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# INTERACTION OF LEADING AND SUPPORTING FACTORS FOR THE SME COMPETITIVENESS

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## Abstract – (100 words)

The *main goal* of this research was to investigate the SMEs competitiveness in terms of leading and supporting factors, and to compare the influence of these factors on SMEs performance. The study focused on four leading and four supportive factors. For each of these factors the respective indexes were constructed and calculated on the basis of 300 Bulgarian SMEs. Through the econometric modelling the research addressed the interaction between two groups of factors. The main findings related to the factors ordering - with some of leading factors stepping back and supporting ones becoming more important in the times of crisis.

**Key words:** SMEs, competitiveness factors, interaction, performance

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## INTRODUCTION

The SMEs competitiveness depends on many factors, which have been usually considered as firms' external, internal, and related to entrepreneur factors. Following the concept of *sustainable competitive advantages* (Porter, 2004, p. 126) these factors could also be divided into two other groups. The first group includes factors for achieving sustainable competitive advantages (leading factors), and the second group comprises other supporting factors. Leading factors are contingent to the economic environment, including the stage of country development, while the supporting factors are more invariable. According to Porter, the most important condition for achieving sustainable advantages is the firms' continuous improvement and innovation (ibid, p. 123). This is because innovations lead to the creation of unique brands, technology, marketing channels, etc., which are difficult to imitate. In the present global, network and the information economy, innovations are increasingly linked with ICT applications, international quality standards implementation, and the internationalization of firms' activities.

Sustainable advantages, however, depend on other factors like the quality of institutions, human resources, technological capacity, access to finance, etc., which form the group of supporting factors. As the literature review indicates, there has been limited research on the SMEs competitiveness in general, and on these two groups of factors, in particular. That is why advancing the understanding of the interaction between these factors under different conditions ("normal" growth vs. crisis) will help entrepreneurs and policy makers by indicating context specific measures for the improvement of SMEs competitiveness.

## LITERATURE REVIEW

Competitiveness is a multidimensional construct, which includes a combination of factors (assets and processes) that determine the firm's performance. A framework of different competitiveness models is presented by Ambastha and Momaya (2004, p. 57), which is however difficult to operationalize and empirically test. Investigating the competitiveness of subcontracting SMEs, Lu *et al.* (2008) propose 35 variables grouped in eight clusters. Using Porter's framework, Yan (2010) demonstrated the significance of competitiveness factors such as cost reduction, differentiation, innovation, strategic alliances and the environment for Chinese SMEs. Szerb and Ulbert (2009) analysed the competitiveness of Hungarian SMEs under seven pillars (factors). As a rule, global competitiveness indices (Global Competitiveness Index, World Competitiveness Yearbook, Doing Business, etc.) do not refer to small businesses. The Global Entrepreneurship Index and The Global Entrepreneurship and Development Index (Acs and Szerb, 2010) measure the level of entrepreneurship, and not the SMEs competitiveness. These, and other competitiveness models, followed the traditional distinction of factors as external, internal, and related to the entrepreneurs, without distinguishing between most important (leading) and supporting factors.

Greater attention was given to leading factors in the literature on innovations, ICT and quality standards implementation, and firms' internationalization. In a global competitive environment, SMEs survival depends on firms' innovation (Bilton and Cummings, 2010), and there is evidence that innovative SMEs grew faster in comparison to the rest (Rosenbusch *et al.*, 2010). Raisch *et al.* (2009) demonstrated that companies with sustainable competitive advantages maintained two types of innovations - exploration and exploitation (organisational ambidexterity). The supporting factors for the firm's innovation are internal, such as strategy, human capital, and intra-firm training; external, such as industry sector, regulations, access to finance (Galankis, 2006, p. 1231); and linked to the entrepreneur's characteristics - learning, market orientation, etc. (Masurel *et al.*, 2003).

A substantial literature was devoted to the ICT and e-commerce adoption by SMEs as a key to growth (Simpson and Docherty, 2004). There are several theoretical models to research the IT adoption in SMEs (Ramdani and Kawalek, 2007, p. 55), and researchers use combinations of these models. The implementation of international quality standards is also crucial for SMEs as it contributes to overcoming some market failures (Knut, 2004, p. 327). Today SMEs are under a growing pressure from their major clients to certify in order to continue to work with them (Baumol, 2009). Creation of own trademarks and brands is another way for SMEs to move higher on the value added chain (Humphrey and Shmitz, 2002) As the ICT and quality standards acceptance, and the creation of own trademarks are a form of innovations, the factors influencing their application in SMEs are similar to those for innovation in general. Many researchers have revealed also the growing significance of “early internationalized” or “born global” firms (Rialp *et al.*, 2005). Internationalization could be considered also as a kind of innovation, which explains the similarity of factors for two processes (Ruzzier *et al.*, 2007; Jansson and Sandberg, 2008; Williams and Shaw, 2011).

Amongst supporting factors, the institutional environment has attracted attention. Institutional analyses of SMEs development reveal the advantages of strong institutions and the disadvantages of weak ones (Xheneti and Smallbone, 2008). The inefficiency of formal institutions leads to the creation of non-productive, rent-seeking entrepreneurs (Desai *et al.*, 2010). The institutional analysis of SMEs, however, occasionally makes connections to other competitiveness factors. SMEs access to finance is the other important factor. It has been discussed under potential market failures due to information asymmetries (Shane and Cable, 2002) and reputation concerns (Kon and Storey, 2003), but often without connections to other competitiveness factors. The increasing globalization of business raises the significance of strategic management (Smith and Tushman, 2005), which is also rarely included in the SMEs competitiveness models. Crucial for all type of innovations is accelerated intra-firm training (Wang *et al.*, 2010) and human capital development (Smith, 2000, p. 89).

In summary, few models seeking to explain the SMEs competitiveness have relied on the general framework of firms’ internal and external factors. Besides, the significance of these factors was analyzed mostly under conditions of “normal” economic development or growth, neglecting periods of unstable economic development and crisis.

