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## **UNIVERSITY-BASED ENTREPRENEURSHIP – EVIDENCE FROM EASTERN FINLAND**

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University-based entrepreneurship has received increasing attention in higher education and innovation policy in Europe. Research-based firms are seen as important for regional development because they are assumed to have high growth potential. In this paper, I present preliminary findings of a study on entrepreneurship that was carried out at the University of Eastern Finland. The findings indicate that the picture of university-based entrepreneurship is very heterogeneous and not necessarily imply rapid growth. Firstly, the materials show that enterprises established by university graduates operate in many fields of business. Secondly, only a part of the firms are research-based or currently utilize research results from the university. Thirdly, research-based or currently research-oriented firms do not seem to differ much from other kind of firms with respect to past or current growth. From the policy point of view, this suggests that university-based entrepreneurship should not be narrowly defined simply on the basis of research orientation.

**Key words:** entrepreneurship, firms, university graduates, business, research-oriented firms.

### **Тимо Лаутанен. КОММЕРЧЕСКИЕ ПРЕДПРИЯТИЯ ПРИ УНИВЕРСИТЕТАХ – ПРАКТИКА ВОСТОЧНОЙ ФИНЛЯНДИИ**

Развитию коммерческих предприятий на базе университетов уделяется все большее внимание в рамках европейской политики поддержки высшего образования и инноваций. Научно-исследовательские компании рассматриваются как важный фактор регионального развития, так как они обладают значительным потенциалом роста. В данной статье приводятся предварительные результаты исследования деятельности коммерческих предприятий при Университете Восточной Финляндии. Выявлено, что деятельность исследуемых коммерческих предприятий весьма гетерогенна и необязательно предполагает быстрый рост. Во-первых, предприятия функционируют в широком спектре отраслей. Во-вторых, только часть предприятий используют результаты научных исследований в своей деятельности. В-третьих, по темпам роста научно-исследовательские предприятия не отличаются значительно от обычных компаний. Делается вывод, что определение коммерческих предприятий на базе университетов не должно сводиться исключительно к научно-исследовательским компаниям.

**Ключевые слова:** предпринимательство, компании, выпускники, бизнес, научно-исследовательские компании.

## Introduction

University-based entrepreneurship has received increasing attention in higher education and innovation policy in Europe. University spin-offs are assumed to benefit the society and the universities in many ways. For example, these enterprises may enhance regional development, generate income for the universities and help them in their primary tasks of research and teaching [Wright et al., 2007, 2, see also Franzoni et al., 2006]. From the regional development policy point of view, university spin-offs, especially those that are born out of the research and are research-oriented, are seen as businesses with high growth potential.

According to Kankaala et al. [2007], the number of new research-based enterprises in Finland, in relative terms, is nearly at the same level as compared to many other western countries. However, economic development of these firms has been comparatively modest. Finland is seen internationally as a country with high-standard research - but at the same time the country has not been very successful in the commercialization of research results (see also Tahvanainen [2009]).

In this article, I explore entrepreneurship that originated at the University of Eastern Finland. This university is a medium-sized, multi-campus and multi-disciplinary university located in the sparsely populated European North. This article presents mainly descriptive findings. The focus is on the mapping of how common entrepreneurship is among graduates and what kind of entrepreneurship has been established as a result of university activities. The question about research orientation and its relation to growth is also analyzed in a preliminary manner.

The article is structured as follows: section two defines what a university-based enterprise is. Section three describes the empirical setting and materials of the study. Findings are presented in sections four to seven. The concluding chapter considers methodological problems and implications for further research.

## Definition of a university based enterprise

Strictly defined, university spin-offs are newly established companies that rest on licensing agreements or mandates based on the immaterial rights of a university. The university may (or may not) have a share of ownership in the company in exchange for the patent rights or licensing fees (see Wright et al. [2007]). Recently, however, researchers have been interested also in other kinds of university-based firms. According to

Markman et al. [2008, 1408–1410], a narrow definition of spin-offs leaves aside a considerable proportion of university-born entrepreneurship. For example, many spin-offs are not based on official agreements dealing with immaterial rights but on tacit information that research workers may have. In addition, only few spin-offs have created totally new markets.

