

Chapter 3

Reinventing Learning and Research in the Twenty-First Century via the Academic Firm and the Entrepreneurial University

Elias G. Carayannis and Piero Formica

“Mode 3” and “Quadruple-Helix” Architectures of Government, University, Industry and Society in the GloCal Knowledge Economy

3.1 Introduction and Definition of Terms and Concepts

“The challenge for a lot of business schools is how to develop leaders and not managers”, said James Tran, a candidate for an M.B.A. and a master’s in public administration at Harvard. Many of the top schools are moving in that direction, he said, but “I don’t think they have actually figured out how to do that in the most effective way”.

“Re-training Business Schools”, NY Times, March 14, 2009.

Universities can be rightly considered the heart and soul of sustainable entrepreneurship leading to robust competitiveness as they act as generators of new and unique knowledge and as global trade shifts increasingly from the trade of commodities goods to the trade of knowledge-based tasks and services in terms of total value added.

In that sense, universities play a very important role in the knowledge economy that is now taking shape. As society changes, the role of universities inevitably changes as well. New capabilities are becoming essential. There is no given single model to be applied, but for universities to fulfill their potential, there must be room for dynamic and complex processes and competence development and leveraging pivoting on higher order learning (Carayannis 2000) as well as sustainable entrepreneurship

E. G. Carayannis (✉)
The George Washington University, 515 C Fungler Hall 2201 G St NW,
WA 20052 Washington, D.C, USA
e-mail: caraye@gwu.edu

P. Formica
International Entrepreneurship Academy, Innovation Value Institute,
National University, Maynooth, CO Kildare, Ireland
e-mail: piero.formica@gmail.com

leading to robust competitiveness (Carayannis 2009) in a socio-economic and political framework of democratic capitalism (Carayannis and Kaloudis 2009).

We define sustainable entrepreneurship as the creation of viable, profitable, and scalable firms. Such firms engender the formation of self-replicating and mutually enhancing innovation networks and knowledge clusters (innovation ecosystems), leading toward robust competitiveness (Carayannis 2009).

We understand robust competitiveness to be a state of economic being and becoming that avails systematic and defensible ‘unfair advantages’ to the entities that are part of the economy. Such competitiveness is built on mutually complementary and reinforcing low-, medium-, and high-technology and public and private sector entities (government agencies, private firms, universities, and non-governmental organizations) (Carayannis 2009). Robust competitiveness results from an emerging twenty-first century Innovation Ecosystem (also called ‘Mode 3’ Innovation Ecosystem) (Carayannis and Campbell 2006, 2009).

The concepts of robust competitiveness and sustainable entrepreneurship are pillars of a regime that we call ‘democratic capitalism’ (as opposed to ‘popular or casino capitalism’), in which real opportunities for education and economic prosperity are available to all, and especially—but not only—younger people. These are the direct derivative of a collection of top-down policies as well as bottom-up initiatives (including strong R&D policies and funding, but going beyond these to include the development of innovation networks and knowledge clusters across regions and sectors) (Carayannis and Kaloudis 2009).

3.2 The Academic Firm Versus The Entrepreneurial University: Implications for Policy and Practice

‘It is so obvious that something big has failed’, said Ángel Cabrera, dean of the Thunderbird School of Global Management in Glendale, Ariz. ‘We can look the other way, brag about. We cannot say, Well, it wasn’t our fault when there is such a systemic, widespread failure of leadership’.

‘Re-training Business Schools’, NY Times, March 14, 2009

The ‘academic firm’ should be understood as a concept or thought. Whether academic firm exists or diffuses and proliferates in the real world of business still represents an open question. Principles of the academic firm can address a whole firm and/or only a subunit of a firm. Similarly, as universities are confronted with different demands (teaching, research, and innovation), also firms may have to balance the following two paradigms either within the boundaries of the same company or within a cluster of firm arrangements: the ‘commercial firm’ (maximizing/optimizing profit) and the ‘academic firm’ (maximizing/optimizing knowledge and innovation). Also, firms represent a type of organization that must integrate a diversity of (partially competing) paradigms.