Based on the literature review and the particular national context, the following *research questions* were investigated: Which are the key factors of the SMEs competitiveness? Can we distinguish between the most important (context leading) and other (supporting) factors for the SMEs competitiveness? How do these two groups of factors influence the SMEs performance by interacting with each other? The *main hypotheses* were the following:

- H1. The higher level of innovation activity accounts for higher SMEs performance.
- H2. The SMEs internationalization impacts positively their economic performance.
- H3. SMEs with own trademarks and patents excel higher economic performance.
- H4. SMEs with implemented quality standards demonstrate better performance.
- H5. Better access to finance contributes significantly and positively to higher level of innovation, internationalization, trade mark and patents registration, quality standards and ICT adoption, and firms’ performance.
- H6. Good management practices (ICT and e-business adoption, staff training, strategic planning and marketing, etc.) lead to higher level of innovation, internationalization, trade mark and patents registration, quality standards and ICT adoption, and firms’ performance.
- H7. The SMEs size positively impacts innovation, internationalization, intellectual property activities, quality standards and ICT adoption, and firms’ performance.
- H8. Export oriented SMEs develop a higher degree of innovation, intellectual property activities, internationalization, quality standards and ICT adoption, and firms’ performance.

## RESEARCH METHODOLOGY

The main goal of this research was to reveal the SMEs competitiveness factors in terms of context specific (leading) and supporting factors. Precisely, the goal was to establish to what degree, and in which ways, these two groups of factors influence the SMEs performance under crisis economic conditions. The measures of competitiveness ranged from simple indicators to complex indexes (Buzzigoli and Viviani, 2009). The situation with Bulgarian SMEs was analyzed through the prism of 8 key factors. Five of these factors were compound variables, represented by indexes: (1) innovations; (2) internationalization; (3) own trademarks and patents; (4) access to finance; and (5) good management practices. The other three factors were implemented quality standards, export orientation, and size. Following the Porter idea about two types of competitive advantages, the factors were separated into two groups. The first group included factors for achieving sustainable competitive advantages (leading factors), while the second group contained supporting factors. Here we included the ICT and e-business adoption factor in “good management practices”, and not as separate leading factor. These groups of factors formed the conceptual model (Fig. 1).

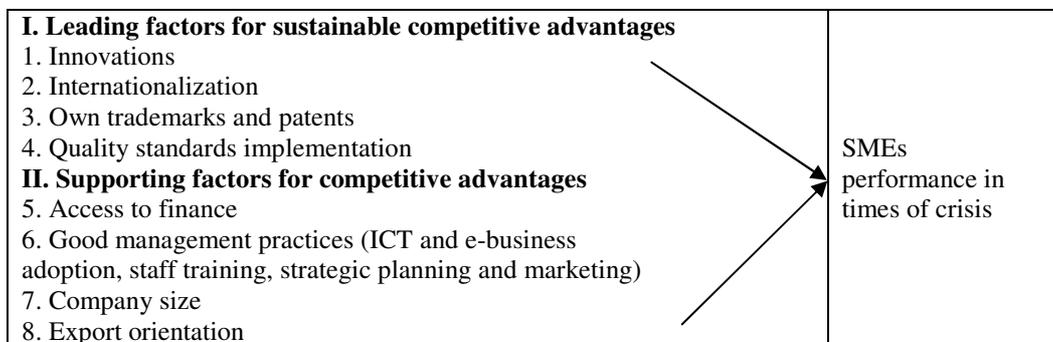


Figure 1. Conceptual model

Based on the conceptual model, a standardized questionnaire was created and duly filled in by 300 SMEs managers with the help of interviewers in February 2011. The sample included SMEs from manufacturing (13%), services (40%), construction (6%), and trade (41%). Among them 89% were micro, 9% small, and 2% medium sized by number of employees. 12% were from the capital, 76% - from district and 10% from small cities, and 2% - from villages.

The companies' performance in times of crisis was defined not in term of growth indicators, but in terms of *lack of* or *less*: release of staff; difficulties in debt payments; decrease in sales; and reduction in yield.

Firstly, five indexes were constructed as ratio between the sum of individual scores and the maximum sum of scores of the constitutive items, and multiplied to 100.

(1) The INNOVATIVENESS index consisted of two equal components: 1) establishment of innovation infrastructure, which included: availability of R&D unit; specialized staff for R&D; use of research institutes or research fellows; specialized staff training; keeping and updating a professional library; cooperation with institutions in education and science; introduction of ICT in sales; and 2) development of new products: issuing of new products on the market; improvement of existing products; development of new products to be launch on the market soon.

(2) The INTERNATIONALIZATION index had two equal components: 1) participation in specialized events like: exhibition/fairs in Bulgaria; exhibition/fairs abroad; cooperative stock exchange; international business forums; business delegations; and 2) international trade activity: import of raw materials, products and services; export of own

products and services (availability of exports; share of exports in the total output; share of export sales in the total turnover).

(3) The TRADEMARKS AND PATENTS index contained the following three components: 1) availability of trademarks and patents at home country and abroad, and such forthcoming registrations; 2) availability of sufficient financial resources for registration of trademark, patent or other intellectual property; 3) level of awareness in respect to the value and opportunities of the brand, as well as with the possibility of registration of such in the EU.

(4) The index ACCESS TO FINANCE contained 15 equal components, which indicated the use of the following financial instruments by the companies: investment bank loan; bank loan; loan for working capital; bank loan for special purpose; overdraft; credit card; financial leasing (for purchase of equipment, automobiles, etc.); venture capital; loan from family and friends, means of the owner(s) of the company; other financial instruments; EU pre-accession funding; EU structural funding; government funded programmes; third party government programmes; other support received.

(5) The index GOOD MANAGEMENT PRACTICES was based on three equal components: 1) level of the ICT usage as a function of implementation of management information systems, and application of internet technologies; 2) level of implementation of policies to improve staff qualifications as a function of assessment of staff qualifications, and availability of trainings enhancing staff competences; 3) level of development of market strategies as a function of availability of short, medium and long term business plans, and implementation of marketing strategies for domestic and foreign markets. The index accounted for the application of these practices in the last and previous five years.

