INNOVATIONS AND DEVELOPMENT

BARRIERS AND FUTURE POLICY DIRECTIONS TO KNOWLEDGE DEMAND AND ABSORPTION IN SOUTH AND EAST BULGARIA

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Abstract: The paper analyses SMEs competitiveness, innovation and knowledge networks using data gathered through a range of interactions with innovative SMEs including interviews and consultations with 50 innovative SMEs from a range of sectors in the region and a focus group with 8 managers of non-innovative SMEs. Survey results show that the region of South and East Bulgaria rely more on the tacit knowledge of their human resources rather than on their formal qualifications (codified knowledge). Bulgarian SMEs are facing mainly with problems of survival and business extension an still do put not enough emphasis on the role of knowledge to the firms' competitiveness. Finding the appropriate policy initiatives to encourage firms to incorporate innovation strategy into the overall business development strategy is becoming a serious challenge for the government. A major factor hampering SMEs in carrying out R&D and innovation is the lack of financial resources. And there is still a large room for improvement and finding the appropriate mechanisms to support SMEs innovation and R&D invetsment. The uncertain demand for innovation product and services also appears to be a substantial factor hampering innovative activities in SMEs. This finding suggests that the general economic environment in the country does not stimulate the production of innovative products and services. Hence one of the avenues of promoting innovation is to convince SMEs that they will benefit from the results of their research efforts. The interviewed firms consider further elaboration of the system for business support and advice, improving physical infrastructure and allowing companies to locate in better equipped premises as the next step to form the core national regional innovation policy in the country.

Introduction

Innovations in a regional context are usually considered being a result of co-operation, interaction and mutual learning between different actors within the region. As an important part of the innovation process, the knowledge demand and absorption is necessarily a difficult area of measurement and analysis. At a regional level, the best available indicators relate to industrial structure and the human capital capacity of the existing workforce. Industrial structure analysed in terms of the knowledge intensity of the region's businesses is a useful indicator of the potential demand for knowledge, while human capital capacity indicators are able to monitor the likely ability to absorb appropriate knowledge. Although Bulgarian R&D expenditure's data are collected by surveys that follow guidelines and definitions outlined in the Frascati Manual and the Regional Manual of Eurostat, data on some of the R&D activities, included some of the knowledge demand indicators, are not completely available. The collection of regional data still faces major methodological difficulties that impedes the comparability among regions and also provides distorted picture of regional R&D. Some of the data are collected by sample surveys, but due to the insufficient sample size many of the traditional used innovation indicators are not computed at a regional level. This means that providing more reliable statistical base for in-depth analysis of innovativeness of the SMEs is considered to be of primary importance for the innovation policies conducting.

The paper presents the results of benchmarking regional knowledge demand and absorption in the region of South and East Bulgaria. This region includes four out of the six planning regions (NUTS 2 level[1]) in Bulgaria - South-West region, South-Central region, South-East region, and North-East region.[2] It covers an area of about 74.2% of the country's territory, homes 79% of the total Bulgarian population, and provides 83.9% of the country's GDP level. Regarding the R&D investments, the region gives 96.2% of the country's expenditures, and manifests its main characteristics - the high centralisation and concentration of resources and activities in the capital of the country. The knowledge demand and absorption within the region also varies considerably with the dominant role of the South-West planning region, including Sofia.

According to the data from the National Innovation Survey conducted by National Statistical Institute about

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[1] The Nomenclature of Territorial Units for Statistics (NUTS), established by Eurostat.

[2] The results presented are part of the research project "Managing and Infusing Research Investment and Development (MIRIAD)", funded by the Framework 6 Programme of the EC under Regions of Knowledge 2 programme (FP6-2004-KNOW-REG-2) (project number: 029490), where the definition of the region was presupposed in order to cover Bulgarian borders with Greece, Turkey and Black Sea.

16% of all firms operating in the country have innovated in the last three years. The share of innovative firms in the groups of enterprises with 10-49 employees and 50-249 employees is 13.5% and 22.8% respectively. Having in mind the relatively low innovative activity of Bulgarian SMEs compared to the average EU-level, the only innovative firms were selected for the standardised interviews instead of applying simple random sampling approach. Eventually, the information necessary was gathered through a range of interactions with SMEs including interviews and consultations with 50 innovative SMEs from a range of sectors in the region and a focus group with 8 managers of non-innovative SMEs.

