Abstract

Name of author and institution

Theme

Universities as interactive partners

Title

The Research University and the Synergistic Innovation: the evolution of the roles

Key Words: Research University; Synergistic Innovation; Role Evolution

The state-of-the-art

Nowadays, the economic competition becomes the zeitgeist. The commercialisation of university research is on the centre of the national agenda. Owing to many influencing factors, the research universities are engaged actively in economic activities. In such a situation, the technology transfer of the university (Lee 1996) and transformation of university roles (Youtie and Shapira 2008; Fini, Grimaldi et al. 2011) become the main research themes.

The positive correlation between the university research and regional development has been studied time and again (Anselin, Varga et al. 1997; Anselin, Varga et al. 2000; Fischer and Varga 2003; Rodriguez-Pose and Refolo 2003; Audretsch, Lehmann et al. 2005; Østergaard 2009).

Research shows that university and industry are mutual beneficial (Van Dierdonck, Debackere et al. 1990; Mansfield and Lee 1996; Geuna and Nesta 2006; Mueller 2006; Perkmann and Walsh 2007) and the interactions of university and industry have changed the landscape of the university, from the research goals to the organizational structure (Peters and Etzkowitz 1990; Etzkowitz 1998). University commercializes its research through creating spin-offs and cooperating with industry. So some studies focus on the performance of spin-offs (Landry, Amara et al. 2006) and on the barriers of cooperation (Siegel, Waldman et al. 2003; Decter, Bennett et al. 2007; Bruneel, D'Este et al. 2010). More generally, the university entrepreneurship (Jacob, Lundqvist et al. 2003; O'Shea, Allen et al. 2007) and its evolution (Etzkowitz 2004) are also explored.

In commercialization of university research, the business incubators and science or technology parks are common practices and are studies by many scholars (Felsenstein 1994; Mian 1996; Vedovello 1997; Harper and Georghiou 2005; Markman, Phan et al. 2005; McAdam and McAdam 2008).

A majority of the research in university technology transfer studied the cases in advanced countries, but at the same time, there are a few cases from developing countries, such as China (Eun, Lee et al. 2006).

Some scholars have noticed the corporatization of higher education (Giroux 2002), but it seems that the involvement of the universities in the economic events is irreversible.

Methodology

This paper will take Huazhong University of Science and Technology as a case to illustrate how the research universities take part in the synergistic innovation and how efficient and effective the process is.

The data are collected by structured and semi-structured interviews. The interviewees include the staff engaged in research, especially those have cooperative relationships with industry, the administrators in commercialization of technology, and the executives in the university spin-offs.

The samples are selected in one university, but the results are representative of the Chinese universities, because all Chinese research universities are governed by governments.

In addition, a more synthetic and systematic methodology should be proposed to address the holistic issues.

A majority of research in the cooperation of university and industry have focused on the micro level. This paper will make some analyses on the macro level based on case study.

Findings and interpretation

This research has findings as follows:

1）The innovation-driven economic development has become a national strategy, which emphasises the synergistic effects of the national innovation system, in which, research universities are important actors. The governments continue to take measures to push research universities to be engaged in more development projects.

2）How university prioritises its missions determines the extent to which the university allocates its resources and commitment among the three functions. There is evidence suggesting that the research university has invested more resources in research and development than in education, which has caused the fear about the quality of education.

3）The Chinese universities are different in several aspects, such as the funders and sponsors, the structures of governance, and the assessment mechanisms, from those in the USA. It could be inferred that the best practices of USA universities may not apply to the Chinese situations. The traditional cultures, the political regimes are the examples of the influencing factors.

4）Generally speaking, incentives would have both positive and negative effects on human behaviours. The rewarding systems could stimulate creativity, and could also encourage opportunistic behaviours. The quantitative assessment of the performance of the university faculty is such an example.