There was no index for the Quality Standards Implementation, because only few companies have adopted such standards. Most of the individual variables were scored on two-point scales (presence/absence), and few on five-point scale. All indexes took values from 0 to 100, distributed in the intervals (0-20 low degree; 21-40 rather low; 41-60 average; 61-80 rather high; 81-100 high degree). Index formulae are given in the Appendix 1.1.

Table 1. Cronbach's  $\alpha$ , number of items, means and standard deviation of indexes values

Indexes	No of components/ items	Cronbach's $\alpha$	Mean	SD
1. Innovations	2 components (7+3=10 items)	0.61	12	19
2. Internationalization	2 components (5+4=9 items)	0.57	4	11
3. Trademarks and patents	3 items	0.67	4	10
4. Access to Finance	15 items	0.47	8	9
5. Best practices:	3 components (7+8+7=22 items)	0.61	24	13
Overall total (1,2,3,4 and 5)	5 indexes (59 items)	0.63		

Secondly, three types of econometric models were used to track the inter-relations between competitiveness factors and their effects on companies: structural models (systems of equations between all factors), regression models identifying the determinants of each factor, and logit/probit models explaining the economic performance. In all models we control for supporting factors, as well as for other characteristics like size of settlement, gender, age and background of the entrepreneur (see Appendix 1.2). After running the specified models, and testing for multicollinearity, heteroscedasticity, and other econometric problems, we have identified the most significant relations. Estimation output is presented in the Appendix 1.3.

## RESULTS AND DISCUSSION

In 80% of the SMEs the innovation activity was *weak*, in 11% - *rather weak*; 5% had *neither weak, nor advanced*; 3% - *rather advanced*; and only a negligible 1% had *advanced* innovation activity. The innovation activity in the medium-sized enterprises was over three

times higher, and in the small firms - almost twice higher than in the micro-enterprises. The mostly innovative companies were from the manufacturing, while least innovative were in the trade. As other researchers have shown, the SMEs sector still suffered of the innovation management deficit (O'Regan *et al.*, 2005). The significant factors for the SMEs innovation were: *size, average age of the equipment, entrepreneur's education, access for finance*. The innovation activity increased with the company size by number of employees (Fig. 2); it was greater in enterprises with newer equipment and vice versa; it was positively associated with the level of the entrepreneur's education; and it augmented with the lighten access to finance.

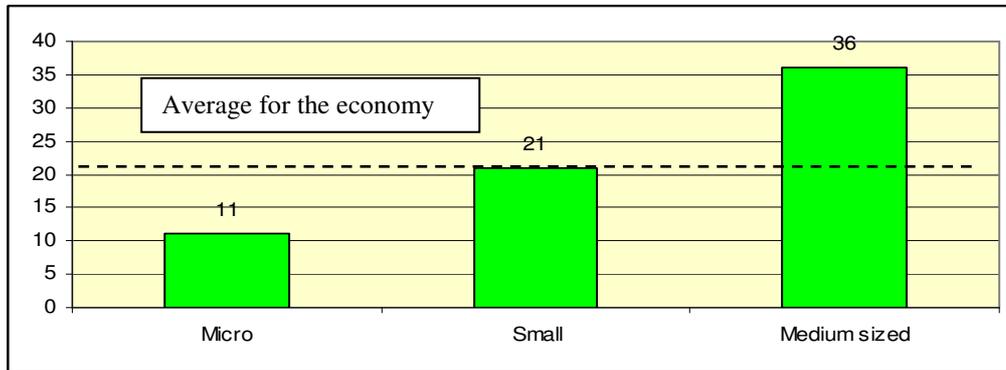


Figure 2. Mean values of the Bulgarian SMEs innovation index by size

After Schumpeter, many authors revealed the significance of entrepreneurs for the innovations (Cosh and Hughes, 2000; Masurel *et al.*, 2003; Migdadi, 2009; Omerzel and Antoncic, 2008; Wang *et al.*, 2010). Other researchers have also stressed the lack of appropriate sources for financing was the most embarrassing factor for innovations (Applied Research and Communications Fund 2007, p. 14). In early 2011 nearly 1/3 of Bulgarian SMEs maintained their own library of professional literature, and roughly 1/5 had provided their employees training in innovation. However, only 10% had sufficient funds to finance innovation activities. This explains the observation that barely 3% of the SMEs had a R&D unit and personnel responsible for such activity. The cooperation with scientific institutes, universities and academia was also limited - 4% of the SMEs have used scientific research, and approximately 10% have collaborated with universities. The insufficient partnership with research organisations obviously had a negative effect on the innovation scores of the researched SMEs (Doloreux, 2004; Hewitt-Dundas, 2006).

The worsened access to finance expressed in the fact, that in 2010 only 13% of SMEs declared that they developed and promoted new product on market; 16% improved considerably already existing products, and 9% were developing new one to be launch on the market soon. The other researchers have also outlined that most often the SMEs innovations were in products in spite that they went out together with process oriented ones (Bala Subrahmanya, 2001). The innovations are difficult to accomplish where the equipment is outdated (Corrocher *et al.*, 2009) as in our case. As a whole, the ability of SMEs innovativeness varies significantly in function of their size, available resources, industry sector, and business environment (Burrone and Jaiya, 2005).

The EU Innovation Index classified the member countries into four groups: leaders; followers; average innovators; and modest innovators. Bulgaria (with Lithuania, Latvia, and Romania) felt in the last group with a level of innovation quite below the EU-27 average (EC 2011, p. 4). The country innovation profile revealed that Bulgaria performs relatively better on some indicators, related to human resources, while the weaknesses were mainly in respect to entrepreneurs' innovation activities, intellectual assets, and patents (Ibid, p. 25).