In this study, a university-based enterprise is defined through the entrepreneur. An entrepreneur is defined as a person who owns either partly or fully an operational business, and is in important ways involved in its operation. An academic entrepreneur is defined as an entrepreneur who either has a basic or post-graduate degree from the university, or is studying for such a degree.

## Research setting and materials

The University of Eastern Finland (UEF) was established in 2010, when the universities of Kuopio and Joensuu merged<sup>1</sup>. The university has about 15 000 degree students and has campuses in three Eastern Finnish towns: Kuopio (about 97 000 inhabitants), Joensuu (73 000) and Savonlinna (28 000). The university is multi-disciplinary with four faculties: Philosophy, Science and Forestry, Health Sciences, and Social Sciences and Business Studies. The university offers teaching in more than 100 major subjects.

The materials used here consist of four types of data. Firstly, the KOTA-database of the Ministry of Education and Culture, which contains information about the employment of persons graduated from Finnish universities. The second and third types of information are based on a mapping of entrepreneurs who have a degree from, or who are currently degree students, at the University of Eastern Finland. This is explained in more detail below. Finally, interview data from interviews with eleven such entrepreneurs in Joensuu was utilized. The latter three sets of data were collected for the purpose of the present study<sup>2</sup>.

No official or comprehensive register of university-based enterprises is available in Finland. Thus, an exploratory approach had to be used to map these enterprises in Eastern Finland. This included an emailed survey posted to different faculties and departments as well as

<sup>1</sup> The universities of Kuopio and Joensuu were initially established in the late 1960s/early 1970s. Partly the data used this article concerns originally these two universities separately.

<sup>2</sup> The data was collected in an EU-funded project trying to foster university-based entrepreneurship in the region of North Karelia [Lautanen, Saukkonen, 2011].

research and innovation services, recruitment services and student services of the university. In addition, the survey was emailed to about 30 different regional organizations (involved in

regional development, business development, funding, lobbying etc.). In total, the survey was posted to more than 100 persons inside or outside the university.

Table 1. Number of observations in different types data-sets used

Campus	(1) Number of entrepreneurs graduated from the UEF (1990–2007)	(2) N. of UEF-based enterprises found in the survey	(3) N. of responses to the survey (response rate)	(4) Number of interviews
Joensuu and Savonlinna	109	57	43 (75)	11
Kuopio	180	36	23 (64)	–
Total	289	93	66 (71)	11

The survey produced information on about 125 firms that potentially belonged to the target group. Using different additional sources of information (enterprise registers, internet-sources, newspapers etc.), this number was further reduced to 93 enterprises, 57 of which were from the Joensuu campus (incl. a few firms from Savonlinna) and 36 from the Kuopio campus (see Table 1).

Publicly available information on the 93 companies (such as year of establishment, industrial classification etc.) was collected from the enterprise register of the National Board of Patents and Registration of Finland; this forms dataset two. The firms identified through the inquiry (93) were also sent a questionnaire, which could be filled in either online or on paper. The number of responses

to this questionnaire was 66, which represents a 71 percent response rate.

### Entrepreneurship among university graduates

The KOTA-database of the ministry of Education and Culture includes information on the employment situation of university graduates at the end of year following the graduation. According to this data, the proportion of entrepreneurs among graduates of the Universities of Kuopio and Joensuu (i.e., the current University of Eastern Finland) was on average about 1.2 percent between 1990–2007. This is a lower proportion than the average for all universities in Finland (1.6 percent). The highest proportion of entrepreneurs among graduates is in those universities focusing on arts (see Fig. 1).