The interaction with SMEs was aimed at:

a. understanding the barriers SMEs face in identification of the research and knowledge they require and finding out the particular types of knowledge that they consider themselves to be deficient;

b. examining how (if at all) SMEs transfer and make use of knowledge generated by other SMEs and research actors and identifying the processes best suited to knowledge infusion into SMEs;

c. gaining information about the issues facing the SMEs in the area of knowledge transfer and in particular in the absorbing effectively the research and knowledge they know already exists.

The main goal of the paper is to analyze how the knowledge, defined broadly as consisting of research and development, ideas, expertise, and other information, have been used to improve the performance of SMEs. The interviewed firms were expected to access the role of different innovation related factors for their competitiveness, using an 1-10 scale, where 1 is the minimum, and 10 is the maximum grade. They were also expected to rate the importance and effectiveness of the various factors, where the importance is related to the necessity of a particular factor, while the effectiveness is connected with its efficient usage for the competitiveness of the company.

In accordance with the above aims, the paper is structured as follows: First, it analyzes the knowledge stock and competitiveness of the SMEs. The next step is an empirical investigation of the knowledge creation and acquisition activities of the regional SMEs. Furthermore, the collaboration with different institutions and the membership in particular organizations are examined. Finally, the main barriers to innovation are characterized and the future policy directions are outlined.

Knowledge stock and competitiveness

This section presents data on the knowledge stock of the SMEs and their importance and effectiveness for the overall competitiveness of the SME. The data are divided into five broad groups: human resources, intellectual assets, practices and routines, physical resources and external relations.

Surveys results suggest that the most important factors for the competitiveness of the firms are the firms' human resources, followed by the firms' external relations, practices and routines within the firms, intellectual assets and physical assets. In terms of human resources, it has become clear that the loyalty of both employees and managers is the most important factor affecting competitiveness (Table 1). The interviewed entrepreneurs value more the quality characteristics of managers than those of the employees. They rate both the formal and tacit knowledge of managers as being of high importance for firm's competitiveness. In contrary as regards to employees their formal qualifications are much less valued than the skills and competences they have accumulated during their work life.

It has to be noted here that the competence needs vary among different sectors and firms, especially concerning innovative activities. Therefore the finding stemming from the data indicate that formal knowledge is less valued than tacit one should not be automatically transferred to all kinds of enterprises. For example whereas some sectors and firms require substantial formal R&D competence others may place greater emphasis on the development of prototypes, testing and trial production, and experience a greater need for skilled workers. Type of competences needed depends also on the type of innovations carried out - radical or incremental. The limited size of the sample does not allow carrying out analysis by economic sectors. Therefore further efforts are needed in order to analyze the competence requirements of the firms involved in innovative activities. The finding of higher appreciation of tacit than formal knowledge as factor for firm's competitiveness can still be a signal of the inadequate mix of skills provided by formal education system.

Table 1 also highlights a general pattern of an asset being of more importance than effectiveness, i.e. these factors are all necessary for the competitiveness of the business but are not used as efficiently. Therefore the firms are, generally, not utilising their assets to the optimum level. The exceptions are employee qualifications and problems solving capacity which are used more efficiently than is necessary.

The summarized data about the role the firms' intellectual assets have played in relation to competitiveness show that market knowledge and IT facilities are rated as the most important assets, scoring 8.6 and 8.5 respectively (Table 2). Interestingly, typical intellectual assets such as patents, copyrights, trademarks and trade secrets rank lowest in terms of importance. Some explanation of this finding can be found in the sector composition of the sample. Such assets seem to be more important for production firms than for service and trade ones. Since only one third of the respondents operate in the production sector, it is not a surprise that typical intellectual assets are not considered of higher importance to firms competitiveness than the other assets. The firms instead rely on internal training programmes, process manuals and websites to generate competitive advantages.

Table 2 shows that 6 of the 9 assets are rated as more important than effective, again a factor is more necessary to the firm than they are efficient at using it. The intellectual assets of patents, copyrights and trademarks are all more effective than important, i.e. they are not crucial to the firms' competitiveness but are used in an efficient way to maximise their value. The respondents are most critical the efficiency in using intellectual assets with regard to internal training programs, market knowledge and IT facilities.

Table 3 shows that communications with both customers and suppliers are the most important practice or routine with scores of 9.5 and 9.4 respectively, followed by management style and on the job training. Interestingly, on the job, or

internal, training appears to be of much higher importance to the firms than external training, highlighting the fact that the SMEs are inward looking in terms of training and may be less likely to look for sources external to the firm when training their workforce. The importance of all the "process and routines" factors are all higher than their effectiveness, i.e. the SMEs are not able to use them as efficiently as is necessary to remain competitive but they are not maximising them.

