15. ENTREPRENEURSHIP AND ITS ENVIRONMENT IN ESTONIA: AN OVERVIEW OF RECENT EMPIRICAL STUDIES[1]

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Abstract

On the international arena, entrepreneurship has recently become a highly attractive topic for discussions. At present, however, entrepreneurship theory is still in the process of development: the related notions are abundant, the fields of study have a wide scope, and the research methods are subject to ongoing debate. Given this rich and varied theoretical framework, the author of the current article chooses a certain entrepreneurship definition and then focuses on related studies in Estonia, including only papers completed during the last years since 1999. (The studies involved are systematized in a table and appended). The following information was collected about the papers: general data of publication, keywords, methodology and results. The objective of this overview was to identify the developments and gaps in the entrepreneurship research done in Estonia. Additionally, the author summarizes the conclusions of the research papers discussed in this article. Thus the article will be useful for social science researchers looking for new research ideas, as well as for people wishing to get an overview of entrepreneurship research done in Estonia (policy makers, students, general public).

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Definition and categorization of the subject of entrepreneurship research

Prior to tackling the available studies on entrepreneurship in Estonia, let us clarify the definition of entrepreneurship and develop a method for conducting the analysis. The definition and possible domains of research are discussed and defined in this section, thereafter in the next section the method of approach is presented.

Entrepreneurship-related research has exploded in the last few years, caused by interest in the field from the macro- and micro-economic perspective. From the former perspective, entrepreneurship and innovation are said to increase nations' wealth and flexibility of economies, from the latter, organizational point of view, entrepreneurship and creativity enhance a company's competitiveness and diminish routines of work.

Definition. Various authors attach rather different meanings to the term "entrepreneurship". Some researchers choose a broad approach, implying under entrepreneurship the performance of small and medium-sized companies (Shane and Venkataraman, 2000; Venkataraman, 1997), but more often the interpretation is connected to the foundation of a start-up, or establishing a "small in size, technology based" firm (Vanderwerf and Brush, 1989). Even though entrepreneurship is frequently understood as a start-up process (this approach simplifies the research methods), it is widely accepted that entrepreneurship should also be applied to the existing firms, using the term "corporate entrepreneurship" or "intrapreneurship" (Sharma and Chrisman, 1999). It is clear that this largely varied understanding of the definition diminishes the possibility to compare the studies.

The problem with the definition is also relevant for Estonia. One can notice large differences in how the term is interpreted: the Estonian Business Code, for instance, interprets the term "entrepreneurship" (ettevõtlus) as a synonym to business activity. The

manifold definitions of entrepreneurship disorient both the general public and also researchers and students.

In the present article, defining the term ”entrepreneurship”, the author avoided choosing a single definition, preferring to follow a synthesized approach. According to Schumpeter (1934), who is considered to be the farther of entrepreneurship theory, an entrepreneur is a person “who carries out new combinations”. From this and other definitions the present author infers that entrepreneurship encompasses acts of organizational creation, renewal, or innovation that occur within or outside an existing organization (Sharma and Crisman, 2001; Schumpeter, 1934; Stopford and Baden-Fuller, 1994). This conception is certainly broader than mere creation of a new firm. It concerns not only the activity of a single person, but also corporate entrepreneurship, i.e. the action of a group creating new combinations.

Research domains. It is widely accepted that entrepreneurship research is important and necessary (Davidsson and Wiklund, 2001). The author could find only a small number of articles, which aggregated and analyzed the structure of the existing entrepreneurship research. The fields have been most explicitly discussed by Low and MacMillan (1988), Davidsson and Wiklund (2001), Vesper (1977), Wortman (1989). Unfortunately, their classifications do not cover all aspects of the rather comprehensive field of entrepreneurship. Some authors focus on the microeconomic perspective, leaving out the aggregate level and the evaluation of entrepreneurial support (e.g., Davidsson and Wiklund, 2001). Several earlier studies (e.g., Vesper, 1977), even though rather insightful, use such a definition of entrepreneurship which, due to insufficient attention to innovation, can be considered outdated by now.

Since there is no academically accepted uniform structure of entrepreneurial research, herein the author elaborates the structure, using the available classifications and combining them with emerging fields of entrepreneurship research (Table 1). Depend-

ing on the categorization criteria, there might be several classifications (Vesper, 1977; Wortman, 1989; Davidsson and Wiklund, 2001). Completing the table, the author's objective was to differentiate between the layers of research as much as possible, so that single studies would not overlap among several groups. The fields presented in the table can be additionally divided into more basic groups, starting from the individual level and finishing with the aggregate economic level:

individual → organization → aggregate economic level

Thus the studies corresponding to the first row of the table – "Psychology of entrepreneurs" – belong to research on the individual level, while the studies in "Economic development, state level" belong to the aggregate economic level.

