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## Socio-cultural circumstances to establish university spin-off companies

Anna Szopa\*, Tadeusz Marek, Magdalena Fafrowicz

*Jagiellonian University, St. Łojasiewicza 4, Krakow30-348, Poland*

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### Abstract

The characteristics and behaviour of university spin-off activity is an important subject in economic and management studies literature. Such studies merit research because it is suggested that university innovations stimulate economies by spurring product development, by creating new industries, and by contributing to employment and wealth creation. For this reason, universities have come to be highly valued in terms of the socio-cultural potential of their research efforts. The aim of this paper is to offer a framework for consequences of university spinoff activity.

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### 1. Introduction

Academic entrepreneurial activity is a vital source of innovation, employment and economic growth [1]. With the innovation turn of the 1990s, during which universities created high-quality spin-off companies, governments increasingly viewed entrepreneurship and innovation as a solution to many socio-cultural issues. In addition there has been underlined considerable growth in new research in many points of view.

The creation of new companies from university- the process of 'spinning-off' companies has received attention from a range of perspectives in recent years. They are not only to create innovative products or services, they also

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\* Corresponding author.

*E-mail address:* [anna.szopa@interia.eu](mailto:anna.szopa@interia.eu)

contribute to the productivity and creativity [2]. The effects of academic spin-offs activity are well identified in stories of the origin of Silicon Valley and the San Francisco Bay Area and more recently in the information technology and biotechnology industry [3]. The role of particular universities, such as Stanford, Harvard and Massachusetts Institute of Technology in the USA or Cambridge in the UK, in these processes is also well documented [4]. There is no doubt that spin-offs are seen as a valid means of knowledge and technology transfer under certain conditions. In spite of this transfer, the influence of social and cultural factors remains understudied. Therefore this paper is dedicated to examining the social and cultural factors involved in university spin-offs' activity. Our study will open new paths for research and discussion, and its results will be supportive for decision making in the context of innovation and entrepreneurship. The logic of this paper is to speculate how university spin-offs can create innovative culture and explain how entrepreneurs best create new business and thus, how societies and economies grow and prosper.

## 2. Background

The idea that individuals and organizations affect and are affected by their socio-cultural context is not novel. Weber's classic thesis stands that culture legitimated individualism leads to economic development, his argument continues to be tested, using various operationalization of culture, by sociologists [5], psychologists [6] and more recently, by economists [7]. Public policy-makers also have shown a growing interest in the contextual factors in which entrepreneurial activities take place. International organizations such as the Organization for Economic Co-operation and Development (OECD) and European Union (EU) are focusing on the environmental drivers of entrepreneurship and innovation, including the social and cultural factors [8,9]. Environmentally relevant patterns of behaviour lead to the formation of different cultural values in different societies. Thus, culture, as distinct from political, social, technological or economic contexts, has relevance for economic behaviour, innovation and entrepreneurship [10].

One of the difficulties in examining the cultural circumstances in relation to university spin-off activity is the lack of a precise and commonly understood definition of culture [11]. For purpose of this paper culture will be defined as "ways in which societies organize social behavior and knowledge"[12].

Innovative entrepreneur who creates a business in a specific cultural environment, reflects that cultural environment; changing or establishing innovation systems is indicated by scientific and technological innovations, the number of new products, the prosperity of regions and firms and the creation of new jobs. However, there is also a less visible outcome of the innovation process in regard to knowledge creation, redesign of cultural software of what is understood as innovation. According to Marquardt [13] culture supports the acquisition of information, the distribution and sharing of learning, and provides rewards and recognition for learning and its application as critical for successful learning societies.

Henry Etzkowitz in his publication "The norms of entrepreneurial science: cognitive effects of the new university-industry linkages" explains the emergence of the entrepreneurial university as a response to the increasing importance of culture of knowledge, technology and innovation in national and regional systems of economic development [14]. Spinning out companies from universities he defines as a "second academic revolution" (the universities' first revolution was to incorporate research as a core function of the enterprise) [15]. The changing role of universities towards commercialization activities combined with governmental and institutional support mechanisms is creating a fertile ground for the seeds of university spin-offs [16]. The concept of university spin-offs refers to the transfer of knowledge and technology in the context of research and development projects. Pirnay et al. [17] define them as "New firms related to exploit commercially some knowledge, technology or research results developed within a university". University spin-off company are complex and multi-stage projects aimed at transforming existing knowledge into an innovative product to meet the needs of the market. Remain an important part of the new economy, as are the makers of the latest technologies and create new sectors of production in addition create knowledge -pool - provide organizational bridges between local businesses and universities.

### 3. Research method

The aim of presented paper is to look and exam the social and cultural factors involved in university spin-offs' activity. We used a qualitative case study approach. Data was collected from sixteen spin-off companies representing various industries: pharmaceuticals, biotechnology, medicine, chemistry, nanotechnology, and information technology. The start-ups were chosen as representative of academic start-up companies whose main focus is innovation, and therefore constitute a good sample for the study of socio-cultural aspects. Choosing extreme cases is a strategy recommended in the literature [18] and lends itself to fulfilling the theory building goal of this paper. The final cases were chosen after initial analysis of the spin-offs founded at three American universities: University of Washington, University of Maryland, and University of Central Florida.

Yin and Bickman argue that building a theory from case studies should include data collected by means of multiple methods [19]. Three main methods were used (in accordance with the principle of methodological triangulation): interviews, observation and document analysis.

Ten high-level management figures were interviewed, including company founders, presidents, vice-presidents and managers. The interviews lasted approximately 1 hour and were recorded and written out in transcript form, with the transcripts coded for the main themes. We posed open-ended questions about the characteristics of socio-cultural factors. The interviews were accompanied by observations from the CEO's and the team. Additionally we have analysed documents, such as websites, press releases, etc.

### 4. The characteristics of social and cultural factors and entrepreneurial activity

A system of innovation is defined as that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the frame work within which governments form and implement policies to influence the innovation process. It refers to national, regional, sectorial and technological system of innovation [20]. Our study pointed out the main factors influencing the culture created by academic spin-offs and investigated the role of spin-offs as a source of socio-cultural aspects of innovation processes. There is no doubt that university spin-off companies play important role in this system. They create, store and transfer the knowledge, skills and artifacts, which define new technologies.

University spin-offs are being increasingly internationalized (as measured, for example, by the proportion of industry R&D expenditures financed from foreign sources, the number of international alliances, etc.). Examined spin-off companies internationalize their research and development function through international technical alliances, international technology transfer, international trade of capital goods and international flows of scientific personnel. Therefore their technology has become increasingly globalized. Scientific international cooperation flows tend to be more intense than technological ones. Through international technological cooperation and the cross-border adoption and adaptation of institutional forms and practices cooperative alliances give university spin-offs access to a wider range of solutions to technological problems. Forming cross-border alliances is one of the most important means for firms to enhance their innovative capability [21].

Examined university spin-off companies provide also a ground for inter-sectors collaboration; encourage mobility and cooperation among faculties, students and business employees. Industry people share their wisdom and experience with university researchers and faculties and students have opportunity to be engaged entrepreneurial projects, and share their knowledge. Due to university spin-offs activities both groups learn from each other. University spin-off companies foster an entrepreneurial spirit, stand linkages between industry and universities, and remain a platform for educating the skilled employees of the future [22]. Much of the success of major system-building efforts derives university spin-offs' ability to bring together two diverse cultures: groups of researchers from universities and professionals from industry, and due to their commitment extend the innovations encourage the development of interorganisational linkages and personal networks through which new technologies and knowledge can be shared and created [23]. Since university spin-offs compete on the world markets in more differentiated segments of the industry and on the basis of own global strategy, spin-offs possess own marketing and serving international networks along with growing reputation abroad.

## 5. Conclusion

“Technological competition has increasingly become global in scope and related technology life cycles have shortened; firms have correctly responded to this new order by implementing multifaceted innovation strategies that reflect a new philosophy about the interdependence of competing firms. Speed in innovation is increasingly becoming the strategic benchmark upon which competitive survival will be benchmarked. As such, firms are partnering with other firms, organizations and institutions in an effort to survive, and are thus trading off a loss in appropriability for timing” [24]. The society based on knowledge, innovations, on benevolent perception of the new ideas, new machines, systems and technologies, on readiness for their practical realization in various spheres of human activity. It allocates a special role of knowledge and innovations, first of all, scientific knowledge. In innovative culture traditional spheres of production of goods are transformed because of the influence of scientific and technological knowledge and considerably change the technological basis, because the manufacture, which is not leaning on the new knowledge and innovations become impractical in the innovative culture. The information technologies, the computerized systems and high industrial technologies are a basis of innovative economy. It is thus important for policies promoting regional innovation processes to include capacity to place significant emphasis on the intensity, quality and socio-cultural relevance of the research conducted in universities. The innovative system should be based on a special innovative infrastructure and institutes of support of innovative process: the legislation regulating of the relations in sphere of innovations (intellectual property protection, patents, other), the innovative centers, which can direct researches and analyze the innovative supply and demand, coordinate efforts of collectives-developers, the centers of commercialization of technologies and developments, which could help the innovation to perform the whole way from idea to the final product, financial institutions (state and private), which can support an innovative activity by different grants and credits, the educational centers, institutes and schools on which base engineers, scientists, and other experts in the sphere of innovations.

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