Knowledge and Information Technology and Urban (Regional) Development

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Abstract: - Knowledge and learning, as the major processes of 'knowledge production', are often cited as ultimate sources of competitive advantage, due to the special characteristics, arising from the analysis of knowledge as an economic factor. In this paper/speech, linkage is made between the well-described theories of knowledge-based companies (economies) and the spatial proximity, facilitated by the relevant urban/region policies. In addition, the theoretical determinants of such a 'knowledge city' ('knowledge region') are placed within the wider context of innovation, with the specific linkage to the idea of habitus, as elaborated by Bourdieu in the field of sociology.

Key-Words: - Knowledge economy, Knowledge-based development, Information technology, Regions, Cities

1 Introduction

Contemporary knowledge and society are often being described by the terms of knowledge economy and knowledge society. Knowledge is supposed to become the 'universal fuel' for running the complex socio-economic 'machine' of the (post)modern society.

Many political initiatives, including those of the European Union (EU), such as eEurope 2002, eEurope 2005, i2010, etc., seem to approach the issue of initiating and sustaining the knowledge-based development in a rather simplistic manner. Although one may not agree, it could be argued that the majority of such programs can be reduced to providing: (a) incentives both to the enterprises, as well as to the academic community, regarding all forms of research and development of commercially viable technologies (as to develop the knowledge-based economy), (b) equitable access to developing and acquiring Information & Communication Technology (ICT) skills, which is supposed to ensure the social acceptability of the emerging knowledge economy, (b) cheap and reliable Internet connections for the general public (preferably via broadband connections) and (c) provision of a simple and efficient electronic infrastructure for the delivery of relevant public services and information, in order to cut the 'red tape' and ensure higher productivity [cf. 9; 10; 11].

Information technology (IT) has certainly provided the society with the new opportunities, which can be used with a certain naiveté, based upon the presumption of a inherently positive influence of technology to the state of human affairs. In this paper, a multidisciplinary review of theories related to knowledge-based development and evaluation of IT influence to the society will be used, in order to present a more balanced to the 'fuzzy' concepts of knowledge economy/society.

2 Knowledge as a factor of economic production

The 1990s and beyond are characterized by the 'explosion' of interest in the field of knowledge, beyond the usual field of epistemology. One of the major ideas, proposed both by the academics and practitioners from the Information Technology (IT), as well as from the business studies, is related to the knowledge as a potential source of commercial success. Starting with the proposition that the knowledge can be viewed as an object of economic exchange and a source of wealth, specific characteristics can be ascribed to it. According to Grant [16], knowledge is characterized by a varying degree of transferability, the capacity for aggregation and the capacity to produce the economic rent. Knowledge transferability depends on the opportunities for codification, inherent to two different categories of knowledge: tacit and explicit, which can be traced to the analysis of M. Polanyi [23].

Explicit knowledge is the objective and positivistic notion of the fact- and/or information-based asset, which
can be classified and managed, in analogy to other forms of assets/capital. Hence the term of *intellectual capital*, popularized by Stewart [28; 29], which is usually conceptualized in terms of 'excess value' over the valuation of a firm's material assets. However, all knowledge cannot be neatly produced, stockpiled and used, in analogy with the material assets. A specific form of deeply embedded skills and competences can be acquired only during a longer period of 'apprenticeship' and socialization within the given environment. Such an *intuitive knowledge*, connected both to its human host and the environment (context) in which it has been created, is usually referred to as the *tacit knowledge* [23].

It is both difficult, if not impossible to capture/codify and to make use of such knowledge [27], which does not imply that the conversion among different forms of knowledge is not possible, as demonstrated by Nonaka's [22] SECI conversion model. It encompasses four conversion processes: *socialization* (tacit → tacit), *externalization* (tacit → explicit), *combination* (explicit → explicit) and *internalization* (explicit → tacit), supported by the common enablers and knowledge-friendly organizational culture, envisaged by the concept of 'ba' (ibid.).

Knowledge, especially the tacit one, meets well most, if not all requirements of the *resource-based view/theory (RBV)* of the competitive advantage: it is certainly a valuable resource (i.e. it has the potential to provide economic rents). In addition, if its transfers are protected, i.e. if knowledge is commercialized in the form of *intellectual property*, it can satisfy the notion of *rareness*, i.e. access to it can be licensed and protected from potential competitors. However, knowledge is usually integrated into the 'materialized' products and services, rather than used in its pure ('idealized') form. This implies that the knowledge can be aggregated in a certain (useful) form, such as the *technology, procedure*(s), *know-how*, etc., which is certainly true for the explicit knowledge, but may not apply to its tacit form. Tacit knowledge is often idiosyncratic, i.e. it cannot be aggregated into a single form and/or location.

