determinants of the enterprise success are concerned with the Gibrat's Law of Proportionate Growth (Evans 1987). However, it seems that more and more studies contradict the Gibrat's Law and find a positive correlation between the growth and the size of the enterprise (Wagner 1995; Burgel, Murray, Fier, Licht, Nerlingen 2004). Furthermore, multivariate models with other determinants have been computed. The most frequent determinants include the enterprise characteristics, the owner/manager characteristics and the enterprise strategies.

Most econometric models measuring the enterprise success use growth as the success measure (although there are studies that also use the average profit or profit per firm or per employee as the measure of success; see for example Honig 1998; Riyanti 2004). The enterprise success is usually explained by the stochastic growth models. Stochastic growth models are the modification of the basic growth models with the incorporated random shocks (in order to understand the business cycles), such as the technological progress, the shock on the supply or demand side, etc. The best example of a stochastic model on the macro-level is the stochastic version of the Cass-Koopmans model (Romer 2001). Recently, there has been an attempt to adjust stochastic models for the micro-level (small firms, microscopic view). Stochastic growth models (the best example on the micro-level is Gibrat's Law) are characterized by the following features: (i) the macro/aggregated dynamics of the model, and (ii) no fluctuations (Storey 1994). Their basic aim is to reproduce the observed power-law distributions, to derive the growth dynamics from the macro-level and to allow for fitting of the real data.

The traditional outlook of any stochastic growth model is presented as a model with two deterministic components (exogenous growth and endogenous growth) and one stochastic component (random growth term ε_t). A model such as the Gibrat's Law (the Law of Proportionate Effect) expressed in terms of a stochastic model has two basic assumptions: (i) log ε_t is normally distributed and is independent of the size of the enterprise in time t (initial period); and (ii) the mean proportionate growth of a group

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of enterprises of the same initial size is independent of the initial size (Reid 1993).

Evans (1987) used a modified version of this model, stating that the departures from the Gibrat's Law decrease as the firm size increases (Evans 1987). Also in Evans (1987), a modified version of the log-linear form model is developed. The enterprise size is expressed as the number of its employees (Evans uses the term "employment size" and denotes it with S) and the growth rate of the enterprise is expressed as the following:

$$\log (S_{t'}/S_t)\ (t' - t) \quad (1)$$

where $S_{t'}$ is the employment size in 1980, S_t is the employment size in 1976 and $(t' - t)$ is the number of years between these two dates (Evans 1987). The growth equation was then expressed by the following regression equation:

$$\log (S_{t'}/S_t)/d = \log g\ (A_t, S_t, B_t) + u_t \quad (2)$$

where d = $t' - t$, $t' > t$, g is the growth function, A, S and B denote the age, size and the number of plants respectively. The regression model estimated by Evans (1987) has the following form:

$$\log (S_{t'}/S_t)/d = \beta_0 + \beta_1 \log S_t + \beta_2 \log A_t + \beta_3 (\log S_t)^2 + \\ + \beta_4 (\log A_t)^2 + \beta_5 (\log S_t)(\log A_t) + \mu_t \quad (3)$$

The Evans's model became an inspiration for the other few researchers. For instance, in their paper on the managerial inputs and the growth of small enterprises, Variyam and Kraybill (1992) began with the model presented by Evans (1987). They first estimated the regression model developed by Evans without the squared and cross product terms, and tested for nonlinearities implied by these terms using the Theil's BLUS residual tests. Then they estimated several model extensions that have additional sources of heterogeneity in the firm growth rates. Their main findings were that independent firms, sole proprietorships and firms owned by women are found to have significantly lower-than-average growth rates; in addition, they found that the firm growth is negatively related to the firm size and age (Variyam and Kraybill 1994).

Reid (1993) discussed profitability as one of the determinants of growth, noting the endogeniety of growth and profitability and the implied simultaneity of growth and the profitability relationships using the evidence from small firms (Reid 1993). It appears from his analysis using the empirical data that the growth/profitability tradeoff (known as the "Penrose Effect") can be confirmed. Furthermore, it appears that the form of enterprise is an important determinant of profitability. The further the managerial organization moves from a pure owner-management form, the lower its profitability.

According to Dobson and Gerrard (1989), the growth and profitability relationship can be expressed by the two-way causation (Dobson and Gerrard 1989). Growth generates profits and profits stimulate growth. Thus, it seems that profit is a good proxy for the enterprise growth and thence its success.