4）The governments live up to local universities, especially those research-intensive ones, to facilitate the national and regional economic development. But under current bureaucratic structures, the universities have not sufficient autonomy to take part in the local innovation activities. The governments influence the process of the interaction of university and industry by policy making. In many cases, the governments use the top-down style to implement the relevant policies and pay less attention to bottom-up style, resulting in the loss of efficiency or the inefficiency. In the mean time, Chinese universities have been accustomed to depending on the governments, which is decided by Chinese political structure.

5）University staffs have spent much more time in commercialising of the research and much less time in education, which has had severe inside effects on the traditional mission of the university. An interest fact is that above-mentioned phenomenon has almost not been paid attention to by innovation scholars.

6）The subjects China is addressing are similar to those that the western countries faced three decades ago. We can therefore make an inference that there is at least two decades of lag between China and the advanced nations in technology transfer and the commercialisation of university research.

Conclusions

Research universities have participated extensively and intensively in the economic development. But their performance is not satisfactory. It is argued that if Chinese research universities had played enough roles in the economic decision-making, the quality and quantity of the economic development would have reached a balanced state but not showing current undesirable disturbance, such as environmental pollution.

Research university should reflect on its roles and the change of social needs. It is not sufficient that research university only take part in technological development. Research university should make use of all intellectual advantages more extensively, from fundamental research to public policy-making.

The synergistic effect of research university in innovation depends to a large extent on its autonomy and independence.

Implications for business management and policy

The university is facing severe challenges from the inside and outside, such as the balance of the university's missions, the criticisms from the public and the drastic competition of other universities for resources. Research university should take measures to address these challenges.

Picking the winners is popular in determining the allocation of resources, and has become one of the serious barriers to the commercialization of the university research. For overcoming those barriers, it is necessary for the governments, national and local, to devolve their powers to the actors, including universities, firms and research institutes. There should be a policy debate about the significant affairs so that the process of decision-making is scientific and the objectives are practical.

In the USA, the business school can provide many supports and helps in innovation and entrepreneurship (Boni, Thomas Emerson et al. 2005). However, In the past in China, the role of the business school in innovation was underestimated or neglected, which should be changed.

In addition to producing technologies, research university should make every efforts to participate proactively in public affairs and get more automomies and the combination of both top-down and bottom-up styles in policy making should be adopted in order that the policies are practical.

References

Anselin, L., A. Varga, et al. (1997). "Local Geographic Spillovers between University Research and High Technology Innovations." Journal of Urban Economics **42**(3): 422-448.

Anselin, L., A. Varga, et al. (2000). "Geographical spillovers and university research: A spatial econometric perspective." Growth and Change **31**(4): 501-515.

Audretsch, D. B., E. E. Lehmann, et al. (2005). "University spillovers and new firm location." Research Policy **34**(7): 1113-1122.

Boni, A. A., S. Thomas Emerson, et al. (2005). An Integrated Model of University Technology Commercialization and Entrepreneurship Education. Advances in the Study of Entrepreneurship, Innovation, & Economic Growth, JAI. **Volume 16:** 241-274.

Bruneel, J., P. D'Este, et al. (2010). "Investigating the factors that diminish the barriers to university–industry collaboration." Research Policy **39**(7): 858-868.

Decter, M., D. Bennett, et al. (2007). "University to business technology transfer—UK and USA comparisons." Technovation **27**(3): 145-155.

Etzkowitz, H. (1998). "The norms of entrepreneurial science: cognitive effects of the new university-industry linkages." Research Policy **27**(8): 823-833.

Etzkowitz, H. (2004). "The evolution of the entrepreneurial university." International Journal of Technology & Globalization **1**(1): 64-77.

Eun, J. H., K. Lee, et al. (2006). "Explaining the "University-run enterprises" in China: A theoretical framework for university-industry relationship in developing countries and its application to China." Research Policy **35**(9): 1329-1346.

Felsenstein, D. (1994). "University-related science parks -- `seedbeds' or `enclaves' of innovation?" Technovation **14**(2): 93-110.

