Editorial

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Piero Formica is Professor for Knowledge economy, innovation and entrepreneurship at Jönköping International Business School and Dean of the International Entrepreneurship Academy, Sweden. He has over 30 years of experience in the fields of international economics and economics of innovation, working with OECD Economic Prospects Division in Paris, large corporations and small companies, governmental bodies and the European Union. His special interests include Industrial clusters, knowledge clusters, knowledge-based economic policy, digital economy, regional technology transfer strategies and infrastructures, regional innovation strategies, and models of public-private partnerships for innovation policy. He is a member of IKED (International Organisation for Knowledge Economy and Enterprise

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The focus of this special issue of the IJTM[1] is on profiling, analysing, benchmarking, and modelling in socio-technical terms, ways and means that creativity, invention and innovation are manifested and flourish in select American, European, and Asian knowledge-based *innovation* networks (Carayannis and Alexander, 2004)[2] and *knowledge* clusters (Excerpts from Carayannis and Campbell, 2005a)[3] *(see definitions below)* and may also serve as catalysts and accelerators of new and sustainable technological venture formation and growth. In this context, innovation-triggering *technological entrepreneurship* is viewed as a core element of local, regional and national innovation systems, as well as '*glocal*' knowledge production and innovation-triggering networks (Carayannis and von Zedtwitz, 2005).[4]

Moreover, the focus of this special issue is on highlighting *critical success and failure factors*, and *lessons learned* about entrepreneurial *initiatives, outcomes, outputs, and impacts* in USA, Europe and Asia and in the context of knowledge creation, diffusion and use in innovation networks and knowledge clusters.

This IJTM special issue aims to attract a number of conceptual and empirical studies from the US, Europe and Asia, that contribute to a better understanding of the role of knowledge in the theory and practice of technological entrepreneurship in *the context of socio-technical networks architecture design, form and function* and from diverse theoretical perspectives, including, regional development economics and sociology of innovation, as well as regional science, and, technology and knowledge management:

- Select industries of focus would be biotechnology, advanced materials and ICT (as well as cross-disciplinary, emerging threads such as nano/bio-technology, MEMS, bio-informatics, etc) and in each region or country, innovation networks and knowledge clusters based on such industries would be identified and studied.
- Public-private partnerships for research and technology development, transfer, deployment and commercialisation would also be studied in this context, and, in particular, their relationships and roles in catalysing and accelerating the formation and growth of networks, clusters and individual new ventures.
- Top-down policies and bottom-up initiatives would be documented and reviewed to identify what works and what does not, how and why in each region, country and industry.

In conclusion, the purpose of this IJTM special issue, is the identification and articulation of insights that could inform *both public sector policies and private sector practices* to render them more effective and efficient. A series of recommendations for policy makers and practitioners would ideally emerge from this comparative, conceptual and empirical research contributing to the growing literature on the role of knowledge on *technology, innovation and entrepreneurship* and in particular with regards to the role of knowledge

creation, diffusion and use in *local, national, regional, and global* innovation networks and knowledge clusters that form the underpinnings of the knowledge economy and society.

Key working concepts defined (Carayannis and Campbell, 2005b):[5] We provide here a set of working definitions developed in the context of this and prior related research projects that are meant to inform the author contributions:

- *'Mode 3'*: 'Mode 3' for Knowledge Creation, Diffusion and Use (Carayannis et al., 2006):[6] 'Mode 3' is a multi-lateral, multi-nodal, multi-modal, and multi-level systems approach to the conceptualisation, design, ent-University-Industry Public-Private Research and Technology Development Co-opetitive Partnerships) (Carayannis and Alexander, 2004).[7,8]
- *Knowledge clusters* (Carayannis et al., 2006):[6] Knowledge Clusters are agglomerations of co-specialised, mutually complementary and reinforcing knowledge assets in the form of 'knowledge stocks' and 'knowledge flows' and management of real and virtual, 'knowledge-stock' and 'knowledge-flow', modalities that catalyse, accelerate, and support the creation, diffusion, sharing, absorption, and use of co-specialised knowledge assets. 'Mode 3' is based on a system-theoretic perspective of socio-economic, political, technological, and cultural trends and conditions that shape the co-evolution of knowledge with the "knowledge-based and knowledge-driven, gloCal economy and society" (Carayannis and von Zedtwitz, 2005).[4]
- *Innovation networks* (Carayannis et al., 2006):[6] Innovation Networks[9] are real and virtual infra-structures and infra-technologies that serve to nurture creativity, trigger invention and catalyse innovation in a public and/or private domain context (for instance, Governm that exhibit self-organising, learning-driven, dynamically adaptive competences and trends in the context of an open systems perspective.

The innovation process

Innovation is increasingly transformed from a game played by a few into a range of activities that engage a broad set of actors. Customers play a prominent role as creator of innovative products and services, for instance.[10] Mobility of experts, or 'brain circulation', serves as an important source of inspiration fuelling new impulses and also new forms of innovation and entrepreneurship.[11] Notably, there is a need for a borderless 'space' encompassing research and education, which is able to enhance interactions among personal development, government interests and enterprise needs. MNEs, which work on a global scale, hold great power in their experience and diversity, also because the customers whom they are selling to are heterogeneous, but for the potential benefits to materialise there needs to be constructive interface with dynamic cross-border pools of experts, entrepreneurs and domestic innovators in a particular region.