Moreover, a number of models and tools have been designed to deal with determining the influence of the various factors on the enterprise success. One of the models that attempted to identify causality, which is a general aim of this type of quantitative analysis, was the study conducted by Honig (1998) of the performance of 215 micro-enterprises in Jamaica, This model, that worked with very "personal" measures of both success and the "sensitive" financial information, tried to explain the determinants of success of Jamaican micro-enterprises expressed as the average monthly profit (log average of monthly earnings). The general model used by Honig (1998) can be presented in the following form:

$$\log Y_t = \beta_0 + \beta_1 S_t + SK_t1 + SK_t2 + SES_t2 + K_t1 + K_t2 + \\ + \beta_2 T_t + T_t^2 + E \quad (4)$$

where Y_t is the log of the average monthly earnings, S_i is the range of dummy variables for the level of schooling, SK_t1 and SK_t2 are two measures of the social capital, SES_i1 and SES_i2 and are measures of the socioeconomic status, $K1$ and $K2$ represent variables for the starting capital and loans, and T_t and T_t^2 are years of experience in the trade or the business occupation (Honig 1998).

Additionally, specific models related to small enterprises have been devised to deal with the selection bias issue. For instance, in a study of the performance of Slovenian enterprises after the privatization of 1995–1999, it was stated that the initial break up of companies into groups of public, internal and external companies was not independent of the initial differences in the companies' performances (i.e. the so-called selection bias). At the time of the selection of the privatization modes, the operational characteristics and the performance of companies influenced the ownership structure and not *vice versa*. There was a strong bias in the selection of the

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privatization modes in Slovenia due to the principle of the autonomy of companies in the selection of the privatization methods (Simoneti et al. 2002). Because of the presence of the selection bias, the Heckman (1979) two-step method was employed. In the first phase, a multinomial logit model (Greene 2000) was used to evaluate the optional multiple selection of enterprises among the three dominant privatization models (public, internal and external) on the basis of their operational characteristics in 1994. In the second phase of the evaluation, the Amemiya procedure (Amemiya 1984) served to calculate the appropriate correction factors (the so-called 'inverse Mills ratios', i.e. lambda) on the basis of the probability (likelihood) of the selection of the individual privatization model (Simoneti et al. 2002).

To sum up, the studies related to identifying causality as a form of the quantitative analysis generally use the econometric model expressed in the following form:

$$Y = X'\beta + \varepsilon \quad (5)$$

where Y is the measure of the enterprise competitiveness and X is the vector of factors internal to the firm (owner/manager and enterprise characteristics) and factors external to the firm (enterprise strategies).

Main results and discussions

The general econometric model for estimation that was employed in our analysis had the following form:

$$Y_i = \sum_{i=1}^{k} \beta_k X_{ki} + \sum_{i=1}^{m} \beta_m Z_{mi} + \sum_{i=1}^{l} \beta_l W_{li} + u_c + e_i \quad (6)$$

where X are the exogenous variables of the small model, Z the extra objective variables of the intermediate model and W the extra subjective variables added to make the large model. u_c is a community identifier.

A number of econometric techniques are employed in the econometric analysis presented in this chapter in order to estimate this model. The standard econometric technique employed is to use the ordinary least squares (OLS) (to allow for the heteroscedasticity problems, robust standard errors are employed hereinafter in all OLS estimations). However, due to the nature of the data and the problems that might occur due to the unknown location-specifics, sometimes the use of the generalized least squares is justified. Thus, the full list of econometric techniques used includes Breusch and Pagan test for the presence of the individual community effects, Hausman test for the individual location effects, the general least squares (GLS) for the estimation of fixed effects and the random effects models as well as the ordinary least square (OLS) estimations with the robust standard errors. Thence, we run a one-way error model expressed by the fixed effects (FE) model and the random effect (RE) model with the error term consisting of two components: a time-invariant component and a remainder component that is assumed to be uncorrelated over time. In addition, we ruled out the individual location effects in the econometric model by using the location variables (location dummies). Hence, the number of innovations according to categories was selected naturally as the explained dependent variable of competitiveness. Dependent variables for the final model have been carefully chosen during the process of crafting a solid model reliably identifying the key determinants of innovations. Just eight observations had to be taken out of the model, because they did not contain the information on the number of innovations the firm has achieved.