We propose the concept of the academic firm as a reaction and adaptation to the increasing importance of knowledge and innovation. Knowledge clusters and innovation networks of entrepreneurial universities and academic firms (academic and commercial firms) generate the synergies and ‘creative milieus’ for triggering and advancing performance in the knowledge-based knowledge economy and society. Important is the hybridization, which adds on to the diversity and pluralism (‘Mode 3’), and does not imply a simple conversion of universities and firms, which in fact would be misleading (and wrong). The academic firm would demonstrate an extension of the world of academia to the world of business (e.g., ‘academic culture and values’, high-quality publishing, and life-long learning).

The entrepreneurial university also demonstrates a partial extension of business elements to the world of academia. Implications of the academic firm are that some concepts or strategies (such as publishing versus patenting) may be discussed in parallel for academia and business. ‘Academic entrepreneurship’ is being granted with an expanded meaning. Hybrid configurations of knowledge clusters and innovation networks may be approached from an organizational (university and firm) perspective or from the perspective of the individual (the individual entrepreneur). Academic entrepreneurship ties such features together, creating an academic knowledge entrepreneur.

The more money governments put into elite universities, the better those institutions will perform, with the associated benefits for the national R&D system, and the more likely it is that their academics’ work will be published in highly reputed journals. This is a cherished tenet of most European public educational and research policies, which are currently under attack (Aghion 2006, 2008).

Yet, the strategy of concentrating public money on the ‘citadel’ of a few select academic institutions for the dual purpose of education and research (as is done, for example, in Germany, Sweden, and the UK) is highly questionable. What matters far more is the creation of a free and ‘co-opetitive’ environment which, through the interrelated forces of competition and cooperation, will spur all universities—not just the most prestigious—to innovative excellence across all aspects of their activities.

In the ‘gloCalizing’ (globalizing and localizing) knowledge economy and society, the ideas and knowledge marketplace is not divided into towns and regions but into affinity groups that derive from a high propensity to sociability and are structured by knowledge creation, diffusion, and use modalities (in other words, ‘knowledge-ducts’ along which flow ‘knowledge nuggets’ such as innovation networks and knowledge clusters—see Carayannis and Gonzalez 2003).

We therefore propose that universities, university-related institutions, and firms should join together in innovation networks and knowledge clusters (Carayannis and Campbell 2006; Curley and Formica (forthcoming)). The complementary and mutually reinforcing roles of academic firms and entrepreneurial universities are crucial for advanced knowledge-based economies and societies—and they should be at the heart of any strategy to reinvent learning and research in the twenty-first century. Despite the significant functional differences between universities and firms, there is the potential for productive overlap between entrepreneurial universities and academic firms, thanks to the fact that such organizations can engage

more easily in university-business research networks. National governments should deploy public resources in accordance with three key strategies (Carayannis and Formica 2008):

- increasing the independence of universities,
- introducing more competition between universities, and
- channeling funds to departments that excel in multiple ways.

To stimulate competition between universities, national governments should liberate them from the rigid regime of tuition fees and student recruitment. Each university should have the right to specialize as it chooses, fixes its own fees for tuition, and selects its own students. Quality control and measurement are needed, but not in ways that stifle differentiation, innovation, and renewal. To achieve a state of successful competition, the life-long tenure of professors must also be ended. This would trigger a healthy process of horizontal and vertical mobility for scientists, researchers, and teachers (ibid).

New foundations are needed for an innovative learning environment that will epitomize the knowledge city of the twenty-first century renaissance. Here, academics will indeed become entrepreneurs of the mind, in the business of ‘growing’ people intellectually, culturally, and spiritually (Carayannis 2001).

3.3 Brain Circulation: Wandering Students Thrive in the ‘Academic Firm’ and ‘Entrepreneurial University’ Contexts

Academics are Entrepreneurs of the Mind in the business of growing people intellectually, culturally, and spiritually.

Elias G. Carayannis, Invited Lecture, World Bank/IFC, April 2001

Diversity makes the power of difference. It creates an intercultural context of mobility and integration rather than a multi-cultural context of emigration and separation. Open boundaries, education without borders, new connections, both physical and virtual journeys into other places and disciplines: all these are ingredients that foster new ideas. Thanks to mobility within the network, informal circles of exchange take shape that are sources of creativity and cross-fertilization of ideas.

Brain circulation can be defined as the international mobility of entrepreneurial scholars, teachers, and students, which gives birth to a collegiate society that incorporates a variety of influences, trades ideas, and makes easier the movement of the entrepreneurial knowledge nomads instead of forcing people to emigrate.

