RESEARCHING SME: DILEMMAS OF STUDIES ON INNOVATIONS AND INTERNATIONAL COMPARISONS

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Problems of investigation of innovativeness of small and medium-size enterprises (SME) are discussed in this paper. It is observed that most of these problems stem from deficiency of interpretation of studied objects, innovativeness, entrepreneurship, and unclear objectives of projects that have been carried out. Some suggestions regarding elimination of such problems have been formulated and ideas that may assist in drawing conclusions from the vast amount of information and current knowledge are provided.

Introduction

Issues relative to activities of small and medium-size enterprises (SME) are not a new topic of interest for businesspeople, scientists, or agencies that support economic development. However, there are still several unanswered questions related to this form of business activity that are believed to be fundamental to the economic development of any country. For example, whether or not SME are the leading mechanism for economic development. In the macroeconomic perspective, these are questions for politicians and economists. In this paper, I want to present sources of research problems dealing with SMEs and in particular those dealing with their innovativeness. In such a manner, I try to identify a platform for making various research efforts comparable. I believe that such comparability will aid in fostering innovativeness of SMEs, and that study efforts may become more effective in strengthening economic vitality.

What is a SME: Definitions and consequences of their interpretation

Definitions (classifications) of SMEs are mainly based upon employment counts and revenue, as well as the degree of independence in terms of ownership from other enterprises. Secondary criteria used are related to value of the enterprise (e.g., in China and Hong Kong, Taiwan, Vietnam); value of fixed assets (e.g., Thailand, Singapore, Indonesia); production capacity (e.g., China), and economic sector of operations (e.g., Japan, United States, Canada, majority of countries of the former Soviet Union) (What is... , 2003; Definitions of ... , 2004). Employment and revenue are the leading criteria and will be used in the foregoing discussion. To be remembered however, both employment counts and revenue differ substantially between countries, as are interpretations of what is an employee and what is revenue.

In an unpublished report by Nagarajan and Meyer (2004, p.7), medium-size enterprises in Central and Eastern Europe employ 100 to 500 employees, whereas small size enterprises employ 10 to 100 employees. The authors, however, have adopted an American definition of SME, instead of the one used in Europe when their study dealt with European conditions. In Egypt, micro-enterprises employ 1 to 4 employees, small 5-to 14, and medium size 15 to 49

(Ministry of Foreign Trade, 2004). In New Zealand, SMEs employ less than 20 employees. In Canada, enterprises are classified as micro if employment is less than 5, with small enterprises employing less than 100 employees (less than 50 for service sector), and medium size enterprises employing less than 500 employees (Key Small business Statistics, 2003, p.2). In some countries, Bulgaria for example, there is a definition of a small enterprise, but there is no definition of medium sized one (Definitions of SME... , 2004), or there is no definition of SME (Hungary, pending decision of the Parliament) (Definitions of SME... , 2004). Beginning January 1, 2005, according to Recommendation of the European Union, the following classification applies:

- Medium size enterprises employ less than 250 employees, and have revenue less than E50 mln;
- Small size enterprises employ less than 50 employees and their revenue is less than E10 mln, whereas;
- Micro-enterprises employ less than 10 employees and their revenue is less than E 2mnl.
- As well, SME must not have more than 25% ownership in any other company classified as SME (Male i Srednie , 2002, p.4; Ustawa, 1999).

Thus, it is warranted to remember that definitions of SME differ remarkably, and international comparisons may be difficult to arrive upon.

Employment counts may form a source of serious misunderstandings. As an example, in Poland an employee is a person employed following a Job Employment Contract (or nomination, selection, or an order). Employment counts do not include owners, co-owners, nor their family members (Raport o stanie , 2004, p.21). Following such a definition, employment counts do not include these working on contractual basis, vaguely include employed part time, or on 7/8 of the standard employment time, and exclude those working illegally, or following the so called governmental job creation programs. Consequently attempts to make international comparisons of SMEs following "definition of an employee" may be fraudulent between companies.

