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Wilfred Dolfsma and Luc Soete, Understanding the Dynamics of a Knowledge Economy

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Knowledge plays an increasingly important role in shaping the dynamics of an economy (Abramowitz & David, 1996; Dolfsma, 2001; Foray & Lundvall, 1996; Lundvall & Johnson, 1994). The OECD defined knowledge-based economies as “those which are directly based on the production, distribution and use of knowledge and information” (OECD, 1996 p: 7). The European Summit of March 2000 in Lisbon fixed a strategic objective for Europe: ‘to strengthen employment, economic reform, and social cohesion in the transition to a knowledge-based economy’ (European Commission, 2000, 2005).

In this book, Dolfsma and Soete (p: 2) point out that “the developments in our current economy are related to knowledge”. The dynamics of knowledge economy is an interesting topic, but difficult to study. Knowledge, in fact, is a very heterogeneous concept: as Dolfsma (2001) points out, knowledge involves tacit dimensions and requires coding and decoding activities. Moreover, the development of knowledge in a social context is cumulative. According to Dolfsma and Soete (p: 3), the dynamic that characterizes the knowledge economy makes obsolete any attempts to provide readily usable answers about knowledge economy obsolete. The authors, therefore, suggest that the aim of the book is not to provide readily usable answers, but multiple views to reading a knowledge economy.

In order to provide multiple views, the authors analyze themes of macro and micro nature and use empirical evidence to offer a deep and comprehensive analysis of the subject. The role of a knowledge economy and its dynamics are explained using analytical models, empirical evidence, and simulation models. The use of different methods of analysis provides a comprehensive grasp of the nature and the dynamics of a knowledge economy.

The book’s contributions to the literature are twofold. First, through the analysis of the knowledge economy using different analytical tools, the authors underline that circulation of ideas, social interactions, and communication among agents are fundamental for the dynamics of a knowledge economy. Second, the book offers a

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broad view of the role of formal and informal institutions. As regards formal institutions, the authors, after analyzing the role of region and state, point out that states and regions should redefine their role to sustain the dynamic of a knowledge economy. Such redefinition implies the exploration of new complex forms of governance and new growth regimes. As regards informal institutions, they argue that coordination problems among agents and knowledge codification and sharing could be facilitated by the development of norms, rules and procedural authority. Specifically, the emergence of community leaders, that may solve coordination problems within community of practice, and the importance of procedural authority in epistemic community, that creates and regulates knowledge, represent examples of the role that informal institutions have in a knowledge-based economy.

The book differs from previous existing studies since it stresses the dynamic feature of knowledge-based economy. As Leydesdorff (p. 43) points out, whereas previous studies have focused on the consequences of a knowledge-based economy (e.g. globalization; relationships between competitors; and relationships between labour markets), the cumulativeness over time of knowledge in a social context (Dolfsma, 2001) makes it necessary to explain the evolutionary dynamics of a knowledge-based economy. This book fills this gap as it provides an extensive analysis of the dynamics of knowledge in different contexts and fields.

The book is articulated in 9 chapters. The first chapter underlines the central role of Enlightenment to explain why, when, and where the industrial revolution arose. Joel Mokyr, the chapter's author, claims that European Enlightenment "was the triumph of open and public knowledge over secret and arcane knowledge" (Mokyr p: 23) and it saw the rise of the idea that knowledge could contribute to economic and social progress. During the Enlightenment the bridges between *savant* who represents the sphere of knowledge and *fabricant* who stands for the sphere of production were built. Different types of knowledge could be combined and support each other and the diffusion of useful knowledge allowed the resolution of technical problems. The author underlines that institutions encouraged human knowledge to bear on technology and promoted innovation lowering the costs of communication. Mokyr emphasizes that the revolutionary contributions of the Enlightenment, which transformed the dynamics of technical progress and reformed the role of institution, were "the very foundations of the European Miracle" (p: 9).

In the second chapter, Loet Leydesdorff develops a triple helix model to explain the conditions under which knowledge-based dynamics could be expected to emerge in a socio-economic system. Existing studies have analyzed the consequences of a knowledge-based economy, but failed to explain their dynamics. The author argues that the knowledge production and control, the economic exchange, and the political decision-making represent three coordination mechanisms and the interactions between these mechanisms that could generate a knowledge base within the system.