Overall, four models (innovation model, ownership model and impact factor model with robust standard errors and barriers model using the OLS) were estimated using the Gretl statistical software. They used 1136 observations, consisting of seventeen variables, three of which were categories, and the rest were defined as binary variables. Each model has the same list of "core" variables but differed in the additional binary variables that coded for instance the existence of barriers to business, the structure of ownership, or the impact of the external factors such as competition, or the rule of law (hence the names of the models such as "innovative", or "barriers" model).

Table 1 above reports the results of all four models in question. We check the value and the sign of the coefficients, as well as the significance of the coefficients to make predictions of their impact on the innovations in SMEs (dependent variable).

Overall, it appears from our analysis that the enterprises classified as small or medium ones tend to be more innovative than the micro-enterprises. This can be explained by their relative abundance of financial and human resources. Some of them can be specifically devoted to developing new products or services, while the micro- enterprises (often represented by sole traders) do not have this option.

Moreover, it becomes apparent that larger target markets induce more innovations. This relationship

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Table 1. Complete results for model estimations

	Innovation model	Barriers model	Ownership model	Impact factors model
	RSE	OLS	RSE	RSE
Small enterprise	0.1659*** (0.0596)	0.1523** (0.061)	0.1598 *** (0.0596)	0.1673*** (0.0599)
Medium enterprise	0.237** (0.1013)	0.230** (0.1023)	0.2459** (0.1012)	0.2443** (0.1029)
Turnover in 2011	0.0873*** (0.0311)	0.0838*** (0.0306)	0.0922*** (0.032)	0.08903*** (0.0312)
Cluster	0.2103* (0.1113)	0.2056* (0.1115)	0.2085* (0.1127)	0.208* (0.1115)
Equipment age	–0.0583** (0.0282)	–0.0597** (0.0284)	–0.0585** (0.0285)	–0.0613** (0.0285)
Competitors	0.0417** (0.017)	0.0380** (0.0173)	0.043** (0.0172)	0.0412** (0.0171)
New technologies	0.195795*** (0.0511415)	0.2003*** (0.0519)	0.1936*** (0.051)	0.198*** (0.052)
Diversification	0.1707** (0.0711)	0.1706** (0.0715)	0.1745** (0.0726)	0.1746** (0.071)
Quality	0.2247*** (0.0484)	0.2201*** (0.0490)	0.2211*** (0.0487)	0.2211*** (0.0487)
Marketing	0.1864*** (0.0626)	0.1866*** (0.0626)	0.1925*** (0.0620)	0.1857*** (0.0626)
Education	0.1195** (0.0544)	0.1154** (0.0557)	0.1206** (0.0543)	0.1202** (0.0557)
Optimization	0.1868*** (0.0562)	0.1877*** (0.0559)	0.1918*** (0.056)	0.1875*** (0.0566)
Customers	0.1689*** (0.04912)	0.1725*** (0.0492)	0.1632*** (0.0491)	0.1672*** (0.049)
Own R&D	0.420*** (0.0592)	0.4126*** (0.0599)	0.4211*** (0.0596)	0.420*** (0.0598)
Market barriers	–0.1064** (0.0471)	–0.1001** (0.0481)	–0.1007** (0.0471)	–0.103** (0.047)
Scientific cooperation	–0.1402** (0.0692)	–0.150010* (0.0779)	–0.1529** (0.071)	–0.1464** (0.0703)
Limited liability company	0.1474* (0.0891)	0.1441 (0.090)	0.1538* (0.0909)	0.1377 (0.0904)
Financial resources		0.227 (0.0596)		
Regulation		–0.0724 (0.0597)		
Rule of law		–0.0724 (0.0597)		0.027 (0.136)
Qualified workforce		0.0166 (0.0578)		
Support of state		0.0711 (0.0536)		
Ownership			0.123 (0.101)	
Competition				0.0502 (0.101)
Constant	1.47266*** (0.1592)	1.4918*** (0.1570)	1.435*** (0.1629)	1.48087*** (0.1634)
Observations		1136		
R-squared	0.47	0.46	0.46	0.45

Note: RSE stands for "robust standard errors", and OLS stands for "ordinary least squares".

Source: Own results

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could be also viewed from the other direction, namely that the innovation causes the firm to expand territorially. These two links cannot be simply separated because they occur simultaneously. Innovations enable the firm to compete internationally and at the same time, international market puts more pressure on the innovativeness of the offered good.

Quite surprisingly, in the case of Czech SMEs, licenses did not come through as a significant determinant of innovation. This might be explained by their diversity and real impact on firms. This finding supports the argument that patents may not be a good representation of competitiveness and innovations. On the other hand, belonging to the cluster plays a positive role (which is in accord with similar findings from other countries – see e.g. Anim-Somuah 2011; Anik et al. 2013; or Janda et al. 2013). Small firms in the clusters dominated over those that were not aware of the advantages that clusters provide, especially in the terms of synergy.