Table 1. Domains of entrepreneurial research

Field	Brief description
Psychology of entrepreneurs	Mental makeup of entrepreneurs. Formal research articles or those with a judgmental or anecdotal nature.
Sociology of entrepreneurship	Entrepreneurs in various groups: cultural, gender, professional, etc.
Entrepreneurship support	Means and institutions to promote entrepreneurs and entrepreneurial environment, for example, the activity of an incubator.
Ongoing corporate development	Entrepreneurship within companies: the development of organizations from start-ups to large companies is analyzed.
Sector-based entrepreneurship	Sectors such as high technology and rural areas are studied. For example, geographically or by industry.
Economic development, state level	Aggregate level. Role of entrepreneurship in a country's economy and policy-making.

Sources: Compiled by the author on the basis of Davidsson and Wiklund, 2001; Vesper, 1977; Wortman, 1989.

Naturally, some studies may simultaneously belong to several fields presented in the table; to complete the classification, one can determine the focal topics (two or three) of a study.

Methodology for a survey of entrepreneurship studies

The central objective of this article is to present the major empirical studies on entrepreneurship and its environment in Estonia. Prior to her analysis of the empirical research, the author developed a framework for collecting information, according to which the following fields were tracked:

1. General information about each paper: the names of its first two authors, the title of the paper and the year of publication.
2. Keywords characterizing the theoretical and empirical parts of the research paper.
3. Methodology: the methods used for collecting data, brief description of the research object.
4. Conclusions of the empirical study about entrepreneurship in Estonia; three most important conclusions are usually presented.

The author examines studies carried out within institutions that do research on a regular basis, such as the University of Tartu, Tallinn University of Technology (academic institutions), and the Ministries. The analysis does not include institutions that presumably are not oriented towards economic and business studies, and business policy research.

The target objects of the analysis are studies whose titles contain "entrepreneurship"-related words (e.g., business development, innovation, starting business, SME development policies). Only most recent empirical studies are analysised, more specifically those whose results were published in 1999–2004. The year 1999 was not a random choice. Namely, 1999 was a turning-point since when the Estonian economy has been more stable (also the legal

system): enterprises began to recover from the 1998 Russian crisis, continuously reorienting their activity towards markets in Western countries. Increasing foreign direct investments and growing competition led to a higher rate of innovation and development of Estonian companies (Kuura, 2001); the banking system stabilized. Therefore during that period Estonia achieved rather stable and favorable conditions for the growth of entrepreneurial activities.

The analysis was conducted in November-December 2004. Most of the published studies were examined using the library resources and the Internet sites of research institutions. The databases on the Internet (e.g., the inter-library catalogue Ester) were used to detect the location of the research papers written at universities.

Exploration of the state of entrepreneurship over the last few years will provide an overview of the current situation of Estonian companies.

Results and discussions

41 research papers were found to match the methodological requirements of the present analysis. Their structured data are presented in the table in Appendix. The head of the Appendix table follows the methodological structure elaborated in the previous section. The papers are presented in the table in alphabetical order by the last name of the paper's fist author.

Discussions of the findings are presented following the head of the results table in the Appendix 1.

General information. Most of the relevant publications on entrepreneurship in Estonia were available in print. However, some of the studies could not be found in Estonian libraries (for example, Hernesniemi, 2000; Romanainen, 2001) but can be downloaded from reliable web-sites, such as that of the Ministry of Economic

Affairs. The majority of the published studies were conducted on a stand-alone basis but there are several institutions that publish entrepreneurship-related studies regularly. Among the latter are:

1. Innovation studies. This quarterly issue is commissioned by the Division of Technology and Innovation of the Ministry of Economic Affairs and Communication. The publications usually present detailed results of studies related to technology, innovation support measures and institutions. The public sector is given a higher priority in this paper.
2. Report articles on the economic policy of Estonia (for example, Economic policy perspectives of Estonia in the European Union). Commissioned by the University of Tartu, this biyearly issue has a large chapter on the SME policy, which often includes a few articles on entrepreneurship studies in Estonia.

Considering the authors of the papers reviewed herein, it is noticeable that most papers related to innovation and technology have foreign experts as joint authors. Local authors usually conduct social studies and evaluate general policies on entrepreneurship. Most of the articles were completed by people who do research on a regular basis. The authors of the following Estonian institutions are presented in this analysis: the University of Tartu, Tallinn University of Technology, the Estonian Institute for Future Studies, the Estonian Market and Opinion Research Center (EMOR), etc.

Some papers that the reviewer came across had entrepreneurship-related titles and should therefore have been included in the present analysis. However, an analysis of their contents showed that several authors treated entrepreneurship as a synonym to small business, or to business processes in general, which did not coincide with the definition chosen for the current paper. So such papers had to be excluded from the analysis.

Keywords. The section “Research domains” (see above) proposes a classification of entrepreneurship research into six groups. The

next step is to compare the six groups with the available 41 research papers and analyze the distribution of the papers. The six groups of entrepreneurship research were subdivided into fields, corresponding to the keywords of the papers (Table 2).