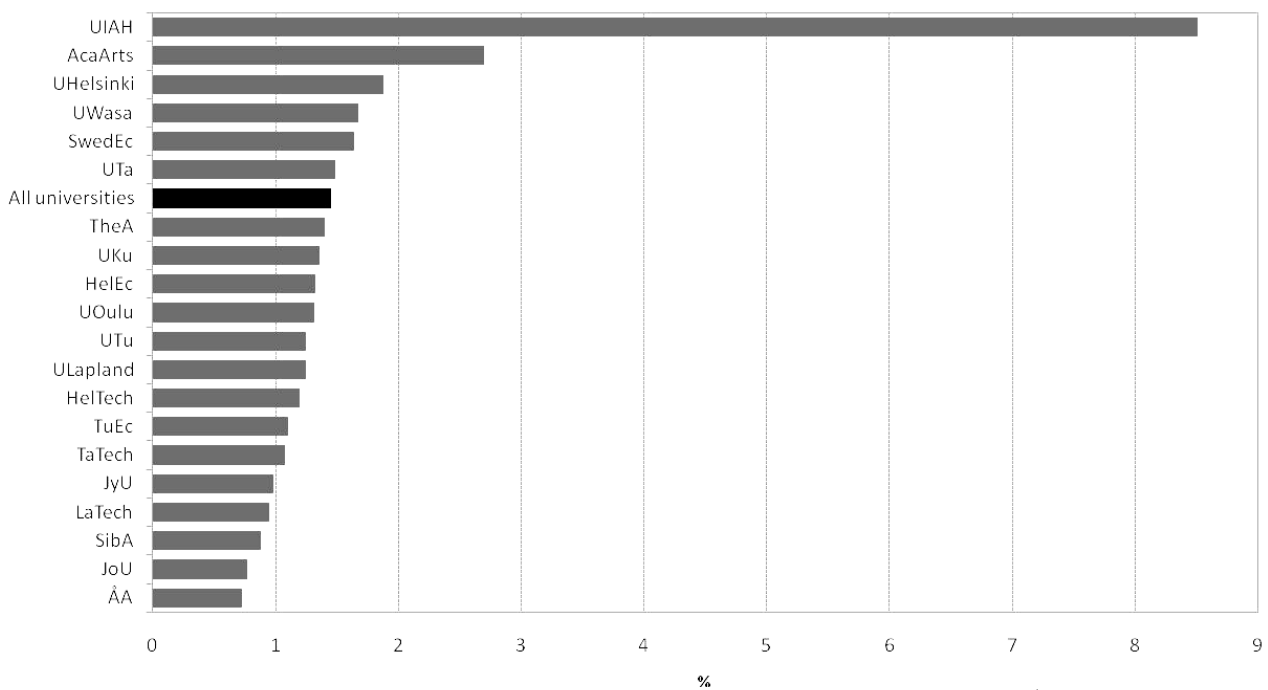


Fig. 1. Proportion of entrepreneurs among graduates from Finnish universities, 1990–2007, %<sup>1</sup>

<sup>1</sup> Years 1990–2007, excl. 2002. According to the university structure 2007. ÅA=Abo Akademi, JoU=University of Joensuu, SibA=Sibelius Academy, LaTech=Lappeenranta University of Technology... etc.

Table 2. Number and proportion of entrepreneurs among graduates in the predecessor universities of the UEF (Kuopio and Joensuu), by field of education 1990–2007 (excl. 2002; source: Kota-database; year after graduation)

Field of education	Number of entrepreneurs, 1990-2007	Number of graduates, 1990-2007	Entrepreneurs/ graduates, %
Dentistry (UKu)	35	265	13,21
Psychology (JbU)	8	300	2,67
Health sc. (UKu)	38	1 789	2,12
Medical (UKu)	64	3 156	2,03
Forestry (JbU)	12	695	1,73
Social sc. (UKu and JbU)	26	2 302	1,13
Humanistic sc. (JbU)	26	2 491	1,04
Education (JbU)	36	5 409	0,67
Natural sc. (UKu and JbU)	27	4 099	0,66
Pharmacia (UKu)	17	2 829	0,6
Theology (JbU)	0	248	0,0
<b>Total</b>	<b>289</b>	<b>23 583</b>	<b>1,23</b>
licentiates, doctors	36	2 422	1,49

### Observations on enterprises set up by the UEF graduates

The 93 enterprises found through the survey (dataset 2) are relatively young businesses. Almost 80 percent (75 firms) have

been established after 2005 and, with the exception of three enterprises, all after 1990. The most common form of business is a private limited company (56 percent). The share of private entrepreneurs is about 30 percent.