Fini, R., R. Grimaldi, et al. (2011). "Complements or substitutes? The role of universities and local context in supporting the creation of academic spin-offs." Research Policy **40**(8): 1113-1127.

Fischer, M. M. and A. Varga (2003). "Spatial knowledge spillovers and university research: Evidence from Austria." Annals of Regional Science **37**(2): 303-322.

Geuna, A. and L. J. J. Nesta (2006). "University patenting and its effects on academic research: The emerging European evidence." Research Policy **35**(6): 790-807.

Giroux, H. A. (2002). "Neoliberalism, corporate culture, and the promise of higher education: The university as a democratic public sphere." Harvard Educational Review **72**(4): 425-463.

Harper, J. C. and L. Georghiou (2005). "Foresight in innovation policy: Shared visions for a science park and business-university links in a city region." Technology Analysis & Strategic Management **17**(2): 147-160.

Jacob, M., M. Lundqvist, et al. (2003). "Entrepreneurial transformations in the Swedish University system: the case of Chalmers University of Technology." Research Policy **32**(9): 1555-1568.

Landry, R., N. Amara, et al. (2006). "Why are some university researchers more likely to create spin-offs than others? Evidence from Canadian universities." Research Policy **35**(10): 1599-1615.

Lee, Y. S. (1996). "`Technology transfer' and the research university: a search for the boundaries of university-industry collaboration." Research Policy **25**(6): 843-863.

Mansfield, E. and J. Y. Lee (1996). "The modern university: contributor to industrial innovation and recipient of industrial R & D support." Research Policy **25**(7): 1047-1058.

Markman, G. D., P. H. Phan, et al. (2005). "Entrepreneurship and university-based technology transfer." Journal of Business Venturing **20**(2): 241-263.

McAdam, M. and R. McAdam (2008). "High tech start-ups in University Science Park incubators: The relationship between the start-up's lifecycle progression and use of the incubator's resources." Technovation **28**(5): 277-290.

Mian, S. A. (1996). "The university business incubator: A strategy for developing new research/technology-based firms." The Journal of High Technology Management Research **7**(2): 191-208.

Mueller, P. (2006). "Exploring the knowledge filter: How entrepreneurship and university-industry relationships drive economic growth." Research Policy **35**(10): 1499-1508.

O'Shea, R. P., T. J. Allen, et al. (2007). "Delineating the anatomy of an entrepreneurial university: the Massachusetts Institute of Technology experience." R & D Management **37**(1): 1-16.

Østergaard, C. R. (2009). "Knowledge flows through social networks in a cluster: Comparing university and industry links." Structural Change and Economic Dynamics **20**(3): 196-210.

Perkmann, M. and K. Walsh (2007). "University-industry relationships and open innovation: Towards a research agenda." International Journal of Management Reviews **9**(4): 259-280.

Peters, L. S. and H. Etzkowitz (1990). "University-industry connections and academic values." Technology in Society **12**(4): 427-440.

Rodriguez-Pose, A. and M. C. Refolo (2003). "The link between local production systems and public and university research in Italy." Environment and Planning A **35**(8): 1477-1492.

Siegel, D. S., D. A. Waldman, et al. (2003). "Commercial knowledge transfers from universities to firms: improving the effectiveness of university-industry collaboration." The Journal of High Technology Management Research **14**(1): 111-133.

Van Dierdonck, R., K. Debackere, et al. (1990). "University-industry relationships: How does the Belgian academic community feel about it?" Research Policy **19**(6): 551-566.

Vedovello, C. (1997). "Science parks and university-industry interaction: Geographical proximity between the agents as a driving force." Technovation **17**(9): 491-502.

Youtie, J. and P. Shapira (2008). "Building an innovation hub: A case study of the transformation of university roles in regional technological and economic development." Research Policy **37**(8): 1188-1204.