Table 2. Number of works on the selected domains and keywords

Field	Keywords	Number of works
Psychology of entrepreneurs	The Entrepreneur, general	2
	Psychology (more formal), values, attitudes	1
Sociology of entrepreneurship	Sociological, general	3
	Generations of entrepreneurs	1
Entrepreneurship support	Education: schools, programs, sources	1
	Cooperation with org. of higher education	**8**
	Supportive public institutions	**9**
	Counseling on business development	4
	Venture finance	3
	General financial (banking, accounting etc)	2
Ongoing organizational development	Small Business Startup	2
	Corporate entrepreneurship	2
	Overviews of problems and needs	6
Economic sectors	Technology, R&D performing companies	5
	Public research institutions	2
	Regional	6
Economic development, state level	Economic development, general	5
	Evaluation of general SME policies	**9**
	R&D policies	5
	Cross-national comparison	5

Sources: Compiled by the author, see additionally the Appendix 1.

Naturally, entrepreneurship studies are not equally distributed. We notice that the fields most actively studied are related to

the environment of entrepreneurship: “entrepreneurship support” (27 studies), and “economic development via entrepreneurship” (24 studies). The least attention has been paid individuals-related topics, such as “the psychology and sociology of entrepreneurship”, as well as the ongoing organizational development.

The general conclusion would be: the present research focuses on indirect issues of entrepreneurship. However, it needs to be emphasized that the prime source of entrepreneurship is an individual, his/her mind, which develops in a specific social environment. It is not the individual, or social level that is receiving major attention at present, but entrepreneurship policies, technical support, and the aggregate economic level. The government is trying to develop the right policies and the right support measures, knowing little about the attitudes of individuals and about the entrepreneurial processes in organizations.

Counting the studies under the respective keywords, we notice (Table 2) that most research deals with public institutions and policies: 9 studies on supportive public institutions, 9 studies on the evaluation of SME policies, and 8 studies on cooperation with institutions of higher education. There are very few studies on how Estonian entrepreneurs think and how they became that way.

Despite the fact that the psychological and sociological domains are generally weakly studied in Estonia, the next domain – entrepreneurship support – has received considerable attention (27 papers). The weakness of this general field is its subfield “education: schools, programs, sources”, which was hardly ever studied at all over the last 6 years. For instance, there is no overview of what courses are run by the numerous institutions of higher education in Estonia. Nor has any cross-institutional evaluation been done.

Entrepreneurship has also been studied regionally. Unfortunately, only few counties were involved in particular research projects in 1999–2004.

To sum up, entrepreneurship is a rather popular topic in Estonian research circles, especially in the public sector research. The drawback is that the number of internal organizational surveys, analyses of entrepreneurial attitudes, and studies of the available educational programs is very small.

Methodology. The most popular method used to analyze entrepreneurship-related matters was an interview (28 cases). Conducted mostly in a free form, the interviews were targeted at experts (for example, politicians, professors, or managers of R&D performing companies). Sometimes interviews were an additional instrument to complete case studies. If the number of interviewed agents was relatively high (over *ca* 20), then usually a structured interview was conducted. The second most frequently used research method was a questionnaire (10 research papers). As a rule, the questionnaire texts were not attached to the research papers, but it can be concluded that the authors designed most of the questionnaires themselves, only 2 or 3 being translations of standard international questionnaires.

The largest sample questioned within an entrepreneurship-related study was the innovation-related study by Kurik, Lumiste *et al*. (4,267 respondents from different companies). It was followed by a survey of West-Virumaa enterprises (288 respondents) and a study distinguishing between various patterns of potential entrepreneurs (216 Estonian respondents). In some cases the authors used secondary data, for example, data from the survey of EMOR with 1,912 respondents. Unfortunately, in many cases (interviews or questionnaires), the authors do not clearly state the criteria for inclusion of respondents into the survey. Thus it is impossible to understand what the object of the study was.

With regard to statistical data processing applied in the studies based on questionnaires, the conclusion is that no other methods than descriptive statistics are used. For instance, the authors do not use ANOVA, correlation matrixes, or factor analysis, but

restrict themselves to presenting means of the data, grouping by sector, by size of companies, etc.

The majority of the papers study the public sector, concentrating on matters like evaluation of policies, public entrepreneurship support institutes, as well as research institutes such as universities. The next most frequently studied object is companies. The usual approach is to ask companies about entrepreneurship-related issues (Dsiss, Murakas *et al*., 2001; Kurik, Lumiste *et al*., 2002). There are no questionnaire-based high-quantity studies of specific sectors (e.g., biotechnology); such specific sectors are mostly analyzed from the point of view of public support.