In 2010, 12% of the Bulgarian SMEs have made *imports* and 5% have made *exports*. 77% of the exporting enterprises directly traded their goods and services on the

foreign market, while 17% exported through dealers or agents. Nearly one third of the exporters were suppliers to foreign companies, and a quarter of them had suppliers outside the country. More than 1/4 of the exporting firms could not ensure consistency in quality and quantity of exported products. The level of awareness of the international markets has been low - only 6% of the businesses thought that they have sufficient and recent information about these markets. There was some activity in terms of participation in exhibitions and fairs, the most frequently visited ones were abroad - almost 20% of SMEs managers stated that they participated in such exhibitions. The SMEs managers had participated in other events too, like business delegations, international business forums, etc., but the share of such participation was still relatively low. Participation of SMEs in clusters affected few of the firms – only 4%. The interviewed owners/managers indicated that most frequently performed cluster activities were training, innovation and public private partnerships. The most recognized benefit from participation in a cluster was finding new partners.

According to the values of the internationalization index, 95% of the SMEs had a *low* degree; the remaining 5% had *rather low* or *neither low, nor high* degree. Companies with *rather high* and *high* degree of internationalization were observed only occasionally. Most internationalized were medium-sized enterprises - more than twice than the micro- and small firms (Fig. 3), and those from manufacturing.

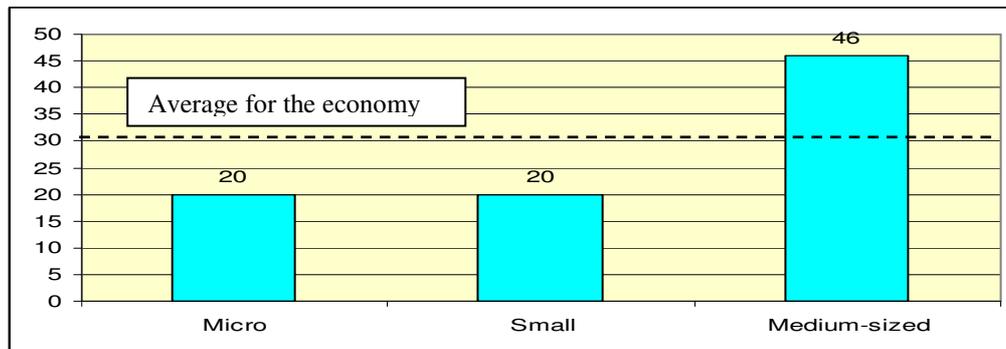


Figure 3. Mean values of the Bulgarian SMEs internationalization index by size

The other researches on the SMEs internationalization also suggested that those from the manufacturing were most active in comparison with trade firms (Matlay and Fletcher, 2000, p. 442). Other factors with significant influence on the SMEs internationalization were *company size and innovation activities*. The level of internationalization increased with the number of employees, as well as with the degree of innovations. Obviously the small size continues to hamper the SMEs internationalization, mainly because of insufficient resources. The small business often have no strategy for going on the external market, and consequently their internationalization seems accidental (Westhead *et al.*, 2002). The present data confirms the related with the innovation model, according which each consecutive stage of internationalization is regarded as a kind of innovation (Gankema *et al.*, 2000). These stages (innovations) are easier to accomplish in new created small firms, as they have not inherited routine administrative practices (Autio *et al.*, 2000).

Humphrey and Shmitz (2002) demonstrated that SMEs could be more successful by developing higher quality or creating their *own brands and trade marks*. This is a difficult task in the extremely competitive EU market. In 2010 only 8% of the Bulgarian SMEs have registered trademark in the country, and 2% - abroad. Regarding patents, these registrations were 4% and 1% respectively. The share of forthcoming registrations of trademarks and patents was also insignificant. A very low level of awareness of the value of the intellectual property, as well as of the possibilities for registering such in the EU was observed.

The values of the own trade marks and patents index showed that 94% of the Bulgarian SMEs had low level in these activities; 4% - rather low; and 2% - average level. There were only isolated cases of *advanced* patent activity. This situation can be explained by the insufficient financial resources - only 7% of the firms had enough money for registration of trademark, and 5% - for patent registration. The patent activity was most developed among the small enterprises where it was almost twice higher than in the micro-enterprises. The fields of manufacturing and trade were most developed in terms of patent registration. The significant factors for these activities were: *company size; innovation activity; and good management practices*. The patent activity increased with the company size; firms with the higher level of innovation were more active in the intellectual property development; greater application of good management practices was positively related with firm's patent activities.

In early 2011, the access to finance was *very difficult* for 93% of the enterprises. Only 6% have *rather difficult* access, and 1% - *neither difficult, nor easy*. These findings correspond to the ECB data for 2009-2010, which reported the deterioration of access to finance for all SMEs in the EU (ECB, 2010). The biggest difficulties in financing were observed in the micro-enterprises, where the average index values were two times lower than in the medium-sized enterprises. Businesses in manufacturing and construction had relatively easier access to finance - higher than the average for the economy. The services had the worst position in getting funding. The main and the only significant factor influencing the access to finance was the *enterprise size*. The larger the enterprise, the easier the funding it gets ( $p < 0.05$ ). Not only in Bulgaria, but everywhere the banks grant credits to smaller enterprises under a higher interest rate and a greater guarantee, which is due to the higher information asymmetry. Because of that the small business prefer using internal funds to external financing (Klapper *et al.*, 2006). In 2010, the most common sources of funding were the resources of the owner (42%), loans from friends and relatives (17%) and bank loans (14% of the SMEs have investment loans and loans for working capital). Venture capital was used by a small share of businesses.

At the same time instalments on bank loans for working capital and loans from relatives and friends have been paid with the highest difficulties. 10% of the SMEs had overdue payments, and 32% had been late in paying their obligations last year. There was also a delay in payments received from customers during the previous year: 55% of the SMEs have encountered this problem, and 15% have been expecting their revenues on average over 91 days. The difficult access to finance was also related to the limited investments made last year - about 1/3 of the enterprises have bought new equipment (35%); 30% invested in staff training and advertising, 22% - in development of new or improving the existing products, 9% introduced management information systems, and 4% invested in intellectual property.