The ‘brain circulation’ concept has been recognized by a number of scholars and development agencies as a central one to catalyzing and accelerating sustainable development driven by science, technology, and innovation including a conference at the World Bank (April 30, 2009).

3.4 Multilayered Brain Circulation: The Role of STI Partnerships in Capacity Building

Dr. Kiyoshi Kurokawa, Former Science Adviser to the Japanese Cabinet and leading Japanese advocate on science and technology innovation, led discussions at the World Bank with experts from government, academia, and the private sector, on science, technology, and innovation (STI) capacity building for sustainable development and the potential role of the World Bank Group in brokering these strategic partnerships. STI partnerships have been established in order to reduce poverty, achieve the Millennium Development Goals, generate wealth, create better paying jobs, and foster sustainable development.

Innovative proposals for STI partnership programs include: A visiting professor program, referred to as a ‘Professor Corps’ where accomplished professors spend a significant amount of time in a developing country, focusing on building capacity for the indigenous scientific community; and a Venture Capitalist in Residence program or ‘Venture Corps’ where business innovators and entrepreneurs create an interface between the scientific and financing communities for the innovation of new products and services based on local scientific achievements.

The student mobility dimension evokes two societal breakthroughs that, respectively, the Phoenicians and medieval communities of scholars made by intuition rather than through a laborious linear logical process, which was the style of innovation embraced by the ancient Greeks.

The Phoenician travels and displacements spanned geographical barriers and shrunk the world of education. They generated interactive spaces for knowledge creation, knowledge dissemination, and knowledge sharing.

The circulation of professors and students, and the resulting exchange of ideas in a climate of freedom, gave birth in medieval Europe to centers of higher education as guilds of wandering scholars (*clerici vagantes*). The first was the Studium of Bologna around AD 1088.

Both the Phoenicians and medieval scholars showed how the culture of transnationality produces ‘flexible citizenship (...) that induce(s) subjects to respond fluidly and opportunistically to changing political-economic conditions’ (Karam 2001).

That form of mobility and the resulting intellectual exchanges foreshadowed those processes of cultural integration, knowledge creation, and result-oriented innovation actions that unfolded all through the Renaissance movement. Brain circulation triggered off nine inventions that were developed during the Renaissance: Clocks, Gunpowder and Artillery, Eye Glasses and Spectacles, Printing Presses, Flush Toilets, Microscopes, Telescopes, Submarines, and the Match. In turn, these inventions enticed the creation of economic value afterwards.

The university cities of the Middle Age used to harbor for a while students from other communities. Each of them played to his or her strengths, rather than ape the host university city. Along the route the *clerici vagantes* were pollinators of new ideas and projects that made the university cities wealthy.

Today's brain circulation is a very important driver of entrepreneurial growth. It refers to the flow of ideas, from clever young nationals who go abroad to study, then take a job abroad, and later bring back the fruits of that study and working experience to their home country. Some authors believe that this form of migration will increase in the future in some regions, especially if economic disparities between countries continue to diminish. Such a circular migration, for example, has been observed among Indians and Malaysians who had studied, respectively, in the United States and Australia. Notably, India, which has been deeply affected by the diaspora of brainpower that went in the direction of Silicon Valley, is experimenting with the new form of brain circulation that nourish tech entrepreneurship and fast moving start-ups in both nations.

During the 1990s, this was a vast phenomenon that mainly affected the emerging economies, with the United States having benefited heavily from this migration. By contrast, the mobility rather than the migration of high-powered intellectual assets stimulates the international transfer of ideas from the university to the marketplace and fosters international collaboration between academics and business people.

While the migration of high-powered intellectual assets enlarges the productivity gap, the international mobility of highly educated, talented young people helps to close that gap since it implies a two-way flow of entrepreneurship-led innovation between a sending country and a receiving country. This movement, in one way, holds off the phenomenon of brain waste that occurs when highly skilled workers migrate into forms of employment not requiring the application of the skills and experience applied in the former job. It also promotes the creation of 'nations of entrepreneurs' dedicated to transferring ideas from university to market, and fostering collaboration between academia and the business community.

A circuit of native missionaries like those in the Middle Age is a fertile ground for 'glocal' communities where the local dimension turns into a local and global dimension. One of the most striking examples of the formation of 'glocal' communities is the circuit of students that links Mumbai and Bangalore, Beijing and Shanghai with London, Boston, and California.