Revenue, the second typically used criterion, may as well be misleading when used to classify a company as a micro-, small, or medium-size enterprise. There are several sources of possible misunderstandings including: currency value fluctuations, Purchasing Power Parity (PPP) of money, level of wealth in the country, comparable income per capita, unequal distribution of income, labour productivity, etc. These items (not limited to the named ones) cannot guarantee consistency of economic (business) results of an enterprise. A simple calculation that takes into account labour productivity (World ... , 2004, p.645, Table 3.1.01) and PPP suggests that SME may include a firm with revenue less than US $ 5 mln (Egypt), E 50 mln (European Union), up to US $400 (United States). Such a wide variety of revenue - all relative to SME - makes classifications at minimum imprecise.

Furthermore, classifications of SME, as a rule, do not take into account economic sector specificity of operations. There is a very different productivity (or sales by employee per hour) in professional services, than in agriculture or fishery. Sector related differences are taken into account for example in the USA and in Japan.

In conclusion, studying SMEs (even when one eliminated micro-enterprises) and in an attempt to make international comparisons, and following quite fuzzy interpretations of 'employee' and

'revenue' , the discussion will be about companies with 5 to 500 employees, with revenue less than US $400 mln. Such a group of companies is very diversified. As an example, when studying such companies in Canada -- that operated in the similar location with the same number of employees the following difference was noted. Revenue in one company involved in mechanical processing of parts for another company was about $2 mln., whereas in the other engaged in food processing with sales to distributors revenue was about $ 30 mln.

Another dilemma in comparisons of reports related to SMEs deals with "standard industry classifications". Canadian SIC (Standard Industry Classification), differs to North American Industry Classification System (NAICS), and differs to Nomenclature des Activites de Communite Europeene (NACE rev.1) (European classification of business activities). Furthermore, such classifications distinguish some 600 groups of economic activities. This element, when coupled with differences in enterprise size, geographic region of operations, experience, etc. makes attempts for statistical elaboration of study results to be risky at minimum (unless a very generic approach to the study is accepted). Next, a company may be classified along several sectors of activities. Thus, it may happen, that comparisons between 'similar' sectors in fact do not hold criteria of similarity, and one may compare 'oranges to nails'.

What is innovativeness: Innovativeness vs. Entrepreneurship

Further problems related to research on innovativeness of SMEs originate from lack of sharp definitions of such terms as innovation and entrepreneurship. Let us accept that innovation is firstly a practical (commercial) application of an invention. Inventions frequently originate as a result of systematically undertaken Research and Development (R&D) activities. According to the definition by the United Nations, accepted also by OECD in Frascatti Manual (paragraph 59) "R&D ... creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications. ... The basic criterion for distinguishing R&D from the rest of S&T is that there is an 'appreciable element of novelty'".

If such a rigid interpretation is accepted then innovation, a result of invention, must include a novelty in global terms. In such a manner one would eliminate the majority of SMEs from further discussion concerning innovations. Such enterprises mainly imitate, or do not protect their ideas because patenting is too costly and too time consuming. Frequently patents do not provide adequate protection for inventions, because patents reveal the novelty, and thus solutions are more prone for copying or reengineering (redesign) without violation of proprietary rights. More and more frequently, "innovation refers to the development and improvement of products and processes arising from exchange of knowledge among firms and the other players in their environment" (Emerging ... , 2001, p.2).
R&D activity is only one of the elements of the innovation process and can be carried out in the different stages of innovation. It may serve not only as the source of innovative ideas, but also as a means to solve problems, whereas one can make references to any stage in this process up to the stage of implementation (Wasilewski et.al., 1997, p.13). This process can be described in many different ways [see for example Kleine & Rosenberg (1986, p.289), Betz (1987, Chapter 1-2), Nasierowski (1997, p.46)]. It is noted that the concept of absolute novelty in global terms is not emphasized in these models. Thus, both in an every day language, and for research