The *good management practices* revealed that the most widespread was the application of internet technologies: 37% of SMEs had a website, and 27% - electronic signature. The share of SMEs applying information management systems was small (less than 6%). The training of the personnel was not a part of the everyday life of most SMEs, but was relatively developed - 37% of companies have applied internal and 17% external staff training. 69% of SMEs had short term planning, 16% - medium term, and only 3% - long term planning. One third of enterprises have developed marketing strategies, but only 17% have done marketing surveys in domestic, and 4% - in foreign markets in the last year.

The values of the index for good management practices showed a certain uptake - 45% of the firms occupied *low* or *rather low* level, while 10% applied such practices to a more considerable extent. However, still no SMEs developed these practices in *high* degree. The application of good management practices in the medium-sized enterprises was twice higher than in the micro-enterprises. These practices were prevalent in the manufacturing and least common in the trade (Fig. 4).

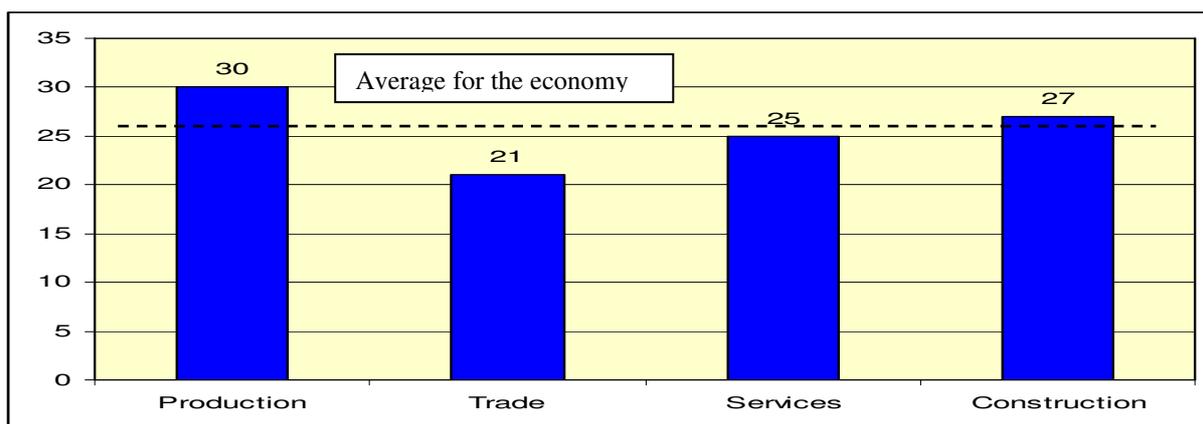


Figure 4. Mean values of the index for good management practices by sector

The significance of the sector in the application of the new ICT and other good practices was in line with data from other researches (Zhu *et al.*, 2006; Love *et al.*, 2005; Zhu and Kraemer, 2005; Oliveira and Martins, 2010, Lin and Lin, 2008), which could be explained by the specificity of products/services (Dinlersoz and Pereira, 2007). Other significant factors were related to: *enterprise size; type of settlement; average age of both the employees and the company; age, education, and gender of entrepreneurs; and innovation activities*. The adoption of good management practices increased with the company size. This result confirmed the positive relation between company size and the level of the ICT use (Baldwin *et al.*, 2004; Fabiani *et al.*, 2005; Hsu *et al.*, 2006; Pan and Jang, 2008), which is due to the greater financial (Hwang *et al.*, 2004) and human resources (Morgan *et al.*, 2006). Smaller companies operate usually in niches, where the benefits of new technologies might be not evident (Pontikakis *et al.*, 2006), and they faced higher risks in the ICT implementation (Bruque and Moyano, 2007). Besides, the information management in SMEs is relatively simple, and because of that it attracts fewer resources (Ramdani and Kawalek, 2007, p. 49). In line with other findings, these practices are more developed in SMEs situated in bigger cities and less developed in smaller settlements (Forman, Goldfarb and Greenstein, 2008).

The application of good management practices was higher in companies with smaller average age of employees and vice versa. The adult employees, who have accustomed to old practices, and who have greater difficulties in acquiring new skills, may hamper the introduction of the new ICT applications (Beatty *et al.*, 2001; Scupola, 2003; Fabiani *et al.*, 2005). The development of good management practices augmented with the level of entrepreneurs' education and age, which underlies the key role of owner/manager of a small firm for the adoption of new technologies (Matlay and Fletcher, 2000; Culkin and Smith, 2000). The higher level of the company innovativeness was positively related to the application of good management practices, which was found in other researches too (Bao and Sun, 2010, p. 173; Wang and Cheung, 2004). The present data revealed that women entrepreneurs in Bulgaria applied good management practices to higher degree than men.

On the basis of the estimated econometric models, the significant driving forces for the SMEs performance under crisis were identified (Fig. 5). According to the illustrated configuration, innovations had *indirect* positive impact on the SMEs performance within a transmission mechanism of good management practices (H1). It turned out that in crisis conditions the competitive advantages of innovations still matter (to some extent), but affect form's performance through the accumulated by good management practices human capital. Thus the medium-sized and micro enterprises with a higher index of innovativeness had made layoffs in 2010, while the enterprises of the same sizes with a lower innovativeness index had

made no such layoffs. This could be due to some sectors specificity, as different sectors were hit differently by the crisis. For instance more innovative SMEs in manufacturing have released employees in comparison with less innovative ones, while the situation in the construction sector was just the opposite.