The third chapter deals with the communities of practice, a central topic in the knowledge-based theory of firm and in open source software development. A community of practice is a group of people applied in a common practice, interacting constantly and developing a common shared repertoire of resources (Brown & Duguid, 1991 in Muller: 78). Paul Muller, the chapter's author, describes how centralized structures emerge within communities of practice and how they influence their activity. The specialization of knowledge and tasks that characterizes communities of practice brings coordination problems, but the emergence of a community leader could solve coordination problems. Muller suggests that leadership

may solve coordination problems through the influence on knowledge and information flows generated by the combined actions of mediation (leaders have a central status within the network that provide the ability to regulate and to direct the communication flows) and informational mimesis (other members mimic the behaviour of leaders since they believe that leaders have more information).

Nevertheless, communities of practice are characterized by the autonomy of people. This implies that the other members of the community should legitimize the leadership. The author claims that the legitimacy of the leadership lies in the compliance with social norms of the community and in trust. The simulation model proposed provides interesting results. First, the emergence of leadership is achieved by individual members' decisions; second, small differences in the individuals' behaviours have large consequences in their social position and the more committed individuals reach the leadership. The nature of the leadership is linked to the share of highly committed individuals within the community. A high share of highly committed individuals may produce distributed leadership and coalitional style of governance as a low share may limit the access to the leadership only to few people and it produces authoritarian style of governance. The social norms are crucial for the coordination of the communities of practice. Since reputation and trust depend on social norms, these norms ensure the legitimacy of community leaders that could be identified in those individual who exhibit a great level of compliances to social norms. Moreover, social norms represent a coordination tool. Muller concludes by highlighting that only a close examination of the co-evolution of norms, leadership and trust permits us to understand the internal coordination mechanisms of communities of practice.

Chapter 4 is related to the creation of new firms. Knowledge-based economy allows the proliferation of new firms due to the pervasive use of information technology that may reduce barrier to entry. The authors of this chapter, Erik Stam and Elizabeth Garnsey, use a longitudinal and retrospective case study to explain the growth paths developed by young, fast growing firms; the turning points in their growth paths; and how the different growth paths could be interpreted. The sample consists of 16 knowledge-based service firms. The authors find that these firms have an uneven growth path—measured using employers indicators—and most of them face turning points in their life. The authors describe the reasons of plateau (employment change less than 5% per year), delayed (employment growth at least 5% per year) and setback (employment decline at least 5% per year) growth and distinguish between internal and external sources of problems. Stam and Garnsey find that although each firm is unique, they must solve common problems that constrain growth and force to focus on some specific resources and competences. These problems generate negative consequences when they are not solved; or they may generate positive ones when they push firms to search new solutions and develop new knowledge. Whereas the quantitative study is unable to capture firms' growth problems, their qualitative analysis identify firms' disequilibrium and the uneven importance of growth mechanisms. Based on these results, the authors conclude that the integration of qualitative and quantitative approach is required to understand better the dynamics of the firms' growth.

Chapter 5 deals with the process of knowledge sharing and knowledge diffusion within a network. The chapter's authors, Nathalie Lazaric and Chaterine Thomas, analyze the difficulties of knowledge codification process in clusters. Codification could be more difficult within clusters with respect to other organizations due to

protection issues. Trust and trustworthiness are therefore crucial for the codification and diffusion of knowledge. The authors distinguish between community of practice and epistemic community. The latter has a substantial authority and a cognitive function that is not limited to the exchange of tacit knowledge within the community, but it includes validation and dissemination of knowledge to the group of practitioners. Lazaric and Thomas analyze the case of Telecom Valley (TV), a non-profit, business-driven association of Sophia Antipolis technological park. TV association launched a project that aimed to create an innovative “Knowledge Management Solution” that legitimized its role as an epistemic community with the aim of spur a codification process of knowledge. The study shows the crucial role played by collective negotiation in the knowledge codification process and the importance of procedural authority for the creation and regulation of knowledge.

Chapter 6 proposes a conceptual framework of the governance forces that determine the economic development in a regional information society. Dunnewijk and Wintjes claim that, even if the information society emerges globally, the inter-related trends that are involved in the information and communication technology (ICT) emerge within a region. The authors propose governance mechanisms that may determine the economic dynamics in regional information society. Planning mechanisms refer to the strategy of the central government and to the decisions of policy makers in term of ICT; the democracy mechanism is related to the well note method of discussion, vote, agreement and arrangement; the market mechanism consists of the market evaluation of ICT; serendipity refers to the capabilities of society, through flows of idea, to find a solution for problems that even policy maker are not aware of. The lack of independences among these forces generates non-trivial dilemmas. The authors apply the conceptual framework to the case of region of Flanders, Belgium. This case shows that the ICT development in Flanders started with planning mechanisms that has been the dominant force, but soon the ICT policy incorporated elements of democracy and market forces. Serendipity was the least influence force in Flanders, but recently, police makers have showed a growing interest on serendipity, with a greater attention to consumer needs. The authors conclude supporting that “a new balance” (p. 178) among all governance forces should be found to address and identifying dilemmas.