purposes, one can adopt a weakened interpretation of novelty and innovation. Innovations in an enterprise can be defined as an economic decision made in order to carry out tasks related to taking advantage of emerging market opportunities, or preventing threats to materialize. Such decisions are frequently of strategic nature, with consequences to the competitive position of the company, and in all aspects of its functioning. Similar interpretation is advocated by Oslo Manual. It is accepted there that a minimum requirement of innovation is for a product or a process to be new (or substantially improved for the specific company it need not be new in global terms (Podrecznik Oslo, 1999, paragraph 131, p.51). Even though such an interpretation enhances possible discussions about innovativeness of SME, it makes measurement of innovativeness or a level of involvement in new activities perplexing.

One can advocate indirect means for measurement of results of innovative activities. It can be done, for example, through measurement of productivity, employment, revenues or profits increase, betterment of competitive position, enhancing distinctive competencies, or quality (if such indicators can be measured). Such indicators, however, depend upon the context of operations. Market conditions (forces), actions undertaken by competition, economic and political situation in the region, reputation of the company and customers loyalty, all may strongly deviate results of innovativeness 'measurement'. Quantification of these processes is almost impossible in light of diversity and the number of possible contextual factors. Quantification of these processes is almost impossible in light of diversity and the number of possible contextual factors. Isolation of the impact of these elements, from the impact of innovations by SMEs, upon the results of an activity is almost impossible to be achieved within empirical (quantitative) methodology. It is very unlikely that companies reveal information about their innovation-related procedures, or allow these processes to be monitored (observed). Interrelationships between and among these factors are not documented. Measurement of innovation processes may fail to provide evidence -- reason(cause)-effect -- relationship, and may be of a non-linear character (McAdam & Keogh, 2004, p.126).

Another of the troubling issues in the study of technological change is that of differentiating innovation from creativity. Innovation can be defined as an output (product, device, theory, etc.) that has an appreciable element of novelty. Creativity is more a process. Studies, which claim to be measuring innovation (or productivity of innovation generating units) by recording numbers of patents, publications, etc., are actually measuring only a quantitative dimension of innovation process and ignore its qualitative (or quality oriented) aspects. The notion of novelty is somewhat subjective. The confinement of studies to novelties in absolute (global) terms ignores, unjustifiably, a substantial part of technological change projects. Aspects related to the measurement of efficiency and effectiveness of technology change projects, irrespective of whether these are inventions in global terms or innovations specific to given location or context, should be explored, in order to get a more comprehensive perspective to innovations of SME.
Results of measurement of innovations (as well as the process of measurement) depend upon several situational conditions, such as the economic sector of the activity, the environment where the company operates, and the internal enterprise pressures and objectives (Salavou & Lioukas, 2003). Innovation by SMEs is undertaken in cooperation with other agents acting on the market, that may operate in different countries and in different economic sectors (Narula, 2000). The measurement of innovations is undertaken in order to identify its impact upon performance results or a competitive position, as well as in order to identify factors that may foster innovative

activities. Following such line of reasoning the discussion is redirected more towards entrepreneurship instead of innovativeness, and more towards questions of effectiveness of innovations instead of efficiency of activities.

There are two underlying aspects within the evaluation of innovations that are often described in the literature without making a clear distinction between them --- the concepts of efficiency (output) of innovation (technology change project), and effectiveness (outcome, productivity) of innovation (invention) processes[1]. In this paper, efficiency is interpreted as an output of agents responsible for technological change, as measured by qualitative and quantitative indicators. By efficiency, we mean the function of transforming inputs into outputs. Effectiveness is regarded as a measure (index, assessment) of the contribution of innovation to a broader system (e.g., company). It is a specific function, which transforms outputs into effects (outcomes). The framework for such an interpretation can be found in Nasierowski (2003).

