

# **Evolutionary Economics and Social Complexity Science**

Volume 21

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The Japanese Association for Evolutionary Economics (JAFEE) always has adhered to its original aim of taking an explicit “integrated” approach. This path has been followed steadfastly since the Association’s establishment in 1997 and, as well, since the inauguration of our international journal in 2004. We have deployed an agenda encompassing a contemporary array of subjects including but not limited to: foundations of institutional and evolutionary economics, criticism of mainstream views in the social sciences, knowledge and learning in socio-economic life, development and innovation of technologies, transformation of industrial organizations and economic systems, experimental studies in economics, agent-based modeling of socio-economic systems, evolution of the governance structure of firms and other organizations, comparison of dynamically changing institutions of the world, and policy proposals in the transformational process of economic life. In short, our starting point is an “integrative science” of evolutionary and institutional views. Furthermore, we always endeavor to stay abreast of newly established methods such as agent-based modeling, socio/econo-physics, and network analysis as part of our integrative links.

More fundamentally, “evolution” in social science is interpreted as an essential key word, i.e., an integrative and /or communicative link to understand and re-domain various preceding dichotomies in the sciences: ontological or epistemological, subjective or objective, homogeneous or heterogeneous, natural or artificial, selfish or altruistic, individualistic or collective, rational or irrational, axiomatic or psychological-based, causal nexus or cyclic networked, optimal or adaptive, micro- or macroscopic, deterministic or stochastic, historical or theoretical, mathematical or computational, experimental or empirical, agent-based or socio/econo-physical, institutional or evolutionary, regional or global, and so on. The conventional meanings adhering to various traditional dichotomies may be more or less obsolete, to be replaced with more current ones vis-à-vis contemporary academic trends. Thus we are strongly encouraged to integrate some of the conventional dichotomies.

These attempts are not limited to the field of economic sciences, including management sciences, but also include social science in general. In that way, understanding the social profiles of complex science may then be within our reach. In the meantime, contemporary society appears to be evolving into a newly emerging phase, chiefly characterized by an information and communication technology (ICT) mode of production and a service network system replacing the earlier established factory system with a new one that is suited to actual observations. In the face of these changes we are urgently compelled to explore a set of new properties for a new socio/economic system by implementing new ideas. We thus are keen to look for “integrated principles” common to the above-mentioned dichotomies throughout our serial compilation of publications. We are also encouraged to create a new, broader spectrum for establishing a specific method positively integrated in our own original way.

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# Co-patenting: An Analytic Tool for Cooperative Research and Development



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# Preface

Technological development, or innovation (defined narrowly), is important for sustainable economic growth, and this has been the case throughout human history. In addition, the pace of technological development has grown continuously over time. Therefore, actors such as individuals or organizations must steadily find a better way to create innovation on a constant basis.

Modern society has developed infrastructure, such as transportation systems, the Internet, and novel communication devices. Our society has also adapted to exploiting infrastructure development for innovation. Therefore, where innovations are located and how this has changed over time are important aspects of innovative activities. In addition, the way in which innovations are created has changed to involve multiple actors because combinations of specialties and ideas can create higher-quality innovations more rapidly than can individual actors. Observing and understanding such collaborations can help us to understand the economy and craft policies to encourage innovation.

We need microdata to observe the locations of and collaborations in innovation processes. Although surveys that include a limited number of observations may provide some findings, cost constraints mean that surveys are normally limited to hundreds or thousands of respondents, which are not enough to obtain a macro perspective. Considering that modern society is characterized by broad and ubiquitous relationships and the complex behaviour they generate, such approaches using limited data can only reveal case studies or anecdotes. On the other hand, patent data include massive amounts of information on invention activity, including information on actors' locations and collaborations. In addition, the data are longitudinal, which means that it is possible to study the dynamics of such activity over time.

However, note that there are limitations to using patent data to study the locations and collaborations involved in innovation. First, the data reflect only some innovative activities. Specifically, actors make a strategic decision to patent inventions or to keep them secret. Additionally, if an invention is incomplete, no patent is filed. Moreover, while co-patenting is an indicator of collaborations, not all collaborative research and development efforts ultimately yield co-patenting

because a patent may be published by a solo inventor or applicant if the members of the collaborative effort have previously agreed on this approach.

This book compiles a series of my studies on the geographical location and co-patenting using patent data, which were published in eight academic journal articles. Through this book, my hope is that the reader will develop ideas of how we can utilize patent data to understand the geographical embeddedness of innovative actors and how they collaborate as a social behaviour.

Kobe, Japan  
September 2019

Hiroyasu Inoue

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