Probably the most significant characteristic of knowledge, within the context of economic analysis, is related to the relative inefficiency of the intellectual property market(s) [31], which makes it a potentially rare resource. If all forms of explicit knowledge cannot be easily and efficiently procured on the external market(s), this is much less the case for the tacit one. This might lead to the conclusion that many valuable forms of knowledge are, actually, *difficult to imitate* (replicate).

In addition, 'production' of knowledge is inherently linked to learning (and other individual cognitive process), although synergies of individual and team-based learning may lead to the institutionalized processes of organizational innovation and adjustment to the changing environment [21]. Actual usage and sharing of knowledge, as the other components of the cycle in which knowledge is managed [19], also depend on the characteristics of individual employees and the groups to which they belong. Feelings of being 'expandable' after valuable individual knowledge is shared may impede the efforts of knowledge management systems, with the organizational effort to actually manage knowledge perceived as a manner of codifying individual intellectual capabilities [1]. With the resulting resistance to practicing different forms of knowledge formalization and/or sharing, it can be suggested that, in many cases, *knowledge will be subject to causal ambiguity and a low level of transferability*.

Relevant knowledge can also be replaced with a substitute resource only with the extreme difficulties, as it is difficult even to imagine the market of a production factor, conceptualized according to [2], which could successfully substitute the role of knowledge. Especially the tacit knowledge seems to be practically irreplaceable by another factor, i.e. meeting the criteria of *nonsubstitutability/internal resource accumulation* [cf. 8].

Within the discussed context, knowledge seems to be one of the 'logical' potential sources of competitive advantage, as it formally meets the requirements of the resource theory, formulated by Barney [3] and Grant [15].

### 3 The notion of (networked) knowledge economy

The *knowledge economy* is often envisaged in terms of sophisticated regions, such as the *Silicon Valley*, which serve as a certain metaphor for the future of the advanced market economies. Supportive institutions, enterprises and societal mechanisms are supposed to drive innovation and revenue growth, based on 'green' technologies and sophisticated social order. However, is this only an utopia?

The common approach starts by stating that the IT development changes everything and dramatically, by (finally?) taking into account the potential of knowledge as a production factor, facilitated by the technological change/development [33]. The same authors provide a convincing review of existing theories, which provide evidence for influence of IT on both reducing costs (and other relevant manners of enhancing operative efficiency), as well as on stimulating innovation and change. Therefore, the notion *knowledge economy* could be constructed along the lines of connecting *knowledge as a factor of production to technology and infrastructure for economic and social innovation*. Such
an extensive definition may seem excessive during the times of the economic crisis, in which all costs, especially those related to all kind of 'overhead' are strictly controlled and eliminated, if possible.

The balanced approach may be the answer to the question what is the role of IT in stimulating economic and social efficiency. Just like the Business Process Reengineering-related claims of 'reinventing' the enterprise on the basis of IT innovation may be an exaggeration, Carr's [5] concept of treating IT as an utility without inherent strategic value, may just be the same kind of overstated reaction (just directed elsewhere).

As the current issues of Harvard Business Review seem to capture well the spirit of the moment, as indicated by publishing both Hammer's [18] and Carr's (op. cit.), it might be of interest to examine its response to the financial/economic crisis of 2008/09. Relevant authors place their emphasis on combining agility with the traditional strengths of large enterprises to withstand crisis [30], while managers need to innovate and achieve hugely innovative goals [17]. At the other hand, traditional advice on guarding the fundamentals, controlling the bottom line and maximizing market value is also emphasized [25]. Therefore, innovation, combined with the customary business prudence is, once again, accentuated as a way forward.

It is sometimes pointed out that, in the age of omnipresent information, the traditional idea of innovation, run by a single organization, in order to profit for it, might be exceeded. Chesbrough [7] asserts that, due to the connectedness of the world and dissemination of the information, brought about by the modern technologies, the real role of research & development is not knowledge generation, but rather providing connections to the relevant partners in a completely new model of innovation (see Figure 1). It allows individual organizations to freely network and create strategic partnerships, in search of best possible ways to address the customer needs. This justifies the term of networked knowledge economy, which has also been mentioned by Wickaramsinghe & Lubitz [33].