Twinning entrepreneurial projects cultivated at the university sites within the circuit open up the door to successful entrepreneurial-friendly environments that, in turn, foster new and emerging high-growth business communities.

Entrepreneurial universities design and manage global networks, onsite and online, which are created and developed by means of worldwide alliances with learning partners and business organisations that link student-centred learning to on-the-job activities. In such a co-operative environment participants can cultivate new business ideas and turn them into commercial realities.

Participants can move from one learning location to another and, in each location, the diversity and ethnic mix of both the student population and the faculty members play an important part in reducing the risk of a brain drain from developing countries and regions and enhancing the opportunity benefits resulting from the increased mobility or 'brain circulation' and manifested as strategic knowledge serendipity and strategic knowledge arbitrage events and processes (Carayannis 2008).

The network is an international platform for the mobility of the higher education communities of practice. These communities bring together in cross-functional teams academics and practitioners from around the world. The integration of thinkers from industrial and consultant backgrounds with their academic counterparts strengthens the quality of educational programmes. Each partner adds value to the network, but the real value of it is greater than the sum of the individual parts. What makes the difference is a synergistic collaborative process involving people with complementary competencies, which results in a symbiotic learning network.

Appropriate actions should be implemented through a combination of ‘academic firms’ and ‘entrepreneurial universities’. This is a matter in regard to which responsibility has to be placed upon the shoulders of those who are responsible for changing the academic foundations on which human capital has been built during the machine age. The new foundations should set the stage for an innovative learning environment that epitomizes the clever polis or the knowledge city of the twenty-first century renaissance. Here knowledge and skills are encouraged, the love of learning and an inquiring mind are fostered, creativity and imagination are emphasized, and a digital-connected collective intelligence is designed to maximize the creative collaboration of small groups of entrepreneurial people addressing issues that interest and concern them all.

3.5 The International Entrepreneurship Dimension of Brain Circulation

As in international entrepreneurship the world is our community, people mobility and intellectual exchanges are qualifying elements of the international dimension of entrepreneurship (Andersson et al. 2010).

International entrepreneurship spans cultural boundaries, emerging as a breakaway pattern of entrepreneurial activity with high expectations to grow. Instrumental in setting the trend for global born/stateless/cross-border/cross-cultural international start-ups has been a dramatic shift in the entrepreneurial environment from a local to a transnational focus.

Founders of international start-ups draw resources from and sell their goods in multiple countries from the very early stage of their development (Mc Dougall and Oviatt 2003). Among international start-ups there are those new ventures whose scope extends well beyond their globally dispersed mode to an organization without a clear national identity that thrives on the diversity of its cross-country founders. There needs to be a high level of trust between the stateless start-ups’ founders—which allows them to be split between the different locations with the twofold role of developing high trust relationships between the cross-border parties and teams, and operating the globally dispersed units as if they were one (Halperin 2001).

Student mobility can serve the purpose of creating international start-ups and also an intercultural dimension. In fact, brain circulation is a vehicle for borderless thinking, cultural curiosity, and cross-cultural activities, which triggers a process conducive to the creation of start-ups whose operations are across borders. They are endowed with a mixed background that covers both cultural diversity and regional identity. In addition, those start-ups are adept at tapping into a global talent pool to form a hybrid management team and enticing knowledgeable founding entrepreneurs from the targeted markets, who complement each other on each other's home turf.

The challenge is how to get a small organization formed by students who decide to pool their resources almost from the start to think like a global organization. By playing the role of matchmakers and thereby building networks of contacts with students, the co-evolution of entrepreneurial universities and academic firms may have much to contribute to the creation of small entrepreneurial student teams that are cross-cultural and cross-country. The co-evolution can also serve the purpose of providing experimental labs, which helps to limit the exposure to risk and uncertainty in the course of actions once field experiments must be carry out in the marketplace (Curley and Formica 2008).

In experimental labs Knowledge-to-Business Achievement Teams (KBATs) of international students aiming at the creation of cross-border and across cultural boundaries firms make experiments in evaluating the performance and function of markets. The results give them a deeper understanding of the actual workings of real-world markets. Experiments also point out how vitally important are the "rules of the game", laws, regulations, customs, truth, and honesty in affecting both individual behavior and market outcomes.

Each KBAT constitutes a knowledge pool—a collective networked intelligence of knowledge-driven individuals with an entrepreneurial mindset, who can extend their knowledge to recognize business opportunities where others do not, to prove the power of their business concepts and to stretch out their capabilities by forging relationships with other KBAT members.