The author could detect no studies on intrapreneurship and found very few studies dealing with social issues of entrepreneurship (values, attitudes). Evidently, collecting economic information may be slightly easier than preparing and carrying out sociological and psychological research. Interviewing only a few experts is certainly easier than questioning representative samples of organizations and individuals. Nevertheless, it is necessary for research institutes to use consistent methodology to study entrepreneurship in Estonia.

Conclusions. It has to be admitted that the choice of conclusions presented in the Appendix table is somewhat subjective. Several papers have a more than 10 pages long chapter with conclusions. The author therefore had to choose and usually gave preference conclusions which were not overly self-evident, or trivial, such as "RTDI financing is low" (Hernesniemi, 2000); and which presented problematic, specific issues.

To generalize the conclusions, the author used Table 2 (see above) presenting the distribution of studies on entrepreneurship. Since it may be unreliable to make generalizations about the topics that have been studied only by a few researchers, the author generalizes the conclusions only for those topics that have been investigated in more than 5 studies. In this way, five subfields of

entrepreneurship research were chosen and the conclusions are presented in Table 3.

Table 3. Frequently drawn conclusions in the reviewed research papers

Domains of research	Conclusions
Cooperation between higher education and businesses	1. There is lack of industry-education cooperation: mismatch of education programs and research activities. 2. Lack of professionals prepared by local higher edu sector, small influx of young scientists. 3. Research activity is under funded, insufficiently interdisciplinary, equipment is often outdated.
Entrepreneur-shipsupporting public institutions	1. Institutions have too few experts to provide the necessary services. 2. The effectiveness of Enterprise Estonia services needs to be screened. 3. Services provided by incubators are mostly low value-added.
Overviews of SME problems and needs	1. Motivation of managers to cooperate with support and higher education institutions is low. 2. There is lack of information on networking possi-bilities. 3. The current business policy does not favor knowledge-intensive start-ups.
Regions, counties	1. The entrepreneurship surveys are conducted in only a few counties: Tartu, Harju, Viljandi. 2. The innovative activity has strong regional differ-ences, being concentrated in Harju and potentially in Tartu counties.

Additionally to Table 2, it was possible to conclude that innovative activity is relatively low in Estonian companies. The conclusions presented in Table 3 may refer to the reasons for that.

There are about 10 studies dedicated to the evaluation of the Estonian Innovation System: the role of entrepreneurship-supporting

public institutions, RTDI policies, etc. One can draw several conclusions on the basis of these studies. It is mentioned that an important obstacle to innovation in Estonian companies is the lack of cooperation between companies and the educational sector. For instance, the research done at universities only rarely matches the interests of local companies (Innovation policy profile, 2001); moreover, universities do not adjust their educational programs to the needs of the local companies. For example, neither universities nor company-support institutions offer relevant training in innovation management. On a more general level, the universities fail to release sufficient numbers of engineers and professionals. (Romanainen, 2001; Nedeva and Georghiou, 2003).

Not only entrepreneurs are dissatisfied with cooperation with universities, but there is also a lack of networking with other institutions (Dsiss *et al*., 2003). Innovative companies, for which it is often vitally necessary to go abroad, experience difficulties with finding suitable networking partners. Unfortunately, entrepreneurship-supporting institutions are incapable of offering consultancy in their specific field (e.g. Hernesniemi, 2000). The studies show that the problems of entrepreneurs are not confined to lack of information about networking, but also include more basic difficulties, such as the unfavorable legal system, insufficient sources of start-up capital, etc (Eesti …, 2004; Riigi tegevus …, 2003).

Currently, the entrepreneurial conditions are surveyed only in a few counties of Estonia. From the country-based surveys it appears that most of the innovative activity is centered on Harju county (Kurik *et al*., 2002; Terk and Raagmaa, 2004). Thus governmental measures would be needed to improve the situation. It appears from numerous surveys, however, that so far political measures have proved to be rather ineffective in fostering entrepreneurship and innovation across the country. Various policies are often weakly interrelated and have no realistic implementation plans (e.g. Riigi tegevus …, 2003).

Recommendations

One has to admit the limitations of the present overview: firstly, some studies have probably been overlooked, secondly, the brevity of the paper has forced the author to leave aside some less valuable considerations, thirdly, the presented studies are of a considerably diverse quality – some conclusions are based on interviews with only a few people. Thus, when making generalizations, the information presented in the Appendix table should be handled with caution.

Summarizing the discussions of the surveys, it is clear that the studies of the recent years are biased towards the public matters of entrepreneurship: policies, support institutions, education centers. Unfortunately, even though the problems are rather clear in this field, little is being done to improve the situation. Therefore it might be necessary to familiarize a wider political audience with the results of the studies and motivate institutions to orient themselves towards measurable results.

Concerning the research fields that are studied less than characteristic of international practices, it is necessary to focus on the following:

- Entrepreneurship from the sociological and psychological points of view: attitudes, values, and influence of societal groups on existing and potential entrepreneurs,
- Sector-specific businesses and their problems,
- Available entrepreneurship-related educational programs and pedagogy in Estonia, mapping available competencies on the higher, vocational, and other educational levels.