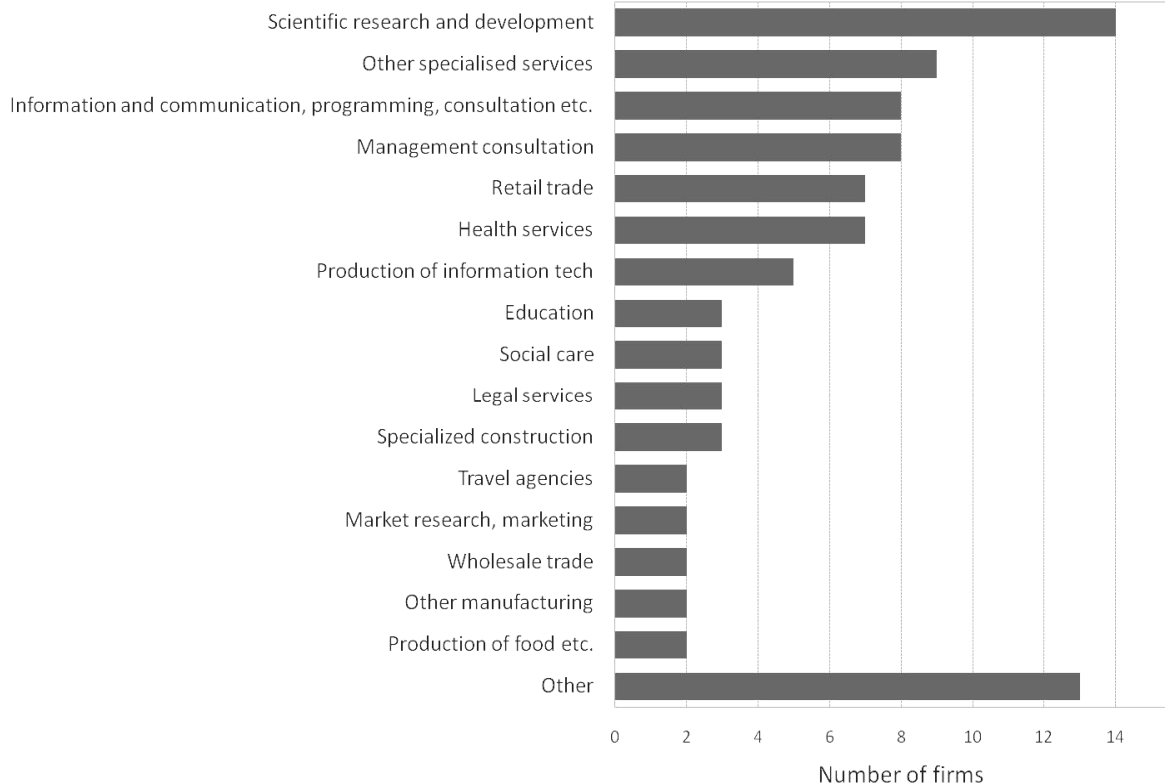


Fig. 2. Fields of business of the 93 firms mapped in the study

The proportion of female entrepreneurs is 28 percent, which is close to the national average of female entrepreneurs of all entrepreneurs (33 percent in 2009<sup>1</sup>). Four out of five businesses are

based either in Kuopio or Joensuu region. In all, the firms operate in 29 different fields of business (according to the Finnish standard industrial classification, 2-digit level). However, it is notable that four out of five firms operate in service industries (Fig. 2). The largest number of

<sup>1</sup> Statistics Finland 2010: Labor force survey.

enterprises operate in the branches of scientific research and development, other specialized business services, and in the field of information and communication, programming and management consultancy. Several enterprises operate in retail trade and health services.

Most of the firms that replied to the questionnaire (66 businesses, dataset 3) are private entrepreneurs which employ only the entrepreneur. The proportion of firms employing less than 10 persons is 87 percent. On the other hand, the largest of the firms has more than 100 employees. The educational background of the entrepreneurs at the university is almost in half of the cases a basic degree and in one third of the cases a post-graduate degree. About 20 percent were registered as students either for a basic or post-graduate degree. In most cases the firms operated only in the domestic markets – quite often only locally. Only five of the 66 firms saw global markets as their primary market.