In order to increase international linkages for innovative ventures, certain dynamics are needed as regards cross-border flows of researchers and experts. The presence of foreign researchers matters for tapping into international technology networks and platforms, and thus for enhancing the formation of knowledge clusters and strengthening access to cutting-edge technology.

It should be stressed that functioning 'knowledge clusters' are different from mere agglomerations of universities and industrial activities within a specific disciplinary field. A knowledge cluster is a critical mass of processes that are able to put knowledge into action: from education and research to business innovation, and from the latter to new venture creation (new businesses and new companies). Information flows and impulses pulling responses need to work both ways, interlinking a range of complementary actors active in research, production, sales, after-sales service, etc. This requires, in turn, that pools of knowledge-driven professionals from both academia and different parts of business are able to interact in continuous and constructive ways. For this to work, they must generally be engaged in tight and synchronic collaboration relating to new ideas, inventions, or innovations evolving into a new product or service. Organisational modes must allow for processes of mutual adaptation, specialisation and complementarity among participating actors and categories of skills.

The 'Road Map' method

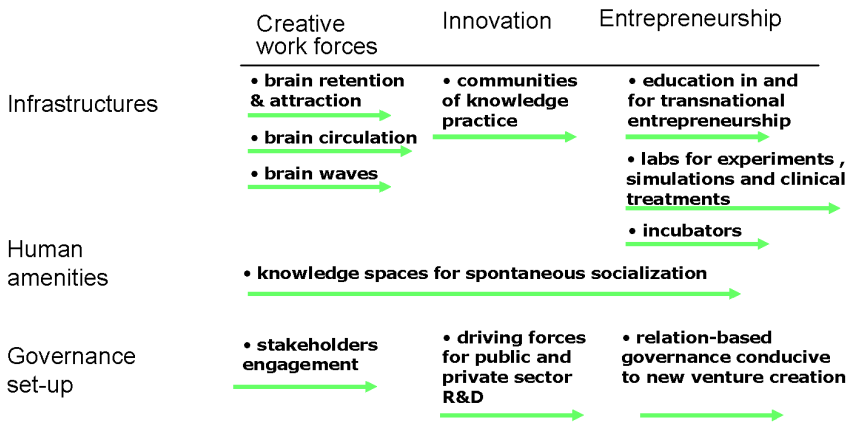
The proposed method consists in the development of a *compass* rose that is to be useful in identifying, and keeping attention to, the delicate but crucially complementary progresses in areas of tangible and intangible assets.

Main categories of the compass rose are:

- creative work forces, innovation and entrepreneurship
- infrastructures, human amenities and governance set-up

Within a matrix format of those categories, illustrated in Figure 1, the green arrows (resembling the compass needle's function) correspond to actions that help display the map of direction. We recommend that special attention be placed on identifying methods for spurring a creative interface between important stakeholders and institutions engaged in the innovation process. This requires overcoming (or even breaking with) counterproductive barriers between societal spheres, national and cultural barriers, and scientific disciplines, so as to enable the spontaneous socialisation and cross-fertilisation that can help bring about unexpected combinations of knowledge put into action, better than what can be done in any other similar portfolio of competencies anywhere else.

Figure 1 Tracking the road map: 'compass rose' and 'compass needles'



R&D and innovation need to materialise as sources of business opportunities that feed entrepreneurship and intrapreneurship – the ultimate destination of the Road Map, under the assumption that the mission is that of broadening and deepening the economic base, in particular the knowledge-intensive base.

The Road Map is conceived in such a way to trigger a process of organic growth. Organic growth is a self-organised, self-sustaining and self-reinforcing formation of interconnected businesses, whose seed is a 'food' molecule (catalyst) without which the 'business reaction' would proceed only with a great difficulty. High quality local resources such as skilled individuals and local-rooted entrepreneurial heroes usually act as catalysts.

Who has to play the role of catalyst is a critical issue. A primary role ought to be conferred on pools where researchers, business strategists, sales forces, and patent experts are brought together and devote time to customers in order to really understand the kinds of problems and needs that really need to be addressed.

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Notes

[1]This IJTM Special Issue is a companion issue to the following one: *International Journal of Entrepreneurship and Innovation Management Special Issue on Entrepreneurship and Innovation Triggers, Catalysts and Accelerators*, Editor: Elias G. Carayannis, forthcoming by Inderscience Publishers in 2009.

[2]Carayannis and Alexander (2004).

[3]Excerpts from Carayannis and Campbell (2005a).

[4]Carayannis and von Zedtwitz (2005).

[5]Excerpts from Carayannis and Campbell (2005b).

[6]Carayannis *et al.* (2006).

[7]Inter alia see: Carayannis and Alexander (2004).

[8]Inter alia see: Carayannis and Alexander (2004). Note: Awarded 1999 Lang-Rosen Award for Best Paper by the Technology Transfer Society.

[9]Networking is important for understanding the dynamics of advanced and knowledge-based societies. Networking links together different modes of knowledge production and knowledge use, and also connects (sub-nationally, nationally, trans-nationally) different sectors or systems of society. Systems theory, as presented here, is flexible enough for integrating and reconciling systems and networks, thus creating conceptual synergies.

[10]Examples are iPod Podcasting or Youtube.

[11]The Chinese speak of 'sea turtle', referring to skilled Chinese nationals who go abroad and return home to 'lay eggs' (start new ventures). The Chinese government now provides incentives to spur this process, and is pursuing a host of initiatives to increase entrepreneurship among overseas Chinese as well as current residents. (Knowledge@Wharton special report 'Selling in China', October 2006). India, Chinese Taipei and many other countries are developing similar strategies.