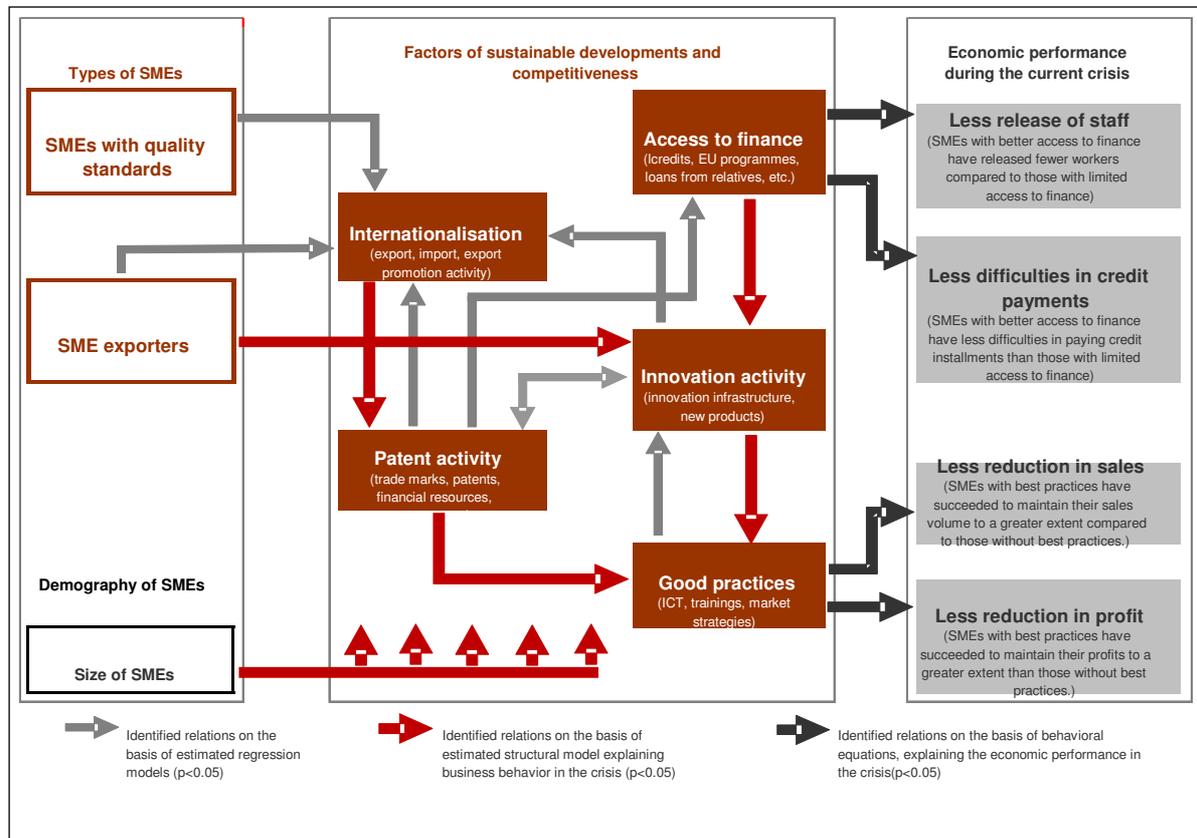


Figure 5: Interaction of competitiveness factors and their impact on the SMEs performance in times of crisis

The positive influence of the internationalization on the SMEs performance was also *indirect* through its effect on the intellectual property activities and therefore through good management practices (H2). This could be due again to sector specific conditions, as the crisis affected both internationalized and domestic oriented enterprises. On the one hand, the enterprises, whose turnovers had not suffered in the crisis, were more internationalized. On the other hand, firms which had experienced personnel cuts were more internationalized. More internationalized manufacturing SMEs released personnel in difference to those operating only on the internal market, while in the construction sector the internationalized companies did not lay off staff.

The impact of own trademarks and patents development on the SME performance in times of crisis was similar to that of innovations – positive, but indirect through good management practices (H3). In 2010 enterprises with a higher index of patent and trademark activity (from all sectors and size groups) had experienced labour force contractions, while those with a lower index had retained their employment. SMEs with implemented quality standards were more innovative and more internationalized. This factor had also a positive, but quite *indirect* influence on the SMEs performance (H4).

Thus the first four hypotheses received only partial support. The impact of four leading factors on the SMEs performance, which were considered as more important for their competitiveness, turned to be positive, but more or less indirect.

The access to finance has affected *directly* the SMEs performance (H5). The enterprises with better access to financing have released less number of employees or haven't done it at all. On the contrary, enterprises from all sectors with a lower index of access to financing have made layoffs. The limited access to finance has also affected regularity of debt payments. The access to finance emerged as the most important and almost independent factor for the company performance. It impacted positively also the degree of innovation, and indirectly – the adoption of good management practices and firm's internationalization. It was influenced only by the firm's size and intellectual property activities.

Good management practices affected *directly* SMEs financial results (H6). The enterprises with higher level of such practices (ICT and e-business adoption, staff training, strategic planning and marketing) have undergone a reduction of sales and profits to a lesser extent or have not incurred any. Furthermore, the SMEs with a higher index of good management practices had no personnel layoffs in 2010 unlike the ones with a lower index values. This was true, however, only for trade and construction, while in services and manufacturing the relationship was the opposite. Good management practices contributed positively to higher innovativeness, and through it – to higher trade marks and patent development, and greater level of internationalization.

The SMEs size was at the bottom of the stronger development of all investigated factors for competitiveness, which proved the H7. Export oriented SMEs had a direct and positive impact on the innovation, through it - on good management practices, intellectual property activities, and internationalization, and thus – on final company performance (H8).

### **Conclusion**

These results revealed relatively new relationships between factors for the SMEs survival in turbulent times. It turned out that the *leading role* of innovations, trademarks and patents, quality standards and internationalization in achieving sustainable competitive advantages was not always valid, but rather in times of "normal" functioning of the economy or smooth growth. In times of crisis, these factors became *supportive*, while some supportive transformed into most important. Innovation and internationalization, which are fundament for mid-term business success, cannot lead to immediate positive impact on sales and profits, which is crucial in crisis periods. When the economy catches up again on the growth path, however, these factors could be the engine of growth.

The other plausible explanation of the observed factors ordering could be related to the country stage of development. It might be that this factors configuration is typical for the efficiency driven economies, and not for innovation driven or factor driven ones (Porter *et al.*, 2002), but this hypothesis needs to be checked.