Beside networks, the knowledge economy seems to be either connected, or even completely identified with the idea of digital economy. E.g., Sharma [26] believes that the digital economy consists of IT (including communication technology) use, knowledge formalization and development of information-based products. All those characteristics of the economy also bring about completely new social arrangements, arising from the new ways people work and organize their life in knowledge-based organizations [e.g. 6].

Many theorists analyze these changes on the global level and believe that socio-economic processes in contemporary (post)modern societies need to follow such a pattern. However, on the macro-level, changes arising from the networked knowledge/digital economy may be a more or less vague mixture of responses from different actors in the society. For the case of US, in which such changes are supposed to be most visible, Whitford [32] suggests that the 'new' and the 'old' economy 'mix and match', by combining outsourcing with stubborn reliance to the old patterns. However, decentralized networks seems to pervade as a prevailing form of organizing production, which requires formulation of relevant local and regional development policies (ibid.). On the micro-level, different economic contexts and cyclical developments, such as the current economic crisis, may sometimes obscure the overall logic of knowledge-based development, as firms need to rely on short-term cost cuts and survival requirements. At the other hand, innovation, as a notion inherently related to knowledge and application of new technologies seems to be the answer, even in this case.

4 Knowledge economies in the knowledge regions

In the late 1990s, M. E. Porter [24] has argued that clusters (sometimes referred to industrial districts, although the terms may not be exact synonyms), defined in terms of "geographic concentrations of interconnected companies and institutions in a particular field" [24, p. 78] are a significant component of the urban/regional competitiveness. Synergy of different local features, specific to a community, or a region, such as better access to employees and suppliers, free flow of information among the cluster members, complementarities among the local businesses and
informal motivation for raising performance, lead to the development of common strategic competences, improving the performance of all the actors in the area. Local government bodies, research and educational institutions and non-profit organizations also participate as significant cluster members, which participate in production of highly specialized production factors (especially the human resources) and continuous innovation. In other words, the social fabric of the cluster seems to be responsible for the development of those delicate intangibles, which account for the economic success of locally concentrated industries (economic sectors).

Some theories try to explain the cluster logic from the static point of view, although it may be suggested that the commonly accepted logic revolves around the notions of dynamic processes, based on the local knowledge and initiated by the local customer base. However, Wolfe & Gertler [34] believe that the influence of social actors (such as nonprofit organizations) is decisive factor for knowledge sharing, with the cluster's competence to import and adapt external knowledge also seems to be a critical factor in this context. By referring to the previously described characteristics of the knowledge as an economic factor (input), imported codified knowledge is probably as important as the tacit, locally 'produced' (constructed) and socially dependent component of relevant cluster knowledge.

At the policy level, it is argued that urban/regional policy-makers need to focus on the interaction among the spatial/social structures and the opportunities for innovation [4], as demonstrated by Figure 2. Local institutions need to facilitate the interactions and knowledge sharing among the cluster actors, as well as in building the knowledge-supportive (local) climate/culture, which has already proved as essential at the micro (organizational) level (Jashapara, op. cit.). Therefore, assistance to local clusters, as well as development policies per se, need to be closely connected to provision of relevant know-how and the knowledge absorption capabilities of the recipient firms [cf. 13]. This can be achieved due to the fact that, in the age of information technology development, economy should be conceptualized in the terms of the "learning and evolutionary process, instead of a static allocative mechanism" [20], which can make use of the spatial proximity to foster the development and exchange of tacit knowledge, as well as exploit other benefits from the deeply embedded local socio-economic relationships.

Theoretical concepts, analyzing the issue of knowledge-based economy in the urban/regional context, seem to contradict the idea of the 'flat world' [12], in which technological developments and globalization create a common socio-economic knowledge. The 'stubborn' durability of regional successes (and failures), as well as of the digital divides, suggest that only the knowledge regions may be good 'hosts' to the (networked) knowledge/digital economy.

6 Instead of a conclusion

If local heritage and culture actually represent capital of a community/region [cf. 14], knowledge may very well be a form of the collective habitus, as suggested by Bourdieu in the field of sociology. It is the (usually unrecognized) role of urban and regional policies to develop such a habitus, with the IT professionals providing assistance to the its formulation, both at micro and macro level(s).

References:


