

# Redesigning the Ivory Tower: Academic entrepreneurship as a new calling supporting economic growth

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**Abstract:** Innovation in the world of markets safeguards the viability of the companies or the organizations and the society within which they operate. Entrepreneurship's role is significant in the promotion and economic development of countries and it is the young generation who should be given adequate knowledge to develop competent skills. The core of entrepreneurship may be found at academic entrepreneurship that moulds younger generations and may contribute to innovation and technology transfer. This may have positive effects on local economic growth. This paper examines the significance of academic entrepreneurship providing an overview of current trends and future outlook. Synergies need to be initiated between educators, different actors, stakeholders and organizations from local community which is strategic for economic development. The university needs to change in order to cope with the changes in society and in order to be able to contribute to the development of technology-oriented companies with economic consequences on local, national and international economic growth.

**Key words:** academic entrepreneurship, innovation, entrepreneurship education, restructuring of academic curricula

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## 1. Introduction

Over the past two decades, academics worldwide have been witnessing or, in several cases, have been actively involved in the emergent phenomenon of entrepreneurial science (Etzkowitz, 2002), and what has been lately described as the second academic revolution (Etzkowitz, 2003). This emergent phenomenon is not simply a cursory sign of the times bound to subside after running its course, but rather constitutes a profound change on how academia is perceiving and reshaping its role within society and is examining how this newly-assumed role can have an impact on a regional, national and even global level. University knowledge positively influences entrepreneurial firm performance, while entrepreneurial firms' resources and capabilities can boost and be usefully implemented if they take into consideration and be in cooperation with universities and the knowledge they

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may offer (Link and Sarala, 2019). In an era during which economies are shifting towards new models, and economies of knowledge have been identified as the most successful and sustainable models, it should not come as a surprise that the very loci of knowledge generation should adapt and redefine their purpose and goal settings in order to address broader societal challenges and economic issues on various levels ranging from the local to the global. Universities with their Research and Development (R&D) centres, Research Centres and Science and Technology Parks are considered strategic for economic development, and they are the main source of innovation. There is a close need to establish a close relationship and a symbiosis with the private sector; it is a deliberate choice of the university in order to cope with the changes in society (Caseiro and Santos, 2019).

Nonetheless, as with any change, the actors involved are not necessarily consenting, but may be rather skeptical, reluctant or even hostile towards redefining the traditional academic tasks and embracing the new concept of the ‘triple helix’ (Etzkowitz and Leydesdorff, 1999). The aim of this paper is to examine how academia in general should reposition itself with respect to society. In particular, the authors wish to discuss how changes may be brought forth and which steps are necessary in order for these changes to be implemented. Keeping in mind that the transformation of traditional academic structures is both endogenous and exogenous, this work has been divided into 3 sections. Section 2 sets the framework of discussion. Section 3 focuses on the endogenous transformative steps that the academic institutions should follow in order for the generators of knowledge to also become generators of profit. Section 4 encompasses the exogenous parameters that are required for the second academic revolution to take place in regard to how the Ivory Tower may be redesigned in order to capitalize the generated knowledge and evolve into a novel economic player that will work on a par and in sync with more traditional economic sectors. Methodologically, the paper is a literature review that searched databases like Science Direct, Emerald, EBSCO host and scientific search engines like Google Scholar.

## 2. Transformation of academic entrepreneurship

Non-profit organizations or centres that share information technology knowledge, such as universities, may contribute to technology transfer and the development of technology-oriented companies with economic consequences on local economic growth through encouraging small business entrepreneurship (Kavoura and Andersson, 2016). Entrepreneurship education may foster business incubation and may have direct positive impact on entrepreneurial intention of students (Li, Rehman and Asim, 2019). Entrepreneurship is already established worldwide as a legitimate scholarly research subject, with many existing academic journals, while business schools offer courses on entrepreneurship aiming at innovation, growth, economic progress and the creation of strong bonds with the local community, while strategy development in a university setting is required focusing on diversification and multinationalization in order for entrepreneurial universities to develop (Lombardi et al., 2019; Stevenson and Jarillo, 2007).

As a corollary, an entrepreneur is ‘someone who exercises initiatives by organizing a venture to take benefit of an opportunity and, as the decision maker, decides what, how, and how

much of a good or service will be produced' (Business Dictionary). As straightforward and clear as this definition may be and regardless of the abundance of related literature and studies that have emerged during the last twenty years, defining academic entrepreneurship is more elusive. This elusiveness is not related to how academic entrepreneurship may be perceived, but mostly relies on the fact that it is not a single event, but a rather *dynamic process* consisting of a series of events and actions (Friedman and Silberman, 2003). The most succinct definition though that could be given is one of the earliest ones, which defines academic entrepreneurship as a commercialized activity involving technology developed in a university (Louis, Blumenthal, Gluck and Stoto, 1989). As academic entrepreneurs, scholars exploit research-produced ideas, products or processes by bringing them to the market and trying to make a profit out of them. In other words, academic entrepreneurship aims at transforming inventions to technological innovations with profit as the final outcome. This process involves six stages: conducting basic research, generating a prototype (proof-of-concept), protecting intellectual property, deciding to commercialize, establishing an enterprise (or at least participating in the commercialization process) and finally profit-making (Feldman, Feller and Bercovitz, 2002). Within these stages, one has to be aware of three critical milestones, when the eventual success (or failure) must be objectively and critically re-assessed (Vekinis, 2014). The first critical milestone coincides with the proof-of-concept confirmation resulting from systematic research and development within a laboratory framework and academic setting. This first milestone can be viewed as the generation and demonstration of the invention that can potentially lead to an innovation. The second milestone occurs when the technology is demonstrated—still at the level of a prototype—in a relevant environment. Only after reaching this milestone, an academic may proceed to reach the third critical milestone the attainment of which paves the way for the commercialization activities to begin and for profit-generation to be attempted. This last critical milestone entails the demonstration of the prototype in an operational environment, and it is essential in demonstrating not only the potential of the invention as an innovation, but defines the engineering and manufacturing risks and most importantly the cost-benefit ratio which is part of the determinants on the success of technology transfer (Maicher, Mjos and Tonisson, 2019).

The Ivory Tower seems to be opening up its doors and embracing a new, almost neo-Humboldtian model that amalgamates the traditional missions of teaching and research with entrepreneurship, circulating knowledge and making a societal contribution with challenges that academic boards need to take into consideration (Blankesteyn, van der Sijde and Sam, 2019; Etzkowitz, 2013). The twenty-first-century academic settings (universities and post-war developed research centres) are called to play an even more active societal role and emerge as alternative engines of economic growth alongside more traditional wealth generators (such as natural resources and labour). This transition requires the emergence and support of a new framework that of the 'triple helix' as theorized by Etzkowitz and Leydesdorff (Etzkowitz, 1994; Etzkowitz and Leydesdorff, 1995; Leydesdorff, 2010; Smith and Leydesdorff, 2014). The triple helix model of innovation refers to the spectrum of interactions between academia, industry and governments capable of fostering and nurturing knowledge-based economic development. Under this perspective and given the fact that academic entrepreneurship is a dynamic, non-linear and often iterative process, academia seems to be developing a new

identity, which targets at creating value and profit through exploitation of the generated knowledge. It is increasingly becoming apparent that since skills and ideas are the new currency, academia needs to evolve from a purely epistemological enterprise to a wealth-generator capitalizing and promoting its main asset, human creativity. Emphasis should be put upon the strengthening of students' competent skills, since they are tomorrow's entrepreneurs, so that economic viability and society return on investment may emerge; emphasis should be put on the entrepreneur as an individual that has a specific background, environment, goals, values and motivations, as well as their personal reasons to pursue aims should be also taken into consideration by universities (Argyri, 2019; Asonitou, 2015; Sahinidis, Stavroulakis, Kossieri and Varelas, 2019; Stevenson and Jarillo, 2007). The search for change is an opportunity according to Drucker that brings innovation and individuals increasingly take responsibility for their own learning and careers and the organization, either the university and/ or the business should be seen as a learning organism (Drucker, 2015). Given the above definitions, the next sections provide an overview of the endogenous processes that are required for the Ivory Tower to start re-defining its identity and goals.

### 3. Endogenous transformations

Generation of wealth through academic activities was seen almost as unethical or antithetical to the mission and values of a professor or a researcher. In several instances, the industry–academia relation was even perceived as a serious breach to academic independence and freedom, and it was equally argued that should academia develop strong ties with the industrial sector, basic research would be threatened with extinction. Of course, at the turn of the twentieth century, the development of knowledge-based economies has partly dispelled—or at least assuaged these fears—and has demonstrated that having academia working synergistically with the industry leads not to a conflict, but to a confluence of interests (Etzkowitz, Webster, Gebhardt and Cantisano Terra, 2000; Earnshaw, 2017). Therefore, it becomes clear that in order for the second academic revolution to take shape and bear fruit, it is firstly the very academia that needs to change from the inside following a bottom-up approach. It is in this sense that the authors opted to describe these transformations as 'endogenous'. However, academia is not an abstract, soulless construction; it is, first and above all, the people that make it up. Hence, the endogenous transformations required for a true metamorphosis of academia can be divided into four levels, the first three of which are directly related to the individual (and are more or less of an 'esoteric' nature) and only the last one is related to the institution as a whole. These four levels are the following: (1) accepting academic entrepreneurship (the so-called third way or third mission) as a legitimate part of academia and as a sanctioned option (Garcia-Martinez, 2014), since it requires change of culture in order for academic institutions to boost academic third mission and respond to the domains of smart specialization (Fonseca Ferreira, Guerra and Sá Marques, 2019), (2) making a personal decision to become an academic entrepreneur, (3) acquiring and developing the necessary skills in order to follow the third way, and (4) each institution as a whole deciding to incorporate academic entrepreneurship as part of its identity and mission.

### **3.1. Conceptually legitimizing academic entrepreneurship**

As already mentioned, academic entrepreneurship has been viewed with a large dose of mistrust and skepticism by the very same members of academia, a large number of which supported the notion that ‘the traditional ethos of science did not permit [erosion of ...] the boundary between science and private, profit-seeking-business’ (Etzkowitz, 1983, p. 198), and that academic scientists must pursue work that stimulates them intellectually, advances the frontiers of science and generates new knowledge regardless of potential applications. There is an abundance of existing literature written by experts on the subject (e.g. Wadhvani, Galvez-Beharb, Mercelis and Guagnini, 2017 and references therein; Berman, 2011). Academic entrepreneurship that may boost regional or national growth and generation of wealth through knowledge is not only legitimate, but they should be seen as an integral part of today’s academic institutions. Knowledge-based economies are not economies of scarcity, but rather of abundance; abundance of knowledge, information and ideas. 2018 Nobel Laureate of Economics Paul Romer has plainly and simply argued that ‘in advanced economies, smart people and new ideas are the primary catalysts for economic growth’ (Romer, 2007), while Henry Chesbrough has added: ‘The locus of innovation has migrated beyond the confines of the central R&D laboratories of the largest companies and is now situated among start-ups, universities, research consortia and other outside organizations’ (Chesbrough, 2003). The linear approach that simply funds academia in hopes that such investment will eventually be translated to worthwhile returns, is not just old-fashioned, but has rather proven ineffective and slowly-paced for sustainable and viable communities. Directly linking ideas and inventions to production can be used as a catalyst to speed up innovation generation. Academia should not simply prepare highly-skilled personnel that can be later hired, but should prepare knowledgeable, creative people that will strive for excellence and the generation of novel products and services replenishing the local economies with new business opportunities. Adopting the third way should not just be perceived as an egotistical personal goal or bet, but rather as a societal contribution. According to a comprehensive project led by MIT, universities have the ability to become powerful innovation drivers, but are most successful when attuned to the economic structure of their local communities (Lester, 2005). In other words, entrepreneurial endeavours emanating from research results is a new, effective means of returning the taxpayers’ money into tangible results. This affects knowledge-based economy and reward systems reformation should be firmly fixed in the institutional framework of society (Momeni, Mazar Yazdi and Sajjad Najafi, 2019). Needless to mention that on top of the economic benefits to the local communities, innovativeness that can be boosted by universities and incubator centres has an important role in the sustainable development of the country and its regions (Guerrero, Cunningham and Urbanoc, 2015; Olkiewicz, Wolniak, Grebski and Olkiewicz, 2019; Shane, 2004).

### **3.2. Deciding to follow the third way**

A lot of successful academic entrepreneurs claim that ‘any good scientific researcher has both the capacity and most of the critical skills necessary to become a good entrepreneur’

(Vekinis, 2016, p. 38) and that ‘physicians and scientists are natural innovators because they are constantly faced with unmet needs and problems they are eager to solve’ (Makower, 2016, p. 1187). Be true as it may, a lot of academic members are deterred from the task, thinking it is incredibly risky and overwhelming. And for most of us it can be. Even though ‘traditional’ research is a path full of failures, these are encountered in the safe haven of our laboratories, libraries and offices and do not have direct financial repercussions. On the contrary, entrepreneurship inherently involves risk-taking and academicians—though great visionaries—have an innate risk-aversion. When launching a business though, most often than not, decisions have to be made expeditiously without all the data at hand relying on calculated risks. Opting for the new way of academic entrepreneurship: leaving one’s comfort zone and approaching life in totally different way, abandoning certainties and embracing risk taking (Vekinis, 2016).

Under this perspective, opting for the third way is a very personal choice and is underlined by individual personality traits. Even though some of the entrepreneurial skills can—and should—be taught (as will be argued and presented in the following sections), taking a leap of faith to follow an unknown *modus operandi* is the most difficult step. A recent study by Fritsch and Krabel (Fritsch and Krabel, 2012) conducted among scientists working in the German Max Planck Society revealed that even though 28% of the surveyed scientists regard it as ‘attractive’ or ‘highly-attractive’ to start their own firm, only 3.2% actually engage in start-up activity. Vekinis has calculated that within the European Union only 1% of ideas became innovations even after receiving research funding by the European Commission (EC) under the various framework programs (Vekinis, 2016). He attributes this disheartening fact in part to the low-commitment and risk-aversion of many researchers to take their technology beyond the technical feasibility steps. It could be argued that academic entrepreneurship can be viewed as a new form of academic calling, and apart from the positive societal impact it may have, it can constitute a new means for personal development and life-long satisfaction. Becoming an academic entrepreneur should be freely chosen, but conscientiously supported as a life mission and a new form of academic identity. This is where the university has an important role to fulfill in order to contribute to the development of competent skills as well as the recognition of intentions for entrepreneurial activity from students’ point of view.

### **3.3. Developing the skills for academic entrepreneurship**

Educational institutions have been under a lot of pressure to update, change, and relook at the way they deliver teacher educational practices while at the same time educators are slow to change (Asonitou, 2015; Kenny and Gunter, 2018). Entrepreneurship requires a set of skills that any academician already possesses, such as good analytical, synthetic and organizational skills, resilience, perseverance, patience and ambition. Modern day academic groups operate as ‘quasi-firms’ ‘lacking only a direct profit motive to make them a company’ (Etzkowitz, 2003). Professors and researchers are almost removed out of the laboratory and every day research activities, and forced to undertake more ‘managerial’ and organizational tasks within their research group. However, practice shows that a good inventor is not necessarily a good innovator and does not always become a successful businessman/ woman. This

demonstrates that ‘nature’ is not enough and new, non-technical skills need to be ‘nurtured’ (Vekinis, 2014; Vekinis, 2016).

The development of transversal skills (problem-solving and communicative skills), as critical and necessary in educational setting and workplaces if implemented by universities, may successfully connect education with industry (Argyri, 2019). The development of transferable skills for determining the power of competitiveness and enabling innovation in social communities may take place with the contribution of universities. In the National Research Council report (2012) specific reference is made to the process through which an individual becomes capable of taking what was learned in one situation and applying it to new situations (National Research Council, 2012). Entrepreneurial education could also offer a positive contribution to distinguish entrepreneurial intentions, since intentions have proved to predict entrepreneurial behaviour especially among youths, while taking into account gender issues (Sahinidis, Stavroulakis, Kossieri and Varelas, 2019; Sinell, Müller-Wieland and Muschner 2018). National institutional settings should focus on the individual agent in order for the potential entrepreneur to learn how his actions and behaviour can be shaped, although such performance differs across countries, thus, the government and policy issues in a country place a significant role as well (Acs, Audretsch, Lehmann and Licht, 2017; Friedman, 2011).

The support provided by the state or other agencies but also the level of knowledge regarding the design of a business plan as well as the knowledge that young people receive from their education system, for example through their universities, may influence young entrepreneurship (Sahinidis, Vassiliou and Hyz, 2014). It has been shown that scientists can be trained for business regardless of their cultural background, ethnicity or religion (Hunady, Orviska and Pisar, 2018). Also, it is feasible to instigate the drive for entrepreneurial activity and to teach the practicalities of launching a business through appropriate sets of courses irrespective of the pre-existing cultural background of the academic environment (Etzkowitz, 2003). Still, apart from acquiring the ‘practical’ set of skills and apart from overcoming the innate risk-aversion, an academic aspiring to follow the third way must train himself/ herself and acquire skills that cannot be developed in an academic environment and cannot be taught in any course (Vekinis, 2014; Vekinis, 2016).

First of all, the aspiring academic entrepreneur needs to develop acumen and the ability to make rapid decisions without clear facts based on weighed guesses. Secondly, he/ she must abandon the more ‘romanticized’ notions of scientific excellence and acquire a sort of ‘colder’ perspective with regards to the most significant figure of merit for a business, the cost-benefit ratio. Striving for excellence is one thing, getting into the market at the right time is another. The third skill is ‘ruthlessness’, required when trying to penetrate a market and develop an antagonistic product or service. Next, the academic member needs to train oneself to identify and manage less tangible and non-technical risks that are hardly encountered in the academic arena, such as the shifting market, the ever-changing customer needs and opinions, the competition that may arise at any moment. Understanding the market trends as well as being able to forecast and foresee the future market trends and the positioning of his/ her invention with respect to them is of paramount importance. Equally important is to develop negotiating skills, necessary not only to attract investors, but to secure a viable business when dealing with customers, personnel and other business entities. Lastly, the academic en-

trepreneur should have a good measure of self-awareness in the sense that one must be prepared to identify and acknowledge one's own strengths and weaknesses (Makower, 2016). Building the right team is not much different than creating one's research group or a research consortium; it is the complementarity of skills that one is looking for. The hard part is to acknowledge what one cannot or is not willing to do. Is it then easy to follow the third way? It seems that it is not, and it requires a unique blend of skills. It is still though feasible and up to a point teachable.

#### **4. Exogenous transformations**

Academic entrepreneurship, as already described, is not a single event, but a dynamic, multi-stage process involving many actors. However, for knowledge spawned at a university or a research centre to become a product, it is equally important to develop the appropriate infrastructure and re-design the academic institutions in such a way that they become able to turn inventions to innovations. This re-design is what the authors of this paper have termed as 'exogenous', emanating both from the state—that regulates the operations of the academic institutions and from the universities and research centres as entities—in the sense that they should incorporate entrepreneurial activities in their strategic planning. In an analogous way to with the individual's change, academic institutions can re-invent themselves and re-set their goals in order to incorporate entrepreneurial endeavours in their missions. However, in contrast to the bottom-up approach of endogenous transformations, creating the new Ivory Tower is more of a top-down approach. The first step towards a modern academia harmonized with a knowledge-based economy is again a change in the way of thinking, but one that has to start from the state. As it was very eloquently put by Mazzucato, who views the state as the 'creator of the knowledge economy', 'the role of the government, in the most successful economies, has gone way beyond creating the right infrastructure and setting the rules. It is the leading agent in achieving the type of innovative breakthroughs that allow companies, and economies, to grow, not just by creating the "conditions" that enable innovation. Rather the state can proactively create strategy around a new high growth area before the potential is understood by the business community (from the Internet to nanotechnology), funding the most uncertain phase of the research that the private sector is too risk-averse to engage with' (Mazzucato, 2011, p. 19). This suggestion is on a par with the triple helix model and indicates how a state can boost its economy by turning it into a knowledge-based economy. The state is the actor that traditionally invests in high-risk research. The key parameter is to prioritize the sectors that have the greatest potential for immediate results if engaged in entrepreneurial activities. The potential is there awaiting for the three strand of the helix to start intertwining and it is more a matter of how to use existing pieces rather than creating new ones.

From the institutions' part, the first suggested step—that it is the norm in a lot of countries—is that each university and research centre funded has its own patent and technology transfer office (TTO). It is also suggested that part of any institution's budget should be allocated for the protection of the intellectual property (IP) generated within the institution. The selection of the patents to be financially supported could be selected by the technology transfer experts of the respective office or/ and by specially-organized committees. Even though

the number of patents is not directly linked to the willingness to engage into entrepreneurial activities (Fritsch and Krabel, 2012), lack of IP protection is synonymous to wasted revenues. Any invention that is not protected is a lost opportunity for innovation and profit. Recent studies suggest that the odds of success can be increased through the synergy of faculty and TTOs the role of which is of paramount importance in commercializing the outcomes of research (e.g. Wood, 2011).

The second suggested step has already been hinted throughout this work—even by its very title. It is up to each university and research centre to decide on how to redefine its goals and mission. Each ‘tower’ has to select to what extent and how it can include academic entrepreneurship into its activities and functions. Of course, this presupposes that the corresponding laws include academic entrepreneurship as a legitimate part of the academic identity and as a possible criterion for career advancement. Engaging in entrepreneurial activities sometimes requires a short-term ‘abstinence’ from academic duties and a lot of academic members decide to take leaves of absences in order to engage into the commercialization of their ideas. Such choices should not be ‘penalized’ when academic entrepreneurs apply for advanced positions. Moreover, it would be very beneficial if there were a greater focus on finding ways to incentivize and reward academic staff when developing their inventions and engaging in entrepreneurial activities. Lastly, but not least, part of the academic restructuring seems to involve a tighter interaction and cross-fertilization among the various disciplines. New curricula incorporating entrepreneurship, managerial, communication and advertizing courses could be very beneficial in any faculty that embraces commercialization of its ideas. As pointed out by Hunady et al., those with higher education who took during their study a course on entrepreneurship were more likely to start a business as well as to start a successful business (Hunady, Orviska and Pisar, 2018). Inversely, the trial- and-error approach, which is almost natural to scientist but alien to business school, can be proven as a great asset of reliance and creativeness when launching a high-risk venture. Departments should open their gates and share their different point of views; science has a lot to learn from economics and humanities and vice versa. Synergies need to be initiated between educators, different actors, stakeholders and organizations from local community for the best possible design and choice of the teaching methods to set the agenda for the entrepreneurial university (Starnawska, 2018).

## **5. Conclusions**

This work on the redesign of the Ivory Tower does not claim to be an exhaustive literature survey nor an in-depth analysis of academic entrepreneurship. However, it aspired to instigate a discussion on how modern-day academia needs to readjust and reposition itself and how it can contribute to national growth in a shifting global environment and a fast-paced transformation of economical systems based on knowledge-creation. Creativity is the greatest capital and the most precious asset humanity possess; academia has a duty to exploit it the best way it can to accomplish its main goal and serve society. As former US president Woodrow Wilson said, ‘I not only use all the brains I have, but all that I can borrow’.

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## Restrukturyzacja wieży z kości słoniowej. Przedsiębiorczość akademicka jako nowe wyzwanie wspierające wzrost gospodarczy

**Abstrakt:** Ulepszanie rynków gospodarczych chroni rentowność firm lub organizacji oraz społeczeństwa, w których one działają. Innowacyjna przedsiębiorczość odgrywa istotną rolę w promowaniu krajów oraz w ich rozwoju gospodarczym. Dlatego młode pokolenie powinno otrzymać odpowiednią wiedzę, pomagającą rozwijać odpowiednie kompetencje. Trzon przedsiębiorczości stanowi przedsiębiorczość akademicka, która kształtuje młodsze pokolenia i może przyczynić się do stałego doskonalenia i transferu technologii. Może to mieć pozytywny wpływ na lokalny wzrost gospodarczy. Niniejszy artykuł analizuje znaczenie przed-

siębiorczości akademickiej, dostarczając przeglądu aktualnych trendów i perspektyw na przyszłość. Należy zainicjować współpracę pomiędzy nauczycielami, różnymi podmiotami gospodarczymi, zainteresowanymi stronami i organizacjami społeczności lokalnej, która będzie miała strategiczne znaczenie dla rozwoju gospodarczego. Uniwersytet musi się zmienić, aby poradzić sobie ze zmianami w społeczeństwie i przyczynić się do rozwoju firm zorientowanych na technologię, mających znaczenie w kształtowaniu lokalnego, krajowego i międzynarodowego wzrostu gospodarczego.

**Słowa kluczowe:** przedsiębiorczość akademicka, innowacje, edukacja w zakresie przedsiębiorczości, restrukturyzacja programów akademickich