TABLE 1. HUMAN RESOURCES AND COMPETITIVENESS

Human resources	Importance	Effectiveness	Percentage difference
Employee skills and competences	7.5	7.4	1.4
Employee qualifications	6.4	7.6	-15.8
Employees' problem solving capacity	7.0	7.2	-2.8
Employees commitment	8.5	7.5	13.3
Employee loyalty	9.3	7.5	24.0
Management skills and competences	8.8	8.4	4.8
Management qualifications	8.7	8.6	1.1
Management commitment	8.6	8.0	7.5
Management loyalty	9.1	8.3	9.6

TABLE 2. INTELLECTUAL ASSETS

Intellectual assets	Importance	Effectiveness	Percentage difference
Patents filed	4.0	3.6	11.1
Copyrights held	3.5	3.5	0.0
Trademarks registered	3.9	5.0	-22.0
Trade secrets	4.6	5.6	-17.9
Market knowledge	8.6	7.1	21.1
Process manuals	6.5	5.6	16.1
Internal training programmes	6.7	5.2	28.8
Website	6.8	6.5	4.6
IT facilities	8.5	7.0	21.4

TABLE 3. PRACTICES AND ROUTINES

Practices and routines	Importance	Effectiveness	Percentage difference
Process manuals	6.5	5.6	16.1
On the job training	8.4	7.5	12.0
External training	7.8	6.0	30.0
Management style	9.3	8.7	6.9
Forums for solving problems	7.5	6.0	25.0
Communication with customers	9.5	8.5	11.8
Communication with suppliers	9.4	8.9	5.6

TABLE 4. PHYSICAL RESOURCES

Physical resources	Importance	Effectiveness	Percentage difference
Industrial buildings	6.4	7.4	-13.5
Retail premises	5.4	7.0	-22.9
Land	5.5	6.3	-12.7
Plant equipment (owned)	7.8	7.1	9.9
Plant equipment (leased)	7.1	6.8	4.4
Road links	5.6	6.0	-6.7
Rail links	3.2	3.4	-5.9
Proximity to customers	5.0	6.0	-16.7
Proximity to suppliers	5.1	5.5	-13.5

Physical resources are generally the least important factors for the competitiveness of SMEs as the average scores in Table 4 are lower than the scores for the factors presented in Tables 1-3. Plant equipment owned by the firms, followed by industrial buildings, are the most important physical resources. Interestingly the firms' proximity to their suppliers and customers together with the road and rail links do not appear to be very important, suggesting that the sampled firms may be trading outside the region. Compared to the other factors for competitiveness physical resources appear to be most effectively used. As table 4 shows 7 of 9 such assets are rated as more effective than important. Thus, the firms are using their physical resources more efficiently than they are necessary and thus efficient use is more important for competitiveness than possessing these resources.

Table 5 highlights the fact that the most important factors in terms of external relations are customer satisfaction (average score of 9.6), the firm's reputation (9.5), responsiveness to customers demands (9.1), brand image of products/services (8.8) and customer loyalty (8.6). The data also show that relationships with customers are rated as more important than relationships with suppliers. The licensing of the firm's products or obtaining licences for other firm's products does not appear to be important for competitiveness, suggesting that the firms focus on their own products and services. With the exception of licence agreements for both other firm's products for own products, the importance of these factors is higher than the effectiveness, thus the firms are not utilising the resources they possess as efficiently as they should to be competitive.

TABLE 5. EXTERNAL RELATIONS

External relations	Importance	Effectiveness	Percentage difference
Distribution arrangements for firm's products and services	7.5	7.0	7.1
Customer loyalty	8.6	6.0	43.3
Brand image of products/services	8.8	7.0	25.7
Reputation of the company	9.5	9.0	5.6
Customer satisfaction	9.6	8.5	12.9
Responsiveness to customer demands	9.1	8.2	11.0
Relationships with customers	8.5	8.2	3.7
Relationships with suppliers	7.6	7.5	1.3
Licence agreements for own products	4.2	4.5	-6.7
Licence agreements for the other firms' products	3.2	4.0	-20.0

Knowledge creation and acquisition

This section examines data on knowledge creation and acquisition activities of the SMEs in region of South-East Bulgaria. In order to get a clear picture of the knowledge and innovation creation, the respondents have been asked to answer the question "How did you create knowledge and innovations in the last three years?", as well as to differentiate the answers according to the type of knowledge and innovation.