In chapter 7, Isabel Salavisa deals with the changing role of state in a knowledge-based economy. Important transformations (e.g. globalization; high level of unemployment; negative demographic trend) affected the role of the welfare state and determined “urgent need of recasting the welfare state and making it more comparable with the new economy” (Salavisa: 191). Under Fordism the economic growth was based on a cumulative causation pattern, where the main economic driver was the exploration of economies of scale in manufacturing sector. Productivity growth and the rise of real wage were comparable with full employment. The new era, which is characterized by the high potential of new information and communication technology, has produced unexpected difficulties of sustaining a new growth regime by the previous one. Fordism must be replaced by a new configuration of welfare state based on knowledge and information technology. The author describes the principal transformations in the role of welfare state in five domains: (1) the instalment of a growth regime made by ICTs and knowledge; (2) the emergence of new types of markets with new rules that need new forms of regulations; (3) the growing density of interactions within economic systems that implies state intervention to regulate networks and network externalities; (4) the new forms

of inequality, defined intra categories inequalities by Fitoussi and Rosanvallon (1996), across profession categories and social strata; (5) the position with respect to less developed countries. The author concludes with the underlying need to adopt a more complex view of the role of state and institutions.

In chapter 8, Wilfred Dolfsma argues that a knowledge-based economy needs a dynamic welfare theory. In order to estimate the dynamics of a knowledge-based economy, a dynamic Schumpeterian welfare theory rather than the static foundation of Paretian welfare theory seems more appropriate. Following Schumpeter's idea, the author argues that the communication among agents is important for the evolution of economy. Communication among agents is related to the costs of storage, decoding and transmission (Dudley, 1999), that in turn determine the communication structures. By including the storage, decoding and transmission costs into a Cobb–Douglas production function, it is possible to measure the effects of these changes in costs of communication with respect to social welfare. The author underlines that knowledge depends on communication and increases in communication costs could hamper innovation. This leads the author to make some considerations on intellectual property rights (IPRs), an important policy domain for the knowledge-based economy. Analyzing IPRs from the prospective of dynamic welfare theory, the author find that “current strengthening of IPRs is debatable” (Dofsma, p: 216) because changes in IPRs increasing the costs of communication could hampering the dynamics of the economy and future social welfare.

The last chapter offers an investigation of the concept of knowledge. The lack of interdisciplinary curiosity on concepts such as knowledge and information and the uncritical use of ideas imported from artificial intelligence and cognitive psychology by evolutionary economics pushed the author to use an interdisciplinary approach to provide a new understanding of information and knowledge. The author, Jorge Bateira, provides a different interpretation of the concept of Polanyi's tacit knowledge as compared to that offered by Nelson and Winter (1982). In Polanyi's idea, tacit knowledge is a dimension of all types of knowledge, but Nelson and Winter (1992) interpretation supposes a dichotomy of two type of knowledge, tacit versus codified. Furthermore, tacit knowledge could be converted into codified knowledge based on the cost involved. Following the interpretation of Nelson and Winter (1992), Cowan et al. (2000) claimed that the two distinct types of knowledge that characterize a skilful performance are the articulated knowledge—in correspondence of focal awareness—and tacit knowledge—in correspondence with subsidiary awareness. This dichotomy does not exist in Polanyi's words. He defined tacit knowledge as the overall process of integration of subsidiary awareness into focal awareness. Based on this, Bateira argues for the adoption of a Naturalistic view of knowledge and summarizes his views on knowledge in the phrase: “human beings are constituted as persons by interacting with the (natural and social) world, which enable them to construct implicit information of the latter, to generate meaning, and to develop knowledge and skills in order to manage their life as member of a society they co-create” (p: 242).

The book could be easily read by those who are familiar with the knowledge economy concept. It represents a good starting point for anyone who wants to better understand the dynamics of a knowledge economy. In particular, the topical way in which the subject is discussed makes this book useful also for police makers or entrepreneurs interested in the subject. It is also appropriate for Masters or Ph.D. students who have a basic background in economics and management.

To conclude, the authors provide a review of different views on the concept of knowledge economy. I appreciate the fact that they offer a complete outline of the knowledge economy in different contexts so that their analysis shows interesting insights that help readers better understand the topic and its importance. The structure of the book is well articulated, even if I would have preferred the last chapter to be placed early on in the book, as it provides an extensive exploration of the concept of knowledge. Due to the fact that each chapter explores a specific issue, it is easy for the reader to select parts of the book in which he/she is more interested. I suggest, however, reading the whole book because it provides interesting and deep analysis of the dynamic of knowledge economy and it is very well written.

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