3.5.1 The Knowledge-to-Business Achievement Team

The following intangible assets contribute to build the platform for the KBAT:

Teambuilding to form a tight team:

- Each player covers a specific but not rigid role.
- Each player comes to terms with strengths and weaknesses of all the other players.
 - Creativity and curiosity for exploring key driving forces of the business environment.
 - Brainstorming to generate business ideas and to make business simulations.
- Observatory to get the maximum of information and knowledge of business opportunities.

- Co-opetition, a judicious mixture of competition and co-operation, to shape new business relationships and new forms of enterprises as well.
- Implementation and action to devote more energy to achieving gain than to avoiding loss.

In the KBAT context, connectivity and conductivity nurture a sense of community. By driving toward the access of everyone to everyone, everything to everything, and everything to everyone, connectivity creates circles of exchanges and facilitates journeys into other disciplines and business fields as well (see also the chapter ‘Knowledge of Culture and Culture of Knowledge from Low-Tech to High-Tech’ by Carayannis and Popescu in (Carayannis and Chanaron 2007)).

Bibliography

- Andersson T, Curley M, Formica P (2010) Knowledge-driven entrepreneurship: the key to social and economic transformation. Springer, New York
- Aghion P (2006) Primer on innovation innovation and growth, Bruegel Policy Brief, October
- Aghion P (2008) Higher aspirations: an agenda for reforming european universities. Bruegel blueprint, 5 July
- Carayannis EG, Chanaron JJ (2007) Leading and managing creators, inventors and innovators: the art science and craft of fostering creativity, triggering invention and catalyzing innovation innovation. Praeger Publishers, NY
- Carayannis EG (2008) Knowledge-driven creative destruction: strategic knowledge serendipity and arbitrage as real options drivers triggered by co-opetition, co-evolution co-evolution, and co-specialization. *J Ind High Educ* 22(6):343–353 December 2008
- Carayannis EG (2009) Firm formation dynamics. *International Journal of Innovation and Regional Development* 1(3):
- Carayannis EG, Kaloudis A (2009) A time to lead and a time to act: democratic capitalism and a new ‘new deal’ for the US and the world, *Japan Economic Currents*, January
- Carayannis EG, Campbell DFJ (2009) Mode 3 and quadruple helix. *Int J Technol Manage* 46:3–4
- Carayannis EG, Formica P (2008) Knowledge matters. MacMillan/Palgrave Press, NY
- Carayannis EG, Formica P (2007) The concentration of resources and academic performance: reinventing learning and research. *J Ind High Educ* 21(2):121–123
- Carayannis EG, Campbell DF (eds) (2006) Knowledge creation, diffusion and use in innovation networks and knowledge clusters: a comparative systems approach across the United States Europe and Asia. Praeger, CN
- Carayannis EG, Gonzalez E (2003) Creativity and innovation = competitiveness? when, how, and why’. In: Shavinina LV (ed) *The international handbook on innovation innovation*. Pergamon, Amsterdam, pp 587–606 especially at 593
- Carayannis EG (2001) Academics as entrepreneurs of the mind, invited lecture, World Bank, IFC, April
- Carayannis EG (2000) The strategic management of technological learning. CRC Press, Boca Raton
- Curley M, Formica P (2008) Laboratory experiments as a tool in the empirical economic analysis of high-expectation entrepreneurship. *J Ind High Educ* 22(6):355–363
- Curley M, Formica P (forthcoming) University ecosystems design creative spaces for start-up experimentation. *J Ind High Educ*
- Formica P (2003) Industry and knowledge clusters: principles, practices, policy. Tartu University Press, Estonia
- Formica P (2005) The argument for international entrepreneurship in the knowledge economy. In: *Structural change in Europe—entrepreneurial spirit in cities and regions*, Hagbarth Publications

- Halperin A (2001) Globally dispersed startups—Executive summary of research Conducted at the Sloan School of Management at MIT
- Karam JT (2001) Review of flexible citizenship: the cultural logics of transnationality by aiwha ong (Duke University Press, 1999). *Anthropol Quart* 74(1):45–46
- McDougall PP, Oviatt BM (2003) Some fundamental issues in international entre-preneurship, Kelly School of Business, Indiana University, July, Mimeo