Table 6 shows that the largest share of knowledge and innovations is created inside the SMEs. Only about one tenth of the innovations is taken from external sources. SMEs are more active in collaboration only with regard to process innovations. This finding is not a surprise because such type of knowledge creation and innovations include new or considerably improved production methods, methods for supply and supplementary activities. All of them require more active co-operation with external organizations than the product innovations. The results suggest that the main part of innovation in SMEs is not based on specific research activities but on the use of existing technologies.

One of the most striking finding stemming from the interviews is the low importance of traditional knowledge creators such as universities and private research institutes. It became clear that the top two external sources of knowledge for SMEs are customers and suppliers. This result suggests that innovation and knowledge creation in the region is not supply-driven. According to the survey data, technological transfer of traditional type - that is transferring research from R&D performing agencies and knowledge-creating institutions into applications in firms - does not take place in the country. The study also indicates very weak relationship between SMEs and intermediary organizations such as professional networks and associations.

In terms of who actually creates the knowledge within the firms, all of the respondents pointed out that their firms have neither R&D teams, nor R&D departments. Since the largest part of the innovations includes adoption of existing technologies, the interviewed stressed the importance and effectiveness of knowledge workers with an average score of 7.5. However, the most important source of knowledge and innovation in the firm is the management according to the survey results. The survey found that, on average, almost of two-thirds of the firms report that the workforce has adequate skills for their needs. During the focus group and interviews however participants stressed that many SMEs, especially traditional ones, are lacking management capacities to implement new ideas and innovative projects.

According to the survey, every second Bulgarian SMEs has co-operated with national partner in knowledge creation and innovations (Table 7). There have been indications

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from other studies that the process of opening SMEs to external - mainly European partners - is going on. However, we do not know enough about the type of such collaborations. Existing studies point out that in the bulk of the cases the co-operation includes transfer of existing technologies rather than outsourcing. In addition, in terms of innovation culture, the respondents emphasized that the

two of the most important factors are the core values of the firm and the innovative culture within the firm, which suggests that the firm will be innovative if the management team values the contribution of innovation to competitiveness, and among the workforce there is a culture which promotes innovation.

TABLE 6. KNOWLEDGE AND INNOVATION CREATION IN THE LAST 3 YEARS (IN %)

Source of Innovations	Product innovations	Process innovations
Developed by the SME	73.4	69.1
Developed in co-operation with other enterprises or institutions	12.7	20.9
Developed outside the SME	13.8	10.0
Total	100.0	100.0

TABLE 7. SOURCES OF KNOWLEDGE AND INNOVATION BY LOCATION (IN %)

Sources	Share
National	49.9
European	33.5
US or other countries	16.7
Total	100.0

As regards the types of knowledge the SMEs obtain from external sources, our observation highlights the fact that the firms obtain a diverse range of knowledge but almost two-thirds of them spent efforts on IT development/support and acquisition of equipment. The group of important types of knowledge includes general business support, license, know-how and marketing knowledge, suggesting that it is the knowledge of running a business rather than developing products which is the most often obtained from external sources. R&D both in house and from external sources occupies very modest share in the total innovative activities of the SMEs. In fact, 6.9% of the respondents report intramural R&D and almost double

number (12.2%) - extramural R&D in the last three years. This results once again confirms that for SMEs the access to the existing technologies is more important than R&D.

Collaboration

This section examines data on SME collaboration focussing on the following factors: with whom they collaborate, the importance of various sources of collaboration, the changing nature of the relationships, the impact of social interaction, and the collaboration and membership in business organisations such as chambers of commerce.

TABLE 8. PERCENTAGE OF FIRMS IN MEMBERSHIP ORGANISATIONS

Organizations	Member	Non-member
Chamber of Commerce	54.2	45.8
Trade or Business Association	69.0	31.0
Business Incubators	7.0	93.0
Other professional networks	29.3	71.7

TABLE 9. IMPORTANCE OF MEMBERSHIP OF NETWORKS

Effects	Importance
Developing customer contacts	4.2
Developing supplier contacts	3.6
Obtaining knowledge from other parties	5.0
Creating solidarity within your industry	4.2
A means of representing views	4.8
Sharing knowledge with member	5.2
Developing trust within the industry	4.5

The most striking result appearing several times in the survey responses is the lack of interaction between knowledge creators (higher education institutions and research institutions) and private sector, in particular SMEs - only 7% of the respondents found universities the most

valuable partner in knowledge creation and absorption The quality of science and higher education has been improving in recent years but it seems that the actors are not able to commercialize the results of these efforts. The customers and suppliers are rated as the most important collaborator,

mirroring the result obtained with sources of external knowledge.