Our results demonstrate that the most significant determinants of rural enterprise's competitiveness are the location within a region with the competitive situation, the enterprise size, the enterprise age, and the fact whether the enterprise has some form of innovation. Moreover, our findings show that the increasing age of equipment is negatively related to competitiveness and innovations. This is quite understandable, as far as the newer equipment allows a more innovative usage and implementation. On the contrary, competition had a positive effect (especially higher competition categories). A more competitive environment forces the firms to innovate more.

However, a top innovative firm with a unique business proposition can have very few competitors. There are also firms that specialize on serving the public sector and if selected in the often dubious public procurements, these firms no longer have the motivation for improvements in the absence of any competitors.

A number of investing activities of firms show a significant impact on innovations. Investments into technologies and quality show a strong impact, also when compared to other variables. Although investment is just a precondition to a potential discovery and its successful realization, it is a necessary step towards achieving innovation. Unfortunately, our survey revealed that many firms could not afford to invest because their main concern was the survival in the market. This creates a vicious circle because without investment, innovations have a harder way to come and nobody can expect high profits for mediocre goods or services.

By far and large, the greatest determinant of innovations is own R&D which was indicated as a main source of innovations by 31% of firms. Although own R&D facilities may be a costly investment, it is definitely worth to have them. It is important to emphasize that not only medium firms exploit their benefits. About 30% of the micro- and small enterprises engage in this activity, followed by 41% of the medium enterprises. Customers also represent an important source of innovations. This stems from the fact that they may come to the firm with new and more difficult requests and thus motivate it to a higher originality.

On the other hand, barriers to innovation did not prove to constitute a real obstacle for innovations to a large extent, although two actual barriers emerged, nevertheless. Market barriers, e.g. the competition or an insufficient demand, and the cooperation with scientific institutions thus had a negative effect on those firms who encounter them. The legal form of the enterprise is also a factor crucial for innovations, as far as the limited liability companies tend to innovate more than the other legal forms. This finding generally means that the limited liability company is the right form of enterprise for the Czech rural SMEs at present.

CONCLUSIONS

Our paper provides an overview of competitiveness in Czech rural enterprises. Our results take into account the recent development of Czech rural SMEs in the framework of the regional and rural development. Results based on our empirical analysis tend to be valid for a reasonable understanding of firms on a regional level. However, when it comes to the micro- level of the individual firms, it turns out that every case is unique and no common inference can be easily drawn.

It appears that the majority of factors leading to the rural firms' competitiveness can be influenced by the firm itself, it is therefore desirable for the SME to focus on these factors. At the first glance, some of them may look unsuitable for a particular SME, probably because the terms are used mainly in a different context, i.e. the R&D for non-technical SMEs providing services. However, it is important for every firm to translate these variables into its

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own language and to find ways how to exploit the available opportunities.

One of the crucial factors for innovations proved to be the legal form of the enterprise which shows that the limited liability companies tend to innovate more than other legal forms. There are two possible explanations to this: first, the limited liability companies are often represented by the sole-traders (one-person firms) and the micro-enterprises that seek to establish a strong position in the market. These small companies tend to innovate and invest into new technologies and processes in order to beat the competition. Second, small companies are less cumbersome and more creative than the large enterprises and can spend less time dealing with the tax forms and the employment and health insurance agenda, and more time innovating their products or services.

From our analysis, it becomes apparent that the Czech government should focus on the specific aspects of support for the rural SMEs in the areas, where its guiding hand is really needed. In the Czech context, it might be the support of investment activities of the SMEs, the education of employees, expansions of Czech exports to the new markets and the intensive support of R&D in firms that are the right subjects for that. Those firms have the potential to bring fruits in the future in the forms of productive innovations. The general governmental support should create a progressive environment which would enable the micro-enterprises to grow faster to become small and medium enterprises that tend to be more innovative.

Overall, our results yield implications for both the academics and stakeholders and might constitute the core of the specifically targeted rural enterprise policies in the Czech Republic as well as in the other post-transitional countries of the Eastern and Central Europe.

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Contact address:

Josef Abrhám, University of Economics Prague, 4 Winston Churchill Sq., 130 00 Prague 3, Czech Republic
e-mail: abrham@vse.cz