Another conclusion was that the survival of SMEs in conditions of crisis depended mainly on previously accumulated (through good management practices) and current usage of human capital. In times of crisis when the access to finance was aggravated and accompanied by high level of inter-company indebtedness and decreased sales, the short run business success required an efficient use of available human capital. Other studies have also confirmed the importance of human capital (Johnson *et al.*, 1996), and concluded that businesses must keep good practices considering as their structural capital (Ngha and Ibrahim, 2009, pp. 8, 9). Human capital stocks at company level refer not only to availability, but also to establishing competence, i.e. staff training. According to Warner (1996), "*learning and innovation in modern economies are inextricably linked*" (Warner, 1996, p. 348). Therefore, companies with limited resources (SMEs) or countries with limited natural endowments should invest in human capital as a strategy for competitive advantage (Chen *et al.*, 2005).

The estimated relationships between factors for competitiveness and economic performance in crisis allowed for identification of the SMEs, which were sustainable in the short run, and therefore could contribute to the overcoming of the crisis. Such companies

were mostly medium-sized, with greater access to financial resources, and with higher implementation of good management practices. In the medium term, however, higher competitive potential have SMEs, which innovate, register patents and trademarks, and have a higher level of internationalization. This study has fully confirmed three of the research hypotheses (H5, H6, and H7) and partially the other five. The interpretation of results, however, was limited by the small number of SMEs as well as the prevalence of micro-enterprises in the sample (the latter are not typical in innovation, internationalization, intellectual property and application of modern management practices). Therefore, further surveys with greater representation of bigger SME are needed.

The perspective of there being two groups of competitiveness factors does not in itself reveal new factors, but introduces a new perspective on the traditional dimensions of internal, external, and related to entrepreneur factors, and their interactions. It provides much-needed empirical evidence about configurations of SMEs competitiveness factors, and contributes to the development of current theories, and the convergence of theory and practice. Being highly specific, these configurations will serve better to inform the practices of entrepreneurs and SMEs policy makers, as they will indicate *context specific measures* and policies.

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## APPENDIX 1

### 1.1. Index formulae

#### Index „Innovation Activity”

The index accounts for the innovation activities of the entrepreneurs in the previous and in the past five years. The formula by which the index is calculated as follows:

$$IRD_i = \frac{\frac{\sum_n RDbase_i^n}{\max\left(\sum_n RDbase^n\right)} + \frac{\sum_m RDproducts_i^m}{\max\left(\sum_m RDproducts^m\right)}}{3} \cdot 100, \text{ where:}$$

$IRD_i$  is the index that measures the innovation activity of entrepreneur  $i$ ,  $RDbase_i^n$  indicates whether the entrepreneur  $i$  does activity  $n$ , associated with the establishment of innovation infrastructure,  $RDproducts_i^m$  indicates whether the entrepreneur  $i$  does activity  $m$ , associated with the development of new products.

#### Index „Internationalisation”

The index accounts for the activities related to the internationalization of the SMEs during the last year. The index formula is:

$$ITN_i = \frac{PR_i + EX_i}{2} \cdot 100, \text{ where:}$$

$ITN_i$  is the index that measures the degree of internationalization of firm  $i$ ,  $PR_i$  shows the

$$PR_i = \frac{\sum_m PR_i^m}{\max\left(\sum_m PR_i^m\right)},$$

promotion activities carried and is equal to: foreign trade and is equal to:

$$EX_i = w_1 \times \frac{Im\ port_i + Export_i}{2} + w_2 \times \frac{Exp\_output_i + Exp\_turnover_i}{2}, \text{ where } w_1 \text{ and } w_2 \text{ are}$$

respectively the weights (in this case assumed to be equal respectively to 40% and 60%),  $Im\ port_i$  and  $Export_i$  indicate the presence of relevant import and export  $Exp\_output_i$  is the export share of total production in enterprise  $i$ , and  $Exp\_turnover_i$  - the share of turnover that comes from exports.

#### Index „Trade marks and patents”

The index formula is as follows:

$$ITM_i = (w_1 \times Re\ gistrations_i + w_2 \times Financing_i + w_3 \times Awareness_i) \cdot 100, \text{ where:}$$

$ITM_i$  is the index, which measures the degree of patent activities in enterprise  $i$ ,  $Re\ gistrations_i$  is an indicator corresponding to the already made and expected registrations of trademarks and patents at home country and abroad by company  $i$ ,  $Financing_i$  measures the extent to which company  $i$  can finance the registration of trade marks, patents or intellectual property,  $Awareness_i$  measures the extent to which company  $i$  is informed about the opportunities and brand value, and the possibility of

registering such in the EU,  $w_1$  is the weight of the registered intellectual property in the final index, which in this case is equal to 60% and  $w_2$  — the weight used for the availability of funding and the level of awareness in the final index, which in this case is equal to 20%.

### **Index „Access to Finance”**

The index considers whether the companies have used different financial instrument in the last year. The formula used for the calculation of the index is as follows:

$$IAF_i = \frac{\sum_n FinInstrument_i^n + \sum_m Programme_i^m + \sum_k FamilyFriends_i^k}{\max(\sum_n FinInstrument^n + \sum_m Programme^m + \sum_k FamilyFriends^k)} \cdot 100 \text{ where:}$$

$IAF_i$  is the index of access to finance for entrepreneur  $i$ ,  $FinInstrument_i^n$  measures whether the entrepreneur  $i$  uses financial instrument  $n$ , provided by banking, investment and other financial institutions,  $Programme_i^m$  measures whether the entrepreneur  $i$  uses funding program  $m$ , granted by the Government, the EU funds and third parties,  $FamilyFriends_i^k$  measures whether the entrepreneur  $i$  uses loans from source  $k$ , received by the owner(s) of the enterprise, family and friends.