Innovation champions can be very efficient in terms of getting patents, recognition, or having excellent reputation with peers. They may be, however, ineffective from the viewpoint of other criteria ----- i.e., because their innovations do not produce commercially viable projects, because manufacturing cannot produce new products on time, or because marketing/sales do not perform well. Criteria used to assess efficiency and assess effectiveness are separate, though at times overlapping.

A cornerstone of innovation, and technology management in more general terms, is the establishment of a monitoring system. Such a system allows managers to meet predetermined objectives in the selection of projects and to anticipate any reorganization that accompany technological change. Such changes either yield new business opportunities or increase the risks for current operations. Paradoxically, however, although innovations may turn up to be costly and risky, there are no commonly accepted methods to measure the efforts of agents associated with innovations, technology change projects or projects by themselves. Some claim that the sole act of measurement may have a negative impact upon the performance of project related agents. Differences between efficiency, effectiveness, and appropriateness are frequently ignored. Such objectives may sound very fundamental, especially in light of the pivotal importance of the topic. However, there seem to be no unequivocal criteria to be recommended for project, institutions, and individuals' assessment.

The measurement of innovations can be done from the viewpoint of their impact upon competitive position, for example in order to identify factors needed to improve rate of innovations. Naming the problem in such terms we start, however, to talk about entrepreneurship, and not only about innovativeness or creativity. Capability to identify market opportunities, chances, gains, correct business decisions, and following it actions are decisive to business success. These items cal for knowledge, intuition, business (common) sense, courage, business experience, adequate attitude, and ability to implement progressive concepts in cooperation with other agents that operate on the market.

However, what is entrepreneurship? Criteria for assessment of this phenomenon are vaguely identified, means to measure them are not clear, and means to operationalize them are not set.

[1]) Normally, efficiency, effectiveness, and productivity are considered as synonyms in dictionaries.

Thus, we frequently use only a common language when discussing this phenomenon. This may lead to serious misunderstandings. As indicated by studies carried out by Professor R.Peterson from York University in Estonia in early 1990s, "an enterpreneur it is a person who does business on a 'black market' ".

Assuming some uniformity in terms of definitions the World Competitiveness Yearbook (2004, Table 3.4.07) provides some indicators relevant to the degree of entrepreneurship in different countries. It is believed - in the scale 1 to 10 - that the most innovative entrepreneurs are in Hong Kong (measure 7.61) and in the United States (measure 7.47). Entrepreneurs from Poland and Canada get respectively indicators of 5.45, and 6,70. Entrepreneurs in Japan gained the lowest rank (4.15), which is quite surprising. Probably the most vital economy in the world is believed not to be driven by entrepreneurial innovativeness !!!!

Additional problems in measurement of innovativeness - entrepreneurship occur then when the sector of operations is examined, especially in conjunction with the country of operations. This aspect is, beyond organizational culture, linked to national culture (Hofstede, 1991). There are different conditions for operation and different elements that contribute to success. Investigating success or failure different assumptions have to be dealt with. For example, implementation of a new computer system or launching a web page may be an indicator of innovativeness. Thus, for example, asking a question "has your company introduced a web page in the last three years" may yield confusing results. In some countries, or for some companies it may be a norm used for years -- these companies will answer NO -- so they are not innovative. Some others will answer YES, because it was something that just emerged as a new possibility -- so they will be innovative according to the survey result. Such conclusions are misleading. Moreover, legal system, power distance, uncertainty avoidance, and the manner innovation is perceived (whether is more concerned with products or processes) are different between countries. Therefore, any investigation related to innovations is perplexing when country specifics are included.

Problems in conducting research regarding SME

Problems in conducting studies and using results of studies related to SMEs stem from the organization (financing) of studies, as well as from conditions of carrying these studies.