It is most important not to merely study these matters, but also to disseminate the results to carefully chosen target groups and start acting to solve the problems revealed.

In view of the methodologies, the studies could be more analytic, not restricted to surveys, but expanded to in-depth evaluation,

comparison, suggestions and promotion of the possibilities for improvement. It is especially important that the provided suggestions should be neither too general nor self-evident. Unstructured interviews should not be the major but rather a supportive informational source.

Several surveys show that the effectiveness of present entrepreneurship-supporting policies and institutions needs to be improved; more attention should be paid to pragmatic support policies and explicit monitoring of supportive institutions. It was also revealed that an important source of innovation – centers of higher education – are relatively uncooperative with businesses. Consequently, it will be necessary to influence the remuneration policies of major institutions and to review the programs they offer (in terms of their content and pedagogy).

Entrepreneurs in Estonia face a number of difficulties, some of which are explicitly studied and others are yet to be revealed. It is essential to deal rationally with the detected problems and choose such research methodologies that will help find out what obstructs long-term entrepreneurial development.

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Appendix 1. Systematized studies on entrepreneurship in Estonia

Author, Title, Year	Keywords	Methodology of empirical study		Selected results, conclusions
		Type of Analysis	Data (object or sample)	
Deutsche Direktinvestitionen in Estland: Motive, Erfahrungen und Chancen (1999)	German direct investments, business opportunities in Estonian business environment	Questionnaire	46 German-Estonian joint ventures	1. Low labor costs, liberal economic policy and qualified personnel attract German investments. 2. Negative factor are smallness of the market, shortage of labor, and bureaucratic problems.
Dsiss, H., Kingumets, J. *et al.*, Tartumaa ettevõtlus (2003)	Tartu county, SME-s, sociological study, business environment	Structured interviews	200 enterprise managers from Tartu county	1. Cooperation with SME support and educational institutions is unimportant for majority of businesses. 2. There is lack of professionals. 3. Sole entrepreneurs mostly involved in agriculture.
Dsiss, H., Murakas, R. *et al.*, Lääne-Virumaa ettevõtlusuuring (2001)	Investment climate, West-Virumaa, entrepreneurial policy, innovation, municipality	Interviews, questionnaire	288 enterprises that operate in Lääne-Virumaa	Description of: 1. The investment climate in Lääne-Virumaa. 2. The role of municipality in business development. 3. Labor and innovation issues of responding companies.
EC DG Enterprise. European Trend Chart on Innovation. Theme-Specific Country Report. Estonia (2003)	IPR, entrepreneurial innovation, innovative clusters, cluster policy	International methodology, details n.a.	Based on secondary data, details n.a.	1. Patenting activity is very low in Estonia. 2. Description of the Estonian Innovation system.
Entrepreneurship and Enterprise Development in the Baltic Region (2000)	Regional development, Baltic states, North-West Russia, economic policy, enterprise promotion	Workshops	6 themes on development of entrepreneurship	Guidelines and recommendations in 6 themes: 1. Institutionalization of SME policy. 2. Regulatory framework and the informal economy. 3. Tax policy. 4. Financial instruments for start-ups and SME-s. 5. Advisory services. 6. Regional and local enterprise promotion.

Appendix 1 continued

Author, Title, Year	Keywords	Methodology of empirical study		Selected results, conclusions
		Type of Analysis	Data (object or sample)	
Estland: Marktchancen und praktische Tipps: ein Handbuch für Geschäftspraxis und Investitionen (2003)	Estonian economy, labor market, infrastructure, starting business, practical information	Analysis of statistics, legislative acts, programs	Statistics on Estonian economy, legislative acts, information about Estonian industries	Overview of the following subjects: foreign trade, investments, labor market, financial sector, infrastructure, starting a company, taxes.
Ettevõtlus Eestis (1999)	General business environment, economic sectors	Statistics, experts' opinions	Estonian economy, various industries	Description of: 1. Estonian economy. 2. Relations between employers and employees. 3. Estonian industries.
Hernesniemi, H. Evaluation of the Estonian Innovation System (2000)	Innovation system innovation support structures, technology policy, RTDI funding	Interviews	Estonian innovation system	1. The need for higher RTDI investments is not highly ranked among political decision-makers. 2. Politicians do not possess sufficient information about innovation and technology management. 3. Technology supporting and bridging organizations have too few experts to provide necessary services.
Innovation Policy in Six Candidate Countries: the Challenges. Innovation Policy Profile: Estonia (2001)	Innovation awareness; legislative, administrative environment, support of business innovation, innovation potential	N.a. Presumably expert interviews	Estonian innovation system	1. Historical overview of Estonian innovation system and several studies. 2. Available research staff does not match the needs of developing Estonian firms, their productivity and innovation. 3. Estonian legislation does not favor technology based companies. 4. Company managers lack managerial *skills*; there is need to improve cooperation between industry and educational institutions to improve the quality of training and offer training on innovation management.