Overall, the sample firms appear to be well connected. Over three quarters report membership of a trade of business association. Over 2/3 of the firms report membership of trade or business associations, and over half of them are members of the local chambers of commerce.

Table 9 shows that obtaining and sharing knowledge are the most important factors with respect to the membership of networks. While these advantages do not score highly, i.e. scores of 5.0 and 5.2 suggest that they are only rated as fairly important; they do suggest that the transfer of knowledge may be the most important factor influencing involvement and membership of network organisations. This finding needs further exploration because the differences in the scores are neglible. For example developing trust within the industry and representing views are almost equally rated with the effect of obtaining and sharing knowledge.

Barriers and business support

This section examines data on the barriers to innovation faced by the firms and the policy actions the firms would like to see implemented across the region. Also, awareness of the regional business support network is examined along with the interaction between the SMEs and the support organisations.

The data from the interviews suggests that the major barrier faced by SMEs in carrying out R&D and innovations is the lack of financial resources. Reasonably the major priority for future policy according to the firm managers is to make finance available for firms to expand R&D and knowledge related activities (Table 10). It has to be stressed here that when respondents are asked about the role of finance in the innovative activities the respondents predominantly think about internal resources. This is due to the very low public financial support to the SMEs in this area. And there is still a large room for improvement and finding the appropriate mechanisms. When committing resources to innovation SMEs spend more as a proportion of their turnover than larger firms and face higher risks. During focus group most of the participants pointed out the lack of well-functioning venture capital or seed finance market to support their research and development efforts, or their investments in innovations.

It is interesting that uncertain demand for innovation products and services is rated quite high as a factor hampering innovative activities in SMEs. This finding suggests that the general economic environment in the country does not stimulate the production of innovative products and services. Hence one of the avenues of promoting innovation is to convince SMEs that they will benefit from their research efforts. Probably surprisingly the inability to recruit skilled labour, access relevant networks and information on technologies are not rated as so important barriers to innovation as lack of finance and uncertain demand.

TABLE 10. BARRIERS TO KNOWLEDGE CREATION

Barriers	Importance
Unable to access relevant co-operation and collaborators	6.1
Unable to access information on technologies and equipment	5.7
Uncertain demand for innovative products and services	6.6
Unable to access information on markets	5.8
Unable to access suitable finance in the firm	7.6
Unable to access suitable finance outside the firm	7.1
Unable to access skilled labour	6.1
Innovation costs too high	7.5

TABLE 11. FUTURE POLICY DIRECTIONS (IN %)

Future policy directions	Does not need to be addressed further	Needs addressing but is not the core issue	Should form the core policy
Creating an improved system of business support and advice	12.6	25.4	62.0
Making more finance available to companies enabling them to become involved further in R&D and knowledge related activities	0.0	23.5	76.5
Creating more access to training and workforce development opportunities	13.0	36.0	51.0
Supporting companies in entering and accessing new markets	11.0	40.0	49.0
Creating better networks that link companies with universities and other R&D performing organisations	15.0	38.0	47.0
Making improvements to the physical infrastructure allowing companies to locate in better equipped premises	12.0	26.0	62.0
Providing more support to companies to improve their supply-chains and logistical needs	23.0	39.0	38.0
Stimulating better supply and demand for knowledge through the attraction of high value foreign investment	13.0	48.0	39.0
Stimulating the creation of new start-up companies	11.0	62.0	27.0

The main priority for future policy according to the firm managers is to make finance available for firms to expand R&D and knowledge related activities, which 76.5% of respondents suggested should form the core of policy (Table 11). The fact that interviewed placed the creating of an improved system of business support and advice and making improvement to the physical infrastructure and allowing companies to locate in better equipped premises on the second place in terms of share of suggestions to form the core of the policy, indicates that SMEs sector in Bulgaria still needs support for its further expansion and sustainable growth. 51% of the respondents suggested that creating more access to training and workforce development opportunities should form the core policy, thus supporting the view that SMEs still need a serious support to improve their capacity to innovate.

Conclusion

Based on the above analysis, the following specific issues concerning the knowledge demand by SMEs in the examine region emerge: a) lack of innovative capacity in traditional SMEs, including both managerial and worker capacity to create and implement knowledge; b) lack of financial resources and finding the appropriate policy mix to support SMEs innovation and R&D investment; c) lack of relationship between knowledge creators and SMEs and the inefficient role of intermediary organizations; d) need for a more integrated approach to the delivery of services to SMEs that combine support and advising services at all stages of innovation process; e) need to discuss a more-sector specific support policy that will focus on the needs of regional SMEs clusters.

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