### Importance of university research and know-how

The importance of research and other kind of learned know-how related to the university for the firms was inquired in two questions in the questionnaire. Firstly, the meaning of these for the initial idea to establish the firm (business idea) and, secondly, the meaning of these for the current operation of the firm were explored. In both questions the importance was evaluated using a Likert scale 1–6 (no meaning – very important). On the basis of these questions the firms can be divided into the categories shown in Table 3.

Almost half of the entrepreneurs (31/66) indicated that university-based research had influenced the business idea at least moderately (4–6 on the Likert scale). However, it was even more common (46/66) to emphasize the meaning of learnt know-how for the business idea.

Table 3. Importance of research and other know-how for the business idea and current operation of the firm

Business idea		Meaning of know-how	
		high	low
Meaning of research	high	27	4
	low	19	16

Current operation		Meaning of know-how	
		high	low
Meaning of research	high	35	4
	low	20	7

### Characterizing research-oriented firms

The literature emphasizes that research-oriented firms are important for regional development. To find out more about research-oriented firms, descriptive statistics and tests were run on dataset 3. The preliminary results suggest that research-oriented firms statistically deviate significantly from other firms only in a few characteristics. The research-based firms are more often established and run by persons who have a post-graduate degree rather than a basic degree<sup>1</sup>. There is no statistically important difference in terms of gender of entrepreneurs, location of the firm, or field of business (service, industrial). Research orientation does not seem to be in connection with the past growth of the firm. However, research-oriented firms seem to differ from

other firms in the respect that they have more often an objective to geographically extend their markets fast<sup>2</sup>.

The interview data brings out some features regarding the firms. Textbook examples of currently research oriented firms are such enterprises, for which university research and its results were important already at the starting phase of the company operations. However, the meaning of university research and know-how has increased in many cases during its operation. Examples of firms resting on other types of know-how than research are management consultancies (e.g. in information technology). The know-how of these firms is typically related to education and taught knowledge without any direct connection to research.

On the other hand, in every fourth firm the meaning of university research and know-how was not perceived as important. Typically these are entrepreneurs, who have established their firm in such a field of business that does not correspond to their field of education, or they have established

<sup>1</sup> Chi-square tests were carried out for two groups of research oriented businesses (those which perceive research as important in relation to the business idea or current operation, see table 3). In both of these cases, research-oriented firms deviated significantly from the rest (p-value 0.00).

<sup>2</sup> Chi-square p-value 0.08.

their enterprises already before their university studies.

### **Discussion and directions for further research**

The findings presented in this paper show that enterprises established by graduates of the University of Eastern Finland operate in many fields of business. Only a part of the firms are research-based or currently utilize university research. The connection between the growth of the firm and its research-orientation remains vague. The above findings are preliminary. Several methodological issues related to the materials used here can be posed. Firstly, the definition of the university-based enterprise is grounded on the graduation of entrepreneurs from a university. This definition excludes those firms, managers of which have not finished their studies at the university (and are not students either). Secondly, the representativeness of the data is hard to evaluate because of the fact that the information about the firms is based on the survey addressed to the personnel of the university and regional business agencies. Due to the regional focus of the research, the data probably overemphasizes enterprises that operate in this particular region. The data also includes only those firms which are still in operation; firms that have for one reason or another ceased their operation or have been sold are not represented in the data. Thirdly, information about research orientation of the firms is solely based on the perceptions of the entrepreneurs. In other words, the meaning of research and know-how is subjectively evaluated.

In further studies, the different mechanisms related to growth, such as acquisitions and network relations, should be analyzed more carefully than is done in this preliminary analysis. On the other hand, Shattock [2009] points out that university-based entrepreneurship is influenced by pull factors exerted by the surrounding society and the local, regional and national economy. Thus, research could also be continued by analyzing the interaction between these in more detail. Also international comparisons between different universities might shed light on the factors influencing university-based entrepreneurship.

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