Appendix 1 continued

Author, Title, Year	Keywords	Methodology of empirical study		Selected results, conclusions
		Type of Analysis	Data (object or sample)	
Jager, D., Sowden, P. *et al.*, Competence Centre. Feasibility Study (2002)	Estonian innovation system, role and activities of competence centers, research and development, project report	In-depth interviews, screening of existing studies, workshops	Estonian and foreign experts, 4 university's spin-offs, 16 R&D performing firms	1. EAS needs to be more proactive, restructure its services, and develop evaluation mechanisms. 2. Innovation, technology, investment, SME policies have to be more interlinked. 3. R&D-based enterprise cluster is small because of lack of trained engineers, science-industry cooperation, info about networks. 4. University' staff lacks orientation on result, has low skills in project management and commercialization.
Menrad, K., Bührlen, B. *et al.*, Research on the Estonian Biotechnology Sector Innovation System (2002)	Biotechnology innovation system: companies, education, finance; benchmarking, recommendations	Interviews, case studies	Estonian biotechnology innovation system	1. Description of biotechnology innovation system. 2. The critical mass required for developing a sustainable biotechnology sector has not yet been achieved. 3. Several recommendation on developing innovation system.
Kaarli, R., Laasberg, T. Research and Development in Estonia 1996–1999: Structure and Trends (2001)	R&D, financing, human resources, patents	Case study, analysis of statistics	Financing institutions, state programs, Estonian innovation system, patents	1. Some fields of science are insufficiently interdisciplinary and have outdated material base. 2. R&D infrastructure is often inadequate for the needs of technological development. 3. Estonian innovation system is weak; leading, bridging and supporting institutions are underdeveloped. 4. The society and politicians have not yet realized the importance of R&D development, a small influx of young scientists.

Appendix 1 continued

Author, Title, Year	Keywords	Methodology of empirical study		Selected results, conclusions
		Type of Analysis	Data (object or sample)	
Kaseorg, M., Sakk, A. Praktilise ettevõtlusalase koolituse roll Eesti väike-ettevõtetes tabelarvutus-süsteemi toetusel	Entrepreneurship training, small enterprises, computer-based courses	Questionnaire	Students at Tartu University FEBA and Narva College	1. Computer-based (Excel) training was useful for the students. 2. There is a demand for more frequent use of computer while training.
Kurik, S., Lumiste, R. *et al.*, Innovatiivne tegevus Eesti ettevõtetes 1998–2000 (2002)	Innovation, industry and service sector, SME-s and micro-enterprises, large sample	Questionnaire	3490 SME-s and 777 micro-enterprises	1. 1/3 of enterprises has done process or product innovations. 2. 3/4 of companies conducted innovations on their own, 1/4 in cooperation with other institutions. 3. 14% of innovative companies have developed new product for the market.
Kurik, S., Terk, E. *et al.*, Tallinna ja Harjumaa ettevõtjad Eesti-Soome integratsioonist (2002)	Regional integration, entrepreneurial environment in Estonia, Finland	Structured interview, analysis of statistics	Managers of 46 companies in Estonia	1. Estonian entrepreneurs are tuned positively towards the Finnish business environment, but have little objective information about it. 2. It is difficult to enter the Finnish market with final product, co-operation is sought.
Kuura, A. Euroopaliku regulatsiooni mõju ettevõtluskeskkonnale (2001)	European business regulations, business development	Qualitative analysis	Code of Commerce, Business Register, European business regulations	1. Clarification of definitions in Estonian: entrepreneur, entrepreneurship and enterprise. 2. The business register has to be re-established. 3. EU regulations diminish number of joint stock companies.

Appendix 1 continued

Author, Title, Year	Keywords	Methodology of empirical study		Selected results, conclusions
		Type of Analysis	Data (object or sample)	
Kõomägi, M. Riikliku riski-kapitalifondi asutamise vajalikkus Eestis (2004)	Small enterprises, state supported venture capital,	Qualitative analysis, comparison with EU venture capital funds	SME statistics, data on venture capital in Estonia	1. There is no satisfactory venture capital (VC) system in Estonia. 2. It is necessary to do research in the field of VC, its development and coordination. 3. Recently initiated state-guaranteed VC has too specific, narrow orientation.
Lange, L., Bruin, G. *et al*., Access of Enterprises to Venture Financing in Estonia: Feasibility Study of Government Support Scheme (2004)	Funding of enterprises' development; pre-seed, start-up, growth, expansion companies; funding scheme options, recommendations	Interviews	Public institutions, financial institutions, research centres, companies	The existing funding structure has several shortcomings. There is need for promotion of: 1. Entrepreneurial values in the society. 2. Transfer of entrepreneurial competences and experience. 3. Institutional collaboration between public and private organizations.
Melin, K. The Entrepreneurial Intentions and their Background in Estonia and Finland – A Comparative Study in Selected Vocational Schools (2002)	Entrepreneurial attitudes, vocational schools, comparison of Finland and Estonia	Questionnaire	Students at vocational schools: 215 in Estonia, 281 in Finland	1. The attitudes of Finnish students are more entrepreneurial: they are more proactive and can cope with uncertainty. 2. Estonian students are more creative, focused on achievements, their motivation is mainly money and continuous learning. 3. Estonian respondents are rather single player: team entrepreneurship is unpopular.