Issues related to SME are the core stone of attention of governmental agencies. In Poland these are works of the Polish Agency for Enterprise Development (PARP), or the Committee for Scientific Development (KBN). In Atlantic Canada these are mandate of the Atlantic Canada Opportunities Agency (ACOA), Fredericton Enterprise, or the Chamber of Commerce, for example. Irrespective of the country of operation, however, activities of separate agencies are not well coordinated. They work on similar topics and have similar agenda, even-though from different perspectives. There are specific reporting practices in place, criteria for funding of projects are set, and many of initiatives intend to support entrepreneurial innovativeness. It is not clear, however, whether these policies support entrepreneurs, justify spending of money, or printing statistical reports of performance results. There is therefore, the gap between political / idealistic objectives, and actual results stemming from an enormous effort dedicated to support SMEs activities. For example, there is an interesting web site regarding support to activities of

SMEs-- yet, it has not even been checked how many times this site has been entered by entrepreneurs.

Results of studies on innovations of SMEs may serve reporting practices, but it is also warranted to ask, how these study results impact upon forming practices for supporting SMEs? A shortage of time series studies yields separate study outcomes largely insufficient to provide assistance in policy-decision process. There is a discrepancy between efficiency of efforts and effectiveness of outcomes. There are a host of reports about statistical facets of operation of SMEs, yet questions related to set goals remain unanswered. It is difficult to conclude whether efforts have yielded expected results.

A serious problem is related to empirical studies. Sending questionnaires provides with a very low response rate, and certainly not a representative sample of respondents is targeted. Additionally, problems of assessment bias are customary - which criteria to use, how to evaluate them, how to assign weights of importance (since criteria used are not equally important). There may be a tendency, especially in small size enterprises, to rely on "business judgement", without paying attention to systematic methods. Complexity of the process, a lack of well established methods, the need to take into consideration a complex web of personal preferences and business contacts add to the difficulty and strengthen temptation for bias and subjectivity. Additionally, irrespective of which assessment method is used availability of reliable data will cause concerns. Even the patenting information or publication/citation counts may prove to be unreliable. Different reporting practices and reasons for patenting (or avoiding to apply for a patent) in institutions can make availability and interpretation of data questionable. For confidentiality reasons some companies may select not to disclose information for research purposes for example. Keeping in mind these objections let us have a closer look at specific measures of efficiency of technology change projects.

The allocation of resources for investments in technology offer special considerations for managers, as technology investment has the longest time frame, offers the least certain outcome, and faces the murkiest of competitive environments. Funds expended on technological change (R&D in particular) come directly from current earnings, but the rewards, if they materialize at all, contribute to distant future profits. Problematic as it is, effective technological change for many companies is essential. If it is neglected, under-funded, or misdirected, the consequences may be damaging to the competitive position of a company. However, a shortage of results of time series analyses, again, makes such a hypothesis difficult to verify.

The opinion that outputs of technology change projects are not amenable to measurement is quite common. One can neither be certain if and when benefits of technological change occur. Consequently any study of the impact of investment in technology development upon results produced looses much of its possible impact upon respective development policies. Beyond the complexity of such assessments there exists a presumption that the sole act of measurement may discourage creativity. For very pragmatic reasons, predetermined criteria may promote a focus on activities, which show that progress has been achieved or that those criteria have been satisfied. Quantity may go up and quality down (Brown & Svenson, 1998). Thus, some feel that management should just “have faith” that R&D is a good investment, without trying to measure it".

Summary

Some of the dilemmas of studies related to innovations of SME have been outlined. It is expected that based on the above further studies will be more focussed and will yield valuable results, that would assist sponsoring agents to enhance effectiveness of SMEs doing business while keeping in mind the need to be innovative. There are serious methodological and logistical difficulties that must be overcome when conducting research on the subject. Some of the most pressing items to be remembered about include:

1. What is needed in order for SME to succeed?
2. What characteristics (attitudes, capabilities) should entrepreneurs have in order to succeed? Can these items be learned, or are they a part of personality?
3. Assuming that creative, innovative ideas contribute to success what are the key driving forces behind creativity?
4. What criteria are used when selecting/evaluating innovative projects - is it the case of the context, product, project ?

These aspects will be examined in the next part of the study I am undertaking.

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