### **Index „Good management practices”**

The index accounts for the application of good management practices in the business during the previous and the past five years. The index formula is:

$$IBP_i = \frac{ICT_i + HR_i + BS_i}{3} \cdot 100, \text{ where:}$$

$IBP_i$  is the index, which measures the implementation of good practices in enterprise  $i$ ,  $ICT_i$  measures the usage of ICT by enterprise  $i$  and is calculated as follows:

$$ICT_i = \frac{\frac{\sum_n MIS_i^n}{\max(\sum_n MIS^n)} + \frac{\sum_m Internet_i^m}{\max(\sum_m Internet^m)}}{2}, \text{ where } MIS_i^n \text{ shows the use of management information system } n, \text{ and } Internet_i^m - \text{ use of internet technology } m.$$

$HR_i$  measures the extent of implementation of human resources policies and is calculated as follows:

$$HR_i = 0.4 \times Qualification_i + 0.6 \times \frac{\sum_k Training_i^k}{\max(\sum_m Training^k)}, \text{ where } Qualification_i \text{ is an indicator of the high qualification of the personnel and } Training_i^k \text{ shows the involvement of staff in training } k.$$

$BS_i$  measures the extent to which firm  $i$  uses marketing strategies and is calculated as follows:

$$BS_i = \frac{\frac{\sum_t Plan_i^t}{\max\left(\sum_t Plan^t\right)} + \frac{\sum_j MS_i^j}{\max\left(\sum_j MS^j\right)}}{2}, \text{ where } Plan_i^t \text{ indicates the existence of planning period } t, \text{ and } MS_i^j \text{ indicates the presence of developed and implemented marketing strategy } j.$$

## 1.2. Econometric models

The structural models are based on the following specification. Let  $\mathbf{X}$  be the vector of all factors for sustainable competitiveness (calculated indexes):  $\mathbf{X} = (X_1, X_2, X_3, X_4, X_5)^T$

Then the structural model defined through a system of equations is as follows:  $\mathbf{X} = \mathbf{AX} + \mathbf{BZ}$ ,

Where  $\mathbf{A}$  and  $\mathbf{B}$  are matrices of coefficients as follows:

$$\mathbf{A} = \{\alpha_{ij}\}, \quad i, j = 1, \dots, 5, \quad \alpha_{ij} = 0, \quad \forall i = j$$

$$\mathbf{B} = \{\beta_{ij}\}, \quad i = 1, \dots, 5, \quad j = 1, \dots, 7$$

And  $\mathbf{Z} = (Z_1, Z_2, Z_3, Z_4, Z_5, Z_6, Z_7)^T$  is the vector of control variables.

After empirically testing all possible combinations of interdependencies between the factors for competitiveness, two systems of equations have been identified and used further in the analysis. Regression models used are trying to explain the linear dependence of each factor for competitiveness on the rest through:

$$Index^{factor \text{ for competitiveness}}_i = \mathbf{X}'\boldsymbol{\beta} + \mathbf{Z}'\boldsymbol{\alpha}$$

where  $X$  and  $Z$  are vectors of factors for competitiveness and control variables respectively, and  $\boldsymbol{\beta}$  and  $\boldsymbol{\alpha}$  are coefficient vectors. For example, the index for innovations is explained by the rest indexes for competitiveness and the control variables.

The third type of models are logit/ probit models and follow the following specification:

$$Effect^k_i = \alpha_0 + \alpha_1 X_{1i} + \dots + \alpha_5 X_{5i} + \beta_1 Z_{1i} + \dots + \beta_7 Z_{7i} + u_i,$$

where  $Effect^k$  denotes the various types of effects as defined above.

## 1.3. Estimation output

Structural model of the inter-relations among the factors for development and competitiveness	System 1		System 2	
	(1) Dependent variable - Innovation activity	(2) Dependent variable - Best practices	(3) Dependent variable - Internationalisation	(4) Dependent variable - Patent activity
<b>Factors</b>				
<b>Innovation activity</b>	-	0.26**	0.14**	-
<b>Best practices</b>	0.68**	-	-	-
<b>Internationalisation</b>	-	-	-	0.42**
<b>Patent activity</b>	-	0.60**	0.27**	-
<b>Standards</b>	-	-	11.13*	-
<b>Exports</b>	19.08**	-	-	-
<b>Number of employees</b>	-	0.25**	0.10**	-
<b>Size of the settlement</b>	-	-5.75**	-	-
<b>Constant</b>	0.26**	31.16**	-0.01	2.25**
<b>Estimation method</b>	WLS		WLS	
<b>R-squared</b>	0.35	0.45	0.32	0.22
<b>Adjusted R-squared</b>	0.34	0.43	0.30	0.22
<b>Number of observations</b>	167	132	188	220
			** $p < 0.01$	* $p < 0.05$

Regression models, explaining the factors for development and competitiveness	Dependent variables				
Factors	Innovation activity	Internationalisation	Best practices	Patent activity	Access to finance
Innovation activity	-	0.06**	0.26**	0.23**	-
Standards	-	8.15**	-	-	-
Patent activity	-	-	0.60**	-	0.24**
Access to finance	0.32*	-	-	-	-
Exports	30.0**	40.5**	-	-	-
Number of employees	0.13**	0.06**	0.25**	-	0.06**
Size of the settlement	-5.19*	1.31*	-5.75**	-	-
Constant	17.8**	-2.23	31.16**	0.52	-
Estimation method	LS <sup>1</sup>	LS <sup>1</sup>	LS <sup>1</sup>	LS <sup>1</sup>	LS <sup>1</sup>
R-squared	0.24	0.75	0.45	0.25	0.13
Adjusted R-squared	0.23	0.74	0.43	0.25	0.12
Number of observations	254	247	132	205	206

<sup>1</sup> Newey-West HAC Standard Errors & Covariance

\*\*  $p < 0.01$  \*  $p < 0.05$

Behavioural equations, explaining the effects of the economic crisis	Dependent variables			
Factors	Increase in sales	Increase in profit	Difficulties in debt payments	Released staff
Best practices	-0.33**	-0.30*	-	-0.02*
Access to finance	-	-	-0.12**	-0.05**
Constant	33.4**	32.7**	-3.00**	-0.45*
Estimation method	LS <sup>1</sup>	LS <sup>1</sup>	Logit	Probit
R-squared	0.14	0.13	-	-
McFadden R-squared	-	-	0.18	0.11
Number of observations	174	169	277	172

<sup>1</sup> Newey-West HAC Standard Errors & Covariance

\*\*  $p < 0.01$  \*  $p < 0.05$