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Author, Title, Year	Keywords	Methodology of empirical study		Selected results, conclusions
		Type of Analysis	Data (object or sample)	
Nedeva, M., Georghiou, L. Assessment of the Estonian Research and Development Technology and Innovation Funding System (2003)	Evaluation of innovation system, RTDI funding, best practice	19 interviews, a workshop	Ministries, funding agencies, research institutes, universities, industry	1. RTDI funding is ineffectively split in two disconnected parts: basic research (universities) and applied research (industry). 2. There is a strong need for bridging these two parts. 3. Four major problems: duality of RTDI, under funding of research institution, aging research (innovation) community, obsolete research equipment.
Oitmaa, K. The Integration of Estonian SME Policy with the European Union SME Policy (2001)	SME policy measures, business development, harmonization of laws	Qualitative analysis	Business policies, European business regulations	1. The incumbent government's SME policy priorities are: internationalization, regional business support, innovation and technological development. 2. There is no official SME policy document. 3. The business support system has to be improved.
Overview of Research, Technology Development and Innovation Policy in Estonia (2003)	Innovation policy, macroeconomic trends, science-industry relation			1. It is necessary to support research-intensive start-ups through reducing the cost of capital and due diligence activities. 2. More innovation-related services and consultancy have to be offered to enterprises.
Pornschlegel, T. Estonia. Economic and Human Resources Development Project. CARIN (2001)	Tartu city, innovation program, technology transfer	N.a. Presumably experts' interviews	Tartu innovation system: science park, university etc.	Description of: 1. Key players in the Tartu innovation system. 2. The innovation projects running in Tartu.
R&D and Innovation Statistics in Candidate Countries and the Russian Federation. (2002)	Statistics on European countries, innovation indicators, R&D personnel, manufacturing and service sector	Questionnaire, review of statistics	97 RD performing companies, 36 govern. and 32 scientific institutions	Statistical data in comparison to other European countries: 1. R&D expenditures. 2. R&D personnel. 3. Innovations.

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		Type of Analysis	Data (object or sample)	
Raudjärv, M. Ettevõtluskeskkonna ja hariduskorralduse mõnedest majanduspoliitilistest aspektidest (2003)	Policies and business environment, higher and vocational education	Secondary data, telephone interviews, statistics	Educational institutions, business-related policies	1. The necessary change of vocational education's system has only recently come under discussion. 2. Pärnu county has a diverse educational system.
Reid, A., Kurik, S. Optimizing the Design and Delivery of Innovation Policy in Estonia (2003)	Evaluation: innovation policy, ESTAG schemes, support for RTDI. Structural funds.	Interviews, case study (ESTAG)	Estonian National innovation policy instruments, ESTAG schemes	1. The current centres of excellence need to clarify their objectives, processes, evaluation procedures etc. 2. The existing RTDI infrastructure appears to be adequate for disbursement of the EU structural funds. 3. The need to develop a sector/cluster technology diffusion. 4. EAS activities need additional monitoring and evaluation.
Reid, A., Kurik, S. Optimizing the Design and Delivery of Innovation Policy in Estonia (2003)	Innovation policy instruments, RTDI funding, technological development	Interviews, case studies	ESTAG grant and loan schemes, RTDI policies, industry, universities	1. Mismatch: ESTAG is focused on supporting product development, whereas companies mainly do process innovation. 2. There is neither early-stage capital not pro-active consulting for technology-based firms. 3. No research has been done into the provided innovation-related competences.
Riigi tegevus raha suunamisel ettevõtluse toetamiseks: kontrolliaruanne (2003)	State audit report, state support of entrepreneurship	Qualitative analysis	Ministries' activity, existing supporting policies and programs	1. The principles for entrepreneurship support are unclear (objectives, resources etc.). 2. The support programs overlap, have unclear implementation, should be better coordinated. 3. Multitude of SME supporting institutes diminish system's effectiveness.

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Author, Title, Year	Keywords	Methodology of empirical study		Selected results, conclusions
		Type of Analysis	Data (object or sample)	
Romanainen, J. Technology Policy in Estonia: System Planning and Development of Implementing Agency (2001)	Establishing of ESTAG, measure of technology policy, innovation policy	Interviews, workshops	Members of EAS, Ministries of Economic Affairs, Education, Finance; Finnish consulting company	1. Long-term RTDI policies are too general, the implementation (resources and processes) are not specified. 2. Also traditional and low-tech companies should be reflected in policies. 3. Lack of awareness of innovation results in poor collaboration between university and industry.
Rozenthal, V. 40 Eesti nokiad: nutikad äriideed elust enesest (2003)	Implemented business ideas, small enterprises	Case studies, interviews	40 small profitable businesses, business ideas	Description of 40 inventive business ideas developed by Estonian authors.
Rouwamaat, V., Reid, A. I., Kurik, S. Business Incubation: Review of Current Situation and Guidelines for Government Intervention in Estonia (2003)	Benchmarking in incubation, technology based incubators, characteristics of Estonian incubators	Case study, questionnaire	Tallinn Technology Park Incubation Centre, Jõhvi BIC, Räpina BIC, Tartu Science Park, Tallinn College of Engineering Incubator	1. Lack of laboratories and well-equipped workshops for tenant users. 2. Their sub-critical size diminishes sustainability of incubators. 3. The incubators have weak business idea, no clear target group, weak networking (isolated). 4. Only basic, unintegrated business support services are offered.
Sellilov, R. The Main Development Constraints Perceived by Small and Medium-Sized Enterprises in Estonia (2004)	Estonian SME, perceived development constraints, EMOR survey	Secondary data	1912 enterprises	1. For companies, which develop technology, financing is especially problematic. 2. Small companies (10–49 employees) have difficulty in finding the market and financing sources. 3. Large enterprises, also from manufacturing and construction sector experience problems with finding skilled employees.

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		Type of Analysis	Data (object or sample)	
Small and Medium-Sized Enterprises in Countries in Transition (2003)	SME legislation, SME supporting measures and institutions, business environment	Questionnaire, qualitative analysis of statistics	Legal systems, SME supporting institutions and schemes	1. Brief description of Estonian SME support system: institutions, supporting measures. 2. Brief SWOT of Estonian business environment.
Teder, A., Teder J. Eesti ettevõtjate liigitus ettevõtjaks kujunemise tõukejõudude alusel (2003)	Classification of entrepreneurs, several rounds of survey, change of entrepreneurial environment	Structured interview	300 entrepreneurs in 1994–1996, 216 entrepreneurs in 2000–2001	1. In comparison with early 1990s, more capital and experience needed to start business today. 2. Recently the second-generation of entrepreneurs in a family business has emerged. 3. The proportion of persons who start business they do not have experience in has fallen.
Teder, A., Teder, J. Väike-ettevõtlus Eestis: roll ja probleemid (2001)	Small business, role in economy, problems		Secondary data, statistics	1. 74% of all enterprises in the Business Register are micro-entreprises (up to ten employees). 2. The average number of employees in companies is diminishing. 3. There are strong regional differences in business activity.
Terk, E., Raagmaa, G. Ettevõtluse võimalused maakondades (2004)	Counties, SME policy	Seminars, discussions	Entrepreneurs, municipalities' agents, journalists	Analysis of the regional development and SME activities in the 15 counties.
Tuutma, T. Rahvusvahelised ettevõtlusuuringud ning ettevõtlusalase statistika korraldus. Master Thesis (2004)	SME statistical system, international entrepreneurship surveys	N.a.	SME statistical system	1. Estonian SME statistical system is in accordance with the EU one. 2. The entrepreneurial indicators are not studied. 3. Statistics on self-employed entrepreneurs has to be improved.

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Author, Title, Year	Keywords	Methodology of empirical study		Selected results, conclusions
		Type of Analysis	Data (object or sample)	
Undrits, A. Ettevõtluse riiklik toetamine Eestis: senine areng, hetkeseis ja täiustamise võimalused. Master Thesis (2004)	SME policy, governmental suport of entrepreneurship	N.a.	Support schemes of entrepreneurship	1. Overview of entrepreneurship development. 2. Shortcomings of the SME policy: overlapping objectives, unclear implementation and evaluation processes. 3. Several suggestions about improvement of SME support system.
Venesaar, K., Kolbre, E. The Role of Trust in Business Relations in Estonia (2004)	Business development, inter-firm relationships	Questionnaire, case studies	N.a.	1. Business relations became more stable and predictable since independence. 2. The managers value long-term relationships. 3. In intra-firm regulation the managers rely on institutional regulation.
Värno, K. Awareness and the Usage of Business Support Measures by SME-s in Estonia (2004)	State business support measures, SMEs, awareness and usage of support	EMOR 2002 survey, phone interviews	1912 companies	1. The awareness of support measures is rather low, but 65% of respondents have heard of the measures. 2. Only 2% of the respondents have used support measures. 3. The information about the measures should be more readily available.
Оптимальная практика организации работы бизнес-инкубаторов (2001)	Business environment, legislative aspects, incubation	Analysis of statistics, questionnaire	Business incubators: services and clients	An overview of the clients and services of business incubators.